7812UDX-AAV Series
3G and HD Up/Down/Cross Converters with Analog Video and Audio I/O and Optional Fiber I/O
User Manual

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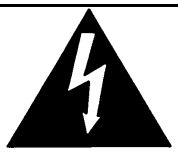
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE

WARNING
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT

WARNING
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE

WARNING
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

EN60065	Safety
EN55103-1: 1996	Emission
EN55103-2: 1996	Immunity

EN504192 2005
Waste electrical products should not be disposed of with household waste.
Contact your Local Authority for recycling advice

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Jul 2016

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1. OVERVIEW

The 7812UDX-AES8-AAV-HD and 7812UDX-AAV-HD are Broadcast Quality Up/Down/Cross Converters that convert between common SD/SMPTE ST 259 and HD/SMPTE ST 292-1 video signals. 3G versions add support for common 3G/SMPTE 424M video signals. These modules also support analog video and audio inputs/outputs. Advanced 3D adaptive comb filtering technology is utilized when decoding composite analog input video signals to eliminate moving artifacts typically introduced during the decoding process. Twelve (12) bit video ADCs are utilized for superior precision and image quality. The card's composite analog video output is only active only when the output video format is set to be standard definition. These modules support frame synchronization and external genlock inputs (card and frame reference) for video timing adjustments.

The 7812UDX series incorporates Mosquito Noise Reduction (MNR) and Block Artifact Reduction (BAR) in addition to motion adaptive spatial-temporal (3D) noise reduction. The 7812UDX series also incorporates new de-interlacing technologies for superior resolution and artifact reduction.

The 7812UDX series supports broadcast quality scaling and offers both standard and user defined ARC modes. AFD (SMPTE 2016) based steering of ARC modes and stamping AFD codes is fully supported. Transitions between AFD modes are frame accurate/glitch free. With the +F option, signals applied to PGM B IN can be keyed into image side panels. FILL inputs are frame synchronized so that pre-timing of FILL inputs is not required. With the +CF2G option, static or animated side panels can be stored locally and keyed into image side-panels. Full broadcast quality color correction and detail enhancement processors are integrated in the 7812UDX series. RGB based color legalization is also supported. ITU Rec. 709 C 601 color space conversions are performed as needed.

The 7812UDX series supports 16 channels of embedded audio with audio delay automatically matching video delay. Additional audio delay is available. Four analog audio inputs and four analog audio outputs are supported with independent audio routing for analog audio outputs. Full audio proc is supported including per channel audio gain, channel swapping and inversion controls. Surround sound to stereo (Lt/Rt or LoRo) down-mixing is supported as a standard feature.

With -AES8 variants, 8 x discrete AES inputs and outputs are supported in addition to advanced audio processes like stereo to 5.1 up-mixing (+UMX), Dolby® E/ACAC- 3 Decoding (+DD), Dolby® E Encoding (+DEE), Dolby® AC-3 Encoding (+AC3E) and IntelliGain Loudness Management (+IG). Any two Dolby® encode or decode functions may be integrated into a single card including dual decoders or dual encoders.

These modules transfer closed caption and time information from input to output performing all HD ↔ SD data translations and time code re-calculations. SFP based fiber inputs and outputs can be supported with the -F variants (SFP modules ordered as separate accessories).

These modules are SNMP and VistaLINK® capable when used with a 7700FC VistaLINK® Frame Controller module in slot 1 of the 7800FR frame. Any Evertz control panel (i.e. CP2232E) or VUE product may also control these modules via SNMP when used in conjunction with a 7700FC.

Features &Benefits

- Broadcast quality up/down/cross conversions between common SD/SMPTE ST 259 and HD/SMPTE ST 292-1 video signals
- Support for common 3G/SMPTE 424M video signals (-3G versions)
- Integrated frame synchronization capabilities
- Support for analog video and analog audio input/outputs
- Support for card reference and 7800FR frame reference
- Advanced noise reduction technologies (3D NR, MNR, BAR)
- New generation de-interlacing technologies
- Supports standard and user defined aspect ratio conversions
- Fully AFD enabled with frame accurate transitions between AFD modes
- Integrated side panel fill keyer (+F)
- Optional compact flash for storage of side-panel content (+CF2G)
- Broadcast quality color corrector and detail enhancement engines
- ITU Rec 709 C601 color space conversions
- “Soft Knee” color legalization (+ICL)
- 16 channel embedded audio support
- Audio delay automatically tracks video delay
- Full audio proc and channel swapping
- 5.1 surround sound to stereo (Lt/Rt and Lo/Ro) down-mixing
- Support for 4 x analog audio inputs and 4x analog audio outputs
- Supports 8 x external AES inputs and 8 x AES outputs (-AES8 only)
- Optional stereo to 5.1 surround sound up-mixer (+UMX on -AES8 only)
- Optional Dolby® E/AC-AC-3 decoder (+DD on -AES8 only)
- Optional Dolby® E encoder (+DEE on -AES8 only)
- Optional Dolby® AC-3 encoder (+AC3E on -AES8 only)
- Optional IntelliGain Loudness Management (+IG on -AES8 only)
- Transfer closed caption and time information from input to output performing all HD ↔ SD data translations and time code re-calculations.
- Dual fiber in and dual fiber out using SFP modules (-F versions)
- SFP modules ordered as separate accessories
- SNMP and VistaLINK® capable when used with a 7700FC VistaLINK® Frame Controller module in slot 1 of the 7800FR frame

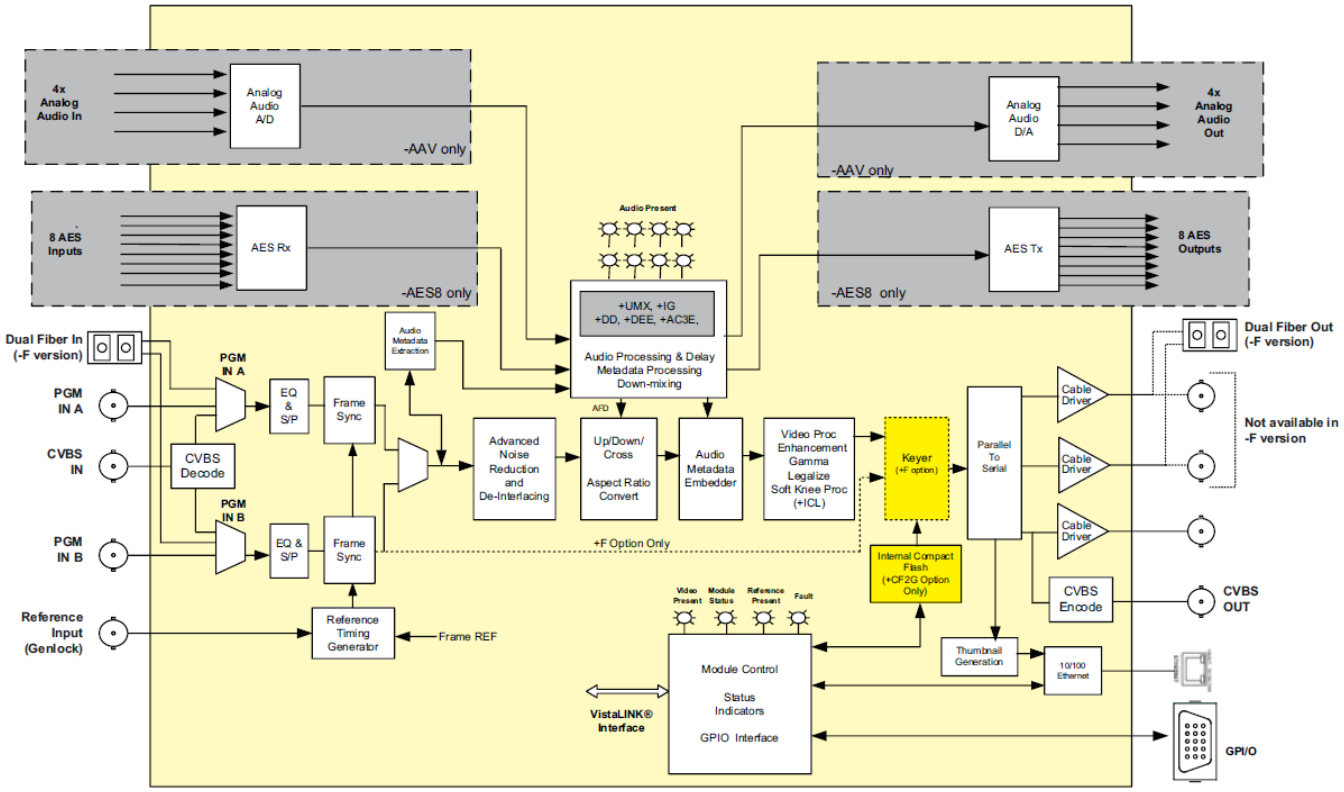

Figure 1-1: 7812UDX-AAV Block Diagram

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2. GETTING STARTED

All 7812UDX series modules come with a companion rear plate and occupy two slots in the 7800FR frame or three slots in the 7700FR-C. If a 7812UDX series module is installed in a 7700FR-C without the "slot blocker" installed, the card will not power-up and will show RED on its main status LED. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR manual. Refer to section 5.3 of this manual for more information on the 7812UDX series slot blocker. Refer to Figure 2-1 and Figure 2-2 for 7812UDX series rear plate layouts.

Note: For proper operation in the 7700FR-C, the on-board "slot blocker" *must be* installed in order for the card to power-up.

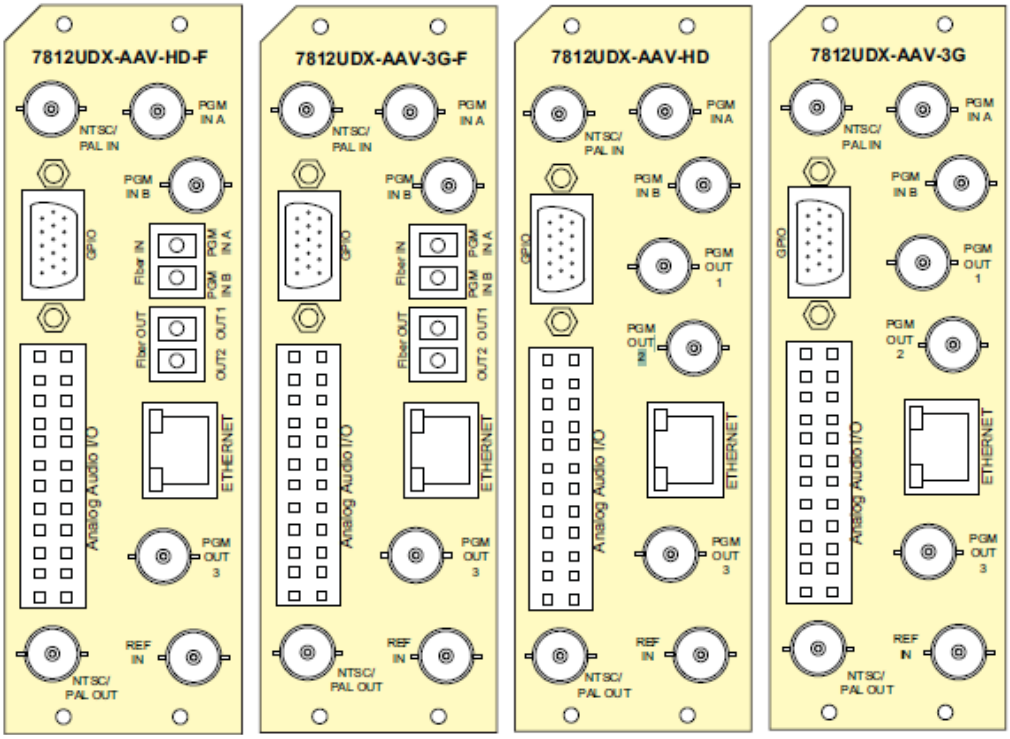


Figure 2-1: 7812UDX-AAV-xx Rear Plates

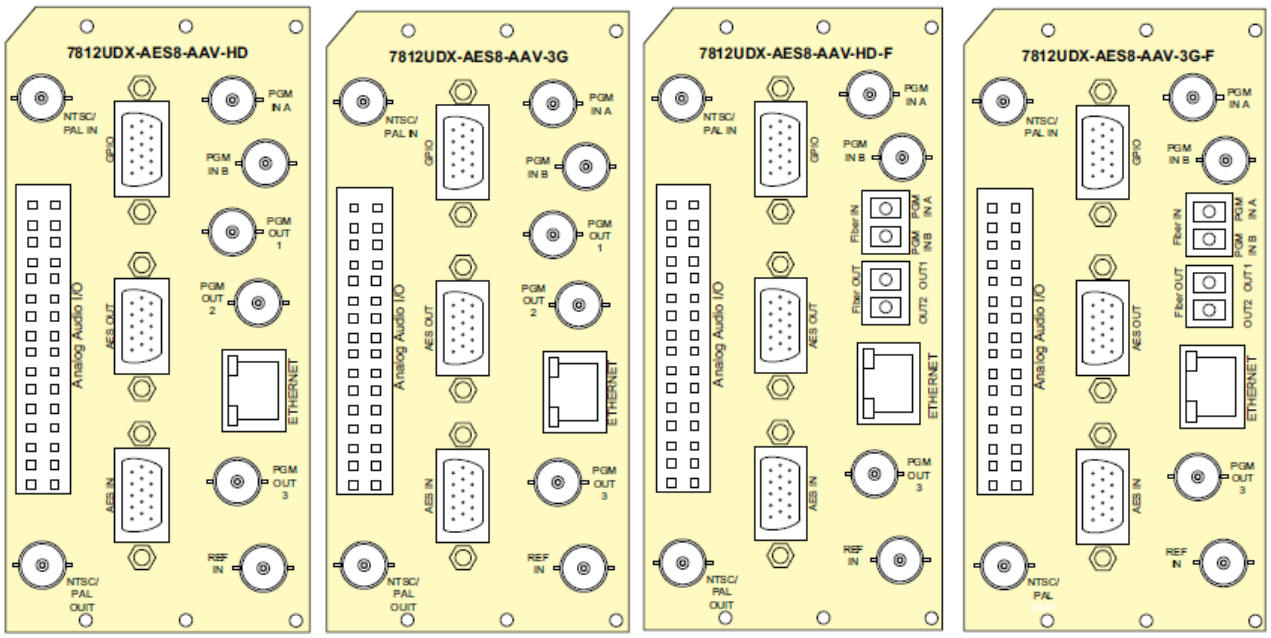


Figure 2-2: 7812UDX-AES8-AAV-xx Rear Plates

2.1. INPUT/OUTPUT CONNECTIONS

PGM IN A: Accepts a 10-bit serial digital video signal. –HD versions have inputs compatible with both SMPTE 259M and SMPTE 292M standards. –3G versions have inputs compatible with SMPTE 259M, SMPTE 292M, SMPTE 372M and SMPTE 425M*. The module can be set to receive a specific video standard or set to automatically detect supplied input video standard. PGM A or PGM B can be selected for subsequent video processing.

* References to 3G, SMPTE 424M/SMPTE 425 and single link 1080p59.94/50 refer 10 bit 4:2:2 1080p59.94/50 signals (Level A or B in SMPTE 425M)
References to dual link 1080p59.94/50 refer to SMPTE 372M mapping for 1080p59.94/50 4:2:2 10 bit data format only.

PGM IN B: Accepts a 10-bit serial digital video signal. –HD versions have inputs compatible with both SMPTE 259M and SMPTE 292M standards. –3G versions have inputs compatible with SMPTE 259M, SMPTE 292M, SMPTE 372M and SMPTE 425M*. The module can be set to receive a specific video standard or set to automatically detect supplied input video standard. PGM A or PGM B can be selected for subsequent video processing.

* References to 3G, SMPTE 424M/SMPTE 425 and single link 1080p59.94/50 refer 10 bit 4:2:2 1080p59.94/50 signals (Level A or B in SMPTE 425M)
References to dual link 1080p59.94/50 refer to SMPTE 372M mapping for 1080p59.94/50 4:2:2 10 bit data format only.

PGM OUT1A-1B: These BNC connectors are used to output video as serial component video for Output Path 1. –HD versions have outputs compatible with SMPTE 292M or SMPTE 259M standard. –3G versions have outputs compatible with SMPTE 292M or SMPTE 259M or SMPTE 372M or SMPTE 425M*.

* When set it to output SMPTE72M dual link 1920x1080p50/59.94 video, PGM OUT1 and PGM OUT2 provide LINK A and PGM OUT3 provides LINK B.

PGM OUT2A-2B: These BNC connectors are used to output video as serial component video for Output Path 2. –HD versions have outputs compatible with SMPTE 292M or SMPTE 259M standard. –3G versions have outputs compatible with SMPTE 292M or SMPTE 259M or SMPTE 372M or SMPTE 425M*.

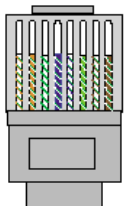
* When set it to output SMPTE72M dual link 1920x1080p50/59.94 video, PGM OUT1 and PGM OUT2 provide LINK A and PGM OUT3 provides LINK B.

2.2. ETHERNET CONNECTIONS

Static or side panel content can be uploaded to the card's internal compact flash using this port. All 7812UDX-AAV series modules are designed to use either 10Base-T (10 Mbps) or 100Base-TX (100 Mbps) also known as *Fast Ethernet*, twisted pair Ethernet cabling systems. When connecting for 10Base-T systems, category 3, 4, or 5 UTP cable as well as EIA/TIA – 568-100Ω STP cable may be used. When connecting for 100Base-TX systems, category 5 UTP cable is required. Make the network connection by plugging one end of a "straight through" cable into the RJ-45 receptacle of the 7812 modules and the other end into a port of the supporting hub. If you are connecting the 7812UDX-AAV series module directly to an Ethernet port on a computer you will have to use a "crossover" cable.

Straight-through RJ-45 cables can be purchased or can be constructed using the pinout information in Table 2-2. A colour code wiring table is provided in Table 2-1 for the current RJ-45 standards (AT&T 258A or EIA/TIA 258B colour coding shown). Also, refer to the notes following the table for additional wiring guide information.

Pin 1



Pin #	Signal	EIA/TIA 568A	AT&T 258A or EIA/TIA 568B	10BaseT or 100BaseT
1	Transmit +	White/Green	White/Orange	X
2	Transmit –	Green/White or White	Orange/White or Orange	X
3	Receive +	White/Orange	White/Green	X
4	N/A	Blue/White or Blue	Blue/White or Blue	Not used (required)
5	N/A	White/Blue	White/Blue	Not used (required)
6	Receive –	Orange/White or Orange	Green/White or Green	X
7	N/A	White/Brown	White/Brown	Not used (required)
8	N/A	Brown/White or Brown	Brown/White or Brown	Not used (required)

Table 2-1: Colour Code Wiring for the Current RJ 45 Standards

Note the following cabling information for this wiring guide:

- Only two pairs of wires are used in the 8-pin RJ 45 connector to carry Ethernet signals.
- Even though pins 4, 5, 7 and 8 are not used, it is mandatory that they be present in the cable.
- 10BaseT and 100BaseT use the same pins; a crossover cable made for one will work with the other.
- Pairs may be solid colours and not have a stripe.
- Category 5 cables must use Category 5 rated connectors.

The maximum cable run between the 7812UDX-AAV series modules and the supporting hub is 300 ft (90 m).

Note that the two LEDs on the Ethernet connector are not used and will not light up when connected to an Ethernet network. Ethernet functionality is not impacted by the lack of these LEDs lighting up.

2.3. GPIO CONNECTOR

There are 4 General Purpose Inputs/Outputs (GPIOs) on the 7812UDX-AAV series modules. Each GPIO can be configured to be an input or can be configured to be an output. These GPIOs are interfaced using a 15-pin DB connector and an associated breakout cable (cable part # WPAES8-BNCM-9W-6F). NOTE: The GPIO breakout cable is not included with the module when purchased. The Pin-out of this connector is as follows:

GPIO DB CONNECTOR			
DB-15 Pin	**Name**	**Description**	**Colour**
1	GPIO1	General Purpose Input /Output #1	Red
2	LTC out	External LTC out	Green
3	GPIO2	General Purpose Input /Output #2	Blue
4	GPIO4	General Purpose Input /Output #4	Purple
5	LTC IN2/6 Hz	External LTC IN 2 / 6 Hz	Orange
6	LTC IN1	External LTC IN 1	White
7	GND	General Purpose Input /Output #6	A2 BNC PIN
8	GPIO3	General Purpose Input /Output #3	Yellow
9	GND	Ground	- -
10	GND	Ground	- -
11	GPIO5	General Purpose Input /Output #5	A1 BNC PIN
12	GND	Ground	- -
13	GND	Ground	- -
14	GND	General Purpose Input /Output #8	A4 BNC PIN
15	GND	General Purpose Input /Output #7	A3 BNC PIN
Shell	GND	Ground	- -

Table 2-2: GPIO Connector Pinout

When a particular GPIO is configured to be a GPI, the following interface shall apply:

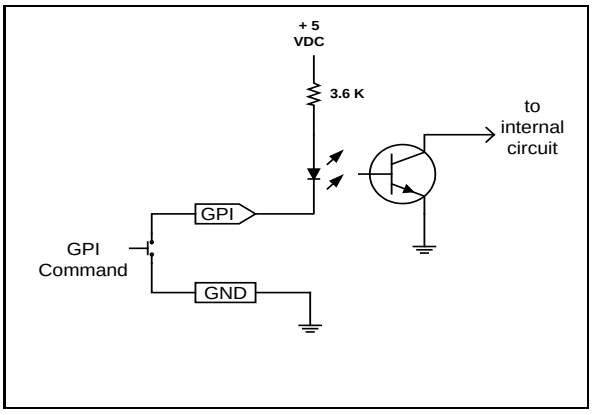


Figure 2-3: GPI Input Circuitry

When a particular GPIO is configured to be a GPO, the interface shown below shall apply. The GPO is active low with internal pull up (10k Ohm) resistors to +5V. When the output goes low, it is able to sink up to 10mA. When high, the signal will go high (+5V). **Do not draw more than 100µA from the output.** Figure 2-4 shows the circuit for the general-purpose output.

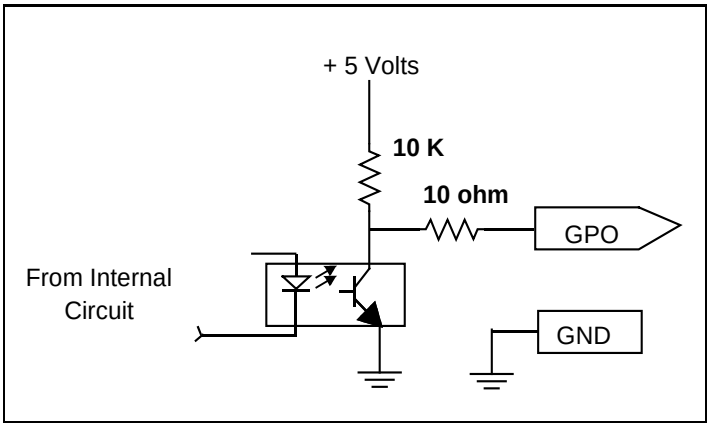
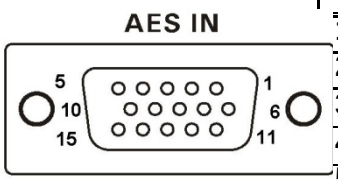


Figure 2-4: GPO Output Circuitry

2.4. AES INPUTS

The –AES8 versions of the 7812UDX-AAV series modules support 8x AES inputs and are interfaced using a DB15 connector and a breakout cable. The part number for the cable is # WPAES8-BNCM-9W-6F. Two cables (one for AES input and one for AES output) are included when the –AES8 option is ordered. The pin-out of the DB15 connector is shown in Table 2-3. The pin-out of the breakout cable is shown in Table 2-4.



Female

PIN #	Name	Description
1	Not used	Reserved for future use
2	RX - Primary	Primary Dolby Metadata RX -
3	Not used	Reserved for future use
4	RX- Secondary	Secondary Dolby Metadata RX-
5	Not used	Reserved for future use
6	RX+ Primary	Primary Dolby Metadata RX+
7	AES In 2	AES Input 2 – Unbalanced
8	RX + Secondary	Secondary Dolby Metadata RX+
9	AES In 6	AES Input 6 – Unbalanced
10	AES In 5	AES Input 5 – Unbalanced
11	AES In 1	AES Input 1 – Unbalanced
12	AES In 8	AES Input 8 – Unbalanced
13	AES In 7	AES Input 7 – Unbalanced
14	AES In 4	AES Input 4 – Unbalanced
15	AES In 3	AES Input 3 – Unbalanced
Shell	GND	Ground

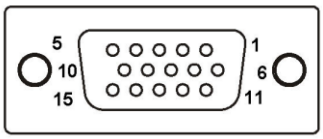
Table 2-3: AES Input Audio Connector Pinout

High Density DB-15 PIN (male)	Breakout Cable Connector	Ground/ Shield Connection	Labelled Name	HD2020 Connector Pin Map
1	Red Wire	None	W1 RED	Pin 1 – Not used
2	Green Wire	None	W2 GREEN	Pin 2 – Not used
3	Blue Wire	None	W3 BLUE	Pin 3 – Not used
4	Purple Wire	None	W6 PUR	Pin 4 – Not used
5	Orange Wire	None	W7 ORG	Pin 5 – Not used
6	White Wire	None	W4 WHITE	Pin 6 – Not used
7	Coax BNC Male	Soldered to Shell	AES A2	Pin 7 – AES In 2
8	Yellow	None	W5 YELLOW	Pin 8 – Not used
9	Coax BNC Male	Soldered to Shell	AES B2	Pin 9 – AES In 6
10	Coax BNC Male	Soldered to Shell	AES B1	Pin 10– AES In 5
11	Coax BNC Male	Soldered to Shell	AES A1	Pin 11– AES In 1
12	Coax BNC Male	Soldered to Shell	AES B4	Pin 12– AES In 8
13	Coax BNC Male	Soldered to Shell	AES B3	Pin 13– AES In 7
14	Coax BNC Male	Soldered to Shell	AES A4	Pin 14– AES In 4
15	Coax BNC Male	Soldered to Shell	AES A3	Pin 15– AES In 3
Shell	Brown Wire	Soldered to Shell	GND BR	GND
Shell	Black Wire	Soldered to Shell	GND BK	GND

Table 2-4: AES Audio Input Breakout Cable (Evertz Part # WPAES8-BNCM-9W-6F)

2.5. AES OUTPUTS

The –AES8 versions of the 7812UDX-AAV series modules support 8x AES outputs and are interfaced using a DB15 connector and a breakout cable. The part number for the cable is # WPAES8-BNCM-9W-6F. Two cables (one for AES input and one for AES output) are included when the –AES8 option is ordered. The pin-out of DB15 connector is shown in Table 2-5. The pin-out of the breakout cable is shown in Table 2-6.



PIN #	Name	Description
1	Not used	Reserved for future use
2	TX - Primary	Primary Dolby Metadata TX -
3	Not used	Reserved for future use
4	TX- Secondary	Secondary Dolby Metadata TX-
5	Not used	Reserved for future use
6	TX+ Primary	Primary Dolby Metadata TX+
7	AES Out 2	AES Output 2 – Unbalanced
8	TX+ Secondary	Secondary Dolby Metadata TX+
9	AES Out 6	AES Output 6 – Unbalanced
10	AES Out 5	AES Output 5 – Unbalanced
11	AES Out 1	AES Output 1 – Unbalanced
12	AES Out 8	AES Output 8 – Unbalanced
13	AES Out 7	AES Output 7 – Unbalanced
14	AES Out 4	AES Output 4 – Unbalanced
15	AES Out 3	AES Output 3 – Unbalanced
Shell	GND	Ground

Table 2-5: AES Output Audio Connector Pinout

High Density DB-15 PIN (male)	Breakout Cable Connector	Ground/ Shield Connection	Labelled Name	HD2020 Connector Pin Map
1	Red Wire	None	W1 RED	Pin 1 – Not used
2	Green Wire	None	W2 GREEN	Pin 2 – Not used
3	Blue Wire	None	W3 BLUE	Pin 3 – Not used
4	Purple Wire	None	W6 PUR	Pin 4 – Not used
5	Orange Wire	None	W7 ORG	Pin 5 – Not used
6	White Wire	None	W4 WHITE	Pin 6 – Not used
7	Coax BNC Male	Soldered to Shell	AES A2	Pin 7 – AES In 2
8	Yellow	None	W5 YELLOW	Pin 8 – Not used
9	Coax BNC Male	Soldered to Shell	AES B2	Pin 9 – AES In 6
10	Coax BNC Male	Soldered to Shell	AES B1	Pin 10– AES In 5
11	Coax BNC Male	Soldered to Shell	AES A1	Pin 11– AES In 1
12	Coax BNC Male	Soldered to Shell	AES B4	Pin 12– AES In 8
13	Coax BNC Male	Soldered to Shell	AES B3	Pin 13– AES In 7
14	Coax BNC Male	Soldered to Shell	AES A4	Pin 14– AES In 4
15	Coax BNC Male	Soldered to Shell	AES A3	Pin 15– AES In 3
Shell	Brown Wire	Soldered to Shell	GND BR	GND
Shell	Black Wire	Soldered to Shell	GND BK	GND

Table 2-6: AES Audio Output Breakout Cable (Evertz Part # WPAES8-BNCM-9W-6F)

3. SPECIFICATION

3.1. SERIAL DIGITAL VIDEO INPUT

Standard:	270 Mb/sec SMPTE 259M 1.485 Gb/sec SMPTE 292M (1080i/720 @ 59.94 or 50 Hz) 2.970 Gb/sec SMPTE 425M* (-3G versions only)
Number of Inputs:	2 (PGM A and PGM B)
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	1V nominal
Input Equalization:	Automatic to 300m @ 270 Mbs with Belden 8281 or equivalent Automatic to 100m @ 1.485 Gbs with Belden 8281 or equivalent Automatic to 80m @ 2.970 Gbs with Belden 8281 or equivalent (-3G version only)
Return Loss:	> 15 dB to 1.5 GHz > 10 dB to 3.0 GHz

3.2. SERIAL DIGITAL VIDEO OUTPUT

Standard:	270 Mb/sec SMPTE 259M 1.485 Gb/sec SMPTE 292M (1080i/720 59.94 or 50 Hz) 2.970 Gb/sec SMPTE 425M* (-3G versions only)
Number of Outputs:	4
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	800 mV nominal
SD Rise/Fall Times:	740 ps nominal
HD Rise/Fall Times:	200 ps nominal
Return Loss:	> 15 dB to 1.5 GHz > 10 dB to 3.0 GHz

References to 3G, SMPTE 424M/SMPTE 425 and single link 1080p59.94/50 refer 10 bit 4:2:2 1080p59.94/50 signals (Level A or B in SMPTE 425M) References to dual link 1080p59.94/50 refer to SMPTE 372M mapping for 1080p59.94/50 4:2:2 10 bit data format only. When set to output 372M dual link, PGM OUT1/2 are assigned for LINK A and PGM OUT3 is assigned to LINK B output. Initial release will not support +CF option for 1080p59.94/50 output signals

3.3. ANALOG VIDEO INPUT

Standard:	NTSC, SMPTE 170M PAL, ITU624-4 PAL-M, PAL-B
Number of Inputs:	1
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	1V nominal
Frequency Lock Range:	±50ppm from nominal
Input level control range:	>±4dB
Black level control range:	>±5 IRE
Chroma level control range:	>±20%
Hue control range:	±180 deg
Input Impedance:	75 Ohm or High impedance (jumper selectable)
Return Loss:	>35dB to 5MHz
Lock up time on a hot switch:	between 15 and 45 frames (may be longer with noisy signals)

3.4. ANALOG BROADCAST VIDEO OUTPUT

Standard:	NTSC, SMPTE 170M PAL, ITU624-4 PAL-M, PAL B
Number of Outputs:	1
Connector:	BNC per IEC 169-8
Signal Level:	1V nominal
Output Impedance:	75 Ohm
DC Offset:	0V +/- 50mV
Return Loss:	>45dB to 10MHz
Frequency Response:	<+/- 0.1dB to 4 MHz (response will depend on selected filtering)
Differential Phase:	< 0.5° (< 0.3° typical)
Differential Gain:	< 0.5% (< 0.3% typical)
SNR:	>75dB (black video, 100kHz to 5MHz)
Output Level Control Range:	±10%
Black Level Control Range:	±7.5 IRE
Chroma Level Control Range:	±10%
Hue Control Range:	±15 deg. (NTSC only)
Minimum Delay:	3 µs
Maximum Delay:	1 frame + 3 µs (+S option only)

3.5. GENERAL PURPOSE INPUTS AND OUTPUTS

Number:	4 (configurable as inputs or outputs)
Type:	Opto-isolated, active low with internal pull-ups to +5 V
Connector:	DB 15
Signal Level:	Closure to ground
Input Function:	User preset select or side pane fill on/off
Output Function:	Panel on/off tally

3.6. AES INPUTS

Number:	8x AES inputs
Standard	SMPTE 276M, synchronous or asynchronous
Connector:	DB 15
Input Type:	Unbalanced
Impedance:	75 Ω
Signal Level	1 V p-p
Sampling Rate	48 KHz

3.7. AES OUTPUTS

Number:	8x AES outputs
Standard	SMPTE 276M, synchronous
Connector:	DB 15
Input Type:	Unbalanced
Impedance:	75 Ω
Signal Level	1 V p-p
Sampling Rate	48 KHz.

3.8. ANALOG AUDIO INPUT

Number of Inputs:	4
Type:	Balanced analog audio
Connector:	Removable terminal strip
Input Impedance:	20kOhm minimum (differential)
Sampling Frequency:	48kHz
Signal Level:	0dB FS => 18 or 24dBu (user selectable)
Level Control Range:	+/- 10dB
Frequency Response:	+/- 0.1dB (20Hz to 20kHz) (broadcast quality)
SNR:	100dB with input at -0.5dBFS
THD+N:	<0.001% (>100dB) @ 1kHz, -0.5 dB FS (rev 2) <0.001% (>100dB) @ 20Hz to 20kHz, -0.5 dB FS (input video locked to genlock video)
CMRR	>90dB @ 1kHz

3.9. ANALOG AUDIO OUTPUTS

Number of Outputs:	4
Type:	Balanced analog audio
Connector:	Two 6 pin removable terminal strips
Output Impedance:	66Ω balanced
Sampling Frequency:	48kHz
Signal Level:	0dBFS => 12 to 25dBu (user settable)
Frequency Response:	<+/- 0.05dB (20Hz to 20kHz)
Dynamic Range:	24 bits when AES inputs selected, 20 bits when embedded audio selected
THD+N:	<0.001% (>100dB) @ 1kHz, -1dBFS
Crosstalk:	<-105dB (20Hz to 20kHz)
DC Offset:	<+/- 30mV
SNR:	>110dB "A" Weighting
Inter-Channel Phase Error:	<+/-1° (20Hz to 20kHz)

3.10. ELECTRICAL

Voltage:	+12VDC
Power:	26.5 Watts
EMI/RFI:	Complies with FCC regulations for class A devices Complies with EU EMC directive

3.11. PHYSICAL

Number of slots

7800FR Frame:	2
7700FR-C Frame:	3 (slot blocker must be installed for proper operation)

4. VISTALINK® PRO INTERFACE

4.1. VIDEO

The ***Video*** control tab is mainly used to configure the frame rate and source of video, the input and output video standards, the source of video reference and frame sync output timing. In addition, 3G Dual link Channel swapping, Fill output path and loss of video mode controls can be found here.

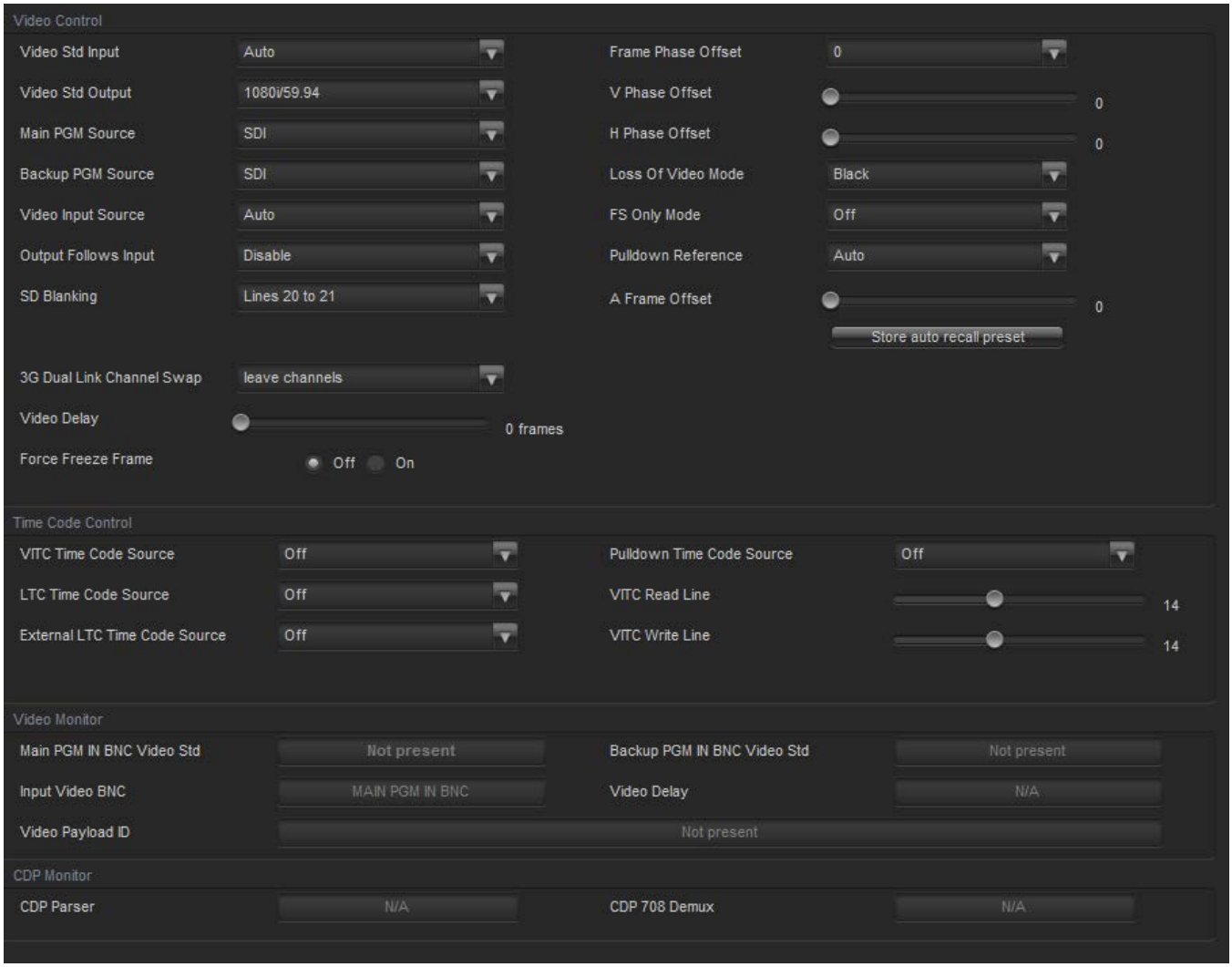


Figure 4-1: Video Tab

Video Control

Video Std Input: This control is used to select the input video standard being used. Interlaced video formats are shown with the number of fields per second. Progressive formats are shown with the number of frames per second. The module is not capable of converting between 59.94/60 Hz and 50 Hz related frame rates.

Video Std Output: The ***Output Video Standard*** control selects the output standard desired. Note that only conversions within the same frame rate family are supported. The module is not capable of converting between 59.94/60 Hz and 50 Hz related frame rates (i.e. standards conversion is not possible).

Main PGM Source: The ***Main PGM Source*** control selects whether the Main PGM source will be on the PGM IN A BNC or from the PGM IN A SFP (fiber) module. In this control, select *Electrical* to process video supplied on PGM IN A BNC through the main up/down/cross conversion paths. Select *Optical* to process video supplied on PGM IN A SFP input through the main up/down/cross conversion paths.

Backup PGM Source: The ***Backup PGM Source*** control selects whether the Backup PGM source will be on the PGM IN B BNC or from the PGM IN B SFP (fiber) module. In this control, select *Electrical* to process video supplied on PGM IN B BNC through the main up/down/cross conversion paths. Select *Optical* to process video supplied on PGM IN B SFP input through the main up/down/cross conversion paths.

Video Input Source: This control is used to select which of the program inputs are to be used for video processing. The 7812UDX-AAV has two program inputs PGMA and PGMB. This control allows the user to select either of these inputs for audio/video processing. In this control, select PGM IN A BNC to process video supplied on PGM IN A through the up/down/cross conversion paths. Select PGM IN B BNC to process video supplied on PGM IN B through the up/down/cross conversion paths. Select Auto to enable the card to automatically fail-over to the alterative input BNC should video on the BNC in active use become invalid for any reason. When the +3D option is ordered you will also have selections on which of the inputs are receiving the left and right eye information in dual link.

Output Follows Input: This control allows the user to enable the output video standard to be forced to the input video standard.

SD Blanking: With this control, you can adjust which standard definition lines will be blanked prior to processing SD input signals. It is customary to blank line 21 where closed caption information may be present. Note that the caption translation process will still occur as expected even when line 21 is blanked. This control simply prevents caption waveforms from being processed as video.

Frame Phase Offset: This control allows the user to set the frame timing of the output video with respect to the reference input.

V Phase Offset: With this control, you can set the vertical timing of the output video with respect to the reference input set by the ***Reference Select*** control. There are separate settings of ***V Phase Offset*** for each output video type. Setting this control to 0 keeps the output video frame aligned with the reference.

Increasing the value will delay the output video in one-line increments of the output video standard. In order to advance the vertical timing of the output video with respect to the reference, set the control to the maximum total number of lines of the output video minus the number of lines that you wish to advance the output video. (I.e. for 1080i/59.94 output video, the total number of lines is 1125, so to advance the output video 5 lines set the value to 1120.) When increasing the *V Phase Offset* value causes it to go beyond the limit of the frame buffer, the ***V Phase Offset*** will wrap to the beginning of the frame buffer, resulting in a change of one frame of throughput delay between the SD input and the video output.

Note: The slider is available for selecting *H* and *V Phase Offsets*. To increment by click on the right hand side of the slider. To decrement click on the left hand side of the slider. The slider can also be selected and dragged across the available range if gross movement is desired.

H Phase Offset: With this control, you can set the horizontal timing of the output video with respect to the reference input set by the ***Reference Select*** control. There are separate settings of ***H Phase Offset*** for each output video type. Setting this control to 0 keeps the output video line aligned with the reference.

Increasing the value will delay the output video in one-sample increments. In order to advance the horizontal timing of the output video with respect to the genlock video, set the control to the maximum number of samples per line for the output video standard minus the number of samples that you wish to advance the output video. (I.e. for 1080i/59.94 input video the total number of samples per line is 2200, so to advance the output video 5 samples set the value to 2195.)

Loss of Video Mode: This control defines the action that will be taken when the input video is lost. You can choose to freeze the output video on the last good frame of input video, force the output video to black or force the output video to blue.

FS Only Mode: This control allows the user to enable the FS bypass.

Pulldown Reference: This control allows the user to select how to generate the pulldown reference when doing a 60-to-24 or 24-to-60 conversion.

A Frame Offset: This control allows the user to set the offset (number of fields) from the reference when determining the location of A frame field 1. If inFrameRate = 24 and inFormat = 'p', the range is 0 to 3. If the card returns a value outside of this range, it should be displayed as (x%4). For example, a value of 6 should be displayed as 2, and a value of 8 should be displayed as 0.
2) If inFrameRate = 24 and (inFormat is not a valid control or inFormat is not 'p'), all odd values are invalid, and the range is 0 to 7. In this case, values should be displayed as ((x/2)%4). For example, a value of 6 should be displayed as 3, and a value of 8 should be displayed as 0. If the card returns an odd value, it should be displayed as ((x/2)%4) using integer math. For example, a value of 7 should be displayed as 3, and a value of 9 should be displayed as 0.

3G Dual Link Channel Swap: This control is used when operating with dual link 1920x1080p input signals per SMPTE 372M. When *Leave Channels* is selected, LINK A should be applied to PGM IN A and LINK B should be applied to PGM IN B. When *Swap Channels* is selected, LINK A should be applied to PGM IN B and LINK B should be applied to PGM IN A. The module will internally swap the inputs so that proper processing can occur internally. When set to *Auto,* the module will automatically determine if LINK A is supplied to PGM IN A or PGM IN B based on embedded video payload ID information.

Leave Channels	When the *Leave Channels* option is selected, LINK A should be applied to PGM IN A and LINK B should be applied to PGM IN B.
Swap Channels	When the *Swap Channels* option is selected, LINK A should be applied to PGM IN B and LINK B should be applied to PGM IN A. The module will internally swap the inputs so that proper processing can occur internally.
Auto	When set to *Auto*, the module will automatically determine if LINK A is supplied to PGM IN A or PGM IN B based on embedded video payload ID information.

Video Delay: This slider control is used to add additional user delay to the video. Up to an additional 17 frames of delay can be added.

Force Freeze Frame: This control enables or disables ***Force Freeze Frame***. It is a manual user control to freeze the output of the card. When set to off, the module will run as expected. When enabled, the output picture will freeze with the last frame of video.

Time Code Control

VITC Time Code Source: This control allows the user to select the source of the time code for the VITC time code output.

LTC Time Code Source: This control allows the user to select the source of the time code for the LTC time code output.

External LTC Time Code Source: This control allows the user to select the source of the time code for the external LTC time code output.

Pulldown Time Code Source: This control allows the user to select the source of the time code for the 3:2 pulldown reference.

VITC Read Line: This control allows the user to select the line number where the VITC will be read on the SD input video.

VITC Write Line: This control allows the user to select the line number where the VITC will be written to on the SD input video.

Video Monitor

Main PGM IN BNC Video Std: The ***Main PGM IN BNC Video Std*** reports if a valid video signal is presented to PGM IN A and what standard has been detected when it is present.

Backup PGM IN BNC Video Std: The ***Backup PGM IN BNC Video Std*** reports if a valid video signal is presented to PGM IN B and what standard has been detected when it is present.

Input Video BNC: The ***Input Video BNC*** reports what input BNC has been selected to pass through the main up/down/cross conversion path

Video Delay: This field will return the amount of delay between the input video and the output video, displayed in milliseconds (ms).

Video Payload ID: The ***Video Payload ID*** reports if a valid Video Payload ID ANC packet has been detected and will display the decoded video format information.

CDP Monitor

CDP Parser: ***The CDP Parser*** parameter displays the status of Closed Caption reading.

CDP 708 Demux: The ***CDP 708 Demux*** parameter displays the status of 708 Closed Caption reading

4.2. CARD REFERENCE

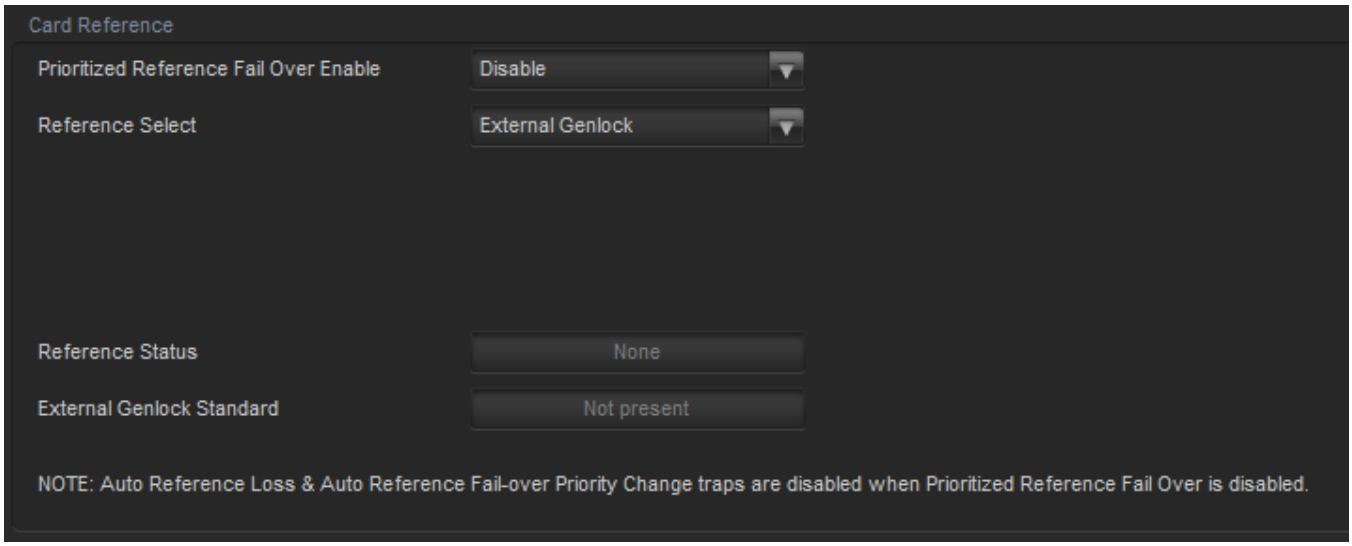


Figure 4-2: Card Reference Tab

Card Reference

Prioritized Reference Fail Over Enable: This control allows the user to enable Prioritized Reference Fail Over.

Reference Select: This control allows the user to select the video locking reference when the prioritized reference fail over mode is disabled.

Reference Status: This field returns the state of the card reference.

External Genlock Standard: This field returns the standard of the video detected on the selected external genlock input.

4.3. AUDIO

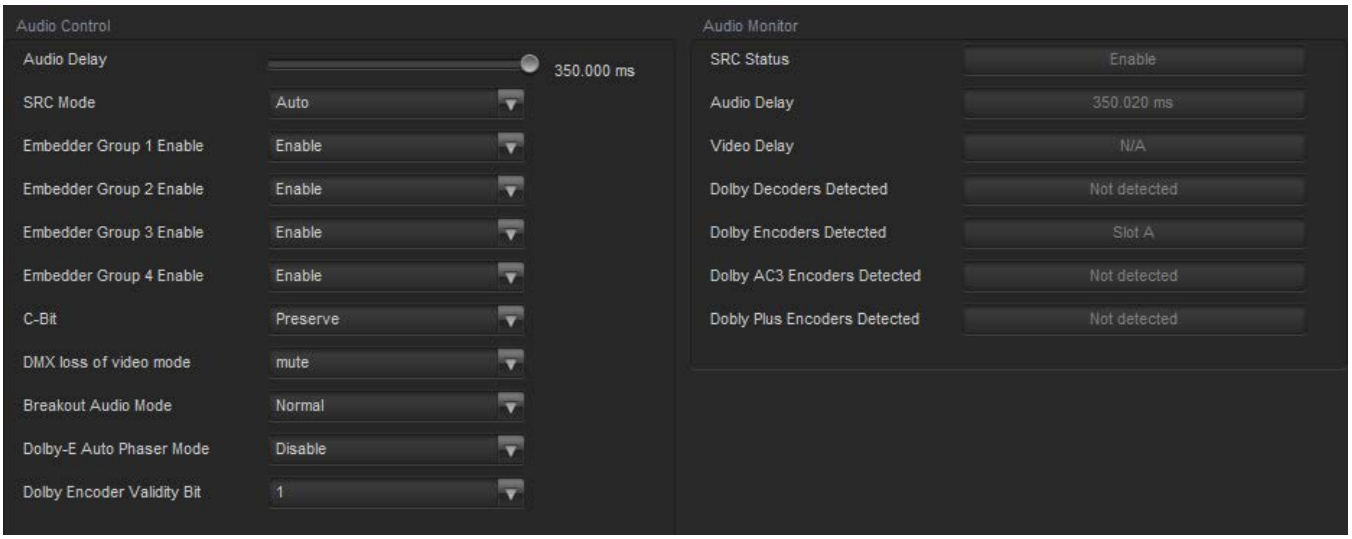


Figure 4-3: Audio Tab

Audio Control

Audio Delay: This control adjusts the audio delay +/- 300.00 ms. This delay is relative to the delay that the module automatically inserts to match audio path and video path delays.

Note: Negative values are limited to the amount of video delay; the card does not have negative delay ability. Additional Video delay can be added in the Video Tab in order to achieve a greater negative audio delay. See Section 4.1Error! Reference source not found. for details on how to add additional Video delay.

SRC Mode: This control allows the user to adjust the mode for the sample rate converters.

Enable	Enables the sample rate converters for PCM audio.
Bypass	Bypasses the sample rate converters. This setting should be used for non-PCM audio.
Auto	The module will automatically detect PCM and non-PCM audio and automatically turn on/off the SRCs as required. Note that all SRCs are set to bypass as soon as a source of non-PCM audio is detected within any of the 16 internally processed audio channels.

Embedder Group <1-4>: These controls allow the user to enable the audio embedder of the associated group on the output video.

C-bit: This control allows the user to specify what should be done with the C-bit on the audio output.

DMX Loss of Video Mode: This control enables the user to set the action that the 7812UDX-AAV series module will take when there is a loss of input video. If the video is lost, you may choose to mute the output audio or choose to pass AES input audio.

Breakout Audio Mode: This control allows the user to specify how the embedded audio is sent to AES Out. *Breakout Mode* will send the embedded audio to AES-Out with minimal delay and zero processing. *Normal Mode* will send the embedded audio to AES-Out with processing and delay that matches the video delay.

Dolby-E Auto Phaser Mode: This control allows the user to set the Dolby-E Auto Frame Phaser Alignment.

Dolby Encoder Validity Bit: This control allows the user to set the validity bit value of AES3 standard audio packets generated by on-board Dolby Encoders.

Audio Monitor

SRC Status: The ***SRC Status*** parameter displays the status of the Sample Rate Converters. The SRC status will display either *Enable* or *Bypass*

Audio Delay: The ***Audio Delay*** parameter displays the delay of the audio in *ms*.

Video Delay: This field will display that amount of delay between the input video and the output video in *ms*.

Dolby Decoders Detected: This field will display the presence of a Dolby Decoder if it is detected by the module.

Dolby Encoders Detected: This field will display the presence of a Dolby Encoder if it is detected by the module.

Dolby AC3 Encoders Detected: This field will display the presence of a Dolby AC3 Encoder if it is detected by the module.

Dolby Plus Encoders Detected: This field will display the presence of a Dolby Plus Encoder if it is detected by the module.

4.4. AUDIO INPUT

All 7812UDX-AAV series modules incorporate a similar audio architecture as shown in Figure 4-4. Internally, 16 channels of audio are processed within the module. These 16 channels of audio are selected (on a pair-by-pair basis) to come from embedded audio inputs or discrete AES inputs. This is done within the ***Audio Input*** control tab. For the sake of brevity, only the settings for channels 1-2 are shown. Controls for CH 3-16 are exactly the same.

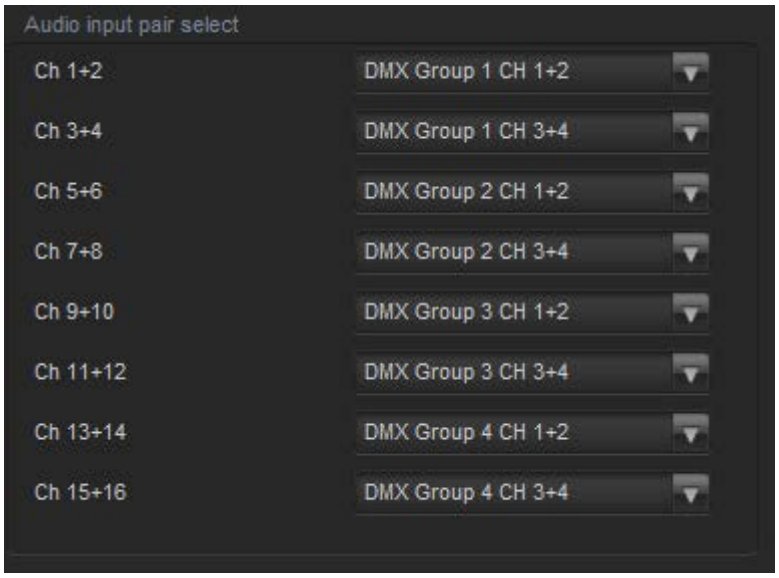


Figure 4-4: Audio Input Tab

Audio Input Pair Select Options

There are 8 controls associated to selecting the source of incoming audio. These allow the user to select if the audio to be processed is coming from embedded audio channels or from the discrete AES inputs. This control tab only shows if the –AES8 option has been ordered. Each of the 8 controls operates in a similar way. For the sake of brevity, only the control for Channels 1 and 2 will be described.

DMX Group 1 CH1+2	Select this option to choose embedded audio Group 1, CH1+2 for subsequent processing in the card.
AES1	Select this option to choose AES1 input for subsequent processing in the card.
Analog Audio Ch 1+2	Select this option to choose Analog Audio Channel 1+2 for subsequent processing in the card.

4.5. AUDIO OUTPUT

All 7812UDX-AAV series modules internally contain 16 channels of audio that are processed within the module. For the sake of brevity, only the settings for channels 1-2 are shown. Controls for CH 3-16 are exactly the same.

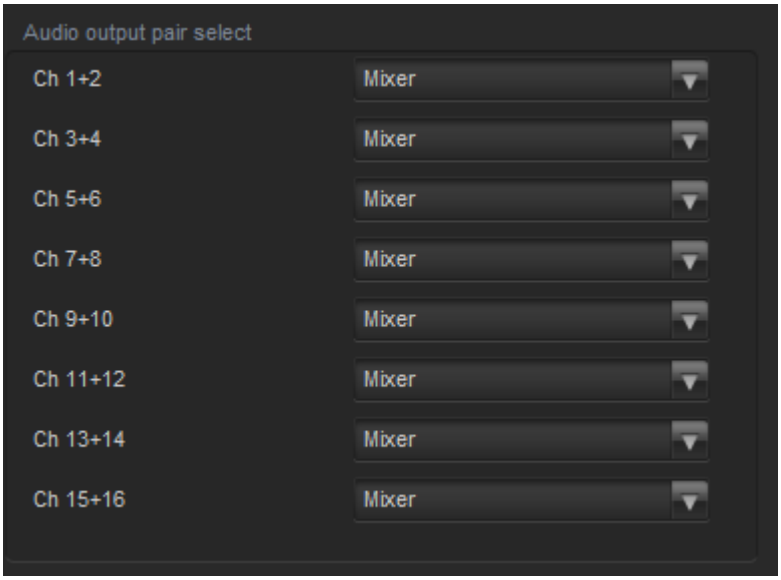


Figure 4-5: Audio Output Tab

Audio Output Pair Select

There are 8 controls associated to selecting the output audio source. This control tab only shows if the –AES8 option has been ordered. Each of the 8 controls operates in a similar way. For the sake of brevity, only the control for Channels 1 and 2 will be described.

Channel 1 and 2: This control allows the user to configure the source for output channels 1 and 2. Your options include *Mixer*, *Dolby Encoder A* or *Dolby Encoder B.*

4.6. AUDIO PROC

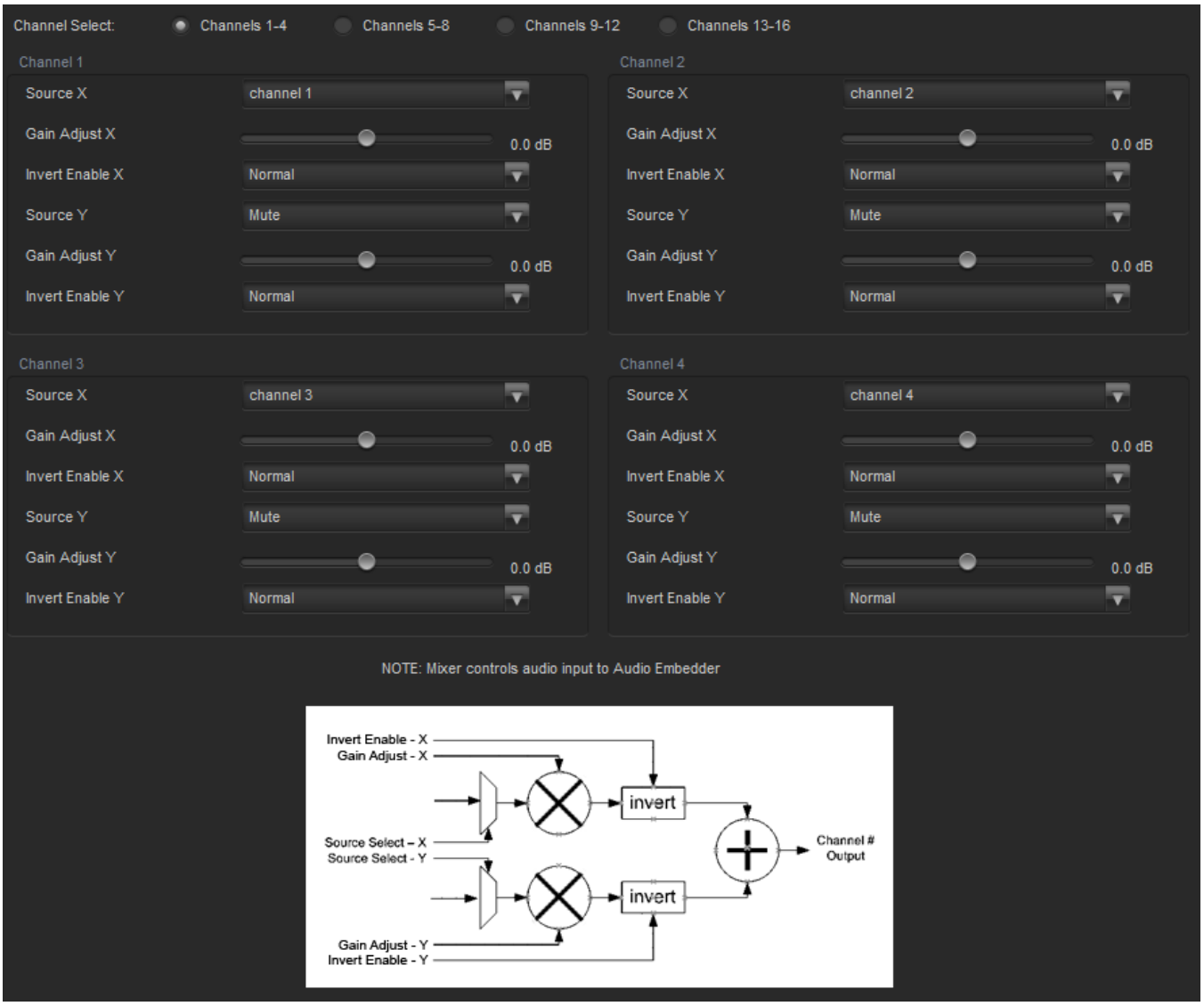


Figure 4-6: Audio Proc Tab

Channel Select

The following controls are configurable for each of the channel groups <1-4>, <5-8>, <9-12> and <13-16>.

Source X: This control enables the user to route one of the 16 internally processed input audio channels to the X input of the Channel mixer. The full set of available channel options is listed below.

Product Option	Mixer Sources
All Products	Mute DMX channels 1-16 Mono mix DMX channels (8 pairs – 1&2, 3&4, etc.) Down mix L, R Down mix mono
Upmix [+UMX2]	Up mix L, R, C, LFE, Ls, Rs, passthru L, passthru R
IntelliGain® [+IG2]	IntelliGain® 1 channels 1-8 IntelliGain® 2 channels 1-8
Dolby Decoder 1 and 2 (+DD or +DD2)	Dolby Decoder A Channel 1 - 8 (+DD) Dobly Deocder A Minitor Channel 1 – 2 (+DD) Dolby Decoder B Channel 1 – 8 (+DD2) Dolby Decoder B Monitor Channel 1 – 2 (+DD2)

Gain Adjust X: This control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associate slider control left to decrease the value or right to increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is incremented or decremented in 0.1 dB steps.

Invert Enable X: This control enables the user to invert the phase or pass the selected audio channel.

Source Y: This control enables the user to route one of the 16 internally processed input audio channels to the Y input of the Channel mixer. The full set of available channel options is listed below.

Product Option	Mixer Sources
All Products	Mute DMX channels 1-16 Mono mix DMX channels (8 pairs – 1&2, 3&4, etc.) Down mix L, R Down mix mono
Upmix [+UMX2]	Up mix L, R, C, LFE, Ls, Rs, passthru L, passthru R
IntelliGain® [+IG2]	IntelliGain® 1 channels 1-8 IntelliGain® 2 channels 1-8
Dolby Decoder 1 and 2 (+DD or +DD2)	Dolby Decoder A Channel 1 - 8 (+DD) Dobly Deocder A Minitor Channel 1 – 2 (+DD) Dolby Decoder B Channel 1 – 8 (+DD2) Dolby Decoder B Monitor Channel 1 – 2 (+DD2)

Gain Adjust Y: This control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associate slider control left to decrease the value or right to increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is incremented or decremented in 0.1 dB steps.

Invert Enable Y: This control enables the user to invert the phase or pass the selected audio channels.

4.7. AUDIO INPUT CORRECTION

The ***Audio Input Correction*** controls as shown in Figure 4-7 are used to configure parameters associated with the audio inputs. Audio input correction is used to adjust the gain, inversion and delay of the individual audio input channels. Channels 1 to 8 can be configured by selecting the *Channels 1-8* radial button and channels 9 to 16 can be configured by selecting the *Channels 9-16* radial button. The controls for Channel 1 will be described in detail, as the controls for Channels 2 to 16 operate in an identical fashion.

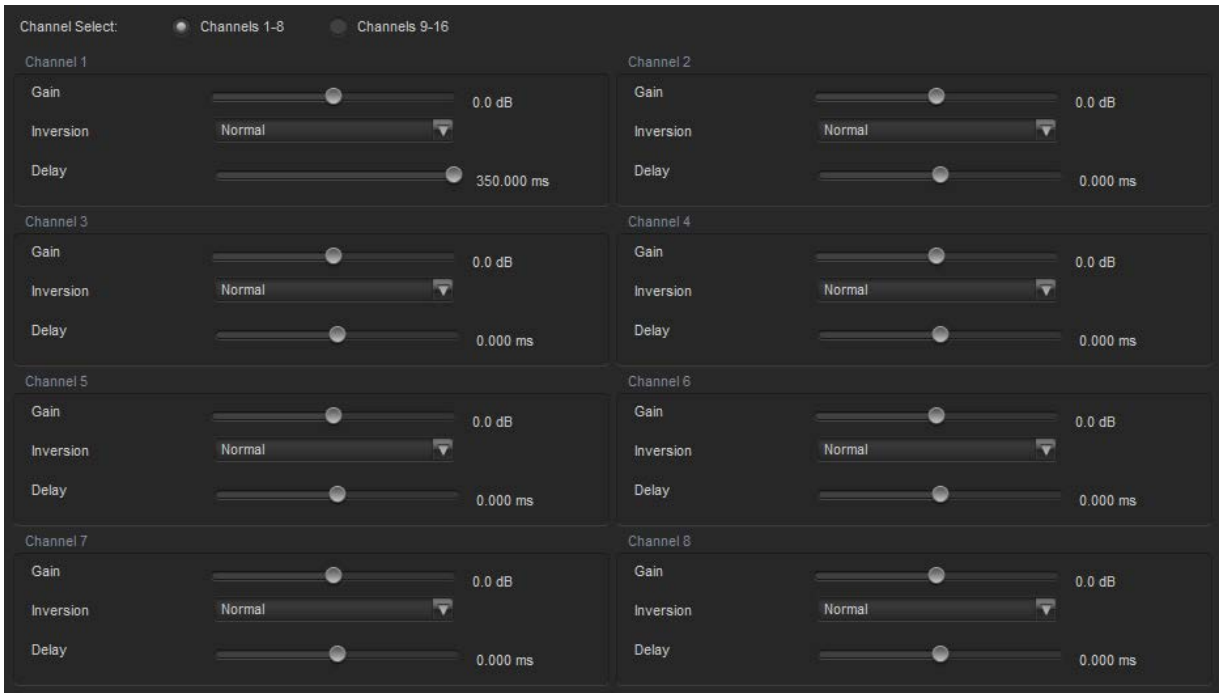


Figure 4-7: Audio Input Correction Tab

Channel <1-16>
The following controls are configurable for each of the 16 available audio channels.

Gain: This control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associated slider control left to decrease the value or right to increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is adjusted in 0.1 dB increments.

Inversion: This control enables the user to invert the phase or pass the selected audio channel.

Normal	Pass the audio channel through with no processing.
Invert	Invert the phase of the audio channel.

Delay: This control adjusts the audio delay +/- 300.00 ms. This delay is relative to the delay that the module automatically inserts to match audio path and video path delays.

Note: Negative values are limited to the amount of video delay; the card does not have negative delay ability. Added Video delay can be applied in the Video tab in order to achieve a greater negative audio delay. See Section 4.1 for details on how to add additional Video delay.

4.8. DEINTERLACER CONTROL

The ***Deinterlacer*** controls as shown in Figure 4-8 are used to configure parameters associated with the video de-interlacer. Video de-interlacing is performed so that the scaling/aspect ratio conversion can occur in the progressive video domain. Scaling/aspect ratio conversion in the progressive domain is the highest quality way to perform up/down/cross conversion.

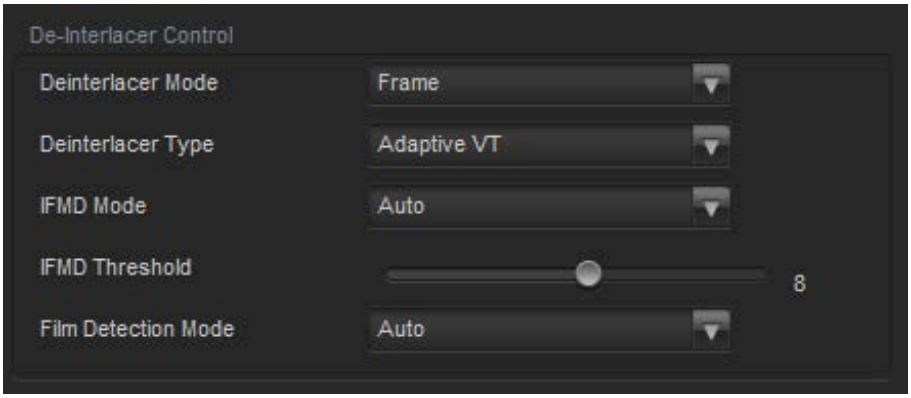


Figure 4-8: Deinterlacer Control Tab

De-Interlacer Control

Deinterlacer Mode: This control allows the user to set whether the module will perform field or frame based de-interlacing conversion. The user can select *Field* or *Frame* based processing using the drop down menu.

Field	In *Field* mode, the de-interlacer works on a field-by-field basis.
Frame	In *Frame* mode, the de-interlacer works on a complete frame basis.

Note: When operating in an up-conversion mode, this control is ignored and is defaulted to frame mode. The deinterlacer will automatically switch between frame and field accordingly to the image.

Deinterlacer Type: This control enables the user to set the base type of de-interlacing that the module will perform. The user may choose between *Temporal Only*, *Field Merge Only* and *Adaptive VT*. Select that de-interlacer processing mode using the drop down menu.

Temporal Only	When de-interlacing, only temporal filtering is performed to interpolate the 480i to 480p pixels or 1080i to 1080p pixels.
Field Merge Only	When de-interlacing, field 1 and field 2 are merged together with no filtering performed to interpolate 480i to 480p or 1080i to 1080p pixels.
Adaptive VT	When de-interlacing fully motion adaptive processing is applied with adaptive spatial+ temporal filtering applied when interpolating 480i to 480p or 1080i to 1080p pixels. This is the highest quality mode of operation and is the recommended setting.

IFMD Mode: This control enables the user to set the motion-processing mode for the de-interlacer. The user may select from *Disable, Auto* or *Noise Adaptive* using the drop down menu.

Disable	No motion adaptive processing will take place and all pixels will be treated as static.
Auto	Per pixel motion processing will take place and de-interlacing filters will automatically change based on the amount of per pixel motion detected.
Noise Adaptive	Per pixel motion processing will take place and de-interlacing filters will automatically change based on the amount of per pixel motion detected and the automatically measured amount of noise in the image. This is the recommended setting for the highest image quality.

IFMD Threshold: This control allows the user to change the threshold of what is deemed motion for the deinterlacer. The user can set the ***IFMD Threshold*** by moving the threshold slider to the left or the right. The IFMD threshold value ranges from 0 to 15. The threshold can be adjusted in increments of 1. The ***IFMD Threshold*** is set to 8 by default. A value of 8 gives the best overall image quality for a wide variety of image content

Film Detection Mode: This control enables the user to set the operating mode. The 7812UDX-AAV modules have the ability to automatically detect embedded 3:2 and 2:2 sequences. When such sequences are present inverse 3:2 and 2:2 is performed so that mathematically lossless conversion back to progressive may be achieved. For optimal performance, the *Auto* mode of operation is highly recommended.

Auto	The card will automatically detect video sequences including embedded 3:2 and embedded 2:2 sequences. Processing will be automatically adapted to match the detected content. If no film mode sequence is detected, the de-interlacer will automatically revert to video mode processing. This is the recommended setting for this control.
Video Only	The video de-interlacer will operate in *video only* mode and will utilize its internal motion adaptive and edge interpolation process for de-interlacing the input signal.
Detect 3:2	The video de-interlacer will search for and lock onto embedded 3:2 sequences and perform inverse 3:2 pull-down to de-interlace the input signal.
Detect 2:2	The video de-interlacer will search for and lock onto embedded 2:2 sequences and perform inverse 2:2 pull-down to de-interlace the input signal.
Detect 3:2 and 2:2	The video de-interlacer will search for and lock onto embedded 3:2 or 2:2 sequences and perform inverse 3:2 or 2:2 pull-down to de-interlace the input signal.

4.9. VIDEO PROC

The ***Video Proc*** control menu as shown in Figure 4-9 is used to configure parameters associated with the video processing functions of the converter. There is one set of video processing controls for each output on the 7812UDX-AAV. Both these sets of controls operate in the same way therefore only controls for output Video Proc 1 will be described.

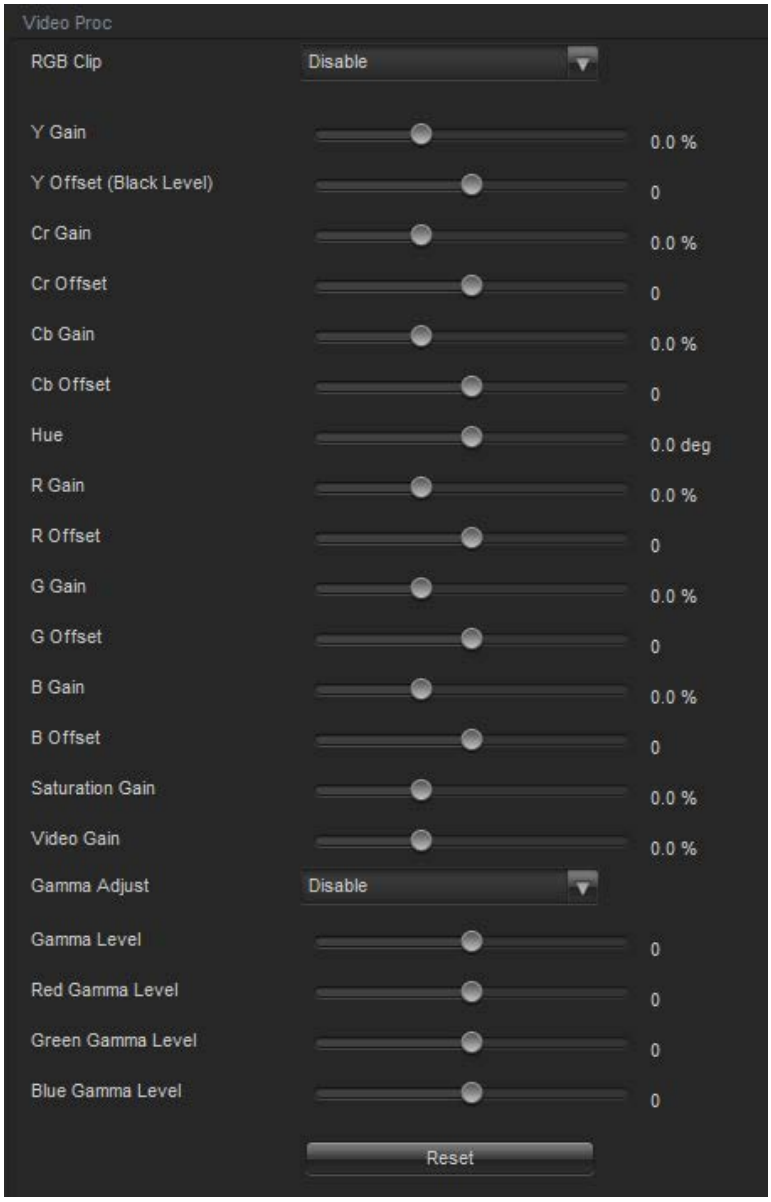


Figure 4-9: Video Processing Tab

ALL of these parameters affect the video in real time. H & V frequency bands will cause hits to the video while a new filter is loaded.

Video Processing

RGB Clip: This control allows RGB clipping/colour legalization process. When set to *enable*, the module will clip any illegal levels of R, G, and B (individually) to their respective Black and White Levels. If disabled, then the illegal values are passed unmodified. This control is normally set to *Disable* in order to allow for Super Black or other test patterns to pass through the module.

Gain Levels: There are eight controls that set the gain of the video. With these controls, the user can adjust the gain of the 3 components in either the Y Cr Cb domain or the R G B domain over a range of -50% to 100% in 0.1% steps. Gain adjustments in the Y, Cb, Cr domain are made first, and then gain adjustments in the RGB domain. Illegal values are clipped after gain adjustments.

Y Gain:	Ranges from –50% to 100% in 0.1% increments.
Cb Gain:	Ranges from –50% to 100% in 0.1% increments.
Cr Gain:	Ranges from –50% to 100% in 0.1% increments.
R Gain:	Ranges from –50% to 100% in 0.1% increments.
G Gain:	Ranges from –50% to 100% in 0.1% increments.
B Gain:	Ranges from –50% to 100% in 0.1% increments.
Saturation Gain:	Ranges from –50% to 100% in 0.1% increments.
Video Gain:	Ranges from –50% to 100% in 0.1% increments.

DC Offsets: There are three controls that set the DC Offset of the video signal. With these controls, the user can individually adjust the DC offset of Y, Cr and Cb with a range of +/- 200 quantization levels.

Y Offset:	Ranges from –200 to 200 quantization levels in 1 level increments.
Cb Offset:	Ranges from –200 to 200 quantization levels in 1 level increments.
Cr Offset:	Ranges from –200 to 200 quantization levels in 1 level increments.
R Offset:	Ranges from –200 to 200 quantization levels in 1 level increments.
G Offset:	Ranges from –200 to 200 quantization levels in 1 level increments.
B Offset:	Ranges from –200 to 200 quantization levels in 1 level increments.

Hue: This control allows the user to adjust the Hue of the video signal. The ***Hue*** control can be applied to the video signal regardless of the type of video signal being applied (SD, HD or 3G).

Gamma Adjust: This control allows the user to enable and disable the gamma adjustment functionality of 7812UDX-AAV series modules. When enabled, the module will allow the user to adjust the gamma level. If disabled, then the gamma level is set to 0.

Gamma Level: This control allows the user to adjust the overall Gamma correction factor from - 128 to + 127 in increments of 1.

Red, Green, Blue Gamma Level: With these controls, the user can individually adjust the Red, Green, and Blue Gamma levels from – 128 to + 127 in increments of 1.

Red Gamma Level:	Ranges from –128 to 127 in 1 level increments.
Green Gamma Level:	Ranges from –128 to 127 in 1 level increments.
Blue Gamma Level:	Ranges from –128 to 127 in 1 level increments.

Reset Button: By pressing the ***Reset*** button, all Video Processing parameters in this control tab will return to their default setting.

4.10. COLOUR LEGALIZE

The ***Colour Legalize*** control menu, as shown in Figure 4-10, is used to configure parameters associated with the video processing functions of the converter. There is one set of Colour Legalizer controls for each output on the 7812UDX-AAV. Both these sets of controls operate in the same way therefore only controls for output Colour Legalizer 1 will be described.

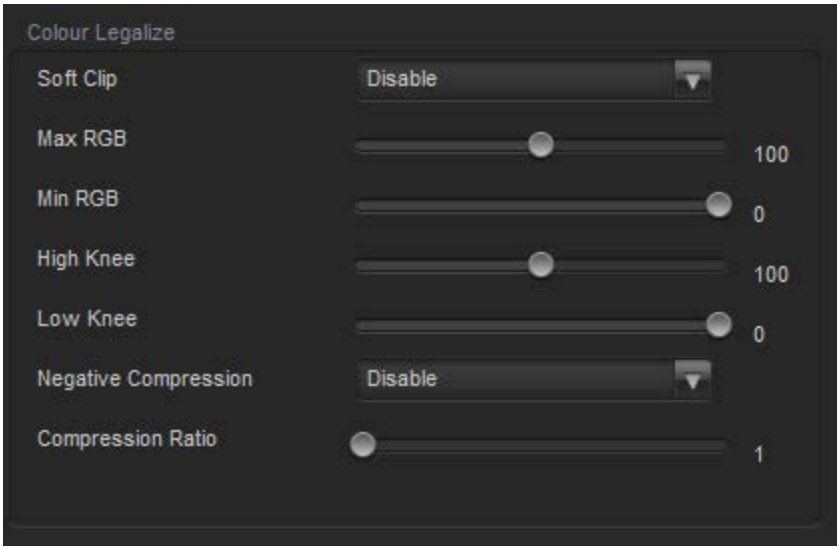


Figure 4-10: Colour Legalize Tab

Colour Legalize

Soft Clip: This control allows the user to enable or disable the colour compander controls.

Max RGB: This control allows the user to set the maximum value for the RGB compander. The value range for the ***Max RGB*** adjustments is 90% to 110% of the maximum legal value. ***Max RGB*** is adjusted in 1% increments. The default value is 100%.

Min RGB: This control allows the user to set the minimum value for the RGB compander. The value range for the ***Min RGB*** adjustments is from 0% to -10% of the minimum legal value. ***Min RGB*** is adjusted in 1% increments. The default value is 0%.

High Knee: This control allows the user to set the point at which companding occurs at the upper range. The value range for the ***High Knee*** adjustments is 90% to 110% of the maximum legal value. ***High Knee*** is adjusted in 1% increments. The default value is 100%.

Low Knee: This control allows the user to set the point at which companding occurs at the lower range. The value range for the ***Low Knee*** adjustments is from 0% to -10% of the minimum legal value. ***Low Knee*** is adjusted in 1% increments. The default value is 0%

Negative Compression: This control allows the user to enable or disable negative colour legalizer compression to be applied. When enabled, the amount of compression can be adjusted with the compression ratio control.

Compression Ratio: This control allows the user to set the gamut range compression ratio. The value range for the compression adjustments is from 5% to 1% of the minimum legal value. The ***Compression Ratio*** is adjusted in 1% increments. The default value is 5%

4.11. IMAGE ENHANCEMENT

The ***Image Enhancement*** control menu, as shown in Figure 4-11, is used to configure parameters associated with the video processing functions of the converter. There is one set of ***Image Enhancement*** controls for each output on the 7812UDX-AAV. Both sets of controls operate in the same way therefore only controls for output Image Enhancement 1 will be described.

Figure 4-11: Image Enhancement Tab

Image Enhancement

Image Enhancement Enable: Setting this control to *Enable* will enable the ***Image Enhancement*** control settings. Setting this control to *Disable* will disable the ***Image Enhancement*** control functionality.

Detail Gain: This control allows the user to select the level of the detail gain with a range of 0 to 127, where 0 refers to no increase in detail gain. A typical range for this control is 0 to 50. Higher values will normally distort the image beyond the range that is normally considered acceptable. The default value is 24.

Enhancement Limit: This control allows the user to select the largest detail value to be added back into the signal. The range is from 0 to 63. The detail that has a value larger than this value will be clipped. The default value is 16.

Horizontal Band: This control allows the user to select the horizontal frequency band to be enhanced. The horizontal band is adjusted in increments of 5, where 0 selects the lowest frequency band available and 20 the highest.

Vertical Intensity: This control allows the user to select the intensity of the vertical enhancement process, as a ratio of the horizontal enhancement. The range is 0 to 100% in increments of 25% where 0% refers to no vertical enhancement and 100% provides a vertical intensity that is equivalent to the horizontal.

Luma Floor: This control allows the user to select the minimum Luma value that will be enhanced with a range of 0 to 15. The default value is 1. Pixels with a value below this floor will be left untouched.

Detail Noise Floor: When the image detail has a value that is below this floor it will be deemed to consist mostly of noise. As such, the pixel associated with that detail level would be left untouched. The ***Detail Noise Floor*** has a valid range of 0 to 15 with a default value of 2

Reset Button: By pressing the ***Reset*** button, all ***Image Enhancement*** parameters in this control tab will return to their default setting.

4.12. SCALER

The 7812UDX-AAV series of converters utilize high performance multi-tap polyphase filters to perform scaling and aspect ratio conversion on the input signal. The ***Scaler*** control menus are used to configure the cut-off frequencies of the polyphase filters and to define the aspect ratio conversion. In addition, the ***Scaler*** tab contains specific controls for managing sharp vertical and horizontal edge transitions so that edge ringing is minimized. Static side panel colours and output AFD stamping values are also adjusted within this tab.

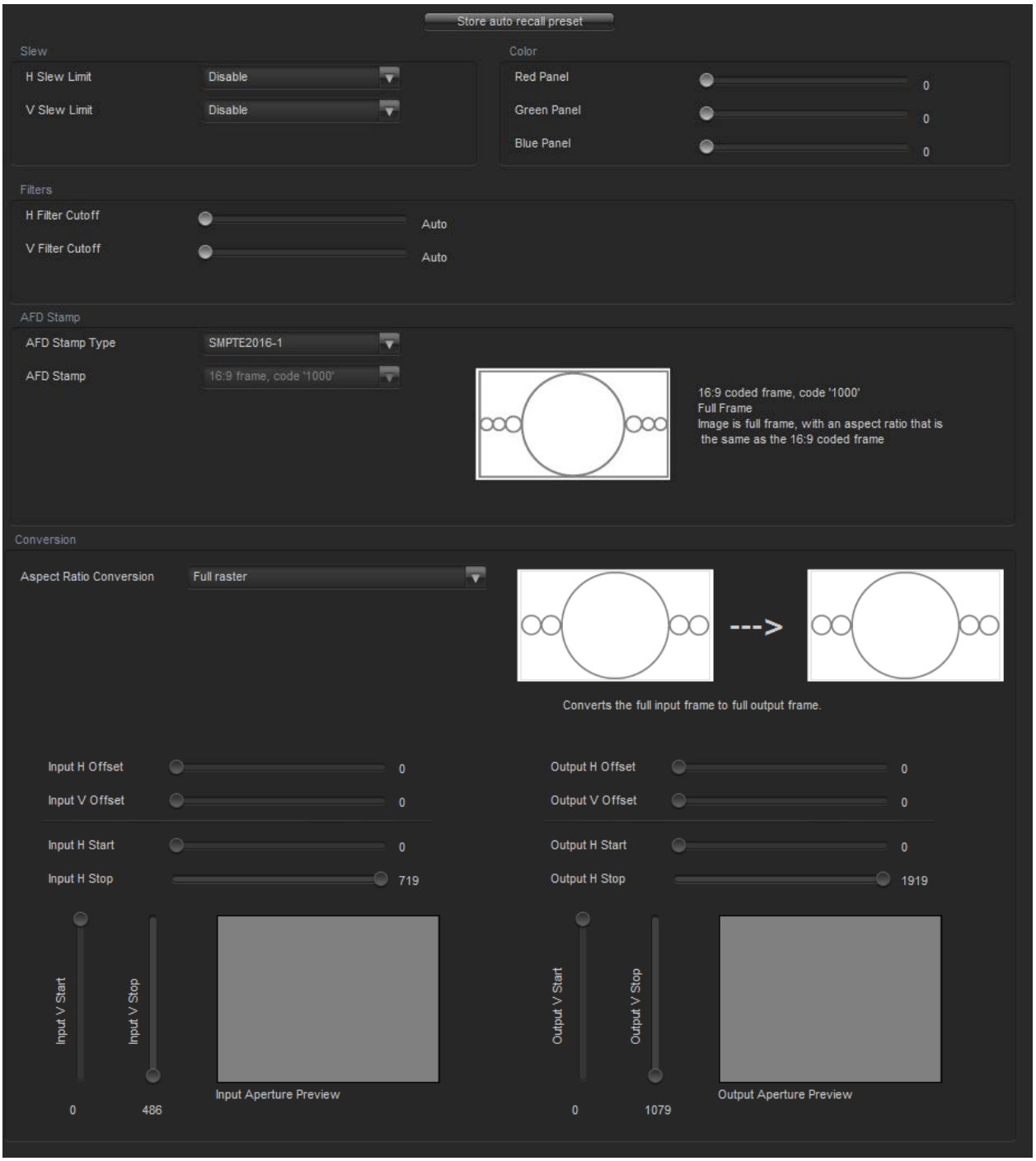


Figure 4-12: Scaler Tab

Slew

There are individual controls for ***H Slew Rate Limit*** and ***V Slew Rate Limit***. When enabled, these controls process sharp spatial transitions so that ringing around such transitions are minimized. When *disabled*, the edge processing is disabled.

H Slew Limit: This control allows the user to enable or disable the feature which manages sharp horizontal edge transitions.

V Slew Limit: This control allows the user to enable or disable the feature which manages sharp vertical edge transitions.

Colour

There are three menu items used to set the default side panel colours. Panel colours are used to fill any "un-used space" in the output image raster when specific aspect ratio conversions are performed (i.e. side panels generated on the left hand and right hand side of an image when converting 4:3 to 16:9). There are individual controls for R, G and B components of the side panel.

Red Panel: This control allows the user to set the value for the R component of the default side panel colour with a range of 0 to 255.

Green Panel: This control allows the user to set the value for the G component of the default side panel colour with a range of 0 to 255.

Blue Panel: This control allows the user to set the value for the B component of the default side panel colour with a range of 0 to 255.

The user can use a standard colour picker such as is available in Microsoft Paint to determine the desired colour values.

Filters

There are two controls that adjust the horizontal and vertical filters for the scaler. Effectively, these controls manage the cut-off frequency for the horizontal and vertical filters.

The smaller the value, the narrower the corresponding filter bandwidth and the less aliasing passed through to the output. The larger the value, the wider the corresponding filter bandwidth.

H Filter Cutoff: This control allows the user to set the horizontal filter bandwidth. It also has several unique filters that have specific enhancement profiles.

V Filter Cutoff: This control allows the user to set the Vertical filter bandwidth.

AFD Stamp

AFD Stamp Type: These controls enable the user to specify the type of outgoing AFD code. Depending on the type of AFD being used there will be a variety of selected AFD stamp codes. The AFD Stamp control is enabled only when the ***AFD Stamp Source*** is set to *User AFD Stamp*. Use the *AFD Stamp* drop down menu to select the appropriate out-bound AFD code. There are 20 SMPTE2016-1 AFD codes to choose from. As each AFD code is selected, a pictorial representation of what that AFD code means is shown in the right hand side of the screen

AFD Stamp: This control allows the user to specify the AFD signal that will be stamped on the output signal when the ***AFD Stamp Source*** control (within the ***AFD Control*** tab) is set to *User AFD Stamp*. It is possible to stamp the following AFD values.

16:9 frame, code '0010'	AFD code 16:9 frame, code '0010' will be inserted into the outgoing video.
16:9 frame, code '0011'	AFD code 16:9 frame, code '0011' will be inserted into the outgoing video.
16:9 frame, code '0100'	AFD code 16:9 frame, code '0100' will be inserted into the outgoing video.
16:9 frame, code '1000'	AFD code 16:9 frame, code '1000' will be inserted into the outgoing video.
16:9 frame, code '1001'	AFD code 16:9 frame, code '1001' will be inserted into the outgoing video.
16:9 frame, code '1010'	AFD code 16:9 frame, code '1010' will be inserted into the outgoing video.
16:9 frame, code '1011'	AFD code 16:9 frame, code '1011' will be inserted into the outgoing video.
16:9 frame, code '1101'	AFD code 16:9 frame, code '1101' will be inserted into the outgoing video.
16:9 frame, code '1110'	AFD code 16:9 frame, code '1110' will be inserted into the outgoing video.
16:9 frame code '1111'	AFD code 16:9 frame code '1111' will be inserted into the outgoing video.
4:3 frame, code '0010'	AFD code 4:3 frame, code '0010' will be inserted into the outgoing video.
4:3 frame, code '0011'	AFD code 4:3 frame, code '0011' will be inserted into the outgoing video.
4:3 frame, code '0100'	AFD code 4:3 frame, code '0100' will be inserted into the outgoing video.
4:3 frame, code '1000'	AFD code 4:3 frame, code '1000' will be inserted into the outgoing video.
4:3 frame, code '1001'	AFD code 4:3 frame, code '1001' will be inserted into the outgoing video.
4:3 frame, code '1010'	AFD code 4:3 frame, code '1010' will be inserted into the outgoing video.
4:3 frame, code '1011'	AFD code 4:3 frame, code '1011' will be inserted into the outgoing video.
4:3 frame code '1101'	AFD code 4:3 frame, code '1101' will be inserted into the outgoing video.
4:3 frame code '1110'	AFD code 4:3 frame code '1110' will be inserted into the outgoing video.
4:3 frame code '1111'	AFD code 4:3 frame code '1111' will be inserted into the outgoing video.

When each AFD code is selected, a pictorial representation of what the code is intended to mean is shown in the right hand side of the screen.

Conversion

Aspect Ratio Conversion: selects the aspect ratio conversion that the module will perform. There are numerous pre-defined aspect ratio conversions as well as the ability to define custom aspect ratio conversions. When the *User Aspect* mode is selected, the user can set input image cropping and output image size on a pixel-by-pixel and line-by-line basis.

Full Raster	Converts the full input raster to full output raster. If the input and output aspect ratios are not equivalent, there will be aspect distortion.
User Aspect	Converts the region of the input raster defined by the *Input H & V Start* and *Stop* values to the region of the output raster defined by the *Output H & V Start* and *Stop* values with coloured side panels.
4:3 Side Panel to 16:9 TB Cut **13:9 Letter Box to 16:9 TB Cut** **14:9 Letter Box to 16:9 TB Cut** **13:9 Stretch to 16:9 TB Cut** **14:9 Stretch to 16:9 TB Cut** **16:9 Stretch to 16:9 TB Cut**	These settings convert the input picture to 16:9 top and bottom cuts. **Note: For 1080i/1035i inputs, these functions only work in field mode.**
13:9 Stretch to 4:3 Side Panel **14:9 Stretch to 4:3 Side Panel** **16:9 Stretch to 4:3 Side Panel**	These settings squeeze common stretched input video back to 4:3 side panel images on a 16:9 aspect raster.
4:3 to 4:3 Side Panel on 16:9 **4:3 to 13:9 Stretch on 16:9** **4:3 to 14:9 Stretch on 16:9** **4:3 to 16:9 Stretch on 16:9** **4:3 to 13:9 Crop on 16:9** **4:3 to 14:9 Crop on 16:9** **4:3 to 16:9 Crop on 16:9**	These settings are common up converter settings for converting 4:3 aspect ratio images to common 16:9 formats. These settings are not appropriate for cross or down conversion.
16:9 to 16:9 Letter Box on 4:3 **16:9 to 14:9 Letter Box on 4:3** **16:9 to 13:9 Letter Box on 4:3** **16:9 to 4:3 Side Cut on 4:3** **16:9 to 4:3 Squeeze on 4:3**	These settings are common down converter settings for converting 16:9 aspect ratio images to common 4:3 formats. These settings are not appropriate for cross or up conversion.
16:9 Top Letter Box on 4:3 to 16:9 **14:9 Top Letter Box on 4:3 to 16:9 TB Cut** **14:9 Top Letter Box on 4:3 to 14.9 Side Panel** **14:9 Top Letter Box on 4:3 to 16:9 Stretch on 16.9** **16:9 Top Letter Box on 4:3 to 16:9**	
14.9 Letter Box on 4:3 to 16:9 TB Cut **14:9 Letterbox on 4:3 to 14.9 Side Panel** **14.9 Letterbox on 4.3 to 16.9 Stretch on 16.9**	
4.3 Side Panel on 16.9 to 4:3 **14.9 Side Panel to 14.9 Letter Box on 4:3** **14.9 Side Panel to 4:3 Side Cut on 4:3** **14.9 Side Panel to 4.3 Squeeze on 4.3**	

NOTE: When the module is configured to operate with AFD, (*AFD Input Enable* is set to Enable and AFD is present on the input video signal) this control will have no effect.

As each of the above settings is selected, a pictorial representation of the selected conversion is shown to the immediate right of the drop down menu.

User Aspect Ratio Setting: These controls allow the user to completely define the aspect ratio conversion processing. There are a total of 8 parameters that define the ARC: Input H Start, Input H Stop, Input V Start, Input V Stop, Output H Start, Output H Stop, Output V Start, and Output V Stop. The input parameters define the bounding-box within the input active picture region that will be used as the input to the scaler. The output parameters define the bounding-box region within the output raster that will contain the scaler output. Table 4-1: User Aspect Ratio Settings defines the function of the 8 parameters that define the ARC.

Input H Offset	The *Input H Offset* defines the additional amount of offset to the input H scaler controls.
Input V Offset	The *Input V Offset* defines the additional amount of offset to the input V scaler controls.
Input H Start / Input H Stop:	The *Input H Start* and *Input H Stop* define the horizontal portion of the input image to process to the output raster.
Input V Start / Input V Stop:	The *Input V Start* and *Input V Stop* define the vertical portion of the input image to process to the output raster.
Output H Start / Output H Stop:	The *Output H Start* and *Output H Stop* define how to scale the cropped input image horizontally and where to place it horizontally on the output raster.
Output V Start / Output V Stop:	The *Output V Start* and *Output V Stop* define how to scale the cropped input image vertically and where to place it vertically on the output raster.

Table 4-1: User Aspect Ratio Settings

4.13. CC CONTROL

The 7812UDX-AAV series of converters extract closed captioning from the input signal and will translate it to the output video signals. The ***Closed Captioning*** menus are used to configure parameters associated with the closed caption handling.

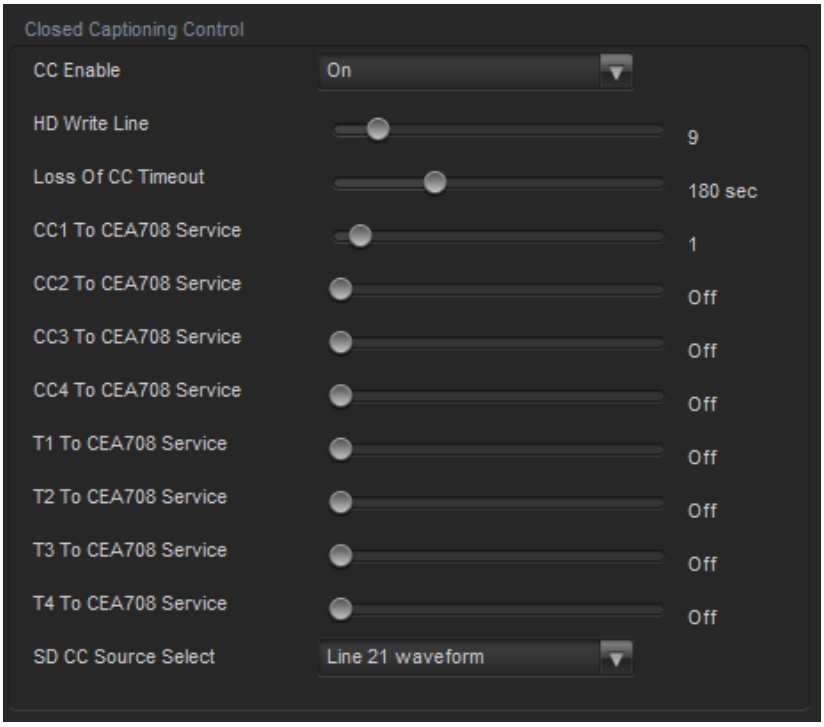


Figure 4-13: Closed Captioning Control Tab

Any changes to the closed captioning settings can cause a momentary interruption.

Closed Captioning Control

CC Enable: This control allows the user to enable closed caption handling for the module.

HD Write Line: This control allows the user to set the HD line where the HD VANC captions are inserted on the output HD video as per SMPTE 334M.

Loss of CC Timeout: This control enables the user to set the amount of time (in seconds) before the Closed Captioning timeouts when the video is lost. To set the ***Loss of CC Timeout***, drag the slider right to decrease or left to increase the value. The value range is 1 to 600 seconds with a default value of 180 seconds.

Caption Service Translation: There are eight controls that allow the user to define CEA608 (*CC1-4, T1-4*) to CEA708 (*Services 1-16)* caption service translation. Each control specifies the translation of one of the 8 supported CEA608 caption services to one of the 16 supported CEA708 caption services. When set to ***off***, no translation in performed for that particular CEA608 service.

NOTE: All caption service translations will overwrite the corresponding CEA708 service data if it is already present on within the input closed caption data.

SD CC Source Select: This control selects the source of input closed caption data for SD input video standards (*525i/59.94Hz, 625i/50Hz*). Since SD video standards can carry a digitized version of the legacy closed caption analog waveform (*referred to as Line 21 waveform*), and/or digital CDP data packets, the user must specify the desired source of caption data to be processed by the module. When set to ***Line 21 waveform***, the closed caption data carried on the digitized closed caption analog waveform will source the closed caption processor. When set to ***CDP***, the closed caption data carried in the digital CDP ANC packet will source the closed caption processor. This control only applies when the input video standard is SD (*525i/59.94Hz, 625i/50Hz*).

4.14. UTILITIES CONTROL

The ***Utilities Control*** tab is used to control the presets. The user can configure the *Recall Preset*, ***Store User Preset***, and enable/disable the ***Auto Recall Presets*** function. This tab also allows for uploading Sub-Preset files to the module through FTP or SNMP. Sub-Preset files can be loaded one at a time or all at once using the Sub-Preset multiple load function.

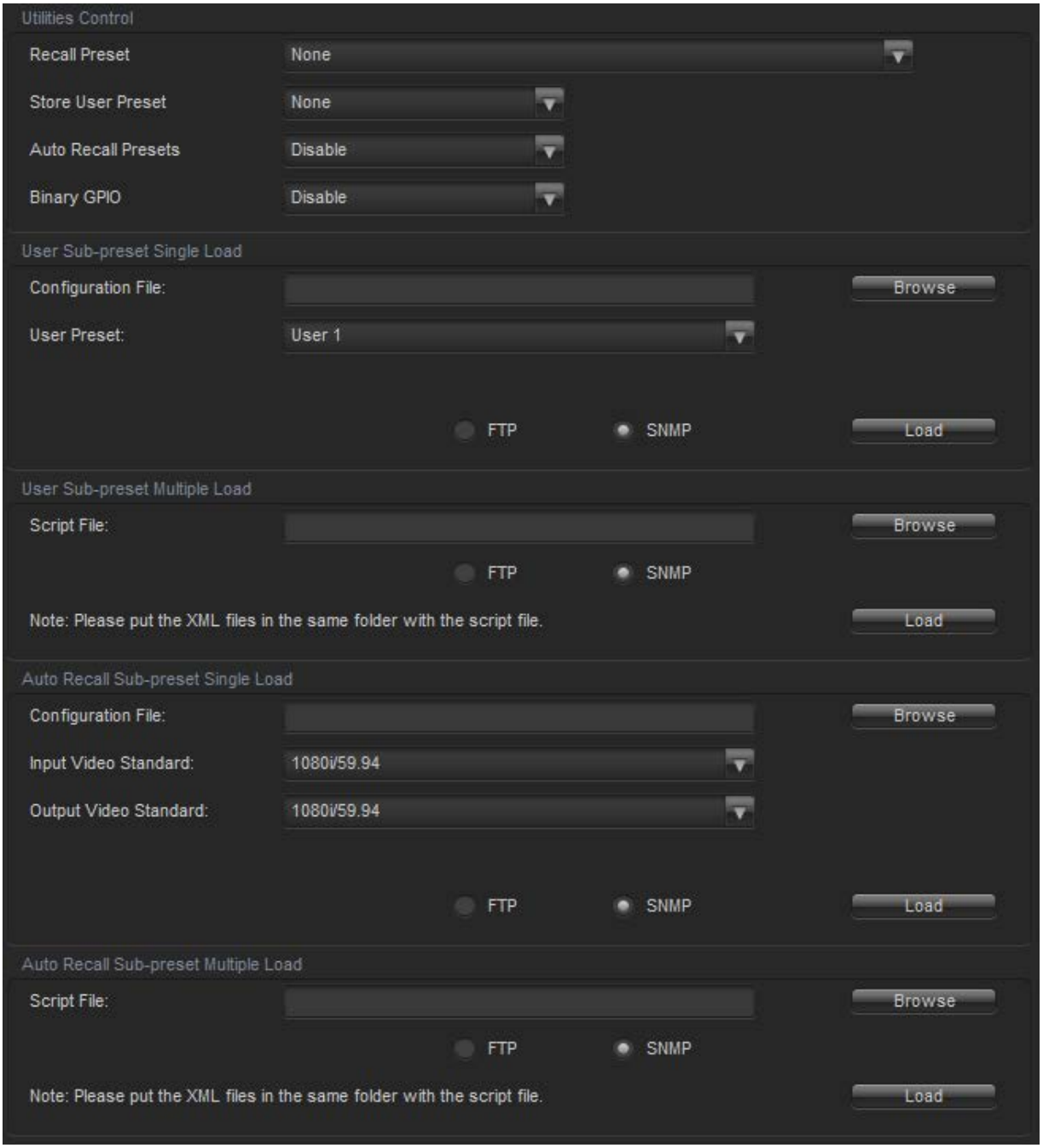


Figure 4-14: Utilities Control Tab

Utilities Control

The 7812UDX-AAV series of converters can manage 10 user presets.

These 10 presets can store the complete set of card controls.

There may be a slight disturbance in the operation of the card while the new preset is being recalled.

Recall Preset: This control is used to initiate a recall of the card configuration from one of the user presets or reset the card to factory defaults.

Store User Preset: This control is used to initiate a store of the current card configuration into one of the user presets. To store a card configuration to a specific preset, select the preset to which you wish to store the card settings and press the APPLY button. There are 10 presets to which you can store.

Auto Recall Presets: This control is used to automatically recall card configurations for specific video input standards. The user must define these format dependant card configurations using VistaLINK® PRO. Once this is complete, they will automatically be recalled once that particular video standard is detected on the module itself. To utilize this functionality, the following steps must be performed:

1) Enable the ***Auto Recall Presets*** functionality in the ***Utilities*** control tab.
2) Set the input video standard for which you wish to define the card preset. This is done in ***Video*** control tab.
3) Proceed to configure as desired ensuring that you press APPLY each time a parameter is changed.
4) Proceed to the ***Utilities*** control tab and select the ***Auto Recall*** option in the ***Store User Preset*** control drop down menu.
5) Repeat steps 2-4 for each input video standard

NOTE:
The Auto Recall Presets functionality should be used with care.

All card parameters are recalled when a new video input standard is detected. When ***Auto Recall Presets*** is enabled, changing any particular card parameter (Y Gain just as an example) will take effect only for that particular video input standard. It will not be stored for all operating modes. When a new video input standard is detected, a new value for that particular card parameter may be recalled. Parameters must be specifically set for each video input standard if you desire the same parameter value to be recalled all the time.

Note that this also includes items like GPIO settings and which ***User Presets*** they recall. If the GPIO settings are not specifically set for each and every possible video input standard, the GPIO functions could change when the new video input standard is detected.

Binary GPIO: This control allows the user to enable the binary encoding of the GPI's and disable all output functionality.

User Sub-Preset Single Load: This control is used to initiate a store to a saved card configuration into one of the user presets. To store a card configuration to a specific preset, select the preset to which you wish to store the card settings and press upload the associated Sub-Preset XML file. There are 10 presets to which you can store a Sub-Preset.

User Sub-Preset Multiple Load: This control is used to initiate a store of multiple XML configuration files to the card configuration into the user presets. To store the card configurations to the presets, a script file must be created which contains the information on the XML files to be used and the User Preset location they will be stored to along with the IP address for purpose to load with FTP. There are 10 user presets to which you can store a Sub-Preset.

Auto Recall Sub-Preset Single Load: These controls are used to automatically recall card configurations for specific video inputs. The user must define these format dependant card configurations using VistaLINK® PRO. Once this is complete, they will automatically be recalled once that particular combination is detected on the module itself. To utilize this functionality, the following steps must be performed:

1) Enable the ***Auto Recall Presets*** functionality in the ***Utilities*** control tab.
2) Load the desired XML Sub-Preset configuration file
3) Set the combination of input and output video standards for which you wish to define the card preset. This is done by the ***Input Video Standard*** and the ***Output Video Standard*** control located directly under the configuration file configuration.
4) Select the method to upload the Sub-Preset configuration file by selecting either the FTP or SNMP radial buttons.
5) Repeat steps 2-4 for each combination of input/output video standards

Auto Recall Sub-Preset Multiple Load: This configuration allows the load of multiple ***Auto Recall Sub-Presets*** with the use of a script file. The script file will contain the information of the Sub-Presets XML files and the Input and output video standards associated with them along with the IP address for purpose to load with FTP. The Sub-Preset XML files must be located in the same folder as the script file when configuring the card.

4.15. CHANGE PRODUCT

This configuration tab provides the ability to perform product string changes. There are a number of product options on the 7812UDX-AAV. Product options can be added to a 7812UDX-AAV at any point using these configuration controls. Figure 4-15 illustrates the layout of the controls in the VistaLINK® PRO global configuration view.

NOTE: A unique checksum must be generated to support a product string change on the 7812UDX-AAV. Please contact Evertz if you are interested in upgrading the feature set of your 7812UDX-AAV.

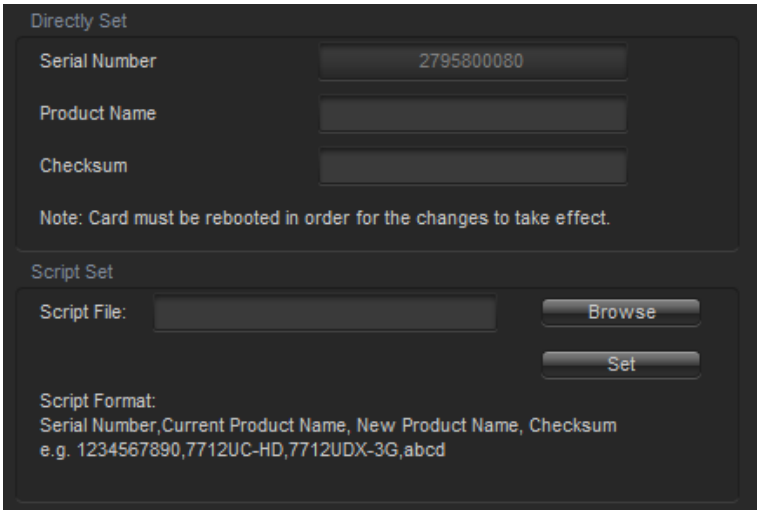


Figure 4-15: Change Product Tab

Directly Set

Serial Number: The serial number is loaded by the manufacturer and is displayed here (read-only).

Product Name: The product name entry area will be used to enter in the name of the product that the module will be upgraded to.

Checksum: The checksum location will contain the verification code that the Evertz sales department will provide when the options have been purchased.

NOTE: The Product name and the checksum NEED to be entered the exact same way as provided by the Sales department or the process will not work.

Script Set

Script File: When upgrading multiple 7812 cards a script file can be used to make the upgrade process easier. If using a script file for upgrading the product string, follow these steps:

1. Browse to the location of the file on your computer
2. Press set to send the script file to the card

4.16. VANC BYPASS

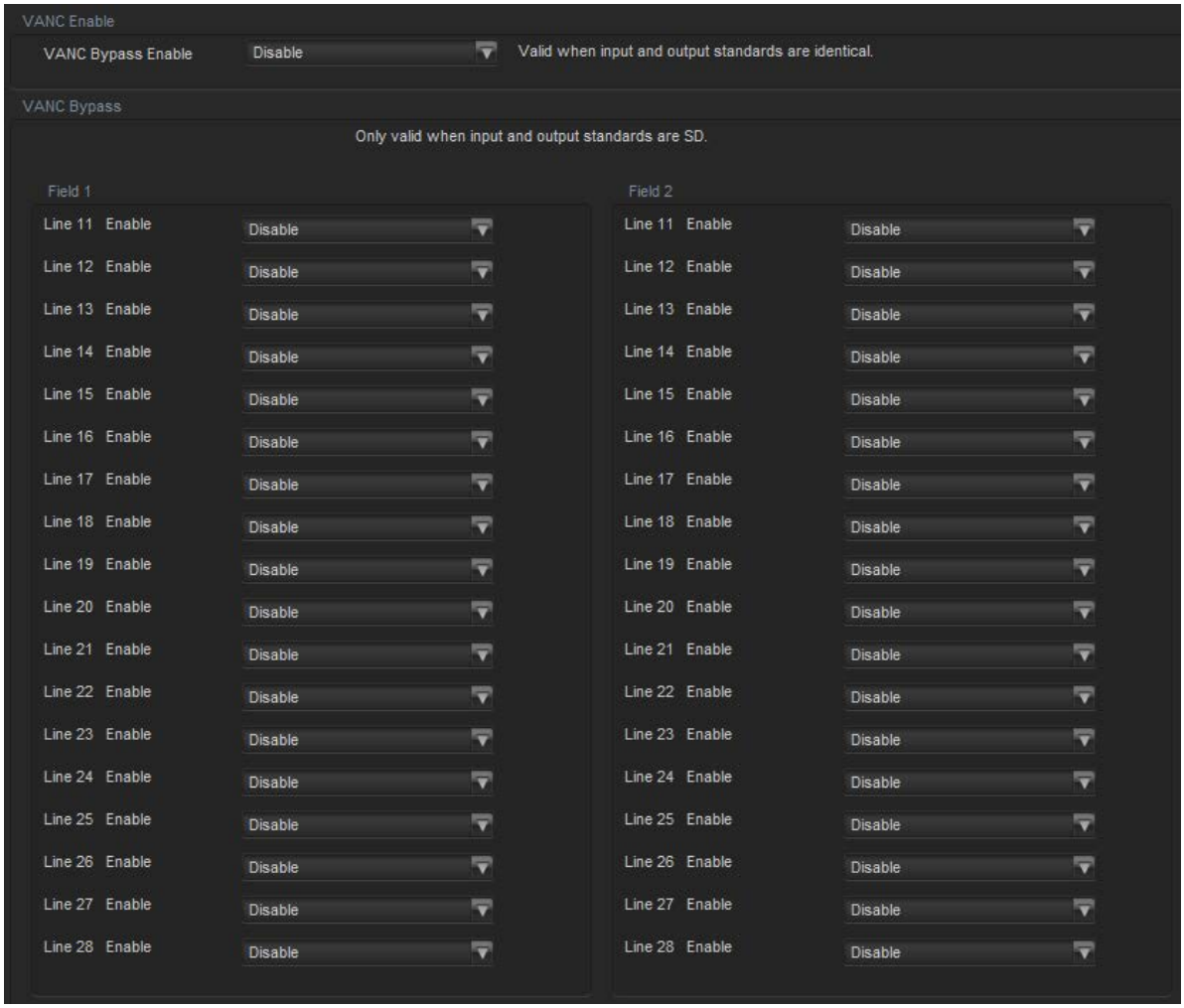


Figure 4-16: VANC Bypass Tab

VANC Bypass Enable: This control allows the user to enable bypassing of any VANC data seen on the input of the 7812 card. VANC bypass will only work when the input and output standards are the same

VANC Bypass

Line Enable for Lines 11-28 for Field 1 & 2: Each of these controls will Enable/Disable the blanking for the incoming VANC data on an SD signal on their corresponding lines and Fields. To black VANC data set to *Enable*. To allow the VANC data to be passed on the output select *Disable*. These controls are only valid when both input/output are set to SD.

NOTE: Each of the individual VANC Bypass line controls will be disabled if the VANC Bypass Enable control is set to disable.

4.17. ANC PASSTHRU

The ANC PassThru feature allows for the user to define specific rules for passing ANC data from input to output. There are two modes of operation for ANC PassThru: **Direct ANC PassThru** and **Mapped ANC PassThru.**

The ***Direct ANC PassThru*** mode of operation routes *ALL* ancillary data in both HANC & VANC frame accurately from input to output. This mode of operation is designed for the use case when the input video standard and output video standard are identical.

Additionally, Direct ANC PassThru will also support passing SD-VBI waveforms from input to output.

All packets that are processed by the module itself (For example: Source ID) are safely blocked from passing from input to output while operating in Direct ANC PassThru.

Key Functional Notes of Direct ANC PassThru:

- Only supported when Input Video Standard is identical to the Output Video Standard
- ***Direct ANC PassThru*** overrides ***Mapped ANC PassThru*** when it is enabled and Input Video Standard is identical to the Output Video Standard
- When ***Direct ANC PassThru*** is disabled or invalid, ***Mapped ANC PassThru*** rules are applied.
- Supports SD-VBI waveform pass through for SD video.
- ANC packets processed by the system *(For example: Source ID)* will be blocked from passing through to avoid duplicate entries on the output video.

The ***Mapped ANC PassThru*** mode of operation routes up to 10 unique (DID, SDID) ANC packets frame accurately from input to output. This mode of operation is designed for the use case when the input video standard and output video standard differ, or when only a subset of the ANC data on the input is desired to be passed through the module.

The Mapped ANC PassThru provides a parameter set to fully define how each ANC packet will be routed from input to output. This includes Packet Location (HANC or VANC), output line numbers and interlaced to progressive and progressive to interlaced ANC data mapping.

Key Functional Notes of Mapped ANC PassThru:

- Supported for all valid input and output video standard combinations.
- When enabled and valid, ***Direct ANC PassThru*** overrides ***Mapped ANC PassThru***.
- ANC packets processed by the system (*For example: Source ID*) will be blocked from passing through using ***Mapped ANC PassThru*** to avoid duplicate entries on the output video.

NOTE: If the module is current processing the selected DID, SDID then the ***Mapped ANC Packet PassThru Status*** will report *blocked*.

The ANC PassThru tab contains all controls relating to ANC pass through processing. Figure 4-17 illustrates the layout of these controls in the VistaLINK® PRO video path 1 configuration view. The specific functionality of each control is provided below.

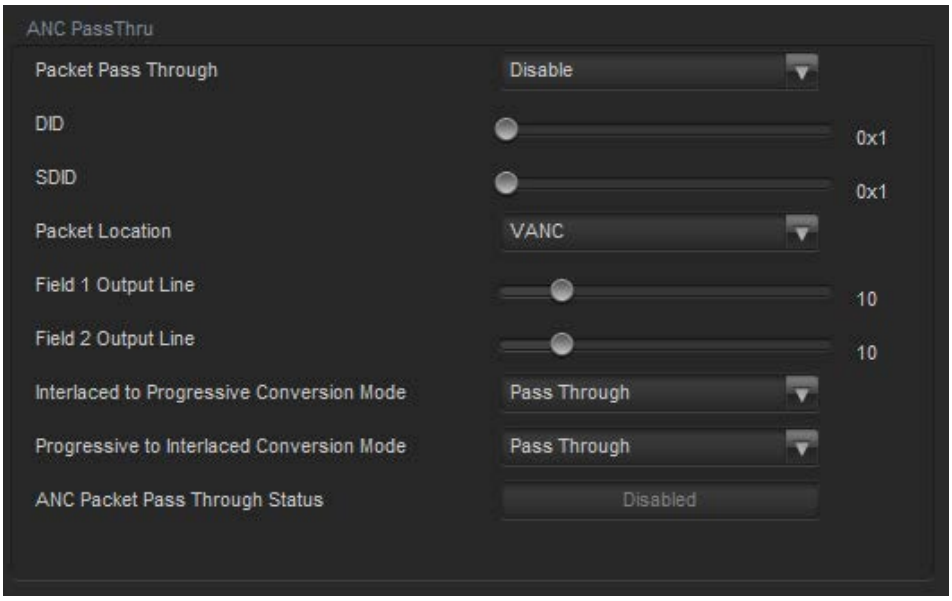


Figure 4-17: ANC PassThru Tab

ANC PassThru

Mapped ANC Packet PassThru: This control allows the user to enable / disable the ***Mapped ANC PassThru*** rule as defined by its controls. When set to **Enable** the ***Mapped ANC PassThru*** rule will be applied to route any ANC packets on the input with matching DID and SDID (*if relevant*) to the ANC of the output video. When set to Disable, the rule will not be applied, and all ANC packets on the input with matching DID and SDID (*if relevant*) will not be included in the ANC of the output video.

DID: This control allows the user to set the DID of the ANC packet to be passed through. Valid range is 0x01 to 0xFF.

SDID: This control allows the use to set the SDID of the ANC packet to be passed through. Valid range is 0x01 to 0xFF.

Packet Location: This control allows the user to specify whether the output ANC packet should be located in the HANC or VANC region. By selecting ***VANC,*** the incoming packets will be inserted on the VANC region of the output video. By selecting ***HANC,*** the incoming ANC packets will be inserted on the HANC region of the output video.

Field 1 Output Line: This control allows the user to set the field 1 output line of the ANC packet to be passed through. The valid range is video standard dependent.

Field 2 Output Line: This control allows the user to set the field 2 output line of the ANC packet to be passed through. This control is only valid for interlaced output video standards. The valid range is video standard dependent.

Interlaced to Progressive Conversion Mode: This control allows the user to determine the method of outputting the ANC packets on an interlaced to progressive conversion. By selecting ***Pass Through,*** the module will take an ANC packet from input field 1 and insert it onto output progressive frame 1 and an ANC packet from input field 2 and insert it onto output progressive frame 2. By selecting ***Duplicate Packet,*** the module will embed data from input field 1 onto both frame 1 & 2 on the output.

Progressive to Interlaced Conversion Mode: This control allows the user to determine the method of outputting the ANC packets on a progressive to interlaced conversion. By selecting ***Pass Through,*** the module will take an ANC packet from input progressive frame 1 and insert it onto output field 1, and an ANC packet from input progressive frame 2 and insert it onto output field 2. By selecting ***Duplicate Packet,*** the module will embed data from input progressive frame 1 onto both output field 1 & 2. By selecting ***Field 1 Only,*** the module will only embed the incoming ANC packets onto output field 1. By selecting ***Field 2 Only,*** the module will only embed the incoming ANC packets onto output field 2.

Mapped ANC Packet Pass Through Status: This field reports the current state of the ANC Packet PassThru rule. The possible reported status values are:

Disabled	The ANC PassThru rule is currently **Disabled**
Not Detected	The ANC packet with corresponding DID and SDID (*if relevant*) is **not detected** on the input video
Processing	The ANC packet with corresponding DID and SDID (*if relevant*) is present on the input and actively being **processed** according to the defined ANC PassThru rule
Blocked	The ANC packet with corresponding DID and SDID (*if relevant*) is present on the input and is being **blocked** from ANC PassThru processing because that same DID and SDID is being processed by another component of the module (*For example: Source ID*)

4.18. SD APERTURE CONTROL

The precise definition of "active region" for an SD input is sometimes unclear. This is due to the fact that SD signals have been defined differently in various standards. The SD Aperture control allows the user to set the exact pixels and exact lines that are used to define the *SD Clean Aperture* and the *SD Production Aperture*. Both the *Clean Aperture* and the *Production Aperture* are independently definable. The user may define whether to use the *Clean Aperture* or the *Production Aperture* to determine the pixel aspect ratio for conversions.

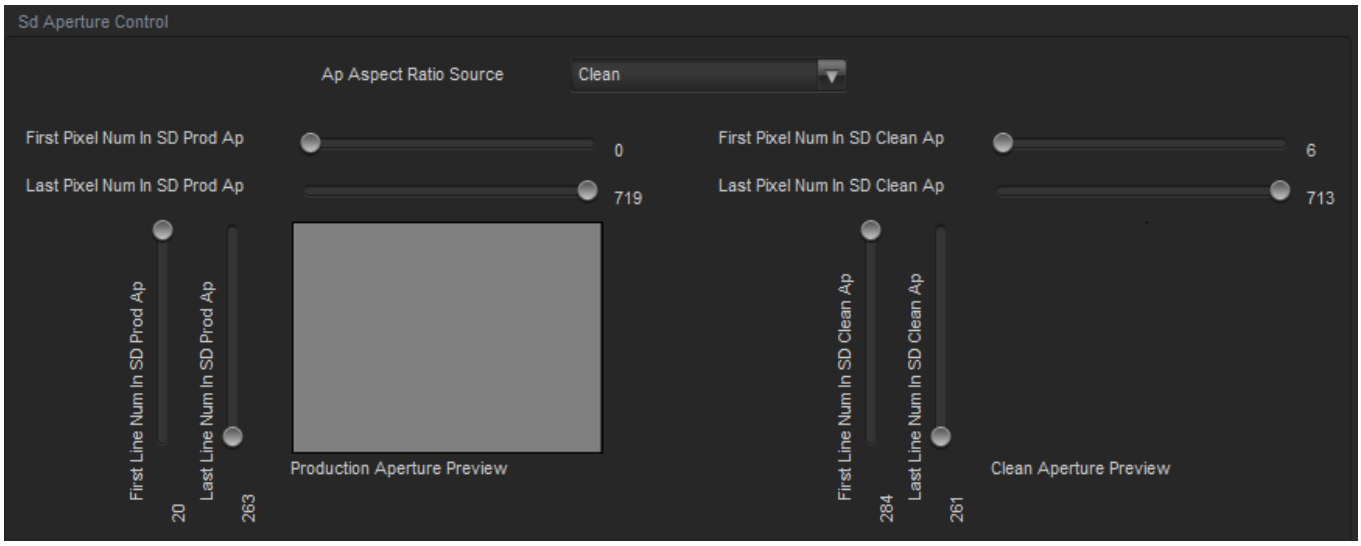


Figure 4-18: SD Aperture Control Tab

The ***Aperture Aspect Ratio Source*** control selects whether the *Production Aperture* or the *Clean Aperture* is used when converting input signals.

Production	Selects the *Production Aperture* to be used when converting input signals.
Clean	Selects the *Clean Aperture* to be used when converting input signals.

First Pixel Num in SD Prod Aperture	By moving the slider bar up and down you can define the first active horizontal pixel for the SD Production Aperture.
Last Pixel Num in SD Prod Aperture	By moving the slider bar up and down you can define the last active horizontal pixel for the SD Production Aperture.
First Line Num in SD Prod Aperture	By moving the slider bar up and down you can define the first active line for the SD Production Aperture.
Last Line Num in SD Prod Aperture	By moving the slider bar up and down you can define the last active line for the SD Production Aperture.

First Pixel Num in SD Clean Aperture	By moving the slider bar up and down you can define the first active horizontal pixel for the SD Clean Aperture.
Last Pixel Num in SD Clean Aperture	By moving the slider bar up and down you can define the last active horizontal pixel for the SD Clean Aperture.
First Line Num in SD Clean Aperture	By moving the slider bar up and down you can define the first active line for the SD Clean Aperture.
Last Line Num in SD Clean Aperture	By moving the slider bar up and down you can define the last active line for the SD Clean Aperture.

4.19. AFD CONTROL

The 7812UDX-AAV series of converters are fully AFD enabled and offer frame accurate and glitch free steering of aspect ratio conversions based on AFD signals decoded from incoming video signals. This applies for all variations of the 7812UDX-AAV series product line.

Within the 7812UDX-AAV series of products, AFD values are monitored and read from the incoming video signal every frame. These inbound AFD codes are then used to index a user programmable ARC/Scaler response for each output. Each incoming AFD code can have its own unique ARC/Scaler response. AFD codes are then re-stamped on the outbound video signals so that down-stream devices may further take advantage of the embedded AFD codes.

There are two main control tabs for AFD. These are the ***AFD Control*** and the ***AFD ARC*** control tabs. The following diagram depicts the ***AFD Control*** tab. Controls for both outputs operate in the same way; therefore, only controls for output 1 will be described in the manual.

Figure 4-19: AFD Control Tab

AFD Control

AFD Input Processing Enable: This control enables and disables the input side of the AFD processing. When *Enabled*, the module will decode incoming AFD values and adapt its processing to those AFD codes. When *Disabled*, the module will not decode incoming AFD values. When incoming AFD codes are not decoded, automatic steering of ARC processing based on AFD presets is not possible.

Loss of AFD Mode: This control enables the user to configure the action that the converter will take when incoming AFD signals are lost or not present. When incoming AFD signals are lost or not present the module can revert to a default ARC/Scaler setting or continue to use the last valid AFD received to steer conversions. The user can set this action by selecting one of the options from the drop down menu.

Loss of AFD Timeout: This control enables the user to set the number of consecutive frames missing AFD before loss of AFD is triggered.

AFD Stamp Source: This control enables the user to set the source for output AFD stamping. The user may configure the card to use the AFD value automatically generated by the scaler and its setting or to stamp a user defined AFD value.

AFD Output SD Aspect Ratio: This control enables the user to define whether SD outputs should be stamped with an AFD value that indicates a 16:9 or 4:3 output image raster. To set the aspect ratio, use the ***Output SD Aspect Ratio*** drop down menu to select the appropriate aspect ratio.

SMPTE2016-1 Output Enable: This control enables and disables the insertion of AFD packets in the outgoing video signal.

SMPTE2016-1 Output Line: This control defines the line on which AFD packets will be inserted into the outgoing video signal when AFD packet insertion is enabled. The user can set the output line using the ***AFD Output Line*** slider. Drag the slider right to increase the value or move it left to decrease the value of the ***AFD Output Line***. The valid range is from 7 to 24 with a default of line 9.

SMPTE2016-1 Bar Output Enable: This control *Enables*/*Disables* Bar Data on the output video. Bar data is used with AFD in order to indicate the exact image size if not exactly 16:9 or 4:3. The following image depicts the drop down menu with the available controls.

WSS Output Enable: This control allows the user to select the source of the output video WSS stamp.

VI Output Enable: This control allows the user to set the source of the output video VI stamp.

VI Read Line Number: This control allows the user to select the line number where the VI will be read on the SD input video.

VI Write Line Number: This control allows the user to select the line number where the VI will be written to on the SD output video.

4.20. WSS – ET SI EN 300 294

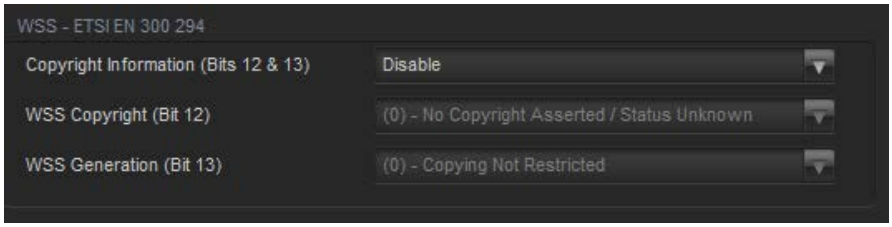


Figure 4-20: WSS – ET SI EN 300 294

WSS – ETSI EN 300 294

Copyright Information (Bits 12 & 13): This control allows the user to enable or disable copyright generation on the WSS stamp (ETSI EN 300 294).

WSS Copyright (Bit 12): This control allows the user to enable or disable copyright on the WSS stamp if the Copyright Information control is enabled above. The user can either select *No Copyright Asserted* (Default value) or *Copyright Asserted*.

WSS Generation (Bit 13): This control allows the user to enable or disable copyright on the WSS stamp if the Copyright Information control is enabled above. The user can either select *Copying Restricted* (Default value) or *Copying Not Restricted*.

4.21. AFD MONITOR

The ***AFD Monitor*** tab is used to monitor the input and output AFD codes. The following sections contain more detailed information on each of the monitoring options.

Figure 4-21: AFD Monitor Tab

Input SMPTE2016-1 Code Status: Any detected SMPTE2016-1 values on the incoming video signal will be reported in this area. The detected SMPTE2016-1 code will be presented and a pictorial representation of what that code means will be presented beside the numerical SMPTE2016-1 value.

Output SMPTE2016-1 Code Status: The SMPTE2016-1 code being stamped on the outputs of the card (if applicable) will be presented and a pictorial representation of what that SMPTE2016-1 code means will be presented beside the numerical SMPTE2016-1 value.

4.22. AFD ARC

The ***AFD ARC*** control tab is the key section that enables the user to define the automatic steering of *Aspect Ratio Conversions* in response to incoming AFD codes. For each incoming AFD code, the user may specify a unique ARC/Scaler operating mode and a unique output AFD code. In this way, incoming AFD codes are effectively treated as "virtual GPIs" that recall scaler specific card presets.

To properly configure the 7812UDX-AAV series cards for AFD, precede to the ***AFD ARC*** control tab. Select an AFD code using the *AFD Select* drop down menu. This corresponds to the inbound AFD value for which you will define a specific ARC/Scaler response. In the ***Conversion*** section, select the specific ARC processing that you would like to occur every time that specified input side AFD code is received. Furthermore, specify the outbound AFD code in the ***AFD Stamp*** section. Note that the ***AFD Stamp*** control is enabled only when the ***AFD Stamp Source*** is set to *User AFD Stamp*. Once all settings are selected, press the *Apply* button on the top of the control tab. If using the ***Auto Recall Preset*** function you should also select the 'Store to auto recall preset' option under the utilities control tab in the Store user presets control. Perform this process for each incoming AFD value.

Note that it is possible for each input video standard to have their own unique set of AFD code responses. This can be done using the ***Auto Recall Preset*** function. When doing so, the first step in defining automatic AFD processing is to first consider your input video standard. Select the appropriate input video standard within the ***Video*** control tab and press the *Apply* button. Following this, complete the process outlined in the preceding paragraph. Be sure to complete this process for each relevant input video standard.

Figure 4-22: AFD ARC Tab

AFD Select: This control enables the user to select the incoming AFD code to which a scaler response will be defined. Use the drop down menu as shown below (in Figure 6-26) to select an AFD code. As each menu item is selected, a pictorial representation of the actual aspect ratio being selected is shown on the right hand side of the screen beside the drop down selection.

The following AFD codes may be selected.

16:9 frame, code '0010'	Scaler/ARC responses will be defined for AFD code 16:9 frame, code '0010'
16:9 frame, code '0011'	Scaler/ARC responses will be defined for AFD code 16:9 frame, code '0011'
16:9 frame, code '0100'	Scaler/ARC responses will be defined for AFD code 16:9 frame, code '0100'
16:9 frame, code '1000'	Scaler/ARC responses will be defined for AFD code 16:9 frame, code '1000'
16:9 frame, code '1001'	Scaler/ARC responses will be defined for AFD code 16:9 frame, code '1001'
16:9 frame, code '1010'	Scaler/ARC responses will be defined for AFD code 16:9 frame, code '1010'
16:9 frame, code '1011'	Scaler/ARC responses will be defined for AFD code 16:9 frame, code '1011'
16:9 frame, code '1101'	Scaler/ARC responses will be defined for AFD code 16:9 frame, code '1101'
16:9 frame, code '1110'	Scaler/ARC responses will be defined for AFD code 16:9 frame, code '1110'
16:9 frame code '1111'	Scaler/ARC responses will be defined for AFD code 16:9 frame code '1111'
4:3 frame, code '0010'	Scaler/ARC responses will be defined for AFD code 4::3 frame, code '0010'
4:3 frame, code '0011'	Scaler/ARC responses will be defined for AFD code 4:3 frame, code '0011'
4:3 frame, code '0100'	Scaler/ARC responses will be defined for AFD code 4:3 frame, code '0100'
4:3 frame, code '1000'	Scaler/ARC responses will be defined for AFD code 4:3 frame, code '1000'
4:3 frame, code '1001'	Scaler/ARC responses will be defined for AFD code 4:3 frame, code '1001'
4:3 frame, code '1010'	Scaler/ARC responses will be defined for AFD code 4:3 frame, code '1010'
4:3 frame, code '1011'	Scaler/ARC responses will be defined for AFD code 4:3 frame, code '1011'
4:3 frame code '1101'	Scaler/ARC responses will be defined for AFD code 4:3 frame code '1101'
4:3 frame code '1110'	Scaler/ARC responses will be defined for AFD code 4:3 frame code '1110'
4:3 frame code '1111'	Scaler/ARC responses will be defined for AFD code 4:3 frame code '1111'

AFD Stamp: This control enables the user to specify the type of outgoing AFD code. Depending on the type of AFD being used there will be a variety of selected AFD stamp codes. The ***AFD Stamp*** control is enabled only when the ***AFD Stamp Source*** is set to *User AFD Stamp*. Use the ***AFD Stamp*** drop down menu to select the appropriate out-bound AFD code. As each AFD code is selected, a pictorial representation of what that AFD code means is shown in the right hand side of the screen.

Aspect Ratio Conversion: The ***Aspect Ratio*** **Conversion** menu is used to select the ARC processing that the card will perform in response to the selected incoming AFD code.

There are numerous pre-defined aspect ratio conversions available, as well as the ability to define custom aspect ratio conversions. When the *User Aspect* mode is selected, the user can set input image cropping and output image size on a pixel-by-pixel and line-by-line basis.

Full Raster	*Converts the full input raster to full output raster. If the input and output aspect ratios are not equivalent, there will be aspect distortion.*
User Aspect	*Converts the region of the input raster defined by the Input H & V Start and Stop values to the region of the output raster defined by the Output H & V Start and Stop values with coloured side panels.*
4:3 Side Panel to 16:9 TB Cut ***13:9 Letter Box to 16:9 TB Cut*** ***14:9 Letter Box to 16:9 TB Cut*** ***13:9 Stretch to 16:9 TB Cut*** ***14:9 Stretch to 16:9 TB Cut*** ***16:9 Stretch to 16:9 TB Cut***	*These settings convert the input picture to 16:9 top and bottom cuts.* ***Note: For 1080i/1035i inputs, these functions only work in field mode.***
13:9 Stretch to 4:3 Side Panel ***14:9 Stretch to 4:3 Side Panel*** ***16:9 Stretch to 4:3 Side Panel***	*These settings squeeze common stretched input video back to 4:3 side panel images on a 16:9 aspect raster.*
4:3 to 4:3 Side Panel on 16:9 ***4:3 to 13:9 Stretch on 16:9*** ***4:3 to 14:9 Stretch on 16:9*** ***4:3 to 16:9 Stretch on 16:9*** ***4:3 to 13:9 Crop on 16:9*** ***4:3 to 14:9 Crop on 16:9*** ***4:3 to 16:9 Crop on 16:9***	*These settings are common upconverter settings for converting 4:3 aspect ratio images to common 16:9 formats. These settings are not appropriate for cross or down conversion.*
16:9 to 16:9 Letter Box on 4:3 ***16:9 to 14:9 Letter Box on 4:3*** ***16:9 to 13:9 Letter Box on 4:3*** ***16:9 to 4:3 Side Cut on 4:3*** ***16:9 to 4:3 Squeeze on 4:3***	*These settings are common down converter settings for converting 16:9 aspect ratio images to common 4:3 formats. These settings are not appropriate for cross or up conversion.*
16:9 Top Letter Box on 4:3 to 16:9 ***14:9 Top Letter Box on 4:3 to 16:9 TB Cut*** ***14:9 Top Letter Box on 4:3 to 14.9 Side Panel*** ***14:9 Top Letter Box on 4:3 to 16:9 Stretch on 16.9*** ***16:9 Top Letter Box on 4:3 to 16:9***	
14.9 Letter Box on 4:3 to 16:9 TB Cut ***14:9 Letterbox on 4:3 to 14.9 Side Panel*** ***14.9 Letterbox on 4.3 to 16.9 Stretch on 16.9***	
4.3 Side Panel on 16.9 to 4:3 ***14.9 Side Panel to 14.9 Letter Box on 4:3*** ***14.9 Side Panel to 4:3 Side Cut on 4:3*** ***14.9 Side Panel to 4.3 Squeeze on 4.3***	

User Aspect Ratio Setting: There are four registers for each input video standard that set the portion of the input picture that will be converted. These register settings do not have any effect when the pre-defined aspect ratios are used.

Input H Start/ Input H Stop:	The *Input H Start* and *Input H Stop* define the horizontal portion of the input image to process to the output raster.
Input V Start/ Input V Stop:	The *Input V Start* and *Input V Stop* define the vertical portion of the input image to process to the output raster.

When operating with *User Defined* aspect ratio conversions, there are four registers for each output video standard that defines the size of the output image and how to place the resulting image on the output video raster.

Output H Start/ Output H Stop:	The *Output H Start* and *Output H Stop* define how to scale the cropped input image horizontally and where to position it horizontally on the output raster. The image will be stretched to fill the width. (I.e. For 1080i the range of values are 0 to 1919. The range of values for 720p output is 0 to 1279).
Output V Start/ Output V Stop:	The *Output V Start* and *Output V Stop* define how to scale the cropped input image vertically and where to position it vertically on the output raster. The image will be stretched to fill the height. (I.e. For 1080i, the range of values are 0 to 539. The range of values for 720p output is 0 to 719).

4.23. NOISE CONTROL

The ***Noise Control*** tab is used to configure parameters associated with the video noise reduction processing. There are three different types of noise reduction supported in the 7812UDX-AAV series products including *Mosquito Noise Reduction* (MNR), *Block Artifact Reduction* (BAR) and *General Noise Reduction*. The *General Noise Reduction* section is a motion adaptive spatial-temporal and recursive noise filter.

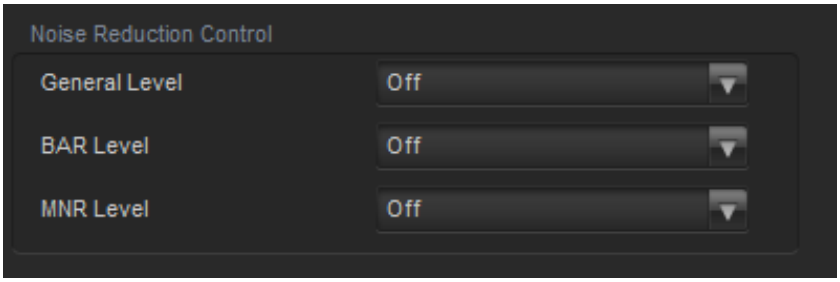


Figure 4-23: Noise Control Tab

Noise Reduction Control

General Level: This control allows the user to set the strength of the applied *General Noise Reduction* filter. Select the level of noise reduction to be applied by selecting the appropriate value from the drop down menu.

BAR Level: This control allows the user to set the strength of the applied *Block Artifact Reduction* filter. Select the level of noise reduction to be applied by selecting the appropriate value from the drop down menu.

MNR Level: This control allows the user to set the strength of the applied *Mosquito Noise Reduction* filter. Select the level of noise reduction to be applied by selecting the appropriate value from the drop down menu.

Off	Noise reduction will not be enabled.
Low	A Low level of noise reduction will be applied.
Medium Low	A Medium Low level of noise reduction will be applied.
Medium	A Medium level of noise reduction will be applied.
Medium High	A Medium High level of noise reduction will be applied.
High	A High level of noise reduction will be applied.

Note: Setting the value higher than needed to remove the noise present will over soften areas of low amplitude, fine details.

Note: Setting the value too low may cause the circuitry to leave random noise that it could remove. However, removal of low-level details will be minimized

4.24. SCTE 104

The *SCTE104* Control Tab manages the process of passing SCTE104 packets from the card's input to the card's output.

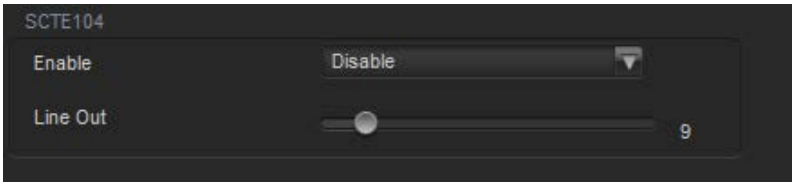


Figure 4-24: SCTE 104 Tab

SCTE104 Enable Control: This control simply enables and disables the re-insertion of SCTE104 packets in the outgoing video signal. When set to *Enable*, the SCTE104 packets will be re-inserted into the outgoing video signal. When set to *Disable*, SCTE104 packets will not be re-inserted into the outgoing video signal.

Enable	SCTE104 packets will be re-inserted into the outgoing video signal.
Disable	SCTE104 packets will not be re-inserted into the outgoing video signal.

Line Out Control: This control enables the user to set the specific line onto which SCTE104 packets will be inserted on the outgoing video signal. Drag the slider right to increase the value number and drag it left to decrease the value number. The value range is from 7 to 24 with a default value of 9. The *Line Out* control can be modified in increments of 1.

4.25. CC FAULTS TRAPS

The ***CC Fault Traps*** control enables the user to enable or disable Closed Caption traps and view trap status. To enable a particular trap, simply click the box located beside each trap so that a check-mark appears. When a check-mark is present, the trap is enabled. When a check-mark is not present, the trap is disabled.

If a parameter under the *Trap Status* is green, then the trap is present. If the parameter is red, then the trap is missing.

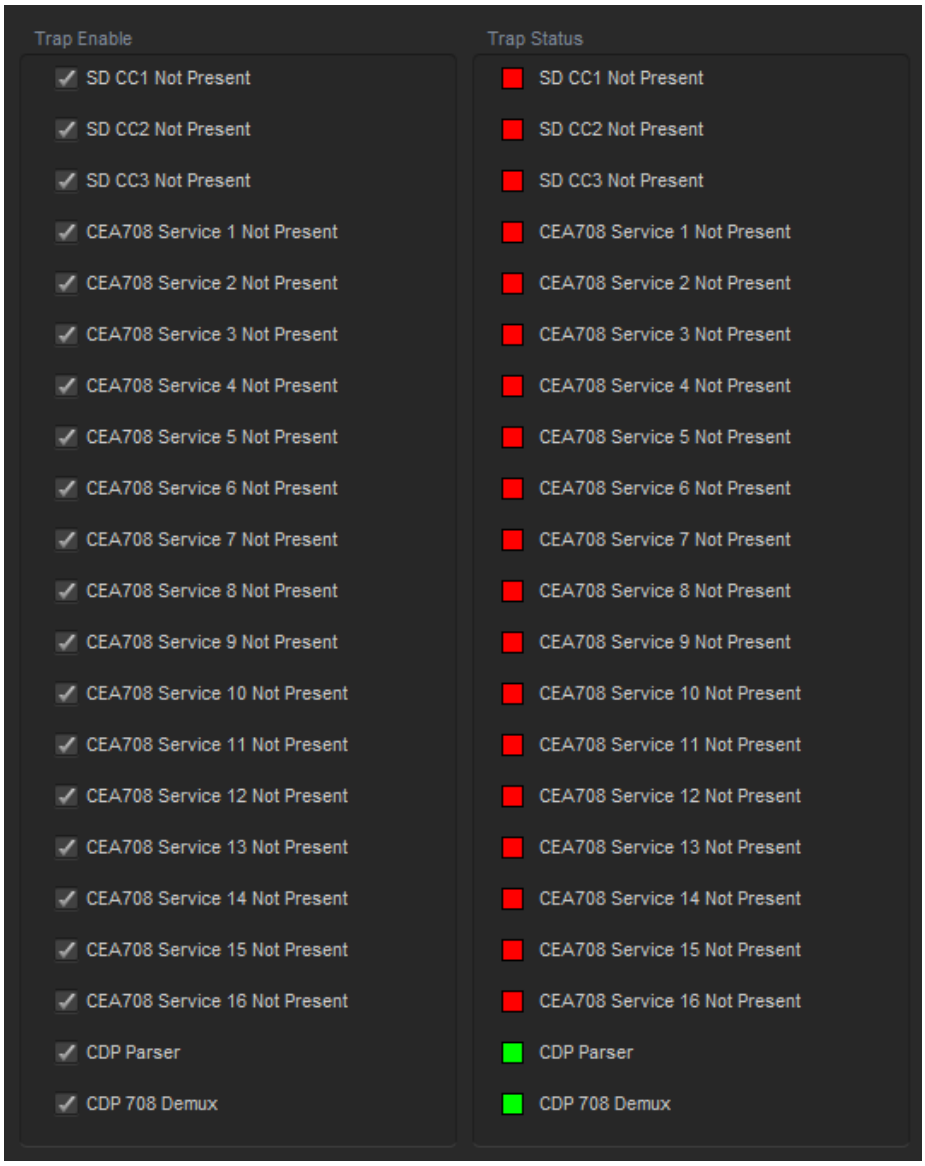


Figure 4-25: CC Faults Traps

4.26. AUDIO/VIDEO TRAPS

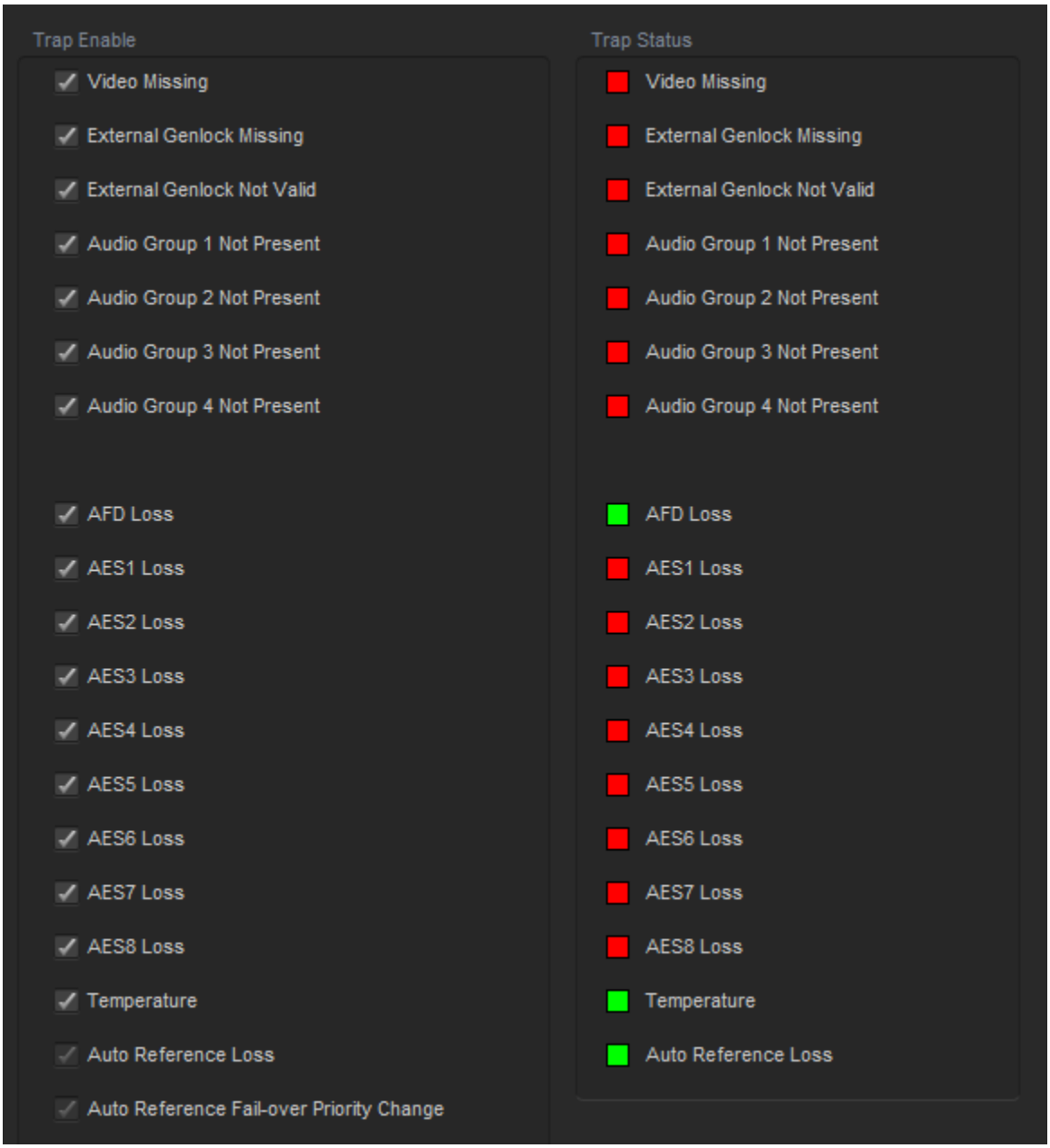


Figure 4-26: Audio/Video Traps Tab

4.27. GPIO CONTROL

This ***GPIO Control*** tab allows the user to define the direction and function of each of the module's GPIOs. For the sake of brevity, only the controls for GPIO1 will be discussed. GPIO2 to 8 operates in the same fashion.

GPIO1 may be configured to be a GPI or a GPO. When set to operate as a GPI, the user may use the GPI to recall a card preset or trigger the playing/looping of a particular set of side panel logos. When set to be a GPO, the user may use the GPO to "tally" a particular logo that is being played/looped or a particular card preset that has been selected.

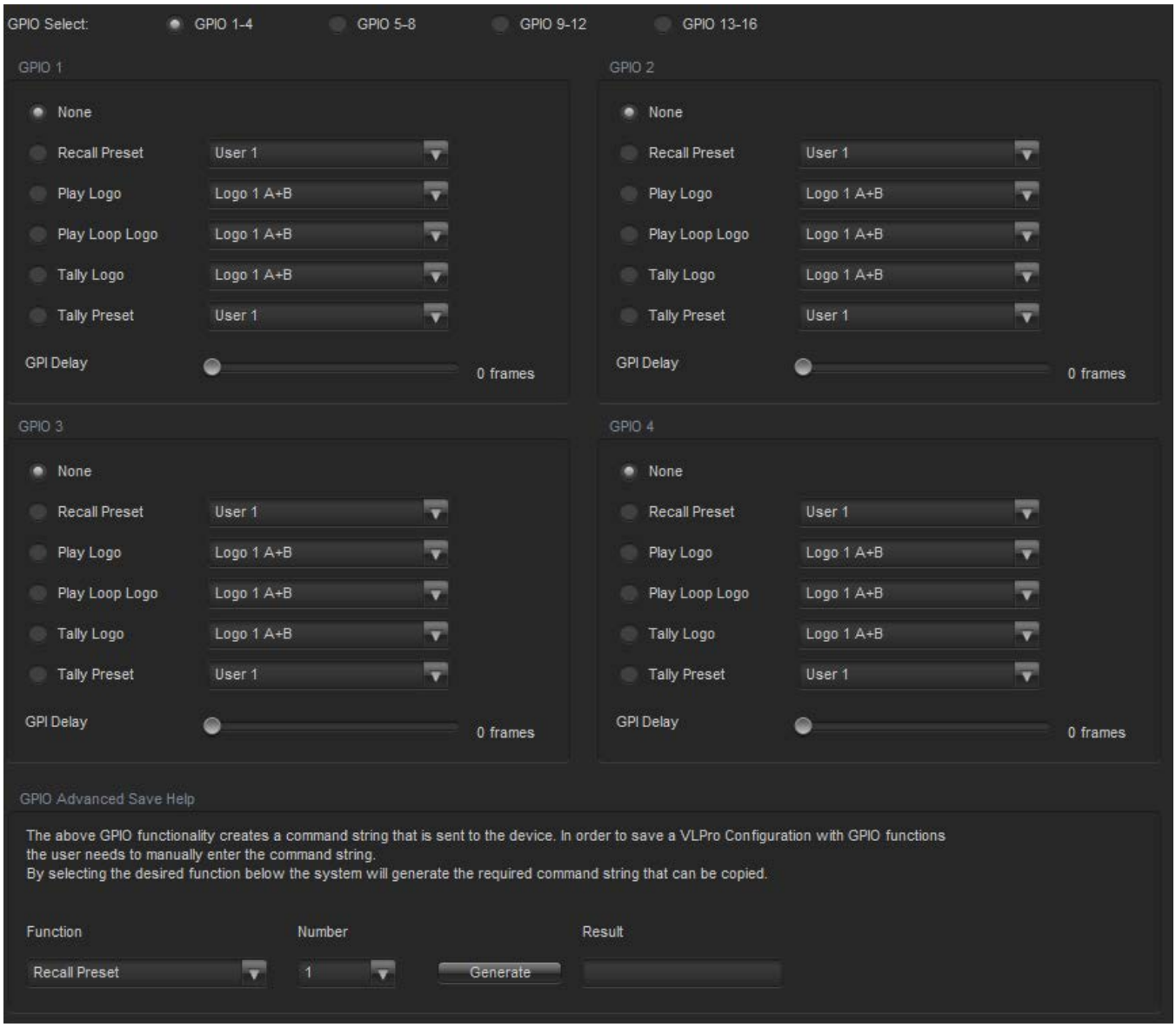


Figure 4-27: GPIO Control Tab

GPIO <1-4>

Recall Preset: To use GPIO1 as a GPI and to further configure it for recalling a card preset, click on the ***Recall Preset*** radio button. Ensure that a black dot is present inside this circle. The 7812UDX-AAV series converter modules provide ten user presets, which can be recalled when GPIO1 is activated. Using the drop down menu, select which user preset should be recalled when GPIO1 is activated.

The ***Recall Preset*** control is used to set which preset will be recalled by the respective GPI input if it is closed to ground.

GPI settings are also stored in the User Presets in addition to the other settings. If the GPI settings are not the same for each video input and output combination, unexpected results may occur. In other words, make sure your GPI settings are the same for each User Preset.

Play Logo: To use GPIO1 as a GPI and to further configure it for playing a particular logo, click on the ***Play Logo*** radio button. Ensure that a black dot is present inside this circle. The 7812UDX-AAV series converter modules can support up to ten logo sets that can be recalled when GPIO1 is activated. Using the drop down menu, select which logo should be recalled when GPIO1 is activated.

Logo 1 A+B	Play Logo 1 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 2 A+B	Play Logo 2 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 3 A+B	Play Logo 3 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 4 A+B	Play Logo 4 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 5 A+B	Play Logo 5 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 6 A+B	Play Logo 6 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 7 A+B	Play Logo 7 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 8 A+B	Play Logo 8 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 9 A+B	Play Logo 9 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 10 A+B	Play Logo 10 A+B (A is the left hand side logo and B is the right hand side logo)

Play Loop Logo: To use GPIO1 as a GPI and to further configure it for playing and looping a particular logo, click on the ***Play Loop Logo*** radio button. Ensure that a black dot is present inside this circle. The 7812UDX-AAV series converter modules can support 10 logo sets that can be recalled, played and looped when GPIO1 is activated. Using the drop down menu, select which logo should be recalled when GPIO1 is activated.

Logo 1 A+B	Play and Loop Logo 1 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 2 A+B	Play and Loop Logo 2 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 3 A+B	Play and Loop Logo 3 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 4 A+B	Play and Loop Logo 4 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 5 A+B	Play and Loop Logo 5 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 6 A+B	Play and Loop Logo 6 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 7 A+B	Play and Loop Logo 7 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 8 A+B	Play and Loop Logo 8 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 9 A+B	Play and Loop Logo 9 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 10 A+B	Play and Loop Logo 10A+B (A is the left hand side logo and B is the right hand side logo)

Tally Logo: To use GPIO1 as a GPO, and to further configure its tallying or indicating when a particular logo is playing, click on the ***Tally Logo*** radio button. Ensure that a black dot is present inside this circle. The 7812UDX-AAV series converter modules support ten logos whose status can be reported in this way.

Logo 1 A+B	Tally status of Logo 1 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 2 A+B	Tally status of Logo 2 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 3 A+B	Tally status of Logo 3 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 4 A+B	Tally status of Logo 4 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 5 A+B	Tally status of Logo 5 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 6 A+B	Tally status of Logo 6 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 7 A+B	Tally status of Logo 7 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 8 A+B	Tally status of Logo 8 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 9 A+B	Tally status of Logo 9 A+B (A is the left hand side logo and B is the right hand side logo)
Logo 10 A+B	Tally status of Logo 10 A+B (A is the left hand side logo and B is the right hand side logo)

Tally Preset: To use GPIO1 as a GPO and to further configure its tallying or indicating when a card preset has been selected, click on the ***Tally Preset*** radio button. Ensure that a white dot is present inside this circle. The 7812UDX-AAV series converter modules support ten card presets whose status can be reported in this way

GPI Delay: This parameter allows the user to control the user added video frame delay for triggered GPI behaviours.

4.28. PANEL LOGO

With +CF2G enabled 7812UDX-AAV series modules, static or animated logos may be stored in the on-board compact flash. The ***Panel Logo*** control tab is used to manage the when and how this side panel is inserted into the out-going video stream.

Up to 10 sets of side panels can be managed within the ***Panel Logo*** control tab. For each set of side panels, the left hand side panel is referenced as $Logo_n$ A and the right hand side panel is referenced as $Logo_n$ B. Before a set of side panels can be keyed into the outgoing video, the side panel content must first be moved from compact flash storage to play-out cache storage. This process is initiated by pressing the CUE button for the related side panel. Depending on the size of the side panel content animations, this process can take several minutes. Once the side panel content has been fully moved into play-out cache the STATUS A and STATUS B boxes beside the relevant logo will become RED and text indicating “QUED” will appear. $Logo_n$ A is cued first and $Logo_n$ B is cued second.

Once the queuing process is complete, you can choose to play the side panel animation once by pressing the PLAY button. By pressing the PLAY LOOP button, the animation sequence will continually play and re-play until the STOP A, STOP B or STOP ALL buttons are pressed.

Note that the cueing, playing and stop functions can also be managed using GPI inputs on 7812UDX-AAV series modules.

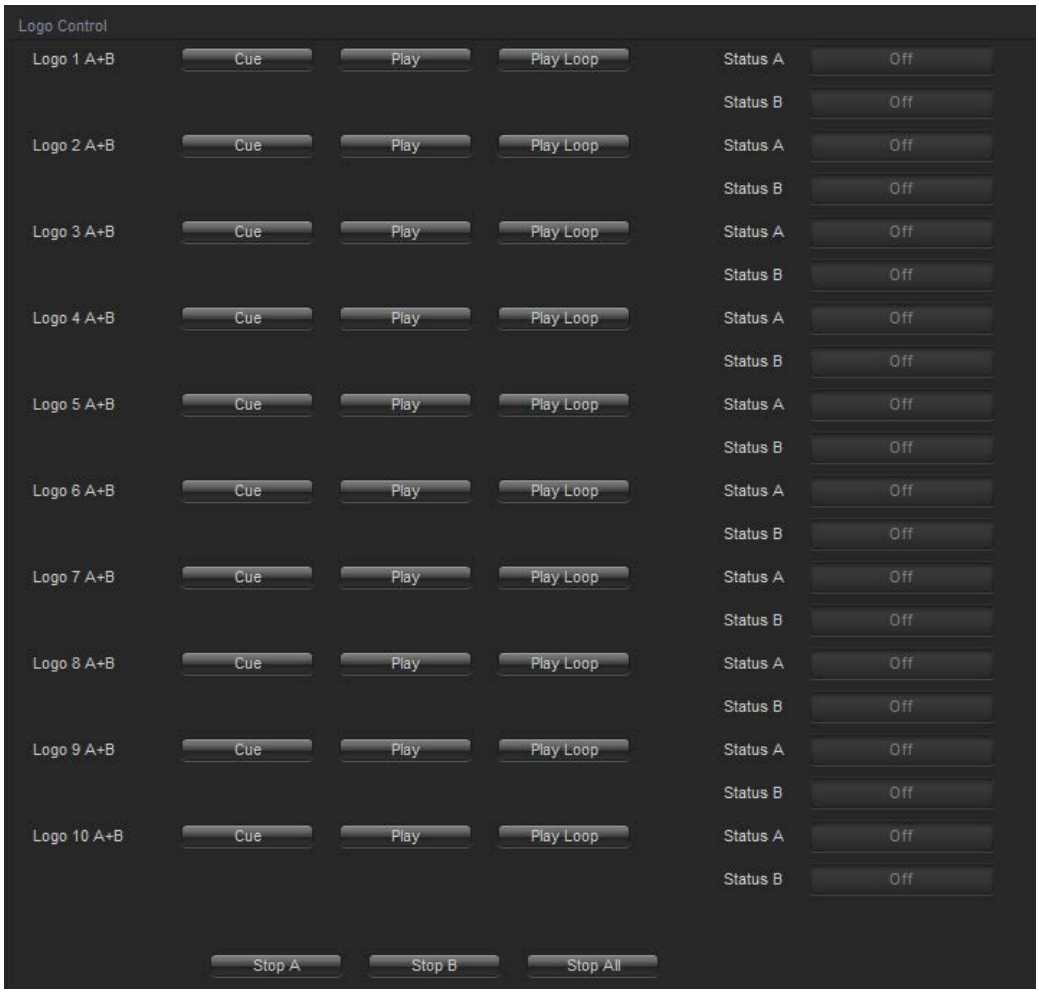


Figure 4-28: Panel Logo Tab

4.29. IP

All 7812UDX-AAV series modules have a dedicated Ethernet port for controlling module functions as a 7812 mini-agent and up-loading data to the on-board compact flash (CF2G option).

Setting the IP address of the 7812UDX-AAV series dedicated Ethernet port is done through VLPRO using the IP control tab. To set the IP address, type the desired network settings into the ***IP Address***, ***Subnet Mask*** and ***Default Gateway*** fields and then press *Apply*.

Note: The card MUST be re-booted for the IP address change to take effect.

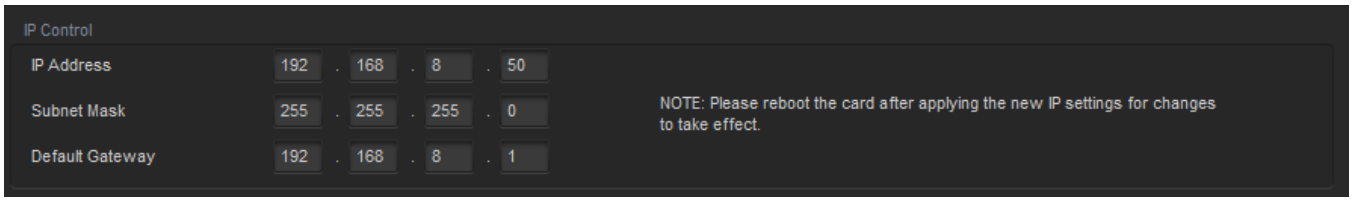


Figure 4-29: IP Control Tab

IP Address: This control allows the user to assign an IP address to the Control port of the 7812UDX-AAV card.

Netmask Address: This control allows the user to define the Netmask/Subnet for the Control port.

Gateway Address: This control allows the user to define the Gateway/Router address for the Control port, which will allow the card to communicate with devices on other networks

4.30. AUDIO 5.1 DOWN MIX

The 7812UDX-AAV series of modules can perform 5.1 PCM to stereo (LtRt or LoRo) down mixing. This is a standard feature in all variations of the module.

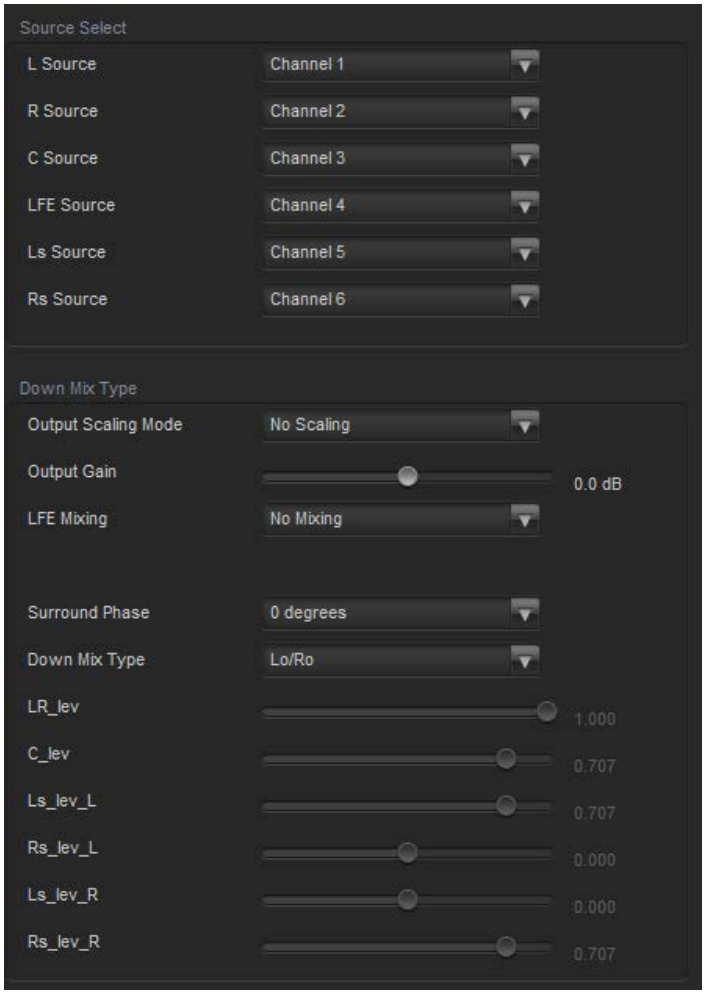


Figure 4-30: Audio 5.1 Down Mix Tab

Source Select: These controls set the audio input source for each of the downmix processor input channels (*L / R / C / LFE / Ls / Rs*). The audio input source can be any of the 16 embedded audio channels on the processed SDI output signal (*which sources the video encoder*).

Product Option	Mixer Sources
All Products	Mute DMX channels 1-16 Mono mix DMX channels (8 pairs – 1&2, 3&4, etc.) Down mix L, R Down mix mono
Upmix [+UMX2]	Up mix L, R, C, LFE, Ls, Rs, passthru L, passthru R
IntelliGain® [+IG2]	IntelliGain® 1 channels 1-8 IntelliGain® 2 channels 1-8
Dolby Decoder 1 and 2 (+DD or +DD2)	Dolby Decoder A Channel 1 - 8 (+DD) Dobly Deocder A Minitor Channel 1 – 2 (+DD) Dolby Decoder B Channel 1 – 8 (+DD2) Dolby Decoder B Monitor Channel 1 – 2 (+DD2)

Down Mix Type

Output Scaling Mode: This control allows the user to determine whether the down mix matrixing is normalized or not. To normalize matrix coefficients, ***Overflow Scaling*** *must be selected.* Normalization of matrix coefficients will avoid any possibility of overflow, but it tends to lower the loudness level when compared against the original 5.1 input. If no normalization is applied, the stereo down-mix usually sounds at the similar levels as the 5.1 audio inputs. But clipping may occur when the input sound level is close to 0dB FS

Output Gain: This control allows the user to configure the output gain of the Downmix audio processing outputs (Downmix L & R). The output gain ranges from -20 dB to +20 dB in 0.1 dB increments.

LFE Mixing: This control allows the user to control whether the LFE channel is included or not in the audio down-mixing.

Surround Phase: This control allows the user to choose whether no phase shift (0 degrees) or a 90 degree phase shift is applied to the surround channels before being passed to the down-mix matrix. Select 0 degree if no 90-degree phase shift is needed. It is required that surround channels are 90-degree phase shifted for Dolby Prologic I decoding, but if surround channels in the 5.1 audio input are already 90-degree phase shifted, then the user should select 0 degree to avoid double 90-degree phase shifting. Normally, the 90 degrees phase shift is applied.

Down Mix Type: This control allows the user to set the type of audio down-mixing that will be performed. The user may select from LoRo (Left Only and Right Only), LtRt (Left Total and Right Total) Prologic I and LtRt (Left Total and Right Total) Prologic II OR may choose to perform a Custom down-mix.

Custom Down Mix Coefficients: When the *Down Mix Type* is set to *Custom* the following equation will be used to generate the down-mixed audio.

$$L = (LR_{lev} \times L + C_{lev} \times C + Ls_{levL} \times Ls\{0° / 90°\} + Rs_{levL} \times Rs\{0° / 90°\} + lfe_{gain} \times LFE) \times gain \div norm$$

$$R = (LR_{lev} \times R + C_{lev} \times C + Ls_{levR} \times Ls\{0° / 90°\} + Rs_{levR} \times Rs\{0° / 90°\} + lfe_{gain} \times LFE) \times gain \div norm$$

Where lfe_{gain} is controlled by LFE Mixing and LFE Gain, $gain$ is controlled by Output Gain and $norm$ is controlled by Output Scaling Mode and where LR_{lev}, C_{lev}, Ls_{levL}, Rs_{levL}, Ls_{levR} **and** Rs_{levR} are custom specified user coefficients. These custom down-mixing coefficients are controlled using the appropriate slider bars in the *Custom Down mix Coefficients* control section in VISTALINK® PRO (see **Error! Reference source not found.**).

LR_{lev} **:** Ranges from 1.000 to –1.000 in increments of 0.001.
C_{lev} **:** Ranges from 1.000 to –1.000 in increments of 0.001.
Ls_{levL} **:** Ranges from 1.000 to –1.000 in increments of 0.001.
Rs_{levL} **:** Ranges from 1.000 to –1.000 in increments of 0.001.
Ls_{levR} **:** Ranges from 1.000 to –1.000 in increments of 0.001.
Rs_{levR} **:** Ranges from 1.000 to –1.000 in increments of 0.001.

4.31. DOLBY METADATA

The 7812UDX-AAV series of modules have the ability to author Dolby Metadata and insert that information into the VANC of the outgoing video signals. The ***Dolby Metadata Encoder*** control tab sets some high level parameters for the Dolby metadata insertion process.

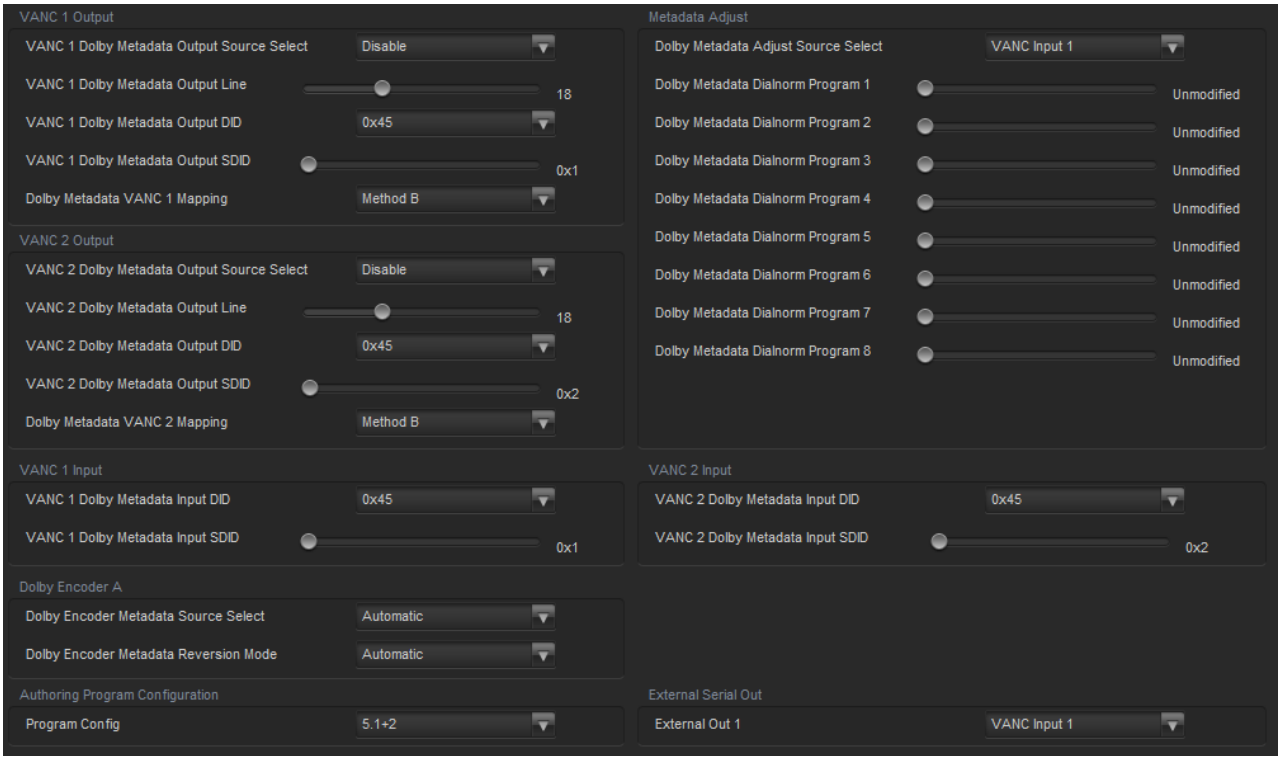


Figure 4-31: Dolby Metadata Tab

VANC <1-2> Output

Each of the VANC outputs has the following controls available for configuration.

VANC Dolby Metadata Output Source Select: This control allows the user to enable or disable the Dolby Metadata Encoder. When set to *Disable*, Dolby Metadata authoring and insertion will not be enabled. When set to *Enable*, Dolby Metadata authoring and insertion will be enabled.

Disable	Dolby Metadata authoring and insertion will not be enabled.
Dolby Decoder A or B	Dolby Metadata authoring and insertion will be enabled sourced by either decoder A or decoder B.
External Input 1	Dolby metadata VANC output will be sourced by the external Metadata input on the rear-plate.
VANC Input 1 or 2	Dolby Metadata VANC output will be sourced by the incoming VANC source 1 or 2
Metadata Adjust A or B	Dolby metadata VANC output will be sourced by the Metadata Adjust Tab through the A or B metadata adjust controls.
Metadata Author A or B	Dolby metadata VANC output will be sourced by the Metadata Author tab in either the Metadata Author A or B controls.

VANC Dolby Metadata Output Line: This control enables the user to adjust the line on which Dolby metadata is encoded. To adjust the control, drag the slider right to increase the value and left to decrease the value. The ***Output Line*** value ranges from 7 to 41 in increments of 1 line. The default setting is 18.

VANC Dolby Metadata Output DID: This control sets the DID for the Dolby Metadata ancillary data packets. Use the drop down menu to pick the desired DID.

0x45	0x45 is selected for the DID for the Dolby Metadata ANC data packet.
0x50	0x50 is selected for the DID for the Dolby Metadata ANC data packet.
0x51	0x51 is selected for the DID for the Dolby Metadata ANC data packet.
0x52	0x52 is selected for the DID for the Dolby Metadata ANC data packet.
0x53	0x53 is selected for the DID for the Dolby Metadata ANC data packet.
0x54	0x54 is selected for the DID for the Dolby Metadata ANC data packet.
0x55	0x55 is selected for the DID for the Dolby Metadata ANC data packet.
0x56	0x56 is selected for the DID for the Dolby Metadata ANC data packet.
0x57	0x57 is selected for the DID for the Dolby Metadata ANC data packet.
0x58	0x58 is selected for the DID for the Dolby Metadata ANC data packet.
0x59	0x59 is selected for the DID for the Dolby Metadata ANC data packet.
0x5A	0x5A is selected for the DID for the Dolby Metadata ANC data packet.
0x5B	0x5B is selected for the DID for the Dolby Metadata ANC data packet.
0x5C	0x5C is selected for the DID for the Dolby Metadata ANC data packet.
0x5D	0x5D is selected for the DID for the Dolby Metadata ANC data packet.
0x5E	0x5E is selected for the DID for the Dolby Metadata ANC data packet.
0x5F	0x5F is selected for the DID for the Dolby Metadata ANC data packet.
0xC0	0xC0 is selected for the DID for the Dolby Metadata ANC data packet.
0xC1	0xC1 is selected for the DID for the Dolby Metadata ANC data packet.
0xC2	0xC2 is selected for the DID for the Dolby Metadata ANC data packet.
0xC3	0xC3 is selected for the DID for the Dolby Metadata ANC data packet.
0xC4	0xC4 is selected for the DID for the Dolby Metadata ANC data packet.
0xC5	0xC5 is selected for the DID for the Dolby Metadata ANC data packet.
0xC6	0xC6 is selected for the DID for the Dolby Metadata ANC data packet.
0xC7	0xC7 is selected for the DID for the Dolby Metadata ANC data packet.
0xC8	0xC8 is selected for the DID for the Dolby Metadata ANC data packet.
0xC9	0xC9 is selected for the DID for the Dolby Metadata ANC data packet.
0xCA	0xCA is selected for the DID for the Dolby Metadata ANC data packet.
0xCB	0xCB is selected for the DID for the Dolby Metadata ANC data packet.
0XCC	0XCC is selected for the DID for the Dolby Metadata ANC data packet.
0xCD	0xCD is selected for the DID for the Dolby Metadata ANC data packet.
0xCE	0xCE is selected for the DID for the Dolby Metadata ANC data packet.
0xCF	0xCF is selected for the DID for the Dolby Metadata ANC data packet.

Table 4-2: Output DID

VANC Dolby Metadata Output SDID: This control sets the output SDID for the Dolby Metadata ancillary data packets. To adjust the control, drag the slider right to increase the value and left to decrease the value. The ***SDID Control*** value ranges from 0x1 to 0xFF. The default value is 0x1.

Dolby Metatdata VANC Mapping: This control allows the user to select the Dolby metadata VANC packet transport method to be used.

VANC <1-2> Input

VANC Dolby Metadata Input DID: This control sets the DID for the Dolby Metadata ancillary data packets. Use the drop down menu to pick the desired DID, see Table 4-2 for available DID values.

VANC Dolby Metadata Input SDID: This control sets the input SDID for the Dolby Metadata ancillary data packets. To adjust the control, drag the slider right to increase the value and left to decrease the value. The ***SDID Control*** value ranges from 0x1 to 0xFF. The default value is 0x1.

Dolby Encoder A-B

Dolby Encoder Metadata Source Select: This control allows the user to select the Dolby Metadata preset source. The user can select either VANC Input 1 or 2, Dolby Decoder A or B or external Input for the source.

Dolby Encoder Metadata Reversion Mode: This control allows the user to select the Dolby reversion mode. The user can select either *VANC Input 1* or *2*, *Dolby Decoder A* or *B*, *external Input*, *Metadata Adjust*, *Metadata Author*, *Automatic*, *Stop* or *Last Good Frame* for the mode to use.

Authoring Program Configuration

Program Configuration: This control is used to describe the desired Dolby encoding mode that should be applied.

External Serial Out

External Out: This control allows the user to select the source of Dolby Metadata to be source to the serial external output of the module.

4.32. DOLBY METADATA PRESETS

The ***Dolby Metadata Presets*** tab allows the user to call specific user defined presets depending on the presence or loss of Dolby Metadata or particular program configurations.

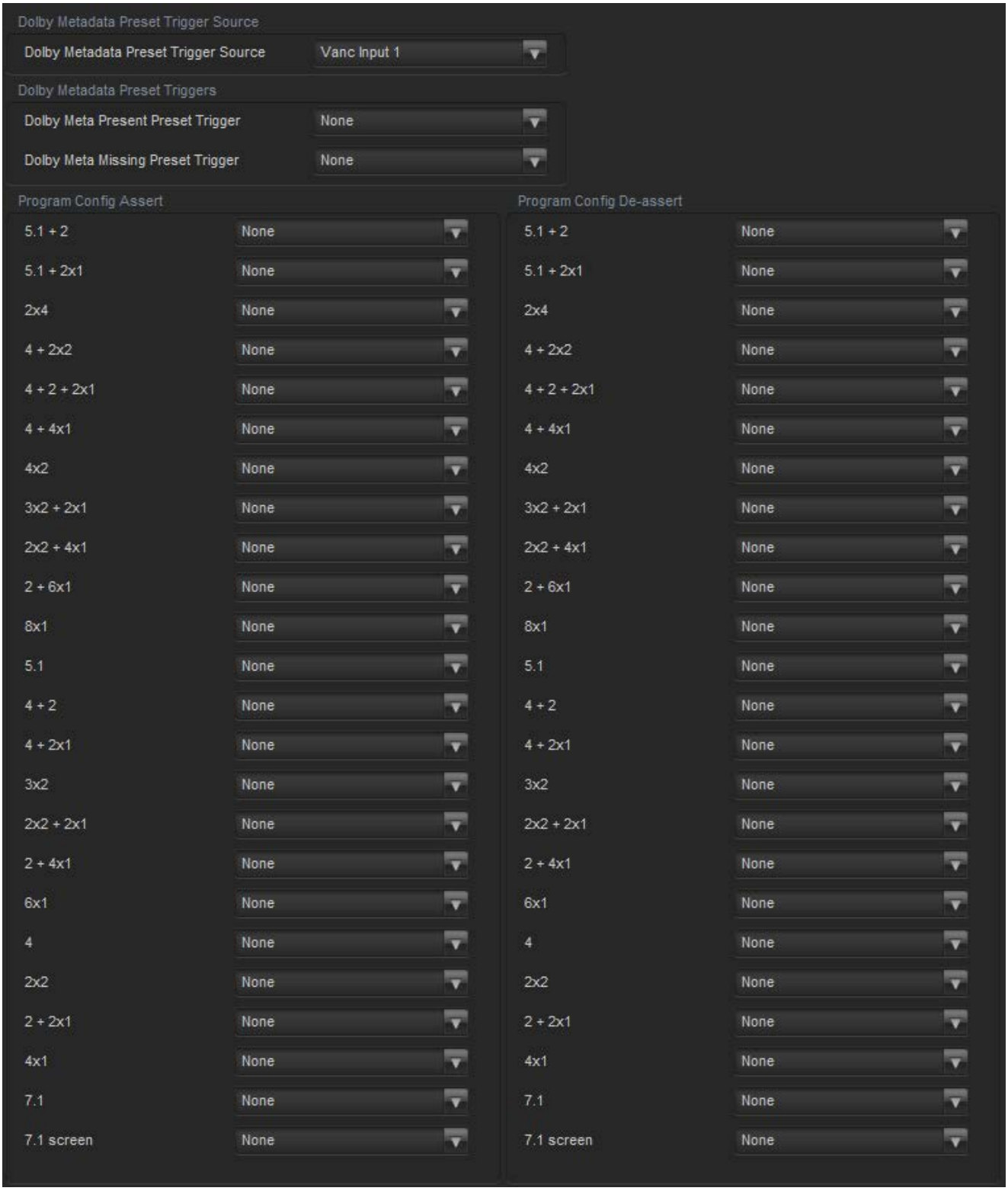


Figure 4-32: Dolby Metadata Presets Tab

Dolby Metadata Preset Trigger Source

Dolby Metadata Preset Trigger Source: This control allows the user to select where the Dolby Metadata source is coming from.

Dolby Metadata Preset Triggers

Dolby Meta Present Preset Trigger: This control is used to trigger presets saved to the module when a presence of Dolby Metadata is detected.

Dolby Meta Missing Preset Trigger: This control is used to trigger presets saved to the module when the absence of Metadata is detected.

Program Config Assert: This control is used to allow the user to select a specific user defined preset with a presence of a specific Program Mode. Each of the different program modes can select any of the 10 user defined presets.

Program Config De-Assert: This control is used to allow the user to select a specific user defined preset with the absence of a specific Program Mode. Each of the different program modes can select any of the 10 user defined presets.

4.33. DOLBY METADATA AUTHOR

There are eight unique programs for each output path that Dolby Metadata may be specified. For simplicity, only *Dolby Metadata Programs 1* will be shown in this manual. Many definitions are based on Dolby Metadata Guide (Issue 3) S05/14660/16797 and all due credits are hereby given to Dolby Laboratories.

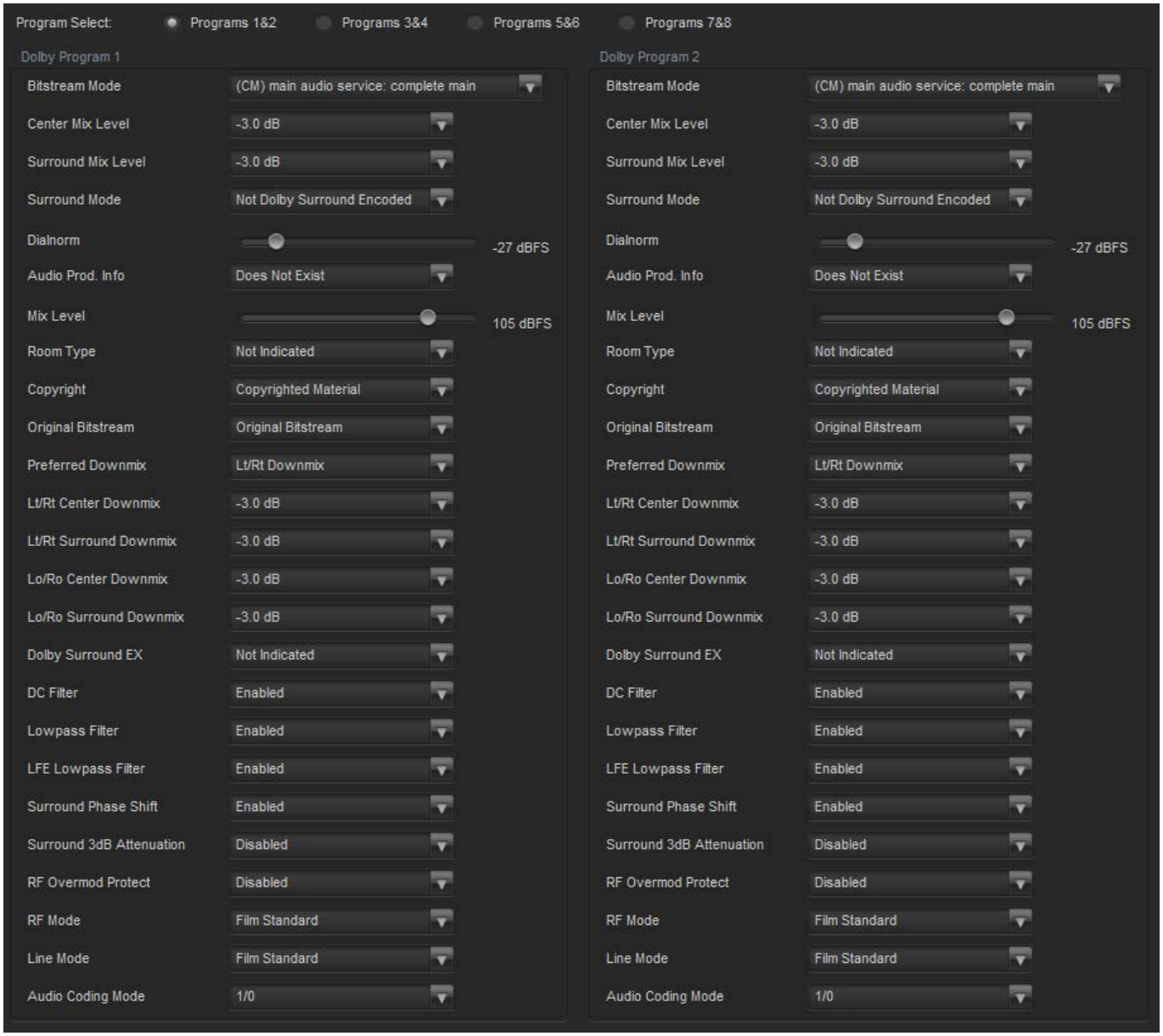


Figure 4-33: Dolby Metadata Author Tab

Dolby Program

Bitstream Mode: This control enables the user to set the bit-stream mode for Program 1. This parameter describes the audio service contained within the Dolby bit-stream. A complete audio program may consist of a main audio service (a complete mix of the entire program audio), an associated audio service comprising a complete mix, or one main service combined with an associated service. To form a complete audio program, it may be (but rarely is) necessary to decode both a main service and an associated service. An example of an exception to this is an emergency service within a digital television program. Most programming typically uses Complete Main (CM) as its setting.

CM	*CM* flags the bit-stream as the main audio service for the program and indicates that all elements are present to form a complete audio program. This is the most common setting. The CM service may contain from one (mono) to six (5.1) channels.
ME	*ME* flags the bit-stream as the main audio service for the program, minus a dialogue channel. The dialogue channel, if any, is intended to be carried by an associated dialogue service. Different dialogue services can be associated with a single ME service to support multiple languages.
VI	*VI* flags the bit-stream as a single-channel program intended to provide a narrative description of the picture content to be decoded along with the main audio service. The VI service may also be a complete mix of all program channels, comprising up to six channels.
HI	*HI* flags the bit-stream as a single-channel program intended to convey audio that has been processed for increased intelligibility and decoded along with the main audio service. The HI service may also be a complete mix of all program channels, comprising up to six channels.
D	*D* flags the bit-stream as a single-channel program intended to provide a dialogue channel for a ME service. If the ME service contains more than two channels, the D service is limited to only one channel; if the ME service is two channels, the D service can be a stereo pair. The appropriate channels of each service are mixed together (requires special decoders).
C	*C* flags the bit-stream as a single-channel program intended to convey additional commentary that can be optionally decoded along with the main audio service. This service differs from a dialogue service because it contains an optional, rather than a required, dialogue channel. The C service may also be a complete mix of all program channels, comprising up to six channels.
E	*E* flags the bit-stream as single-channel service that is given priority in reproduction. When the E service appears in the bit-stream, it is given priority in the decoder and the main service is muted.
VO	*VO* flags the bit-stream as a single-channel service intended to be decoded and mixed to the Center channel (requires special decoders).

Center Mix Level: This control enables the user to author the centre mix level for program 1 of the Dolby Stream.

- 3dB	The Center channel is attenuated 3 dB and sent to the Left and Right channels.
-4.5 dB	The Center channel is attenuated 4.5 dB and sent to the Left and Right channels.
-6.0 dB	The Center channel is attenuated 6 dB and sent to the Left and Right channels.

Surround Mix Level: This control enables the user to author the surround mix level of the Dolby Stream. When the encoded audio has one or more Surround channels, but the consumer does not have surround speakers, this parameter indicates the nominal down-mix level for the Surround channel(s) with respect to the Left and Right front channels. Dolby Digital decoders use this parameter during down-mixing in Lo/Ro mode when Extended BSI parameters are not active.

- 3dB	The Left and Right Surround channels are each attenuated 3 dB and sent to the Left and Right front channels, respectively.
-6.0 dB	Same as above, but the signal is attenuated 6 dB.
0.0 dB	The Surround channel(s) are discarded.

Surround Mode: This control enables the user to author the surround mode of the Dolby stream. This parameter indicates to a Dolby Digital decoding product that also contains a Dolby Pro Logic decoder (for example a 5.1-channel amplifier), whether or not the two-channel encoded bit-stream contains a Dolby Surround (Lt/Rt) program that requires Pro Logic decoding. Decoders can use this flag to automatically switch on Pro Logic decoding as required.

Dialnorm: This control enables the user to author the *Dialnorm Level* of the Dolby bitstream. When received at the consumer's Dolby Digital decoder, this parameter setting determines a level shift in the decoder that sets, or normalizes, the average audio output of the decoder to a preset level. This aids in matching audio volume between program sources. To adjust the ***Dialnorm Control***, drag the slide right to increase the value and left to decrease the value. The ***Dialnorm Control*** has a value range of –1 dBFS to –31 dBFS in increments of 1 dBFS. The default value is -27 dBFS.

Audio Prod. Info: This control enables the user to author the ***Audio Production Information*** for the Dolby bitstream. This parameter indicates whether the mixing level and room type values are valid. If *Yes*, then a receiver or amplifier could use these values as described below. If *No*, then the values in these fields are invalid. In practice, only high-end consumer equipment implements these features. Use the drop down to set this control.

Mix Level: This control allows the user to author the Mix Level for the Dolby bit-stream. The ***Mix Level*** parameter describes the peak sound pressure level (SPL) used during the final mixing session at the studio or on the dubbing stage. The parameter allows an amplifier to set its volume control such that the SPL in the replay environment matches that of the mixing room. This control operates in addition to the dialogue level control, and is best thought of as the final volume setting on the consumer's equipment. This value can be determined by measuring the SPL of pink noise at studio reference level and then adding the amount of digital headroom above that level. For example, if 85 dB equates to a reference level of –20 dBFS, the mixing level is 85 + 20, or 105 dB. Use the slide bar to change the authored Mix Level in the Dolby Metadata packet. The Mix Level ranges from 80 dBFS to 110 dBFS. The default value is 105 dBFS.

Room Type: This control enables the user to author the Room Type information. The ***Room Type*** parameter describes the equalization used during the final mixing session at the studio or on the dubbing stage. A *Large* room is a dubbing stage with the industry standard X-curve equalization; a *Small* room has flat equalization. This parameter allows an amplifier to be set to the same equalization as that heard in the final mixing environment.

Copyright: This control allows the user to author the Copyright information for the Dolby bit-stream. This parameter indicates whether the encoded Dolby Digital bitstream is copyright protected. It has no effect on Dolby Digital decoders and its purpose is purely to provide information.
Original Bitstream: This control allows the user to author the Original Bitstream metadata for the Dolby bit-stream. This parameter indicates whether the encoded Dolby Digital bitstream is the master version or a copy. It has no effect on Dolby Digital decoders and its purpose is purely to provide information.

Preferred Downmix: This control allows the user to author the Preferred Down-Mix metadata for the Dolby bit-stream. This parameter allows the producer to select either the Lt/Rt or the Lo/Ro downmix in a consumer decoder that has stereo outputs. Consumer receivers are able to override this selection, but this parameter provides the opportunity for a 5.1-channel soundtrack to play in Lo/Ro mode without user intervention. This is especially useful on music material.

Lt/Rt Center Downmix: This control allows the user to author the LtRt Center Down-Mix metadata for the Dolby bit-stream. This parameter indicates the level shift applied to the Center channel when adding to the left and right outputs as a result of down-mixing to a Lt/Rt output.

Lt/Rt Surround Downmix: This control allows the user to author the LtRt Surround Control metadata for the Dolby bit-stream. This parameter indicates the level shift applied to the Surround channels when down-mixing to a Lt/Rt output.

Lo/Ro Center Downmix: This control allows the user to author the LoRo Center Control metadata for the Dolby bit-stream. This parameter indicates the level shift applied to the Center channel when adding to the left and right outputs as a result of down-mixing to a Lo/Ro output. When Extended BSI parameters are active, this parameter replaces the Center Down-mix Level parameter in the universal parameters.

Lo/Ro Surround Downmix: This control allows the user to author the LoRo Surround Control metadata for the Dolby bit-stream. This parameter indicates the level shift applied to the Surround channels when down-mixing to a Lo/Ro output. When Extended BSI parameters are active, this parameter replaces the Surround Down-mix Level parameter in the universal parameters.

Dolby Surround EX: This control allows the user to author the Surround EX Control metadata for the Dolby bit-stream. This parameter is used to identify the encoded audio as material encoded in Surround EXTM. This parameter is only used if the encoded audio has two Surround channels. An amplifier or receiver with Dolby Digital Surround EX decoding can use this parameter as a flag to switch the decoding on or off automatically. The behaviour is similar to that of the Dolby Surround Mode parameter.

DC Filter: This control allows the user to author the DC Filter Control metadata for the Dolby bit-stream. This parameter determines whether a DC-blocking 3 Hz high-pass filter is applied to the main input channels of a Dolby Digital encoder prior to encoding. This parameter is not carried to the consumer decoder. It is used to remove DC offsets in the program audio and would only be switched off in exceptional circumstances.

Lowpass Filter: This control allows the user to author the Lowpass Filter Control metadata for the Dolby bit-stream. This parameter determines whether a lowpass filter is applied to the main input channels of a Dolby Digital encoder prior to encoding. This filter removes high frequency signals that are not encoded. At the suitable data rates, this filter operates above 20 kHz. In all cases, it prevents aliasing on decoding and is normally switched on. This parameter is not passed to the consumer decoder.

LFE Lowpass Filter: This control allows the user to author the LFE Lowpass Filter metadata for the Dolby bit-stream. This parameter determines whether a 120 Hz eighth-order low-pass filter is applied to the LFE channel input of a Dolby Digital encoder prior to encoding. It is ignored if the LFE channel is disabled. This parameter is not sent to the consumer decoder. The filter removes frequencies above 120 Hz that would cause aliasing when decoded. This filter should only be switched off if the audio to be encoded is known to have no signal above 120 Hz.

Surround Phase Shift: This control allows the user to author the Surround Phase Shift Control metadata for the Dolby bit-stream. This parameter causes the Dolby Digital encoder to apply a 90-degree phase shift to the Surround channels. This allows a Dolby Digital decoder to create a Lt/Rt downmix simply. For most material, the phase shift has a minimal impact when the Dolby Digital program is decoded to 5.1 channels, but it provides a Lt/Rt output that can be decoded with Pro Logic to L, C, R, and S, if desired. However, for some phase critical material (such as music) this phase shift is audible when listening in a 5.1- channel format. Likewise, some material downmixes to a satisfactory Lt/Rt signal without needing this phase shift. It is therefore important to balance the needs of the 5.1 mix and the Lt/Rt downmix for each program. The default setting is *Enable*.

Surround 3dB Attenuation: This control allows the user to author the *3 dB* Attenuation Control metadata for the Dolby bit-stream. The ***Surround 3 dB Attenuation*** parameter determines whether the Surround channel(s) are attenuated 3 dB before encoding. The attenuation actually takes place inside the Dolby Digital encoder. It balances the signal levels between theatrical mixing rooms (dubbing stages) and consumer mixing rooms (DVD or TV studios). Consumer mixing rooms are calibrated so that all five main channels are at the same sound pressure level (SPL). To maintain compatibility with older film formats, theatrical mixing rooms calibrate the SPL of the Surround channels 3 dB lower than the front channels. The consequence is that signal levels on tape are 3 dB louder. Therefore, to convert from a theatrical calibration to a consumer mix, it is necessary to reduce the Surround levels by 3 dB by enabling this parameter.

RF Overmod Protect: This control allows the user to author the RF Overmod Protect Control metadata for the Dolby bit-stream. This parameter is designed to protect against over modulation when a decoded Dolby Digital bitstream is RF modulated. When enabled, the Dolby Digital encoder includes pre-emphasis in its calculations for RF Mode compression. The parameter has no effect when decoding using Line mode compression. *Except in rare cases, this parameter should be disabled.*

Line Mode: This control allows the user to author the Line Mode metadata for the Dolby bit-stream. Six preset DRC profiles are available to content producers: Film Light, Film Standard, Music Light, Music Standard, Speech, and None.

Audio Coding Mode: This control allows the user to author the ***Audio Coding*** metadata for the Dolby bit-stream.

4.34. UP MIX CONTROL

With the +UMX option (available on –AES versions only) the 7812 series of converters can up mix stereo audio to 5.1 surround sound audio. The Up-mixing block also has the capability to auto detect the incoming source to see if it is a stereo pair or 5.1 signal being supplied and automatically upmix the incoming stereo pair or pass the incoming 5.1.

Figure 4-34: Up Mix Control Tab

Upmix Control

Upmix Mode: The Upmixer can automatically determine if the audio needs to be upmixed. It will detect whether 5.1 or a stereo pair is seen on its inputs.

Center Width: This parameter controls the width of front centre sound in the perceived sound image when listening to up-mixed audio. It mainly affects the perception of speech and dialogue. Narrower centre width will cause the front centre sound primarily coming from the centre speaker. Wider centre width causes the front centre sound comes from the centre, left and right speakers. To adjust the centre width of the up mix control, drag the slider right to increase the value of the centre width or drag the slider left to decrease the value of the centre width. The value range is 0 to 7 in increments of 1. The default value is 3.

Surround Depth: This parameter controls the depth of surround sound in the perceived sound image when listening to up-mixed audio. More sound will be directed to the front speakers (centre, left and right speakers) if a shallower surround depth is selected. If a deeper surround depth is selected, more sound will be shifted to the surround speakers. To adjust the depth of the surround, drag the slider right to increase the depth or drag it left to decrease the depth. The value range is 0 to 7 in increments of 1. The default value is 3.

Up Mix Surround Delay: This parameter controls the amount of time that the surround sound will be delayed against other channels. Proper amount of surround delay will provide a good perception of surround sound. To adjust the delay of the up mix surround, drag the slider to the right to increase the delay or drag it to the left to decrease the delay in milliseconds.

LFE Gain: This parameter controls the LFE channel gain after audio is up-mixed. Use the drop down menu to select the appropriate source.

Mute	Mute the LFE channel in the up-mixed audio.
+ 0 dB	Apply 0 dB gain to the generated LFE channel.
-1.5 dB	Apply –1.5 dB gain to the generated LFE channel.
-3.0 dB	Apply –3.0 dB gain to the generated LFE channel.
-4.5 dB	Apply –4.5 dB gain to the generated LFE channel.
-6.0 dB	Apply –6.0 dB gain to the generated LFE channel.
-7.5 dB	Apply –7.5 dB gain to the generated LFE channel.
-9.0 dB	Apply –9.0 dB gain to the generated LFE channel.

Sound Direction Detect Rate: This parameter controls the detection rate of sound direction. The up-mixer constantly calculates the sound image that would be perceived from the stereo audio input. If the sound direction shifts in the sound image, the up-mixer changes the output sound direction accordingly by switching the amount of sound going to different speakers. If faster detection rate is selected, the sound direction switching may sound more dramatic, but may also be felt as unnatural. On the other hand, slower detection rate would sound dull and uninteresting. To adjust the detection rate of the sound direction, drag the slider to the right to increase the rate or drag it to the left to decrease the rate. The value range is 0 to 7 in increments of 1. The default is level 4.

Soft Switch Duration: This parameter controls the transition time when the upmix module switches modes from 5.1 bypass to upmix and vice versa. The duration can range from xx ms to xx ms.

Stereo or 5.1 Monitor: This field monitors the incoming audio to determine if it is 2.0 or 5.1 and will provide this information.

Upmix Status: This field gives a visual representation of what mode the UMX block is currently running in.

Upmix Source Select: These controls set the audio input source for each of the downmix processor input channels (*L / R / C / LFE / Ls / Rs / Stereo Passthru L / Stereo Passthru R / Upmix Auto Source*). The audio input source can be any of the 16 embedded audio channels on the processed SDI output signal (*which sources the video encoder*).

4.35. INTELLIGAIN® CONFIGURATION

The ***IntelliGain™ Configuration*** tab displays the top-level IntelliGain™ control interface. There are a number of parameters that control both the intelligent leveler and the on-board dynamic processor (compressor, expander, and limiter). Figure 4-35 shows the ***IntelliGain™ Configuration*** view from the VistaLINK® NMS.

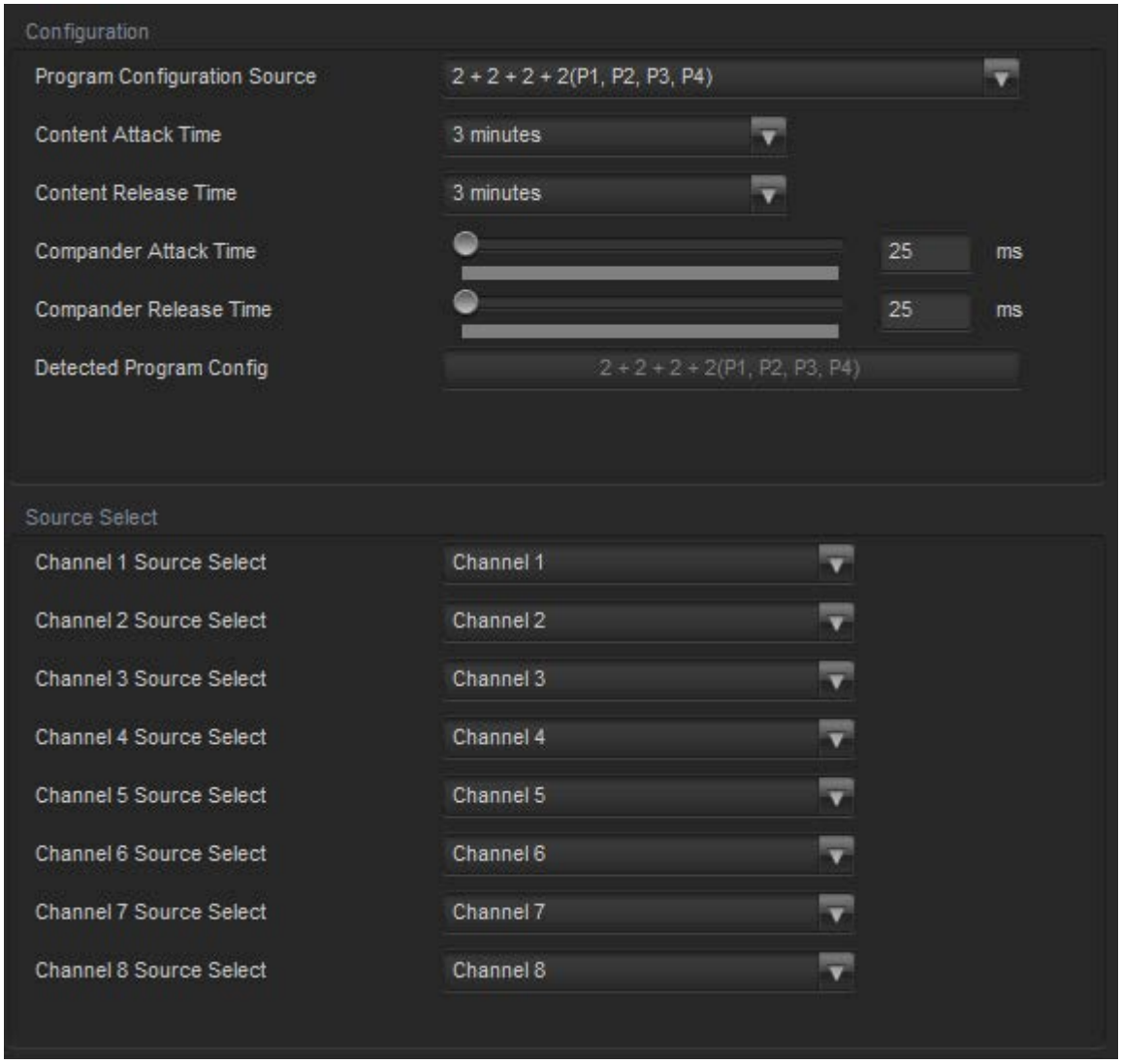


Figure 4-35: IntelliGain® Configuration Tab

Table 4-3 provides a brief overview of the top level of the IntelliGain™ Configuration menu tree.

Program Configuration Source	Defines how the audio channels are grouped together.
Program Attack Time	Defines the maximum integration time that is applied when loudness increases during a program period.
Program Release Time	Defines the maximum integration time that is applied when loudness decreases during a program period.
Compander Attack Time	Defines how quickly the compander reacts to an increase in the input loudness.
Compander Release Time	Defines how quickly the compander reacts to a decrease in the input loudness.
Detected Program Configuration Source	Indicates the detected program configuration by the internal IntelliGain™ program configuration parser.
Audio Source Select	Defines the audio channels that will be fed into the program audio channels.

Table 4-3: IntelliGain™ Configuration Options

Configuration

Program Configuration Source: This parameter defines how the audio channels are grouped together. Up to eight channels can be grouped together in individual programs, where each program contains its own metadata. IntelliGain™ uses this parameter to configure multiple internal settings. This control must be set to define the audio program provided as the input to IntelliGain™

Note: It is important to follow the program to channel mapping guidelines. For example, Program Configuration Source 2 + 2 + 2 + 2 defines audio program 1 mapped to AES 1, audio program 2 mapped to AES 4, audio program 3 mapped to AES 2 and audio program 4 mapped to AES 3. Program Configuration Source 2 + 2 + 2 + 2 (p1, p2, p3, p4) has the audio program mapped sequentially.

If the audio program configuration is defined to be of this type, it is recommended to use this Program Configuration Source. Table 4-5 provides a list of programs to channel mapping guidelines. For example, configuration 5.1+2, program 1 (P1) is mapped to channel CH1 to CH6 and program 2 (P2) is mapped to channel CH7 to CH8. Table 4-4 provides a list of abbreviations used:

Abbreviations	Description
P	Program
CH	Channel
L	Left or left front
R	Right or right front
C	Center or mono
LFE	Low frequency effect
Ls	Left surround
Rs	Right surround
Bsl	Back surround left
Bsr	Back surround right

Table 4-4: Abbreviations

Program Configuration	CH 1	CH 2	CH 3	CH 4	CH 5	CH 6	CH 7	CH 8
5.1+2	P1-L	P1-R	P1-C	P1-LFE	P1-Ls	P1-Rs	P2-L	P2-R
5.1 + 1 + 1	P1-L	P1-R	P1-C	P1-LFE	P1-Ls	P1-Rs	P2-C	P3-C
4 + 4	P1-L	P1-R	P1-C	P1-S	P2-C	P2-S	P2-L	P2-R
4 + 2 + 2	P1-L	P1-R	P1-C	P1-S	P3-L	P3-R	P2-L	P2-R
4 + 2 + 1 + 1	P1-L	P1-R	P1-C	P1-S	P3-C	P4-C	P2-L	P2-R
4 + 1 + 1 + 1 + 1	P1-L	P1-R	P1-C	P1-S	P4-C	P5-C	P2-C	P3-C
2 + 2 + 2 + 2	P1-L	P1-R	P3-L	P3-R	P4-L	P4-R	P2-L	P2-R
2 + 2 + 2 + 1 + 1	P1-L	P1-R	P3-L	P3-R	P4-C	P5-C	P2-L	P2-R
2 + 2 + 1 + 1 + 1 + 1	P1-L	P1-R	P3-C	P4-C	P5-C	P6-C	P2-L	P2-R
2 + 1 + 1 + 1 + 1 + 1 + 1	P1-L	P1-R	P4-C	P5-C	P6-C	P7-C	P2-C	P3-C
1 + 1 + 1 + 1 + 1 + 1 + 1 + 1	P1-C	P2-C	P3-C	P4-C	P5-C	P6-C	P7-C	P8-C
5.1	P1-L	P1-R	P1-C	P1-LFE	P1-Ls	P1-Rs	None	None
4 + 2	P1-L	P1-R	P1-C	P1-S	None	None	P2-L	P2-R
4 + 1 + 1	P1-L	P1-R	P1-C	P1-S	None	None	P2-C	P3-C
2 + 2 + 2	P1-L	P1-R	P3-L	P3-R	None	None	P2-L	P2-R
2 + 2 + 1 + 1	P1-L	P1-R	P3-C	P4-C	None	None	P2-L	P2-R
2 + 1 + 1 + 1 + 1	P1-L	P1-R	P4-C	P5-C	None	None	P2-C	P3-C
1 + 1 + 1 + 1 + 1 + 1	P1-C	P2-C	P3-C	P4-C	P5-C	P6-C	None	None
4	P1-L	P1-R	P1-C	P1-S	None	None	None	None
2 + 2	P1-L	P1-R	None	None	None	None	P2-L	P2-R
2 + 1 + 1	P1-L	P1-R	None	None	None	None	P2-C	P3-C
1 + 1 + 1 + 1	P1-C	P2-C	P3-C	P4-C	None	None	None	None
7.1	P1-L	P1-R	P1-C	P1-LFE	P1-Ls	P1-Rs	P1-Bsl	P1-Bsr
7.1 Screen	P1-L	P1-R	P1-C	P1-LFE	P1-Ls	P1-Rs	P1-Le	P1-Re
2 + 5.1	P1-L	P1-R	P2-L	P2-R	P2-C	P2-LFE	P2-Ls	P2-Rs
1 + 1 + 5.1	P1-C	P2-C	P3-L	P3-R	P3-C	P3-LFE	P3-Ls	P3-Rs
2 + 2 + 2 + 2 (p1, p2, p3, p4)	P1-L	P1-R	P2-L	P2-R	P3-L	P3-R	P4-L	P4-R
2 + 2 + 2 + 1 + 1 (p1, p2, p3, p4, p5)	P1-L	P1-R	P2-L	P2-R	P3-L	P3-R	P4-C	P5-C
2 + 2 + 2 (p1, p2, p3)	P1-L	P1-R	P2-L	P2-R	P3-L	P3-R	None	None

Table 4-5: Relationship between Audio Programs and Audio Channels

Content Attack Time: This control allows the user to define the maximum integration time that is applied when loudness increases during a program period. The actual integration time is content dependent. For more responsive results set the attack time to a smaller value.

Less than 1 second	< 1 sec. maximum integration time will be applied when loudness increases
Less than 2 seconds	< 2 sec. maximum integration time will be applied when loudness increases
Less than 3 seconds	< 3 sec. maximum integration time will be applied when loudness increases
Less than 6 seconds	< 6 sec. maximum integration time will be applied when loudness increases
11 seconds	11 sec. maximum integration time will be applied when loudness increases
22 seconds	22 sec. maximum integration time will be applied when loudness increases
44 seconds	44 sec. maximum integration time will be applied when loudness increases
88 seconds	88 sec. maximum integration time will be applied when loudness increases
3 minutes	3 min. maximum integration time will be applied when loudness increases
6 minutes	6 min. maximum integration time will be applied when loudness increases
12 minutes	12 min. maximum integration time will be applied when loudness increases
24 minutes	24 min. maximum integration time will be applied when loudness increases

Content Release Time: This control allows the user to define the maximum integration time that is applied when loudness decreases during program period. The actual integration time is content dependent. For more responsive results set the release time to a smaller value

Less than 1 second	< 1 sec. maximum integration time will be applied when loudness decreases
Less than 2 seconds	< 2 sec. maximum integration time will be applied when loudness decreases
Less than 3 seconds	< 3 sec. maximum integration time will be applied when loudness decreases
Less than 6 seconds	< 6 sec. maximum integration time will be applied when loudness decreases
11 seconds	11 sec. maximum integration time will be applied when loudness decreases
22 seconds	22 sec. maximum integration time will be applied when loudness decreases
44 seconds	44 sec. maximum integration time will be applied when loudness decreases
88 seconds	88 sec. maximum integration time will be applied when loudness decreases
3 minutes	3 min. maximum integration time will be applied when loudness decreases
6 minutes	6 min. maximum integration time will be applied when loudness decreases
12 minutes	12 min. maximum integration time will be applied when loudness decreases
24 minutes	24 min. maximum integration time will be applied when loudness decreases

Compander Release Time: This control allows the user to define how quickly the compander reacts to a decrease in the input loudness. The ***Compander Release Time*** should be larger than or equal to the ***Compander Attack Time***. The ***Compander Release Time*** can be set to any value from 10 ms to 2000 ms (2 sec.)

Detected Program Config: This control is used to monitor the type of program in use.

Source Select

Channel <1-8> Source Select: This control allows the user to select the Source to use for each channel.

4.36. INTELLIGAIN® PROGRAM CONTROL

IntelliGain™ can individually process up to eight audio programs independently. An audio program defines how the audio is grouped together. For example, a 5.1+2 program configuration mode is defined to have 2 audio programs. The first audio program is 5.1 and the second is 2. Table 4-6 outlines the relationship between the program configuration mode and the number of audio programs.

Program Configuration	Number of Programs
5.1 + 2	2
5.1 + 1 + 1	3
4 + 4	2
4 + 2 + 2	3
4 + 2 + 1 + 1	4
4 + 1 + 1 + 1 + 1	5
2 + 2 + 2 + 2	4
2 + 2 + 2 + 1 + 1	5
2 + 2 + 1 + 1 + 1 + 1	6
2 + 1 + 1 + 1 + 1 + 1	6
1 + 1 + 1 + 1 + 1 + 1 + 1 + 1	8
4	1
2 + 2	2
2 + 1 + 1	3
1 + 1 + 1 + 1	4
7.1	1
7.1 Screen	1
2 + 5.1	2
1 + 1 + 5.1	3
2 + 2 + 2 + 2 (p1, p2, p3, p4)	4
2 + 2 + 2 + 1 + 1 (p1, p2, p3, p4, p5)	5
2 + 2 + 2 (p1, p2, p3)	3

Table 4-6: Relationship between Program Configuration Mode and Audio Programs

The internal IntelliGain™ engine will analyze the value of the *Detected Program Config Source.* This value will determine how many Program VistaLINK® tabs are to be accessible.

For example, if IntelliGain™ detects a program configuration source of 5.1 + 2, then 2 program configuration tabs will be user accessible. However, if IntelliGain™ detects a program configuration source of 1 + 1 + 1 + 1 then 4 program configuration tabs will be accessible.

Figure 4-36 identifies up to eight program configuration tabs that are accessible via the VistaLINK® NMS.

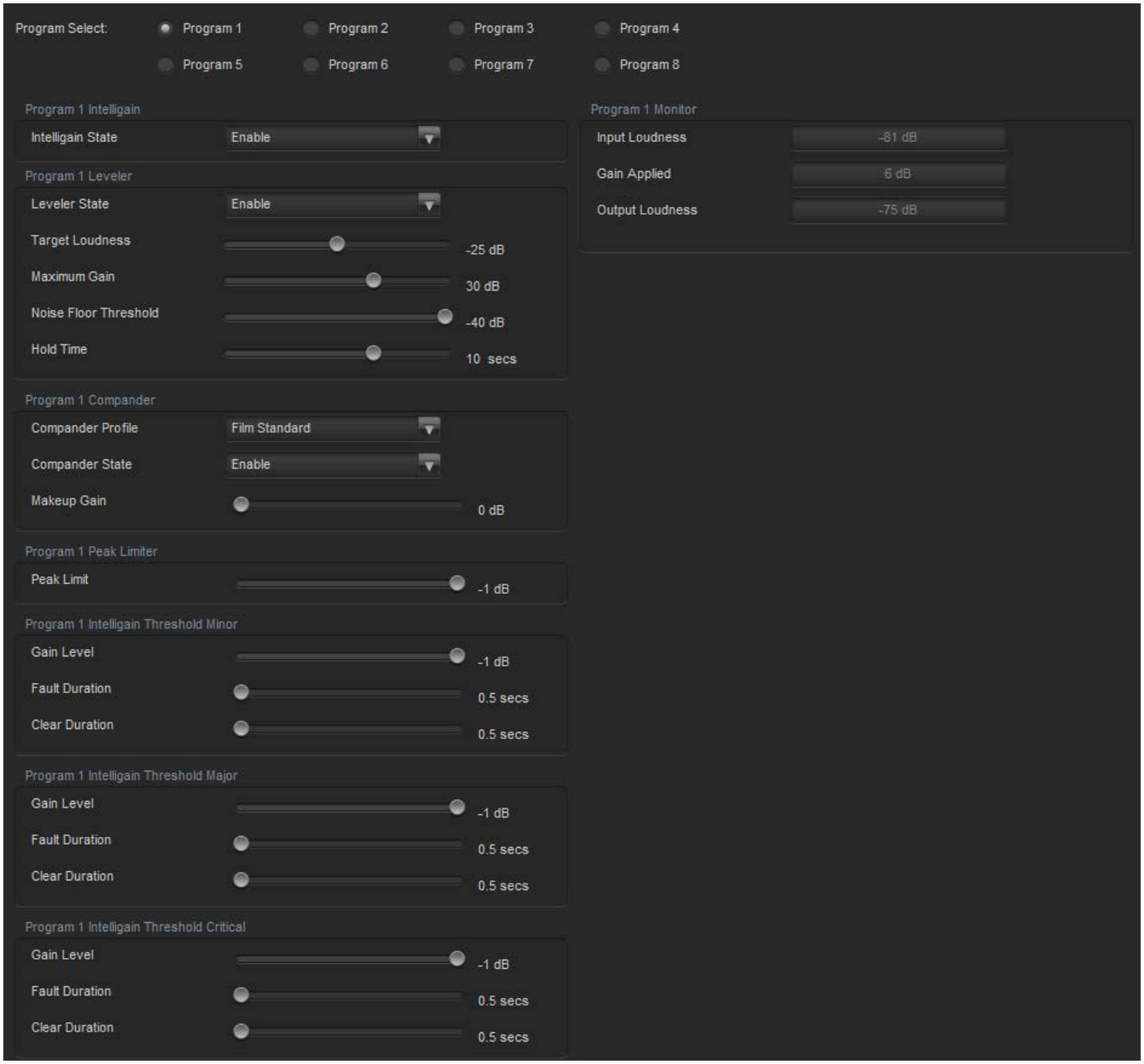


Figure 4-36: IntelliGain® Program Control Tab

Program x Intelligain

Intelligain State: This control is the master switch for the IntelliGain™ processor, which is used for the given audio program.

Program x Leveler

Leveler State: This control is used to activate the IntelliGain™ audio leveler. The leveler is used to level each individual audio channel to the target loudness level. Set this control to *Enable* to activate the IntelliGain™ audio leveler

Target Loudness: This control is used to set the target loudness level for the given audio program. The IntelliGain™ processor will level the audio to this value. Note that if the compander is enabled, it is

desirable to set the target loudness parameter to the range (–31 dB to –26 dB) and use *Makeup Gain* control to reach the final desired target loudness level. The *Target Loudness* control has a full range from -35 LKFS to -15 LKFS.

Maximum Gain: This control allows the user to set the total amount of gain that the IntelliGain™ engine will apply. For example, setting this control to 10 LKFS indicates that IntelliGain™ is not to add anymore than 10 LKFS of gain to the audio program, even if the audio program requires more gain to reach the target loudness level.

Noise Floor Threshold: This control is used to set the threshold level for IntelliGain™ processing. Levels below this value will not have IntelliGain™ processing applied.

Hold Time: This control is used to set the hold time for the given audio program. The IntelliGain™ processor will wait this period of time to add gain once the level goes below the target loudness.

Program x Compander

Compander Profile: The compander profiles are used to define the dynamic range control of the compander. There are 5 default profiles.

Film Standard	The *Film Standard* profile is used to compress/expand sporting events, and movies with a large dynamic range. Max Boost: 6 dB (below –43 dB) Boost Range: –43 to –31 dB (2:1 ratio) Null Band Width: 5 dB (–31 to –26 dB) Early Cut Range: –26 to –16 dB (2:1 ratio) Cut Range: –16 to +4 dB (20:1 ratio)
Film Light	The *File Light* profile is used to compress/expand light movies or program content such as dramas or content with less dynamic range. Max Boost: 6 dB (below –53 dB) Boost Range: –53 to –41 dB (2:1 ratio) Null Band Width: 20 dB (–41 to –21 dB) Early Cut Range: –26 to –11 dB (2:1 ratio) Cut Range: –11 to +4 dB (20:1 ratio)
Speech	The *Speech* profile is used to compress/expand content such as news, documentaries or “talking head” type content. Max Boost: 15 dB (below –50 dB) Boost Range: –50 to –31 dB (5:1 ratio) Null Band Width: 5 dB (–31 to –26 dB) Early Cut Range: –26 to –16 dB (2:1 ratio) Cut Range: –16 to +4 dB (20:1 ratio)
Music Standard	The *Music Standard* profile is used in most typical music environments such as concerts, music videos and music content with a wide dynamic range. Max Boost: 12 dB (below –55 dB) Boost Range: –55 to –31 dB (2:1 ratio) Null Band Width: 5 dB (–31 to –26 dB) Early Cut Range: –26 to –16 dB (2:1 ratio) Cut Range: –16 to +4 dB (20:1 ratio)

Music Light	The *Music Light* profile is used to compress/expand music content with a narrow dynamic range. Max Boost: 12 dB (below –65 dB) Boost Range: –65 to –41 dB (2:1 ratio) Null Band Width: 20 dB (–41 to –21 dB) Cut Range: –21 to +9 dB (2:1 ratio).

Compander State: This control is used to activate the on-board compressor/expander, otherwise known as the compander. The use of the compander allows audio signals with a large dynamic range to be transmitted over facilities that have a smaller dynamic range capability. The compander works by compressing or expanding the dynamic range of the audio signal.

Makeup Gain: This control is used to add additional gain to the audio program. This control would be used if the final desired target loudness has not been reached. The makeup gain control has a range of 0 dBFs to 20 dBFs.

Program x Peak Limiter

Peak Limit: This control is used within the audio program chain to provide an upper limit to peak program levels. Sometimes referred to as a "brick-wall" limiter. This control is used to maintain the upper limit of the peak levels. The peak limit control has a range from -15 dBFs to 1 dBFs

Program x Intelligain Threshold Minor/Major/Critical

Gain Level: This control is used for real time monitoring and SNMP trap alarming. By defining the output level, the IntelliGain™ system will send an SNMP alarm to VistaLINK® if the output loudness level exceeds the defined output level. For example, by setting this control to –18 dBFs, if the calculated output loudness level exceeds –18 dBFS (for the specified fault duration) then an alarm will be sent to VistaLINK® for immediate operator notification. There are 3 levels of alarm thresholds. These can be setup as minor, major and critical alarming thresholds. The ***Gain Level Threshold*** has a range of -65 dBFs to -1 dBFs.

Fault Duration: This control defines the amount of time that the IntelliGain™ system detects the output level has been exceeded. For example, if this control is set to 25 seconds, it means that the output level has to be exceeded for a minimum of 25 seconds before an SNMP trap alarm is sent to VistaLINK®. The ***Fault Duration*** has a range of 0.5 sec to 240 seconds.

Clear Duration: This control defines the amount of time that the IntelliGain™ system must be corrected to before a correction SNMP trap is sent to VistaLINK®. For example, if this control is set to 10 seconds, it means that the IntelliGain™ output level fault must be corrected for a minimum of 10 seconds before a correction alarm is sent to VistaLINK®. This control is primarily used to smooth out alarming for audio with a very wide dynamic range. The ***Clear Duration*** has a range of 0.5 sec to 240 seconds

Program x Monitor

Input Loudness: This control will provide a real time value of the calculated input loudness value. This control is used for monitoring purposes only.

Gain Applied: This control will provide a real time value indicating the amount of gain being applied by the IntelliGain™ system. Values can be either negative, indicating a gain reduction, or positive, indicating gain is being applied.

Output Loudness: This control will provide a real time value of the calculated output loudness value. This control is used for monitoring purposes only. It is used to provide confidence monitoring.

4.37. INTELLIGAIN® TRAPS

The IntelliGain™ system can provide real time analysis and confidence monitoring with SNMP trap alarm notification. These alarms can be enabled and disabled on an individual audio program basis using the IntelliGain™ Fault Traps configuration tab.

To enable or disable an SNMP alarm notification, either check or un-check the defined control.

The system also provides real time trap status information. If a trap is sent by the IntelliGain™ system, the trap status box will change state indicating the real time value for that trap. For example, if the trap status box is the colour green, then the trap has not been sent. However, if the status box is the colour red, then the fault is in a current state of alarm. Once corrected, the status box will turn back to the colour green.

IntelliGain™ Traps tab identifies the VistaLINK® configuration view for the IntelliGain™ Fault Traps.

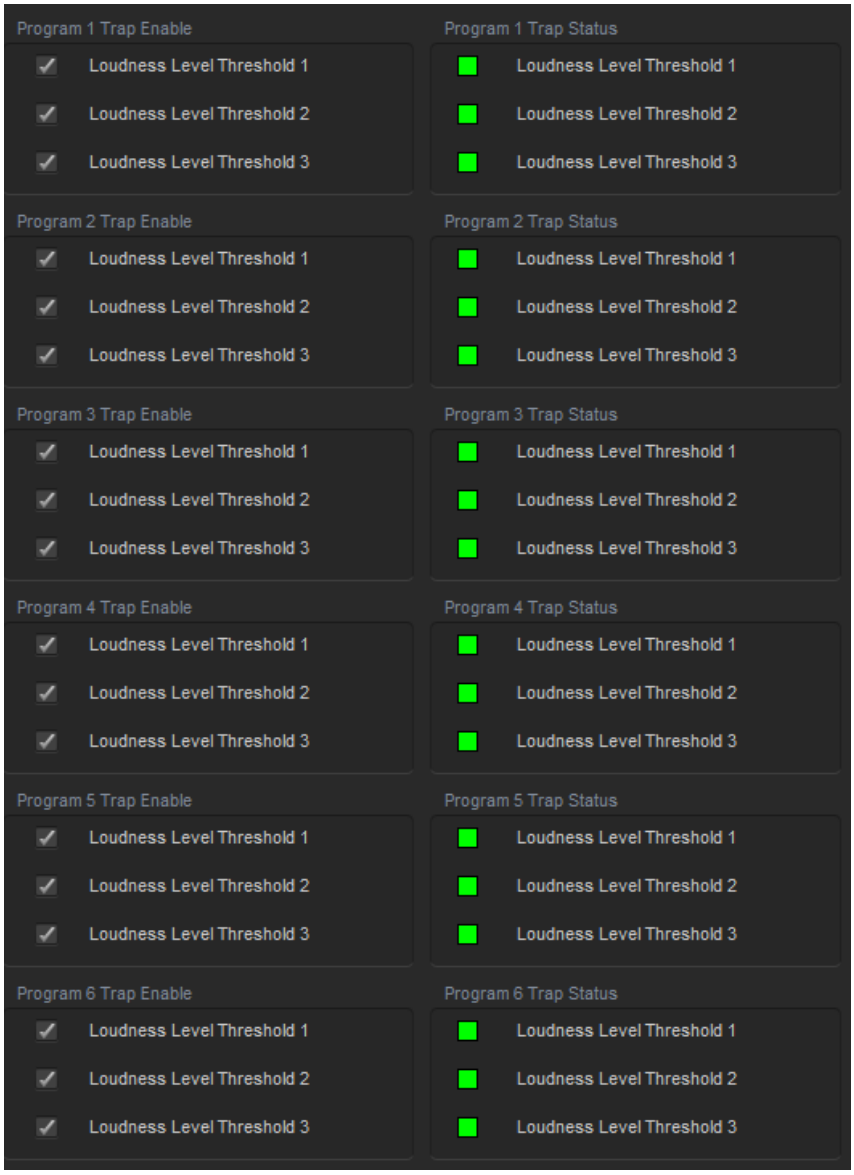


Figure 4-37: IntelliGain® Traps Tab

4.38. DOLBY DECODER CONTROL

The 7812UDX-AAV series module can decode Dolby AC3 and Dolby E with the Dolby Decode options. There can be up to two Dolby decode modules. The controls for each Dolby Decoder are identical. Since each ***Dolby Decoder Control*** tab is identical, only Dolby Decoder B will be described.

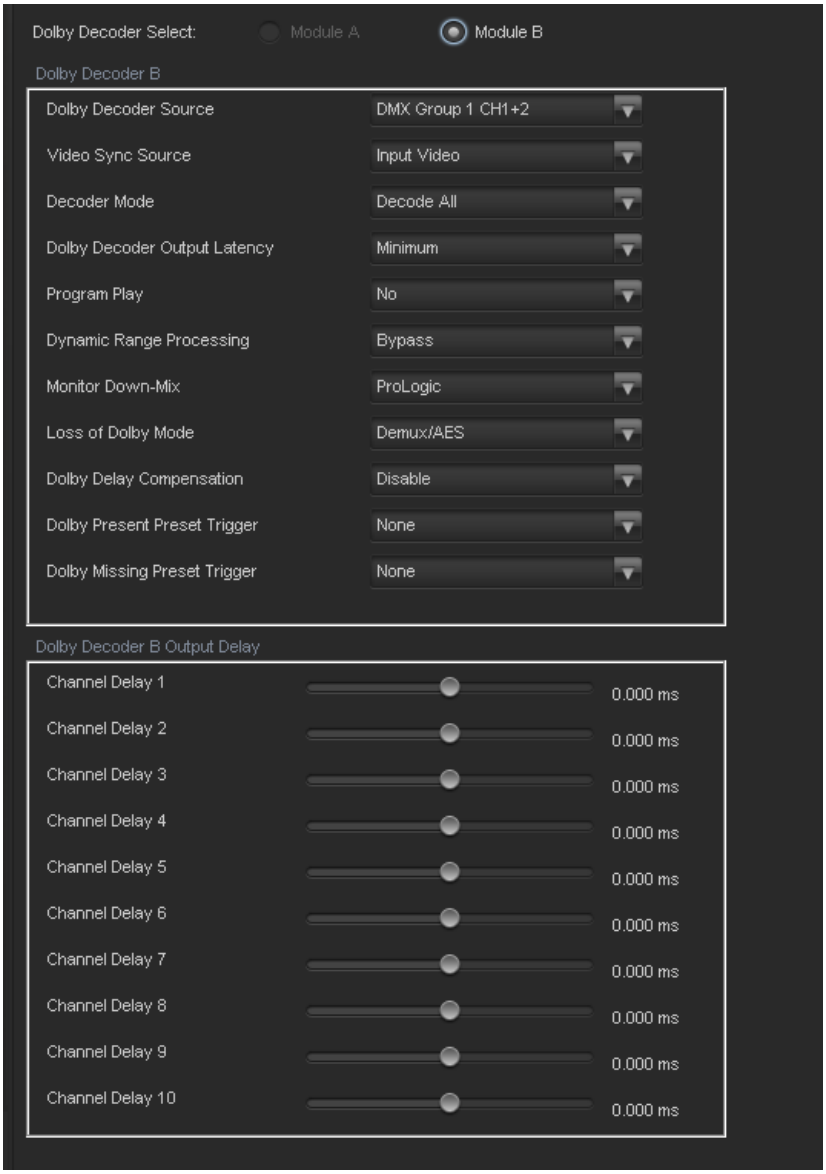


Figure 4-38: Dolby Decoder Control Tab

Dolby Decoder <A/B>

Decoder Source: This control allows the selection of the input source provided to the Dolby Decoder. The following selections are available:

AES1	Selects AES1 as the source to decode Dolby
AES2	Selects AES2 as the source to decode Dolby
AES3	Selects AES3 as the source to decode Dolby
AES4	Selects AES4 as the source to decode Dolby
AES5	Selects AES5 as the source to decode Dolby
AES6	Selects AES6 as the source to decode Dolby
AES7	Selects AES7 as the source to decode Dolby
AES8	Selects AES8 as the source to decode Dolby
DMX Group 1 Ch 1 + 2	Selects DMX Group 1 Ch 1 + 2 as the source to decode Dolby
DMX Group 1 Ch 3 + 4	Selects DMX Group 1 Ch 3 + 4 as the source to decode Dolby
DMX Group 2 Ch 1 + 2	Selects DMX Group 2 Ch 1 + 2 as the source to decode Dolby
DMX Group 2 Ch 3 + 4	Selects DMX Group 2 Ch 3 + 4 as the source to decode Dolby
DMX Group 3 Ch 1 + 2	Selects DMX Group 3 Ch 1 + 2 as the source to decode Dolby
DMX Group 3 Ch 3 + 4	Selects DMX Group 3 Ch 3 + 4 as the source to decode Dolby
DMX Group 4 Ch 1 + 2	Selects DMX Group 4 Ch 1 + 2 as the source to decode Dolby
DMX Group 4 Ch 3 + 4	Selects DMX Group 4 Ch 3 + 4 as the source to decode Dolby

Video Sync Source: This control allows the user to reference the Dolby decoder output with the output video, input video or with the modules reference source.

Output Video 1	The decode will be timed with the video output 1.
Input Video	The decode will be timed with the input video.
Card Reference	The decode will be timed with the card reference.
Output Video 2	The decode will be timed with the video output 2.

Decoder Mode: This control is used to select the type of Dolby source to be decoded. A full list of available options is shown below:

Mute	The output of the decoder will be muted.
Dolby Digital – AC3	The decoder will only process Dolby AC3 Audio.
Dolby E	The decoder will only process Dolby E Audio.
Decode All	The decoder will decode both AC3 and Dolby E audio.

Dolby Decoder Output Latency: This control allows the user to setup the Dolby Decoder decoded outputs latency.

Minimum	Select *Minimum* to configure the Dolby Decoder for the minimum possible decoding delay.
One Frame	Select *One Frame* to configure the Dolby Decoder for a decoding delay equivalent to 1 frame of video.

Program Play: This control allows the user to setup the Dolby Decoder "Program Play" feature for Dolby E.

No	Select *No* to configure the Dolby Decoder Program Play for normal (synchronous) operation.
Yes	Select *Yes* to configure the Dolby Decoder Program Play to enable proper decoding of Dolby-E streams coming off 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.

Dynamic Range Processing: This control allows the user to setup the Dolby Decoder dynamic range compression for AC3 (Dolby Digital only).

Bypass	Select *Bypass* to configure the Dolby Decoder to bypass dynamic range processing. Program levels are unaltered.
RF	Select *RF* to configure the Dolby Decoder to adjust the dynamic range using a RF (or "strong") dynamic range compression profile.
Line	Select *Line* to configure the Dolby Decoder to adjust the dynamic range using a LINE (or "light") dynamic range compression profile.

Monitor Down-Mix: This controls the format of the monitored down-mix output of the Dolby Decoder.

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

Loss of Dolby Mode: This control allows the user to 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.

Demux/AES	Select *Demux/AES* to automatically switch the input sources from the input audio sample rate converters.
Dolby Decoder	Select *Dolby Decoder* 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.

Dolby Delay Compensation: This control allows the user to ensure that the audio processing matches the video processing.

Dolby Switch Suppression: This control will mute the output of the decoder to avoid any audible tone that might occur when switching between a PCM source to a Dolby source.

Dolby Present Preset Trigger: This control is used to trigger presets saved to the module when a presence of Dolby is detected. The following selections are available:

None	When set to None, if trigger conditions are met the module will take no action.
User Preset 1	When set to User Preset 1, if trigger conditions are met the module will recall User Preset 1.
User Preset 2	When set to User Preset 2, if trigger conditions are met the module will recall User Preset 2.
User Preset 3	When set to User Preset 3, if trigger conditions are met the module will recall User Preset 3.
User Preset 4	When set to User Preset 4, if trigger conditions are met the module will recall User Preset 4.
User Preset 5	When set to User Preset 5, if trigger conditions are met the module will recall User Preset 5.
User Preset 6	When set to User Preset 6, if trigger conditions are met the module will recall User Preset 6.
User Preset 7	When set to User Preset 7, if trigger conditions are met the module will recall User Preset 7.
User Preset 8	When set to User Preset 8, if trigger conditions are met the module will recall User Preset 8.

User Preset 9	When set to User Preset 9, if trigger conditions are met the module will recall User Preset 9.
User Preset 10	When set to User Preset 10, if trigger conditions are met the module will recall User Preset 10.

Dolby Missing Preset Trigger: This control is used to trigger presets saved to the module when absence of Dolby is detected. The following selections are available:

None	When set to None, if trigger conditions are met the module will take no action.
User Preset 1	When set to User Preset 1, if trigger conditions are not met the module will recall User Preset 1.
User Preset 2	When set to User Preset 2, if trigger conditions are not met the module will recall User Preset 2.
User Preset 3	When set to User Preset 3, if trigger conditions are not met the module will recall User Preset 3.
User Preset 4	When set to User Preset 4, if trigger conditions are not met the module will recall User Preset 4.
User Preset 5	When set to User Preset 5, if trigger conditions are not met the module will recall User Preset 5.
User Preset 6	When set to User Preset 6, if trigger conditions are not met the module will recall User Preset 6.
User Preset 7	When set to User Preset 7, if trigger conditions are not met the module will recall User Preset 7.
User Preset 8	When set to User Preset 8, if trigger conditions are not met the module will recall User Preset 8.
User Preset 9	When set to User Preset 9, if trigger conditions are not met the module will recall User Preset 9.
User Preset 10	When set to User Preset 10, if trigger conditions are not met the module will recall User Preset 10.

Dolby Decoder <A/B> Output Delay

Dolby Decoder Out Delay: This control can be used to add additional gains per decoded channel.

4.39. DOLBY E ENCODER CONTROL

The 7812UDX-AAV series module can encode Dolby E with the Dolby E options installed. There can be more than one Dolby E module installed. The controls for each Dolby E encoder are identical. Since each ***Dolby E Encoder Control*** tab is identical, only Dolby Encoder A will be described in the manual.

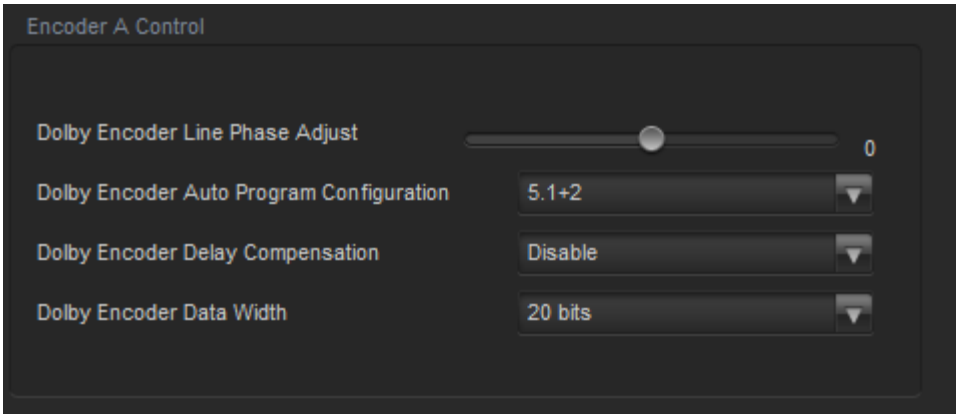


Figure 4-39: Dolby E Encoder Control Tab

Encoder A Control

Dolby Encoder Line Phase Adjust: This control adjusts the output line phase of the Dolby-E encoder with respect to the input video sync source. Adjustments are in increments of 1 line of the sync source.

Dolby Encoder Auto Program Configuration: This control selects the program configuration for the automatic operating mode of the Dolby-E encoder. The control allows the selection of the most commonly used program configurations and enables the module to generate a default metadata BSI in the Dolby-E stream.

Program Config	# Programs	Ch 1	Ch 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8
6x1	6	0.L	1.C	2.C	3.C	4.C	5.C		
8x1	8	0.C	1.C	2.C	3.C	4.C	5.C	6.C	7.C
3x2	3	0.L	0.R	2.L	2.R			1.L	1.R
4x2	4	0.L	0.R	2.L	2.R	3.L	3.R	1.L	1.R
5.1+2x1	3	0.L	0.R	0.C	0.LFE	0.Ls	0.Rs	1.C	2.C
5.1	1	0.L	0.R	0.C	0.LFE	0.Ls	0.Rs		
5.1+2	2	0.L	0.R	0.C	0.LFE	0.Ls	0.Rs	1.L	1.R

Dolby Encoder Delay Compensation: The ***Dolby Delay Compensation*** allows the user to ensure that the audio processing matches the video processing.

Dolby Encoder Data Width: This control allows the user to set the encoder Data width in bits.

20 bits	When *20 bits* is selected, the data count will be 20 bits wide.
16 bits	When *16 bits* is selected, the data count will be 16 bits wide.

4.40. DOLBY E ENCODER MIXER

The 7812 series module can encode Dolby E with the Dolby E options installed. There can be more than one Dolby E module installed. The controls for each Dolby E encoder are identical. Since each Dolby E Encoder Control tab is identical, only Dolby Encoder A will be described.

As shown in Figure 4-40, there are eight individual Dolby Encoder Channel Mixers in 7812 series modules. These Channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 8 Dolby audio channels. Using the X and Y inputs of each Output Channel Mixer an additional level of mono-mixing is also available for each channel of audio.

For the sake of brevity, only the *Dolby E Encoder A Channels 1-4* control tab will be discussed in this manual. Control radial buttons for *Dolby E Encoder A Channels 5-8* are identical in their operation. The controls for Channel 1 will be described in detail, as the controls for Channel 2, Channel 3 and Channel 4 operate in an identical fashion.

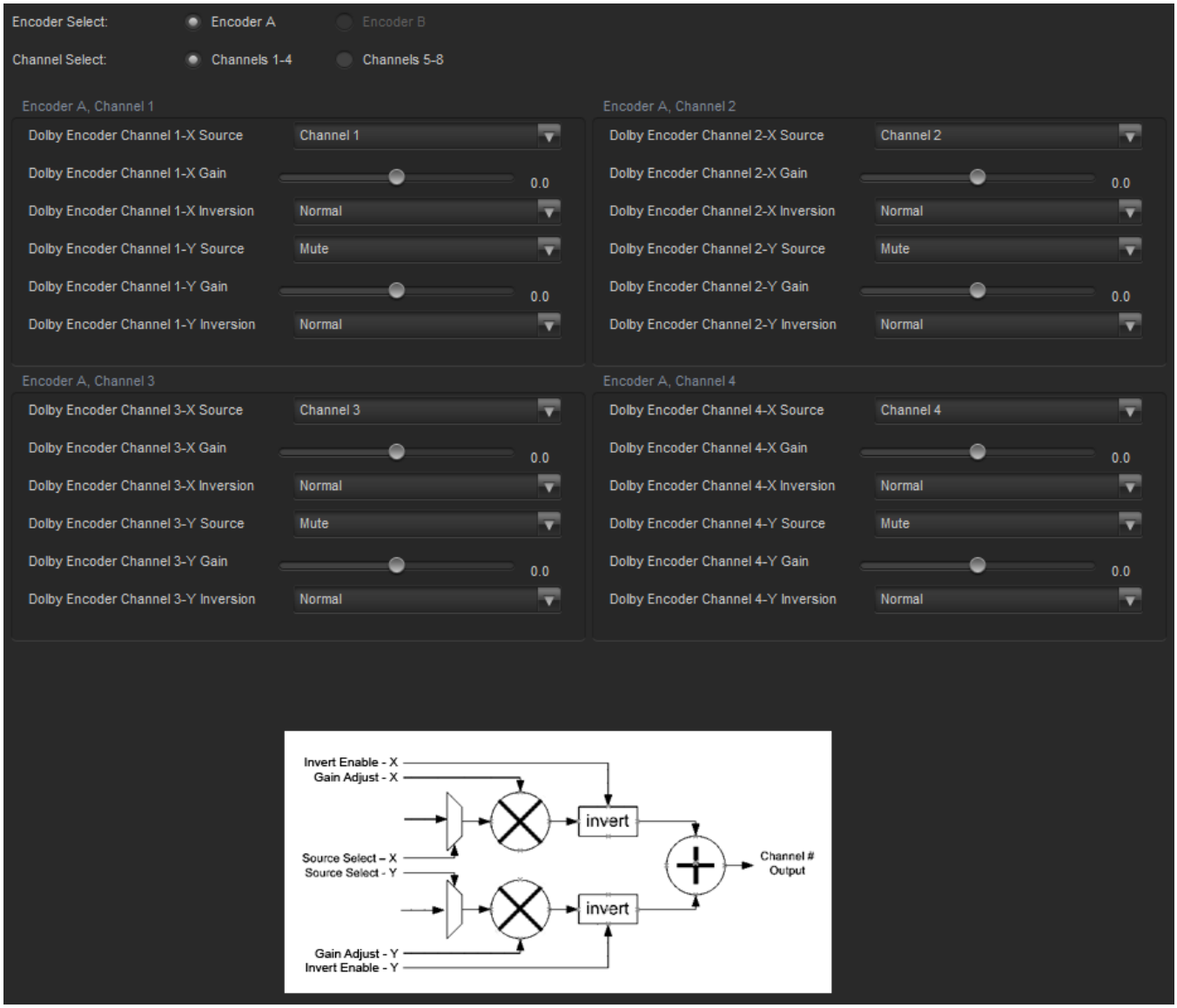


Figure 4-40: Dolby E Encoder Mixer Tab

Channel X

The following controls are configurable for each of the available 8 channels.

Dolby Encoder Channel x-X Source: control enables the user to route one of the 16 internally processed input audio channels to the X input of the Channel 1 mixer. The full set of available channels is listed below.

Product Option	Mixer Sources
All Products	Mute DMX channels 1-16 Mono mix DMX channels (8 pairs – 1&2, 3&4, etc.) Down mix L, R Down mix mono
Upmix [+UMX2]	Up mix L, R, C, LFE, Ls, Rs, passthru L, passthru R
IntelliGain® [+IG2]	IntelliGain® 1 channels 1-8 IntelliGain® 2 channels 1-8
Dolby Decoder 1 and 2 (+DD or +DD2)	Dolby Decoder A Channel 1 - 8 (+DD) Dobly Deocder A Minitor Channel 1 – 2 (+DD) Dolby Decoder B Channel 1 – 8 (+DD2) Dolby Decoder B Monitor Channel 1 – 2 (+DD2)

Dolby Encoder Channel x-X Gain: This control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associate slider control left to decrease the value or right to increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is incremented or decremented in 0.1 dB steps.

Dolby Encoder Channel x-Y Source: This control enables the user to route one of the 16 internally processed input audio channels to the Y input of the Channel 1 mixer. The full set of available channels is listed below.

Product Option	Mixer Sources
All Products	Mute DMX channels 1-16 Mono mix DMX channels (8 pairs – 1&2, 3&4, etc.) Down mix L, R Down mix mono
Upmix [+UMX2]	Up mix L, R, C, LFE, Ls, Rs, passthru L, passthru R
IntelliGain® [+IG2]	IntelliGain® 1 channels 1-8 IntelliGain® 2 channels 1-8
Dolby Decoder 1 and 2 (+DD or +DD2)	Dolby Decoder A Channel 1 - 8 (+DD) Dobly Deocder A Minitor Channel 1 – 2 (+DD) Dolby Decoder B Channel 1 – 8 (+DD2) Dolby Decoder B Monitor Channel 1 – 2 (+DD2)

Dolby Encoder Channel x-Y Gain: This control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associated slider control left to decrease the value or right increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is adjusted in 0.1 dB increments

Dolby Encoder Channel x-Y Inversion: This control enables the user to invert the phase or pass the selected audio channels.

4.41. DOLBY AC3 ENCODER CONTROL

The 7812 series module can encode Dolby AC3E with the Dolby AC3E options installed. There can be more than one Dolby AC3E module installed. The controls for each Dolby AC3E encoder are identical. Since each ***Dolby AC3E Encoder Control*** tab is identical, only Dolby Decoder B will be described.

Figure 4-41: Dolby AC3 Encoder Control Tab

UNDERSTANDING THE DOLBY AC-3 ENCODER

The on-card Dolby AC-3 encoder takes the output of Mixer-B and a selected source of metadata to encode a single AC-3 encoded output. This output can be substituted to any output pair (including duplicating to any number of outputs) and routed to the AES and embedded outputs.

There is neither a frame-rate relationship nor a frame phase relationship between the AC-3 packet and the video frame. Either switches of encoded AC-3 outputs, discrete AES or embedded, into the video signal will result in packet corruption issues.

There are certain restrictions to what can be encoded to AC-3 relating to the LFE (low frequency effects) channel, bit-rate and audio configuration. LFE (low frequency effects channel), can only be included on audio configurations of 3/2, 2/2, 3/1, 2/1 and 3/0.

There is also a restriction on the minimum bit-rate allowed for specific audio configurations. The following table indicates what bit-rates are allowed (shaded boxes indicate the bit-rate is not allowed):

kbps	3/2	3/1	2/1	2/0	1/0
224	Y	Y	Y	Y	Y
256	Y	Y	Y	Y	Y
320	Y	Y	Y	Y	Y
384	Y	Y	Y	Y	Y
448	Y	Y	Y	Y	Y
512	Y	Y	Y	Y	Y
576	Y	Y	Y	Y	Y
640	Y	Y	Y	Y	Y

Table 4-7: Encoder Bit-rate Restrictions

There are also two automatic bit-rate configurations. These will automatically adjust the bit-rate accordingly with the audio configuration of the encoder. The following table shows the bit-rates used for a specific audio configuration:

	3/2	2/2	3/1	2/1	3/0	2/0	1/0
Auto-384	384	320	320	256	256	224	96
Auto-448	448	320	320	256	256	256	96

Table 4-8: Automatic Encoder Bit-rate Selection

Dolby AC3 Encoder

Auto Mode Pgm Configuration: This selects the automatic program configuration and audio configuration default. This is only used if "auto" mode is selected for the metadata source.

A standard default metadata message will be used to encode the selected audio configuration mode.

Program Config	Channels	ch 1	ch 2	ch 3	ch 4	ch 5	ch 6
3/2L	5.1	L	R	C	LFE	Ls	Rs
3/2	5.0	L	R	C		Ls	Rs
3/1	4.0	L	R	C		S	
2/1	3.0	L	R			S	
3/0	3.0	L	R	C			
2/0	2.0	L	R				
1/0	1.0			C			

Table 4-9: Channel Mappings and Program Configurations

Channel naming convention L=left R=right C=center S=surround, LFE=low frequency effects (subwoofer) Ls=left surround, Rs=right surround. Shaded box indicates channel is not used.

Metadata Program Select: This control allows the user to select which metadata program the Dolby Encoder should use. AC-3 can only encode one program, but Dolby-E metadata can contain information for up to 8 programs.

Program 1	Selects program 1 for the source of Dolby Metadata.
Program 2	Selects program 2 for the source of Dolby Metadata.
Program 3	Selects program 3 for the source of Dolby Metadata.
Program 4	Selects program 4 for the source of Dolby Metadata.
Program 5	Selects program 5 for the source of Dolby Metadata.
Program 6	Selects program 6 for the source of Dolby Metadata.
Program 7	Selects program 7 for the source of Dolby Metadata.
Program 8	Selects program 8 for the source of Dolby Metadata.

AC-3 Bitrate Control: This control allows the user to select the output bit-rate for the encoded AC-3 output. Please note, not all bit-rates are applicable for all AC-3 audio coding modes. Auto-384 will automatically select a bit-rate appropriate for the audio coding mode of the AC-3 encoder. For more information regarding available bitrates, refer to the AC3 description above.

224 kbps	Select ***224*** kbps to encode the audio at 224 kbps
256 kbps	Select ***256*** kbps to encode the audio at 256 kbps
320 kbps	Select ***320*** kbps to encode the audio at 320 kbps
384 kbps	Select ***384*** kbps to encode the audio at 384 kbps
448 kbps	Select ***448*** kbps to encode the audio at 448 kbps
512 kbps	Select ***512*** kbps to encode the audio at 512 kbps
576 kbps	Select ***576*** kbps to encode the audio at 576 kbps
640 kbps	Select ***640*** kbps to encode the audio at 640 kbps
Automatic 384 kbps	Select ***Automatic 384*** kbps to encode the audio at 384 kbps
Automatic 448 kbps	Select ***Automatic 448*** kbps to encode the audio at 448 kbps

Final ACMOD Monitor: This monitoring window shows the current output-encoding mode the Dolby Encoder is set to.

Delay Compensation: This control allows the user to ensure that the audio processing matches the video processing.

Metadata Source Select: This control is used to select the metadata source that controls the Dolby E Encoder. A full list of available options is listed below.

Dolby Decoder A	Select the ***Dolby Decoder A*** to use the metadata decoded by the on-card Dolby Decoder. If PCM is provided to the Dolby Decoder, a default 4x2 Dolby-E metadata message is generated.
Dolby Decoder B	Select the ***Dolby Decoder B*** to use the metadata decoded by the on-card Dolby Decoder. If PCM is provided to the Dolby Decoder, a default 4x2 Dolby-E metadata message is generated.
External Input 1	Select ***External Input 1*** to use external metadata provided on the DB-15 AES In connector.
VANC Input 1	Select ***VANC Input 1*** to use metadata de-embedded from VANC area of video.
VANC Input 2	Select ***VANC Input 2*** to use metadata de-embedded from VANC area of video.
Metadata Adjust A	Select ***Metadata Adjust A*** to use the output of the metadata monitor/processor block.
Metadata Adjust B	Select ***Metadata Adjust B*** to use the output of the metadata monitor/processor block.
Metadata Author A	Select ***Metadata Authoring A*** to use the output of the on-card metadata authoring tool.
Metadata Author B	Select ***Metadata Authoring B*** to use the output of the on-card metadata authoring tool.
Automatic	Select ***Automatic*** (Default) to use the selected automatic default configuration.

Metadata Reversion Mode: This control is used if metadata is lost on the primary source. With this control, you can select the backup (reversion) metadata source in case the primary source is lost or in error. A full list of available options is listed below.

Dolby Decoder A	Select the ***Dolby Decoder A*** to use the metadata decoded by the on-card Dolby Decoder. If PCM is provided to the Dolby Decoder, a default 4x2 Dolby-E metadata message is generated.
Dolby Decoder B	Select the ***Dolby Decoder B*** to use the metadata decoded by the on-card Dolby Decoder. If PCM is provided to the Dolby Decoder, a default 4x2 Dolby-E metadata message is generated.
External Input 1	Select ***External Input 1*** to use external metadata provided on the DB-15 AES In connector.
VANC Input 1	Select ***VANC Input 1*** to use metadata de-embedded from VANC area of video.
VANC Input 2	Select ***VANC Input 2*** to use metadata de-embedded from VANC area of video.
Metadata Adjust A	Select ***Metadata Adjust A*** to use the output of the metadata monitor/processor block.
Metadata Adjust B	Select ***Metadata Adjust B*** to use the output of the metadata monitor/processor block.
Metadata Author A	Select ***Metadata Authoring A*** to use the output of the on-card metadata authoring tool.
Metadata Author B	Select ***Metadata Authoring B*** to use the output of the on-card metadata authoring tool.
Automatic	Select ***Automatic*** (Default) to use the selected automatic default configuration.
Stop	Select ***Stop*** to stop encoding Dolby E with loss of Metadata.
Last Good Frame	Select ***Last Good Frame,*** to have the encoder use the last known good frame of Metadata.

4.42. DOLBY AC3 ENCODER MIXER TAB

The 7812 series module can encode Dolby E with the Dolby E options installed. There can be more than one Dolby E modules installed. The controls for each Dolby E encoder are identical. Since each ***Dolby E Encoder Control*** tabs is identical, only Dolby Decoder B will be described.

There are sixteen individual Output Channel Mixers in 7812 series modules. These Output Channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 16 output audio channels. Using the X and Y inputs of each Output Channel Mixer an additional level of mono-mixing is also available for each channel of output audio. Embedded audio and discrete AES audio outputs are driven with the same audio generated using these Output Channel Mixers.

For the sake of brevity, only the *Audio Proc Ch1-Ch4* control tab will be discussed in this manual. Control radial buttons for *Audio Proc Ch5-Ch8*, *Audio Proc Ch9-Ch12* and *Audio Proc Ch13-16* are identical in their operation. The controls for Channel 1 will be described in detail, as the controls for Channel 2, Channel 3 and Channel 4 operate in an identical fashion.

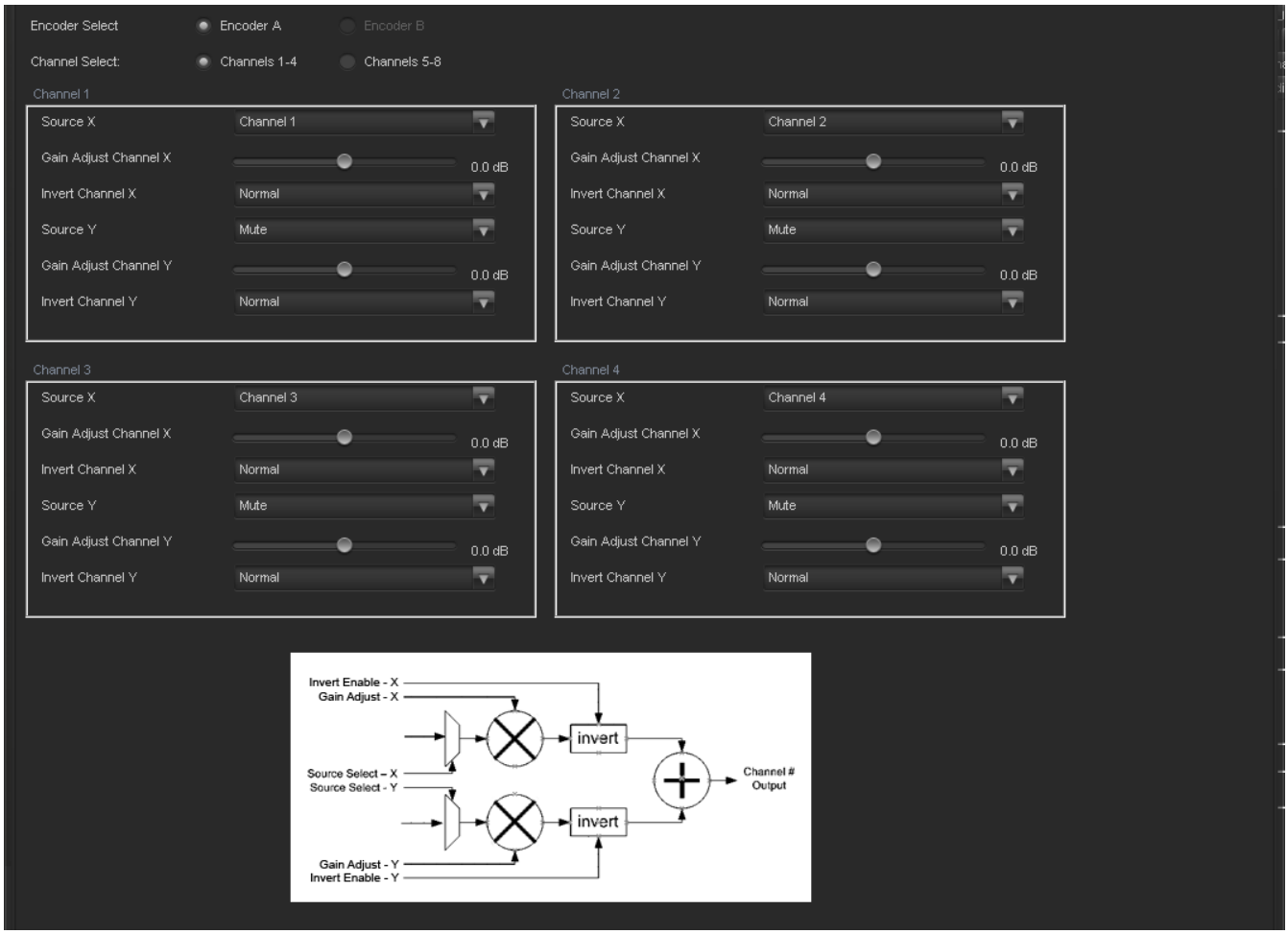


Figure 4-42: Dolby AC3 Encoder Mixer Tab

Channel 1

Source X: This control enables the user to route one of the 16 internally processed input audio channels to the X input of the Channel 1 mixer. The user can select the channel source by selecting the desired channels from the Source X drop down menu, the full set of available channels is listed below.

Source X Input		
	Channel 1	Up Mix L Surround
	Channel 2	Up Mix R Surround
	Channel 3	Up Mix Stereo Pass L
	Channel 4	Up Mix Stereo Pass R
	Channel 5	IntelliGain Channel 1
	Channel 6	IntelliGain Channel 2
	Channel 7	IntelliGain Channel 3
	Channel 8	IntelliGain Channel 4
	Channel 9	IntelliGain Channel 5
	Channel 10	IntelliGain Channel 6
	Channel 11	IntelliGain Channel 7
	Channel 12	IntelliGain Channel 8
	Channel 13	Dolby Decoder A Channel 1
	Channel 14	Dolby Decoder A Channel 2
	Channel 15	Dolby Decoder A Channel 3
	Channel 16	Dolby Decoder A Channel 4
	Mono mix channels 1 and 2	Dolby Decoder A Channel 5
	Mono mix channels 3 and 4	Dolby Decoder A Channel 6
	Mono mix channels 5 and 6	Dolby Decoder A Channel 7
	Mono mix channels 7 and 8	Dolby Decoder A Channel 8
	Mono mix channels 9 and 10	Dolby Decoder A Monitor Channel 1
	Mono mix channels 11 and 12	Dolby Decoder A Monitor Channel 2
	Mono mix channels 13 and 14	Dolby Decoder B Channel 1
	Mono mix channels 15 and 16	Dolby Decoder B Channel 2
	Mute	Dolby Decoder B Channel 3
	Down Mix L	Dolby Decoder B Channel 4
	Down Mix R	Dolby Decoder B Channel 5
	Down Mix Mono	Dolby Decoder B Channel 6
	Up Mix L Front	Dolby Decoder B Channel 7
	Up Mix R Front	Dolby Decoder B Channel 8
	Up Mix Center	Dolby Decoder B Monitor Channel 1
	Up Mix LFE	Dolby Decoder B Monitor Channel 2

Gain Adjust X: This control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associate slider control left to decrease the value or right to increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is incremented or decremented in 0.1 dB steps.

Invert Enable X: This control enables the user to invert the phase or pass the selected audio channel.

Normal	Pass the audio channel through with no processing.
Invert	Invert the phase of the audio channel.

Source Y: This control enables the user to route one of the 16 internally processed input audio channels to the Y input of the Channel 1 mixer. The user can select the channel source by selecting the desired channel from the Source Y drop down menu, the full set of available channels is listed here:

Source Y Input	Channel 1	Up Mix L Surround
	Channel 2	Up Mix R Surround
	Channel 3	Up Mix Stereo Pass L
	Channel 4	Up Mix Stereo Pass R
	Channel 5	IntelliGain Channel 1
	Channel 6	IntelliGain Channel 2
	Channel 7	IntelliGain Channel 3
	Channel 8	IntelliGain Channel 4
	Channel 9	IntelliGain Channel 5
	Channel 10	IntelliGain Channel 6
	Channel 11	IntelliGain Channel 7
	Channel 12	IntelliGain Channel 8
	Channel 13	Dolby Decoder A Channel 1
	Channel 14	Dolby Decoder A Channel 2
	Channel 15	Dolby Decoder A Channel 3
	Channel 16	Dolby Decoder A Channel 4
	Mono mix channels 1 and 2	Dolby Decoder A Channel 5
	Mono mix channels 3 and 4	Dolby Decoder A Channel 6
	Mono mix channels 5 and 6	Dolby Decoder A Channel 7
	Mono mix channels 7 and 8	Dolby Decoder A Channel 8
	Mono mix channels 9 and 10	Dolby Decoder A Monitor Channel 1
	Mono mix channels 11 and 12	Dolby Decoder A Monitor Channel 2
	Mono mix channels 13 and 14	Dolby Decoder B Channel 1
	Mono mix channels 15 and 16	Dolby Decoder B Channel 2
	Mute	Dolby Decoder B Channel 3
	Down Mix L	Dolby Decoder B Channel 4
	Down Mix R	Dolby Decoder B Channel 5
	Down Mix Mono	Dolby Decoder B Channel 6
	Up Mix L Front	Dolby Decoder B Channel 7
	Up Mix R Front	Dolby Decoder B Channel 8
	Up Mix Center	Dolby Decoder B Monitor Channel 1
	Up Mix LFE	Dolby Decoder B Monitor Channel 2

Gain Adjust Y: This control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associated slider control left to decrease the value or right increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is adjusted in 0.1 dB increments.

Invert Enable Y: This control enables the user to invert the phase or pass the selected audio channels.

Normal	Pass the audio channel through with no processing.
Invert	Invert the phase of the audio channel.

4.43. WST OP42/47

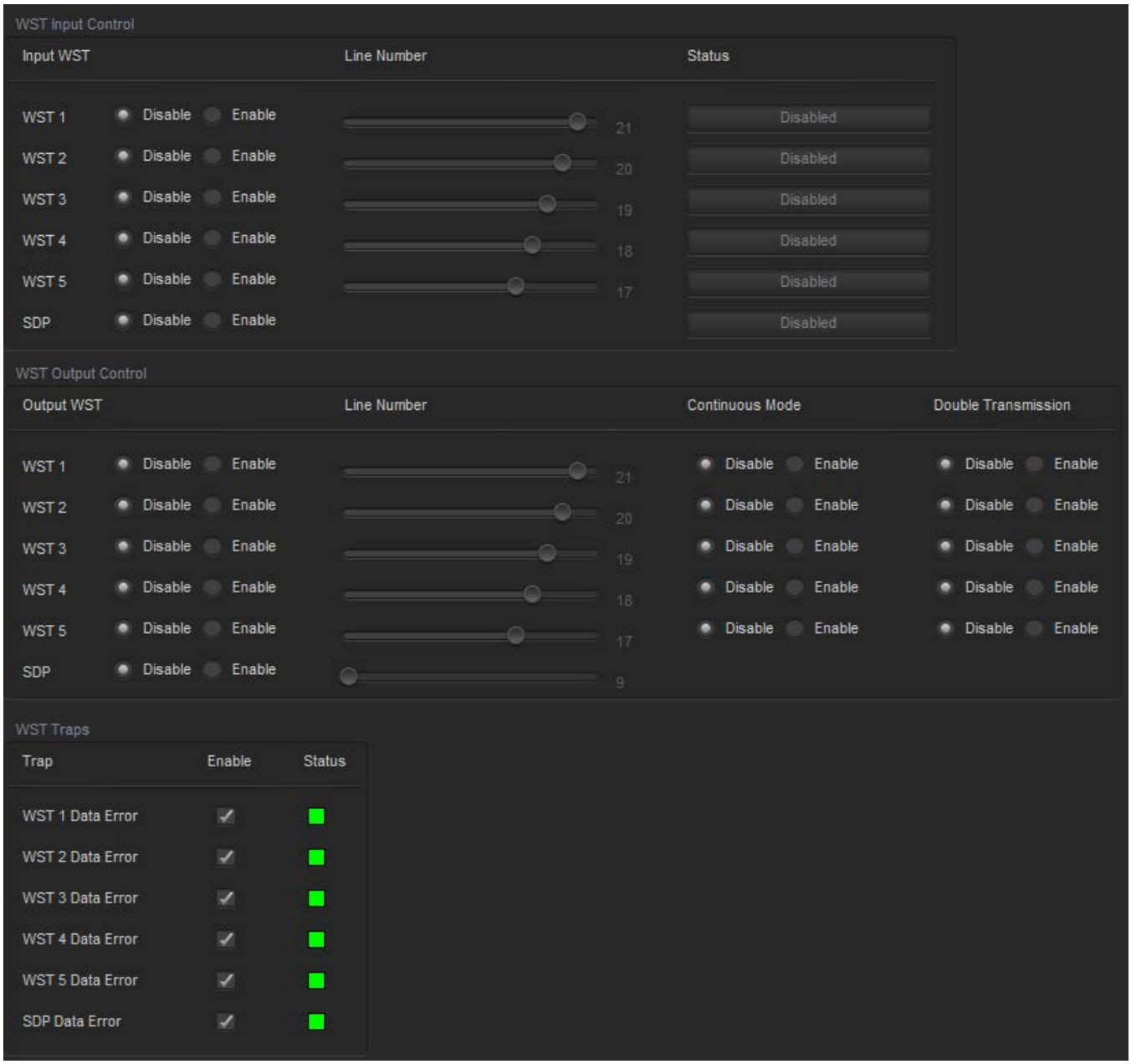


Figure 4-43: WST OP42/47 Tab

WST Input Control

WST <1-5>: When this control is enabled it allows the user to select the Input line number from which to read the associated WST teletext waveform.

SDP: When this control is enabled the module will look for the related SDP packet for subsequent processing.

WST Output Control

WST <1-5>: When this control is enabled it allows the user to select the Output line number on which to write the associated WST teletext waveform, as well as allows them to enable *Continuous Mode* with continuous output or *Double Transmission* which enables duplicate packet transmission.

SDP: When this control is enabled it allows the user to select the Output line number on which to record in the SDP packet (HD).

WST Traps: These controls allow the user to enable WST traps and monitor the trap status. To enable a particular trap, simply click the box located beside each trap so that a check-mark appears. When a check-mark is present, the trap is enabled. When a check-mark is not present, the trap is disabled.

If a parameter under the *Trap Status* is green, then the trap is present. If the parameter is red, then the trap is missing.

4.44. AVM CONTROL

Figure 4-44: AVM Control Tab

Trigger Settings

Audio Silence Level: The audio level threshold below which audio is considered to be silent. The default value is -70.00 dBFS with a valid range from -96 to -20.

Audio Silence Duration: The amount of time (in seconds) that the audio must remain silent before the audio silence trigger condition is flagged to be true. The default value is 5.0 seconds with a valid range from 0.5 s to 127.0 s.

4.45. AVM PRESETS

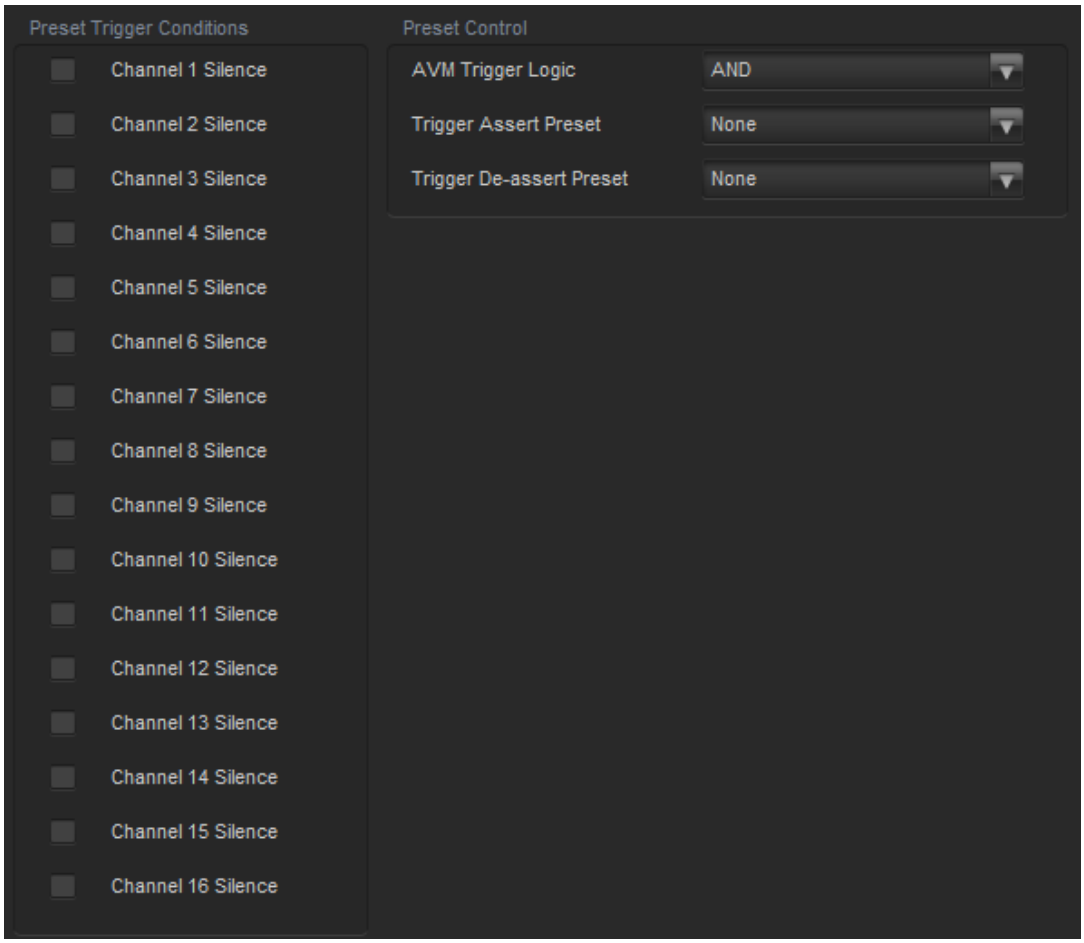


Figure 4-45: AVM Presets Tab

Preset Trigger Conditions

Channel X Silence: This option enables/disables the AVM preset trigger conditions. To select a preset trigger condition, select the check box beside the desired condition.

Preset Control

AVM Trigger Logic: This option sets the logic to be used when combining the AVM preset trigger conditions to determine if the overall AVM preset trigger condition if either True or False.

AND	A value of TRUE, will only happen when all trigger conditions have been met.
OR	A value of TRUE, will happen when any of the trigger conditions have been met.

Trigger Asset Preset: This option sets the preset to be recalled when the overall AVM preset trigger condition is asserted (transitions from FALSE -> TRUE).

None	When set to none, if trigger conditions are met the module will take no action.
User Preset 1	When set to user preset 1, if trigger conditions are met the module will recall User Preset 1.
User Preset 2	When set to user preset 1, if trigger conditions are met the module will recall User Preset 2.
User Preset 3	When set to user preset 1, if trigger conditions are met the module will recall User Preset 3.
User Preset 4	When set to user preset 1, if trigger conditions are met the module will recall User Preset 4.
User Preset 5	When set to user preset 1, if trigger conditions are met the module will recall User Preset 5.
User Preset 6	When set to user preset 1, if trigger conditions are met the module will recall User Preset 6.
User Preset 7	When set to user preset 1, if trigger conditions are met the module will recall User Preset 7.
User Preset 8	When set to user preset 1, if trigger conditions are met the module will recall User Preset 8.
User Preset 9	When set to user preset 1, if trigger conditions are met the module will recall User Preset 9.
User Preset 10	When set to user preset 1, if trigger conditions are met the module will recall User Preset 10.

Trigger De-assert Preset: This option sets the preset to be recalled when the overall AVM preset trigger condition is asserted (transitions from TRUE -> FALSE).

None	When set to none, if trigger conditions are met the module will take no action.
User Preset 1	When set to user preset 1, if trigger conditions are not met the module will recall User Preset 1.
User Preset 2	When set to user preset 2, if trigger conditions are not met the module will recall User Preset 2.
User Preset 3	When set to user preset 3, if trigger conditions are not met the module will recall User Preset 3.
User Preset 4	When set to user preset 4, if trigger conditions are not met the module will recall User Preset 4.
User Preset 5	When set to user preset 5, if trigger conditions are not met the module will recall User Preset 5.
User Preset 6	When set to user preset 6, if trigger conditions are not met the module will recall User Preset 6.
User Preset 7	When set to user preset 7, if trigger conditions are not met the module will recall User Preset 7.
User Preset 8	When set to user preset 8, if trigger conditions are not met the module will recall User Preset 8.
User Preset 9	When set to user preset 9, if trigger conditions are not met the module will recall User Preset 9.
User Preset 10	When set to user preset 10, if trigger conditions are not met the module will recall User Preset 10.

4.46. AVM TRAPS

This control allows the user to enable AVM traps and monitor the trap status. To enable a particular trap, simply click the box located beside each trap so that a check-mark appears. When a check-mark is present, the trap is enabled. When a check-mark is not present, the trap is disabled.

If a parameter under the *Trap Status* is green, then the trap is present. If the parameter is red, then the trap is missing.

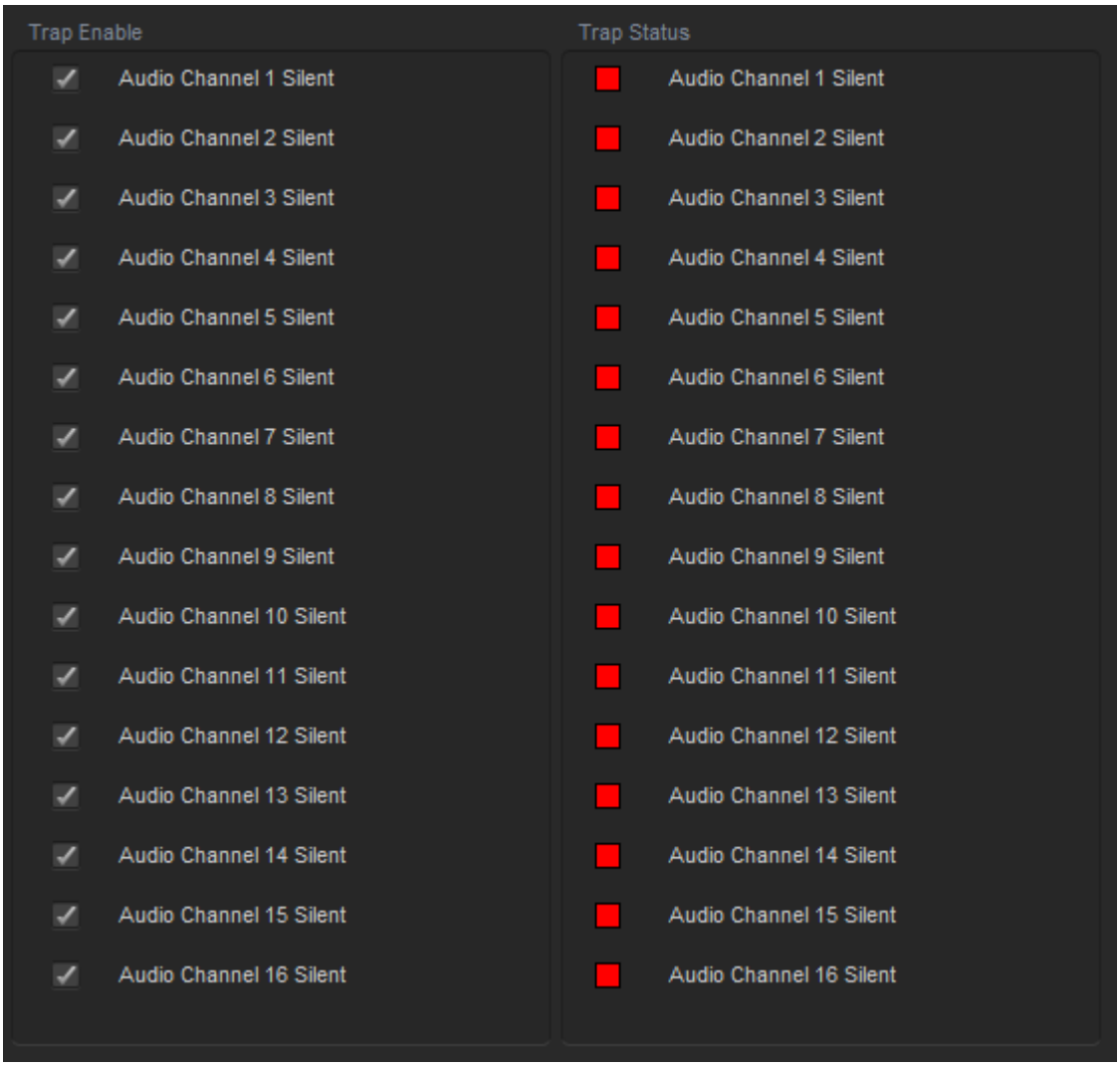


Figure 4-46: AVM Traps Tab

4.47. ANALOG INPUT CONTROL

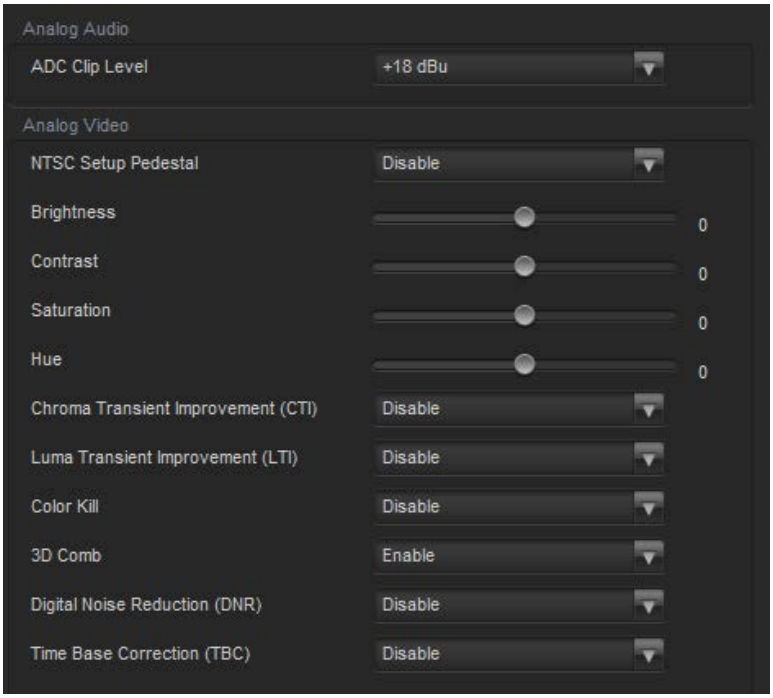


Figure 4-47: Analog Input Control Tab

Analog Audio

ADC Clip Level: This control allows the user to select the ADC Clip Level on analog to digital conversion. The level choices are +18 dBu (default value) or +24 dBu.

Analog Video

NTSC Setup Pedestal: This control selects whether the NTSC 7.5 IRE pedestal will be removed from the composite analog input video, by either selecting *Remove* or *Do Not Remove*.

Brightness: This control allows the user to set the analog input video brightness using a slider with values from -512 to 511.

Contrast: This control allows the user to set the analog video contrast using a slider with values from -512 to 511.

Saturation: This control allows the user to set the analog video saturation using a slider with values from -512 to 511.

Hue: This control allows the user to set the hue of the analog input video signal using a slider with values from -512 to 511.

Chroma Transient Improvement (CTI): This control allows the user to either enable or disable the chroma transient improvement processing on the composite analog input video stream.

Luma Transient Improvement (LTI): This control allows the user to either enable or disable the luma transient improvement processing on the composite analog input video stream.

Color Kill: This control allows the user to enable or disable the colour kill algorithm processing on the composite analog input video stream. The algorithm automatically decides to remove chroma information on the output signal when it degrades below a specified burst size or burst power.

3D Comb: This control allows the user to enable or disable 3D combing during the chroma-luma separation algorithm when processing the composite analog input video streams.

Digital Noise Reduction (DNR): This control allows the user to enable or disable 3D digital noise reduction processing on the composite analog input video stream.

Time Based Correction (TBC): This parameter allows the user to enable or disable the control to determine how to process non-time base corrected video input signals.

4.48. ANALOG OUTPUT CONTROL

Figure 4-48: Analog Output Control Tab

Analog Audio

DAC Gain: This control allows the user to set the full-scale range of the analog audio output DAC. The level choices are +18 dBu (default value) or +24 dBu.

Soft Mute: This control allows the user to enable the force of the analog audio output to mute.

Analog Video

Video Gain: This control allows the user to adjust the analog video output DAC gain using a slider with values from -64 to 64.

DC Offset: This control allows the user to adjust the analog video output DC Offset using a slider with values from -48 to 48.

Brightness Level Offset: This control allows the user to adjust the analog video output brightness level, using a slider with values from -15 to 30.

Contrast: This control allows the user to adjust the analog video output contrast level using a slider with values from 0 to 30.

Saturation: This control allows the user to adjust the analog video output saturation level using a slider with the values from 0 to 40.

Hue: This control allows the user to adjust the analog video output hue using a slider with the values from -45 to 45.

NTSC Setup Pedestal: This control selects whether the NTSC 7.5 IRE pedestal will be removed from the composite analog output video.

Line 21 Setup: This control allows the user to control the line 21 processing.

Video Standard: This control allows the user to set the analog video output standard to be either *NSTC*, *PAL-B* or *PAL-M*.

4.49. ANALOG AUDIO MIXER

As shown in Figure 4-49, there are four individual Output Channel Mixers for the analog output in the 7812UDX-AAV series modules. These Output Channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 4 output audio channels. Using the X and Y inputs of each Output Channel Mixer an additional level of mono-mixing is also available for each channel of output audio.

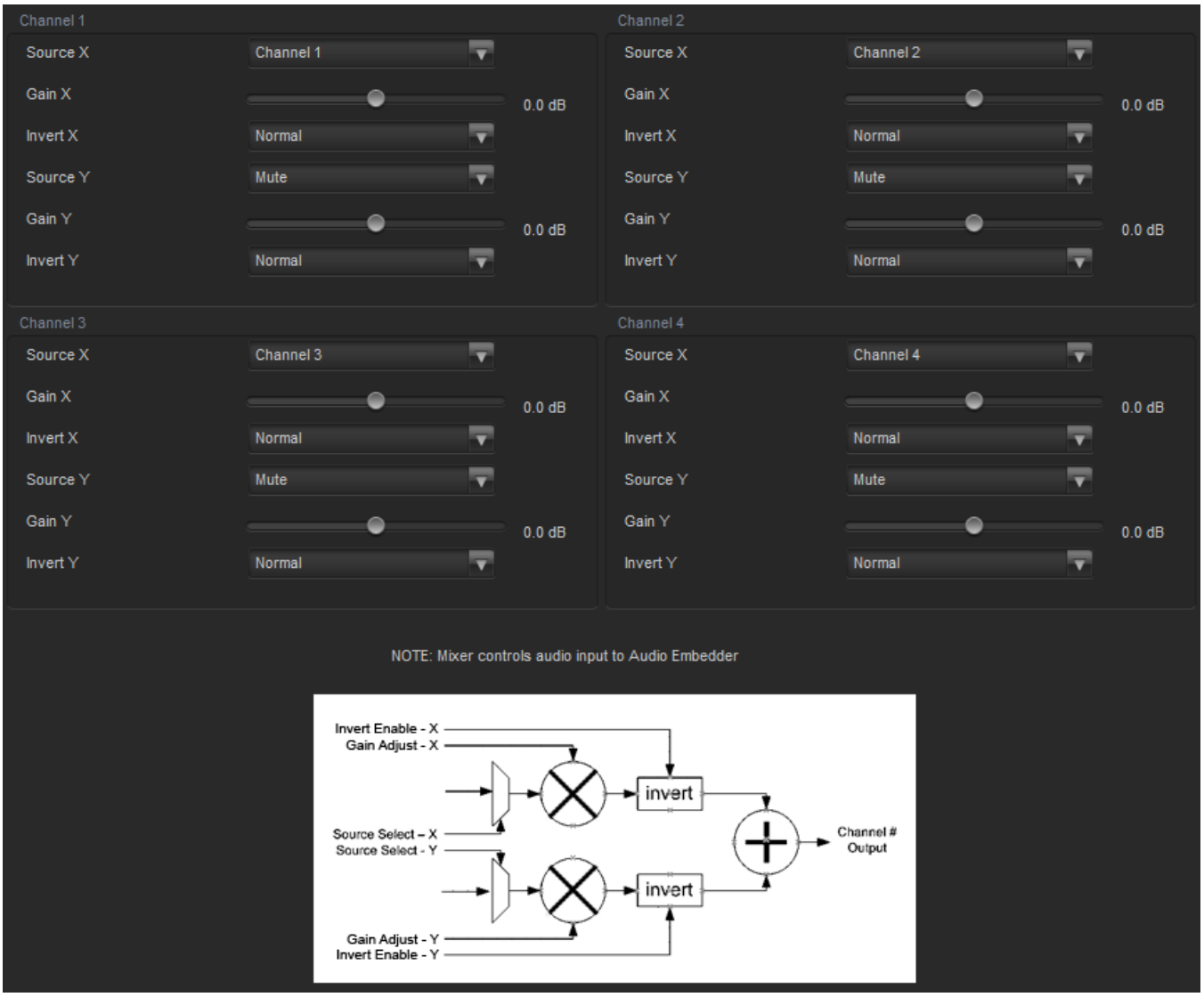


Figure 4-49: Analog Audio Mixer Tab

Channel X

Source X: This control enables the user to route one of the 16 internally processed input audio channels to the X input of the Channel mixer. The full set of available channel options is listed below.

Product Option	Mixer Sources
All Products	Mute DMX channels 1-16 Mono mix DMX channels (8 pairs – 1&2, 3&4, etc.) Down mix L, R Down mix mono
Upmix [+UMX2]	Up mix L, R, C, LFE, Ls, Rs, passthru L, passthru R
IntelliGain® [+IG2]	IntelliGain® 1 channels 1-8 IntelliGain® 2 channels 1-8
Dolby Decoder 1 and 2 (+DD or +DD2)	Dolby Decoder A Channel 1 - 8 (+DD) Dobly Deocder A Minitor Channel 1 – 2 (+DD) Dolby Decoder B Channel 1 – 8 (+DD2) Dolby Decoder B Monitor Channel 1 – 2 (+DD2)

Gain X: This control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associate slider control left to decrease the value or right to increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is incremented or decremented in 0.1 dB steps.

Invert X: This control enables the user to invert the phase or pass the selected audio channel.

Source Y: This control enables the user to route one of the 16 internally processed input audio channels to the Y input of the channel mixer. The full set of available channels is listed below.

Product Option	Mixer Sources
All Products	Mute DMX channels 1-16 Mono mix DMX channels (8 pairs – 1&2, 3&4, etc.) Down mix L, R Down mix mono
Upmix [+UMX2]	Up mix L, R, C, LFE, Ls, Rs, passthru L, passthru R
IntelliGain® [+IG2]	IntelliGain® 1 channels 1-8 IntelliGain® 2 channels 1-8
Dolby Decoder 1 and 2 (+DD or +DD2)	Dolby Decoder A Channel 1 - 8 (+DD) Dobly Deocder A Minitor Channel 1 – 2 (+DD) Dolby Decoder B Channel 1 – 8 (+DD2) Dolby Decoder B Monitor Channel 1 – 2 (+DD2)

Gain Y: This control enables the user to set the value of the gain for the selected source. The user can adjust the gain of the selected source by moving the associated slider control left to decrease the value or right increase the value. The value range for the gain adjustments is -24 dB to +24 dB. Gain is adjusted in 0.1 dB increments.

Invert Y: This control enables the user to invert the phase or pass the selected audio channels.

4.50. THUMBNAILS

The 7812UDX-AAV module can be setup to work with the VistaLINK® thumbnail server in order to send video images of the output pictures using the Simple Network Management Protocol (SNMP). Thumbnails can be configured for each output path. For the sake of brevity only Video Output Path 1 will be described in the manual.

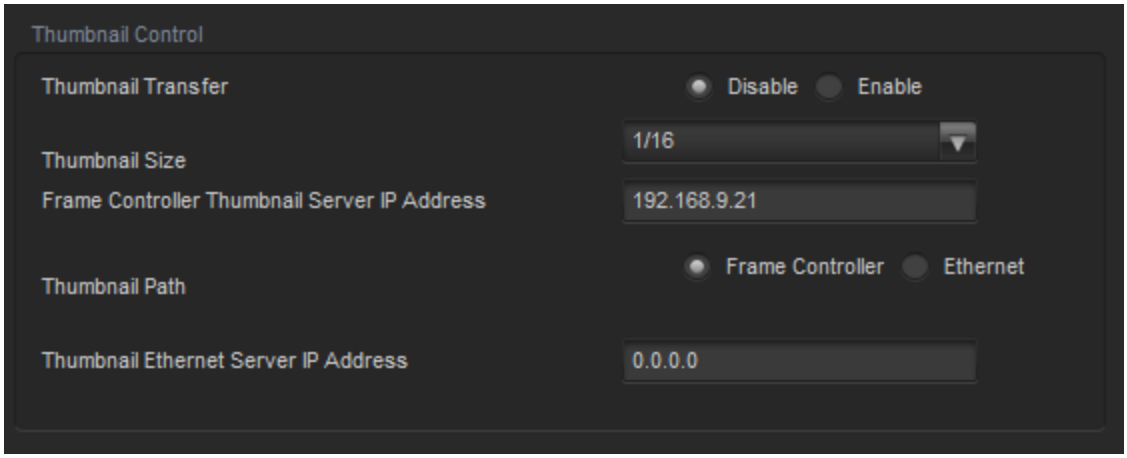


Figure 4-50: Thumbnails Tab

Thumbnail Control

Thumbnail Transfer: This control allows the user to enable/disable the transfer of thumbnails

Thumbnail Size: The size of the image sent to the VistaLINK® Thumbnail sever can be selected with this option. This will enable the user to send either 1/32, 1/16, 1/8, or 1/4 of the original video size to the thumbnail server.

Note: The size of the thumbnail image directly impacts the refresh rate to the thumbnail. As the thumbnail size increases, the refresh rate decreases.

Frame Controller Thumbnail Server IP Address: This control allows the user to set the IP address of the computer running the VistaLINK® thumbnail server.

Thumbnail Path: This control allows the user to set the thumbnail path to be either through the Frame Controller or Ethernet.

Thumbnail Ethernet Server IP Address: This control allows the user to set the IP address of the Ethernet server.

5. JUMPERS

Figure 5-1 and Figure 5-2 provide the locations of the jumpers and LEDs on the 7812UDX-AAV series boards.

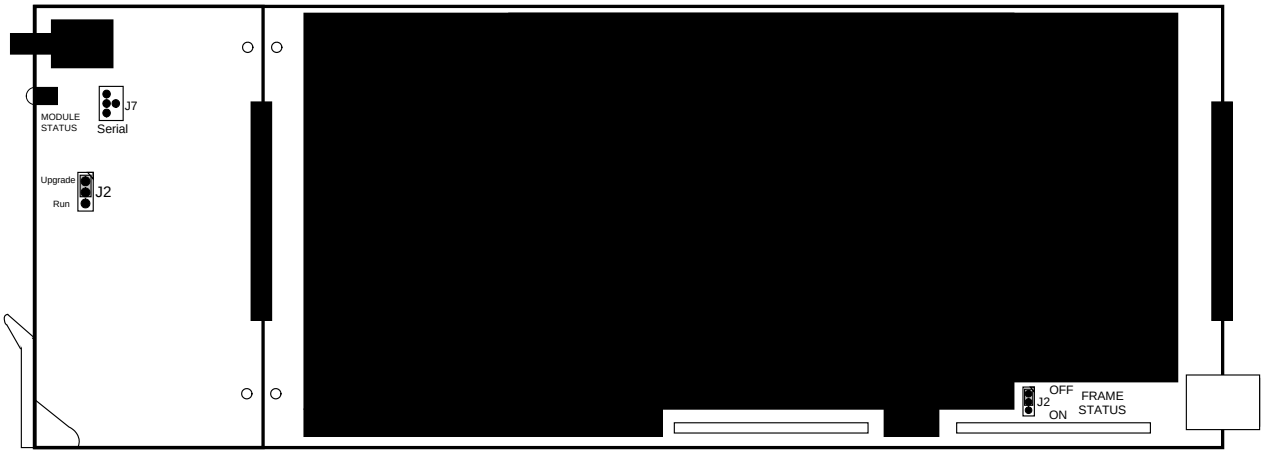


Figure 5-1: Location of Jumpers – Top View Main Module

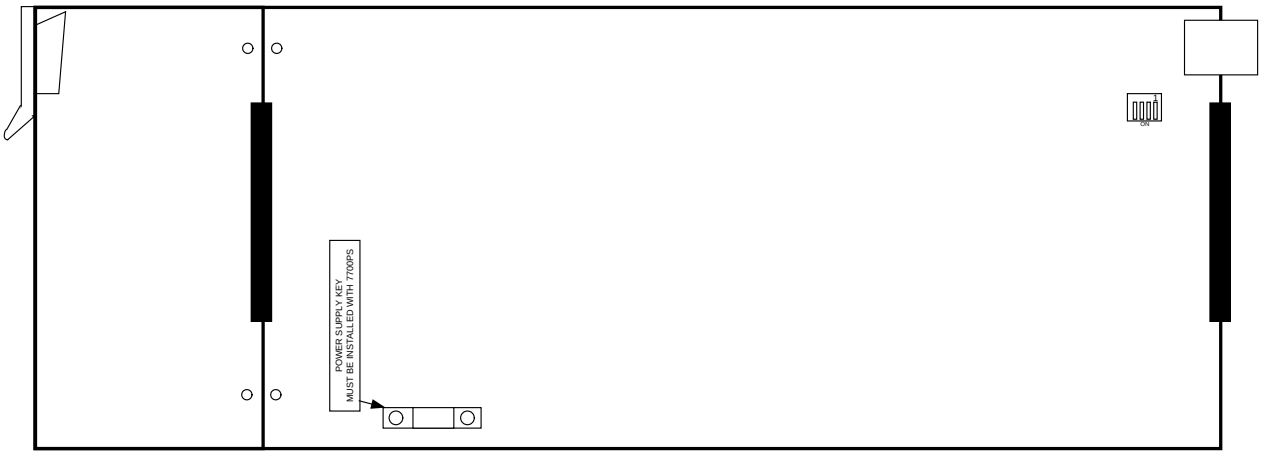


Figure 5-2: Location of Jumpers – Bottom View Main Module

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

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

To monitor faults on this module with the frame status indicators (on the PS FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position. (Default)

When this jumper is installed in the Off position, local faults on this module will not be monitored.

5.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

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

NOTE:

When upgrading from a firmware revision 4.00 or earlier, a two stage firmware upgrade process must be performed. Ethernet or serial based upgrades may be used to perform this two stage upgrade process.

The first step in this process involves up-loading a special intermediate 7711xucupgrade.bin file.
Please contact the Evertz service department to acquire this upgrade file.
After this special intermediate upgrade file is up-loaded, the card should be re-booted.
The second step in the process entails uploading the final card firmware using the same process.

The following outlines the details of how to perform a serial interface based upgrade.

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

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

The Upgrade baud rate for the 7812UDX-AAV series modules is 115,200 baud. Additional serial connection settings are as follows:

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

5.3. 7812UDX-AAV SERIES "SLOT BLOCKER"

The 7812UDX-AAV series of modules can be installed in either the 7700FR-C or the 7800FR frames. These modules are designed to take two slots in the Evertz 7800FR frame and three slots in the 7700FR-C.

Modules can fit into two slots in a 7800FR frame because the 7800FR allows modules to consume more power on a per slot basis than the Evertz 7700FR-C. When a 7812UDX-AAV series module is installed in the 7700FR-C, the module must occupy 3 slots to ensure that the frame power is managed properly. This is accomplished by installing a "Slot Blocker" on the bottom side of the board. If the "Slot Blocker" is not installed on the card and the card is inserted into the 7700FR, the card will not power-up. When installing the card in a 7800FR, the "Slot Blocker" may be removed and it will power-up and operate normally. If the "Slot Blocker" remains installed and the card is inserted into the 7800FR, the card will also power-up and operate normally.

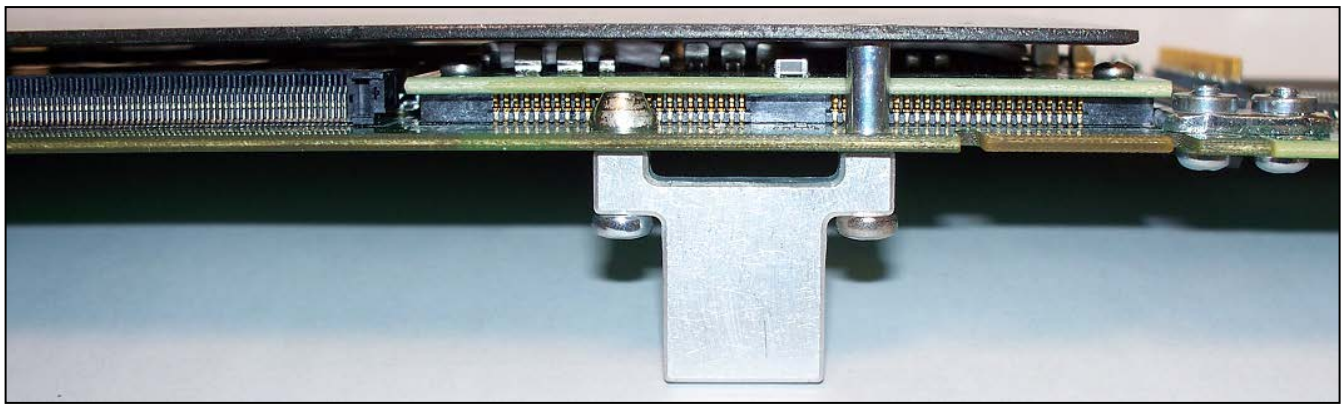


Figure 5-3: Slot Blocker

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6. FIRMWARE UPGRADE PROCEDURES

There are multiple components of the module operation that can be upgraded. These include:

- VistaLINK® PRO Product JAR upgrade
- Firmware upgrade
- Product String upgrade

This section outlines the procedures for performing these module upgrades.

NOTE: If multiple components require upgrading simultaneously (*For example: VistaLINK® PRO JAR and Firmware*), it is recommended the upgrades are performed in the order presented in this section.

6.1. VISTALINK® PRO UPGRADE PROCEDURE

Open VISTALINK® PRO Server and navigate to *Help > Apply Update > Product.* When the window opens you want to select the latest .jar file for the 7812UDX-AAV, from its saved location on the computer and select ***Open***.

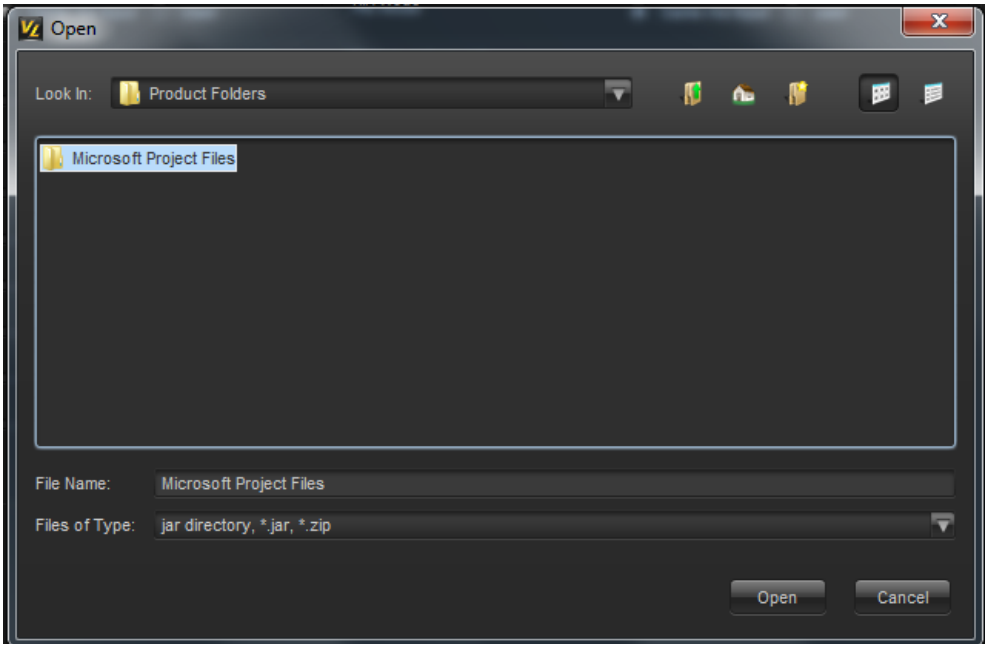

Figure 6-1: Upgrade Window

At this point the VistaLINK® PRO Server will send a message asking to Restart, select ***Yes***. This will apply the update firmware to the 7812UDX-AAV. Restart VISTALINK® PRO Server followed by VISTALINK® PRO Client.

When VISTALINK® PRO Client has re-opened, verify that the 7812UDX-AAV is running the correct version, to check this simply right click on the cards address in VistaLINK® PRO Client and select ***Version Information***.

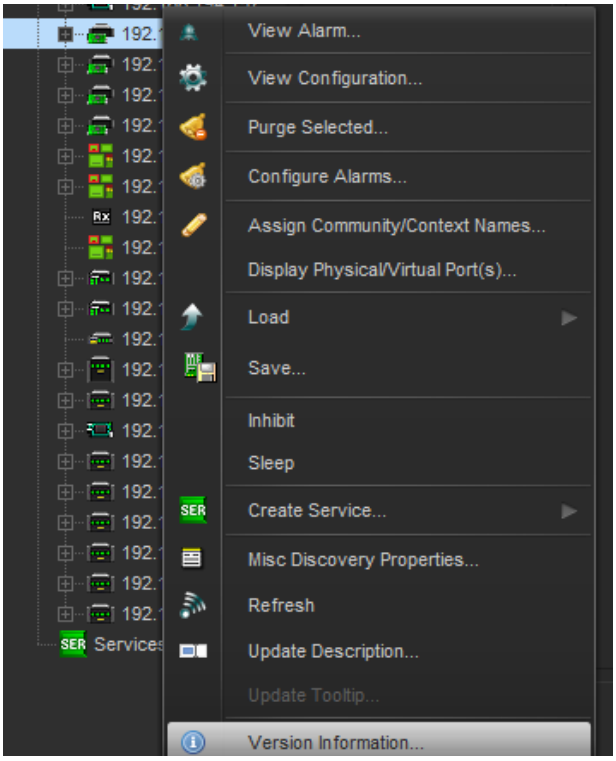

Figure 6-2: Module Dropdown Menu

This will open a window that displays all of the current version information loaded onto the 7812UDX-AAV. Navigate the hardware tree on the left side of the version information window to select the 7812UDX-AAV module. The *VISTALINK® PRO Product Version* reported in the top right corner of the window should match the new version. If it does not, please contact Evertz for further assistance.

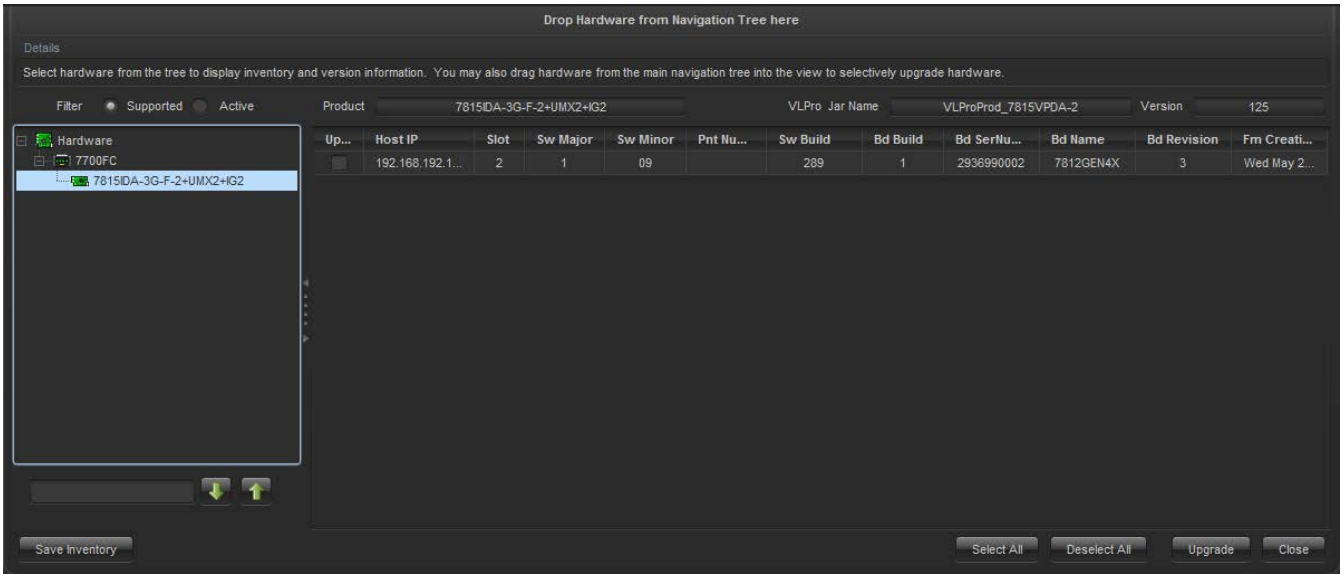

Figure 6-3: Version Information Window

6.2. UPGRADE FIRMWARE

A firmware upgrade can be accomplished through VistaLINK® PRO firmware upgrade facilities. All 7812UDX-AAV modules within the same 7700FR/7800FR frame can be upgraded simultaneously or one-by-one. However, it is more convenient to upgrade them simultaneously.

Right click on 7700FR/7800FR frame that contains the 7812UDX-AAV modules, and select *Version Information*

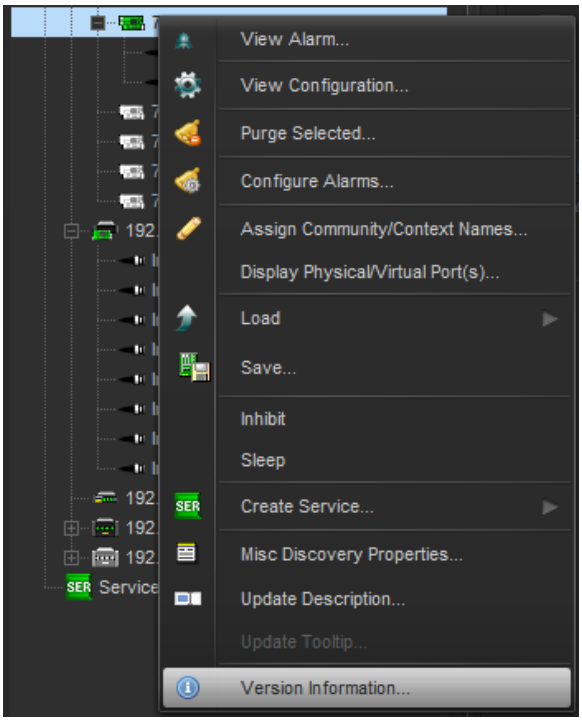

Figure 6-4: Version information selection

Navigate the hardware tree on the left side of the version information window to select the 7812UDX-AAV module listed. The list on the right side of the window should populate with all 7812UDX-AAV modules present in the 7700FR/7800FR. Take note of the current firmware version installed on the 7812UDX-AAV modules to confirm the upgrade has completed successfully.

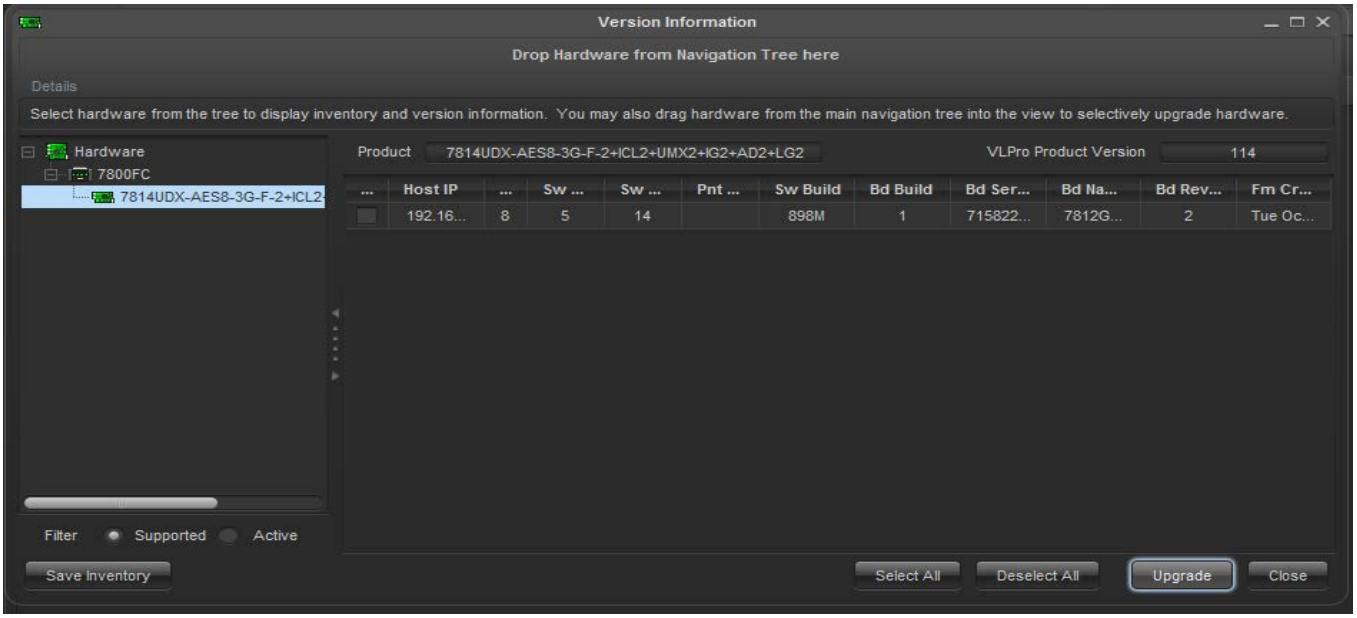

Figure 6-5: Version Information Window

Check the *Upgrade* checkbox for all modules that require the firmware upgrade. Press Upgrade button. This will open a new *Upgrade Firmware* window. Press the Browse button to navigate to the firmware archive provided for upgrading the 7812UDX-AAV modules (**File extension is .tar.gz**). Once the correct file has been selected, press the *Start* button to begin the upgrade process.

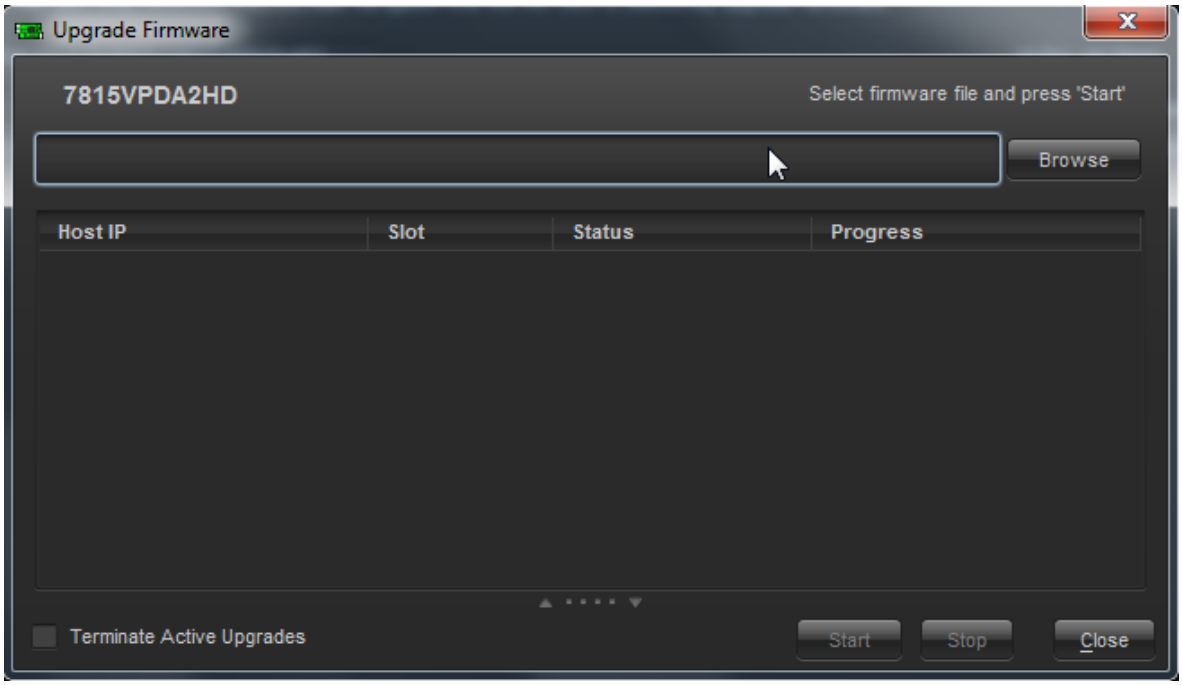

Figure 6-6: Upgrade Firmware Window

After the firmware has been transmitted to the 7812UDX-AAV module successfully, the module will reboot to complete the firmware upgrade process. Close the *Upgrade Firmware* window and *Version Information* window.

Once the cards have rebooted, ensure all 7812UDX-AAV modules are still present in the VistaLINK® PRO hardware tree. Right click on 7700FR/7800FR frame that contains the 7812UDX-AAV modules, and select *Version Information*. Navigate the hardware tree on the left side of the version information window to select the 7812UDX-AAV module listed. The list on the right side of the window should populate with all 7812UDX-AAV modules present in the 7700FR/7800FR. Verify that all modules that have been upgraded are now reporting the expected firmware version.

NOTE: If any of the 7812UDX-AAV modules do not properly upgrade the firmware, please power-cycle those boards and retry the procedure exclusively on the failed boards. If the issue still persists, contact Evertz for further assistance.

6.3. UPGRADE PRODUCT STRING

If a new product option has been purchased, it is necessary for the product options (*i.e. [-3G]*) to be included in the 7812UDX-AAV module product string. Without the correctly updated product options, the 7812UDX-AAV modules will not provide the additional functionality.

A unique checksum is required for each 7812UDX-AAV module to upgrade the product string. These values must be entered correctly into VistaLINK® PRO to successfully update the product strings.

NOTE: Please contact Evertz to obtain the correct checksum values based on the reported 7812UDX-AAV module serial numbers to be updated.

Each 7812UDX-AAV module product string must be updated individually. To upgrade the 7812UDX-AAV module product strings, open VistaLINK® PRO client, navigate to the desired 7812UDX-AAV module in the hardware tree. Right click on the 7812UDX-AAV module and select *View Configuration* to open the *Global configuration* view:

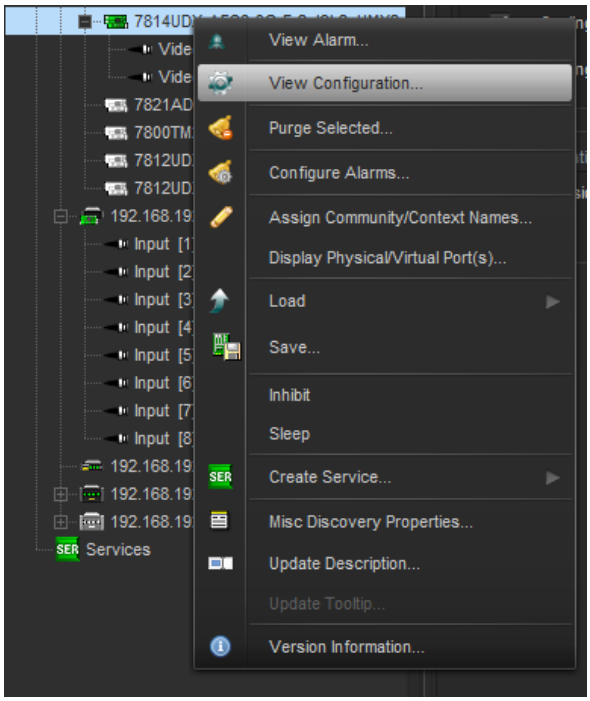

Figure 6-7: Opening 7812UDX-AAV Module Configuration

Select the *Change Product* tab (see Figure 6-8).

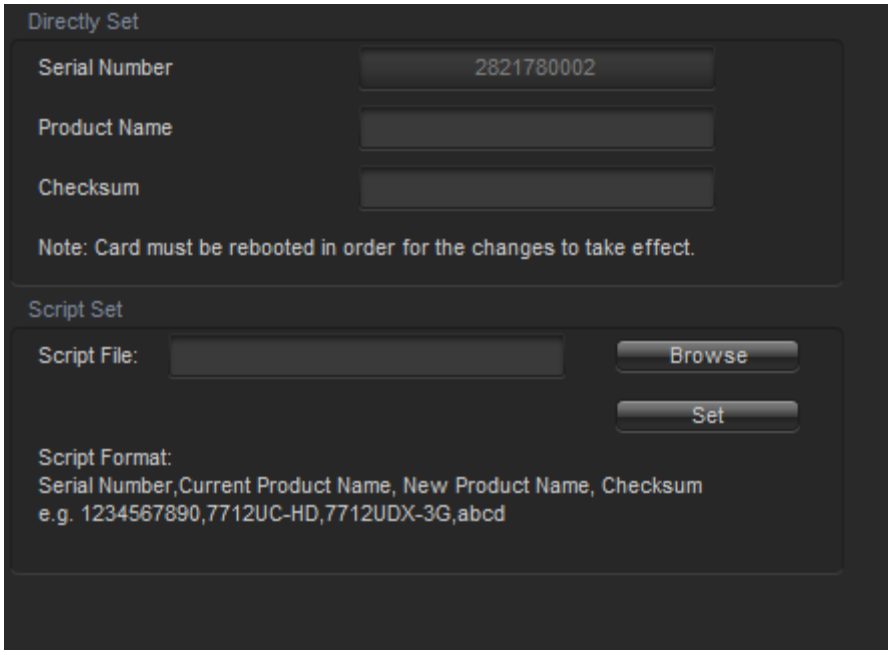

Figure 6-8: 7812UDX-AAV Global configuration view

Enter the **new product name** in the *Product Name* text box.

NOTE: Ensure the product name matches the product name specified with the provided checksum based on the 7812UDX-AAV module serial number in the *Serial Number* textbox.

Enter the **checksum** in the *Checksum* text box.

NOTE: Ensure the checksum matches the checksum value specified according to the reported serial number in the *Serial Number* textbox.

Click the *Apply Button* (first blue arrow in top left of configuration view window) to update the 7812UDX-AAV module product string. If the product string upgrade is successful, the product string specified in the VistaLINK® PRO hardware tree should update with the added product options. It can take approximately 5 minutes for the product string to update in VistaLINK® PRO.

NOTE: If any of the 7812UDX-AAV modules do not properly upgrade the product string, please power-cycle those boards and retry the procedure exclusively on the failed boards. If the issue still persists, contact Evertz for further assistance.

7. APPENDIX A

7.1. HARDWARE OPTIONS

This manual covers the following hardware options:

- 7812UDX-AAV-HD
- 7812UDX-AES8-AAV-HD
- 7812UDX-AAV-3G
- 7812UDX-AES8-AAV-3G
- 7812UDX-AAV-HD-F
- 7812UDX-AES8-AAV-HD-F
- 7812UDX-AAV-3G-F
- 7813UDX-AES8-AAV-3G-F

7.2. VERSIONS

This manual has been built using the following software information. Should the module you are working with have interfaces that differ in appearance this may be due to difference in software versions.

- Based on JAR File Version: 1047
- Based on Firmware Version 31.00 Build 107

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