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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary	Sept 08

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1. OVERVIEW

The 7712UDX-HD and the 7712UDX-AES8-HD are Broadcast Quality Up/Down/Cross Converters that convert between common SD/SMPTE 259M and HD/SMPTE 292M video signals. With the –3G versions of these cards, conversions between SD/SMPTE 259M, HD/SMPTE 292M and single link/dual link 1920x1080p59.94/50 video signals are supported*. This manual will serve to cover all four products.

All cards include integrated frame synchronization capabilities and have an external genlock input for adjusting output video timing. In addition, the cards support FRAME REFERENCE inputs as supported on the 7700FR-G and the 7800FR.

The 7712UDX series of converters incorporate a new generation of signal processing technology. Advanced Mosquito Noise Reduction (MNR) and Block Artifact Reduction (BAR) are supported in addition to per pixel motion adaptive spatial-temporal noise reduction. The 7712UDX series also incorporates new de-interlacing technology that features:

- Pixel adaptive motion processing that maintains maximum vertical resolution
- Directional edge interpolation that minimizes “jaggies” typically seen when converting interlaced video to progressive video
- Advanced film mode processing that delivers mathematically lossless de-interlacing of video content with embedded 3:2 and 2:2 pull-down

The 7712 series supports broadcast quality scaling resources and provides standard as well as completely user defined aspect ratio conversions. In addition, these modules support AFD based steering of aspect ratio conversions and can re-stamp AFD signals on the output video. Transitions between particular ARC modes are frame accurate and glitch free. These modules support colour space conversion from ITU rec. 709 ↔ITU rec. 601. With the +F option, signals supplied to the second program input can be keyed into the un-used portions of the output image raster (ie. side panels typically generated when converting 4:3 to 16:9). When operating in this mode, the FILL input signal is automatically frame synchronized so that pre-timing of FILL input signals are not required. With the +CF2G option, internal compact flash (up-loaded using the card’s Ethernet port), static or animated side panels can be stored directly on the card and keyed into the image side-panels. Up to 7 seconds of side panel animation can be supported.

Wide range YCrCb/RGB video proc capabilities are integrated into the 7712 series products. These include YCbCr gain and offset controls in addition to RGB based gain controls and RGB based color legalization. Video level, Hue and Saturation controls are available. RGB colour legalization and per component video gamma correction capabilities are also available. Finally, per component control over RGB gamma is also available.

The 7712UDX-HD and the 7712UDX-3G support 16 channels of embedded audio. Embedded audio is processed so audio delay matches video delay. Additional audio delay (up to +100ms) is also available. Full audio proc capabilities are supported including per channel audio gain, audio routing/channel swapping and inversion control. Surround sound (5.1 PCM) to stereo down-mixing is supported (Lt/Rt or LoRo). The 7712UDX-AES8-HD and the 7712UDX-AES8-3G versions have 8x discrete AES inputs and supports 8x AES outputs. AES outputs carry the same audio that is being embedded. On –AES8 versions, stereo to 5.1 up-mixing is also supported with the +UMX option.

Summary of 7712UDX Features:

- Broadcast quality up-conversion from SD to common HD/SMPTE 292M video formats
- Integrated frame sync capabilities and external reference input for phasing of output video
- Optional support to convert to/from common 1080p/59.94 signal formats (-3G versions)
- Integrated frame synchronization capabilities
- Evertz proprietary detail enhancement for optimum picture sharpness
- Leading edge de-interlacing technologies:
  - Pixel adaptive motion processing to maintain maximum vertical resolution
  - Directional edge interpolation to minimize "jaggies" typically seen when converting interlaced video to progressive video
  - Advanced film mode processing for mathematically lossless de-interlacing of video content with embedded 3:2 and 2:2 pull-down

- Leading edge video noise reduction technologies:
  - 3D pixel adaptive spatial-temporal noise reduction
  - Mosquito Noise Reduction (MNR)
  - Block Artifact Reduction (BAR)

- Wide range video proc functions including both RGB gains and YCrCb gains/offsets
- Internal RGB colour legalizer
- Per component RGB video gamma correction controls
- Optional compact flash for on card storage of static or animated side-panel content (+CF2G)
- Dedicated Ethernet port for up-loading internal compact flash
- Supports all required colour space conversions (rec. 601 to 709)
- Supports standard and user defined aspect ratio conversions
- Fully AFD enabled with frame accurate and glitch free transitions between ARC modes
- Supports 8 external AES inputs and 8 AES outputs (-AES8 version only) with audio delay tracking video delay
- Full audio proc and channel swapping
- Stereo to 5.1 surround sound up-mix (+UMX)
- 5.1 surround sound to stereo (Lt/Rt and Lo/Ro) down-mix

* 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 it to 372M dual link, the top two outputs become LINK A output and the bottom one becomes LINK B output.
Initial release will not support +CF option for 1080p59.94/50 output signals

1.1. FUNCTIONAL DESCRIPTION

SD or HD video can be supplied to the PGM A or PGM B input. Either PGM A or PGM B may be selected for video processing and up/down/cross conversion. With the –3G version of these cards, 1920x1080p59.94/50 signals may also be supplied to the converter inputs*. When accepting dual link SMPTE 372M signals, both PGM A and PGM B inputs are used; the top two outputs become LINK A output and the bottom one becomes LINK B output.

With the +F option, the PGM B input is used to supply a HD-SDI FILL input signal that can be keyed into unused portions of the output image raster (i.e. side panels typically generated when converting from 4:3 to 16:9). When operating in this mode, the FILL input signal is automatically frame synchronized so that pre-timing of FILL input signals ***is not*** required.

The video signal selected for processing (PGM A or PGM B) is routed through a number of advanced processing stages including frame synchronization, audio/metadata extraction, noise reduction, de-

interlacing, aspect ratio conversion, up/down/cross conversion, video proc adjustment and detail enhancement. The final stage of processing includes keying of the FILL input or embedded compact flash content onto the output image (+F or +CF2G option only). Side panels generated from the compact flash may be static or animated. Up to seven of the animated side panel content can be supported. Content for the compact flash is generated using Evertz's Overture software and then transferred to the card using standard FTP. The compact flash may also be extracted from the card, loaded remotely and then replaced again. De-embedded audio and metadata is re-inserted into the outgoing video signal with audio delay matching video path processing delay.

Within the audio processing block, audio delay is matched to track video delay. In addition, channel swapping, gain and inversion processing is available. Down-mixed audio is also generated in this block. The 7712UDX-AES8-HD and the 7712UDX-AES8-3G versions have 8x discrete AES inputs and supports 8x AES outputs. AES outputs carry the same audio that is being embedded. On –AES8 versions, stereo to 5.1 up-mixing is also supported with the +UMX option.

All cards include integrated frame synchronization capabilities and have an external genlock input for adjusting output video timing. In addition, the cards support FRAME REFERENCE inputs as supported on the 7700FR-G and the 7800FR.

Figure 1-1 provides the block diagram for the 7712UDX-HD and 7712UDX-AES8-HD.

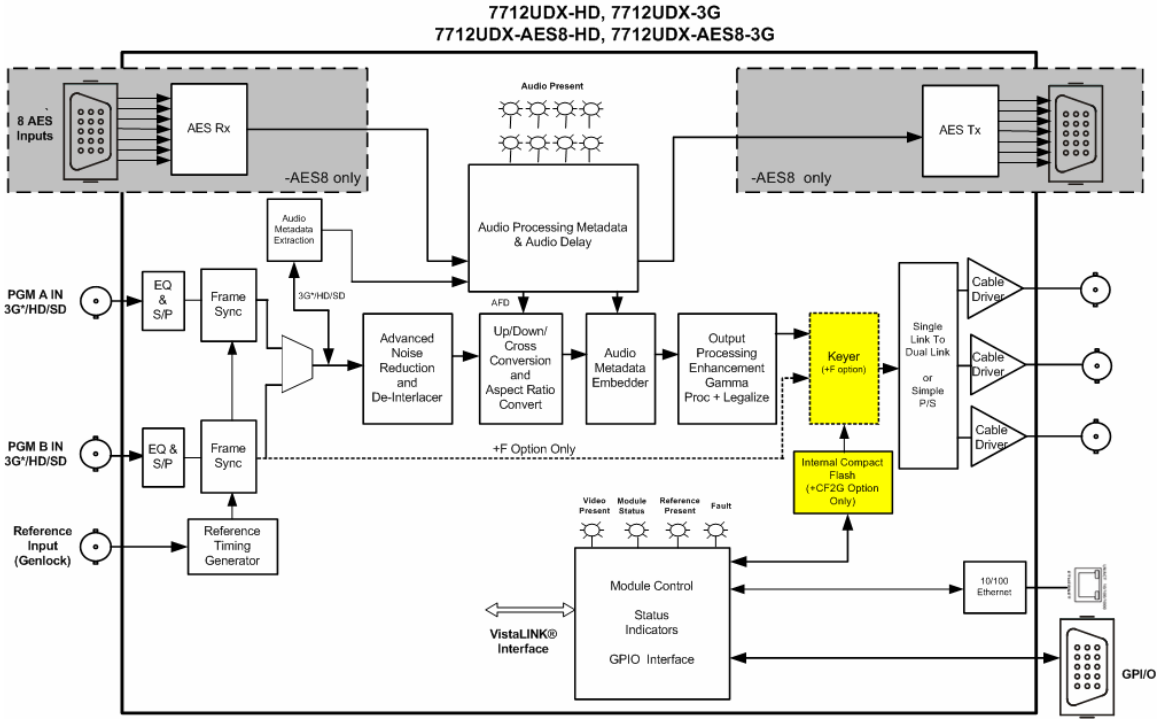


Figure 1-1: 7712UDX Block Diagram (-HD, -3G and –AES8 Versions)

2. INSTALLATION

The 7712UDX modules come with a companion rear plate and occupy two slots in the 7800FR frame or three slots in the 7700FR-C. **For proper operation in the 7700FR-C, the on-board "slot blocker" *must be* installed in order for the card to power-up.** If a 7712UDX-HD 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 chapter.

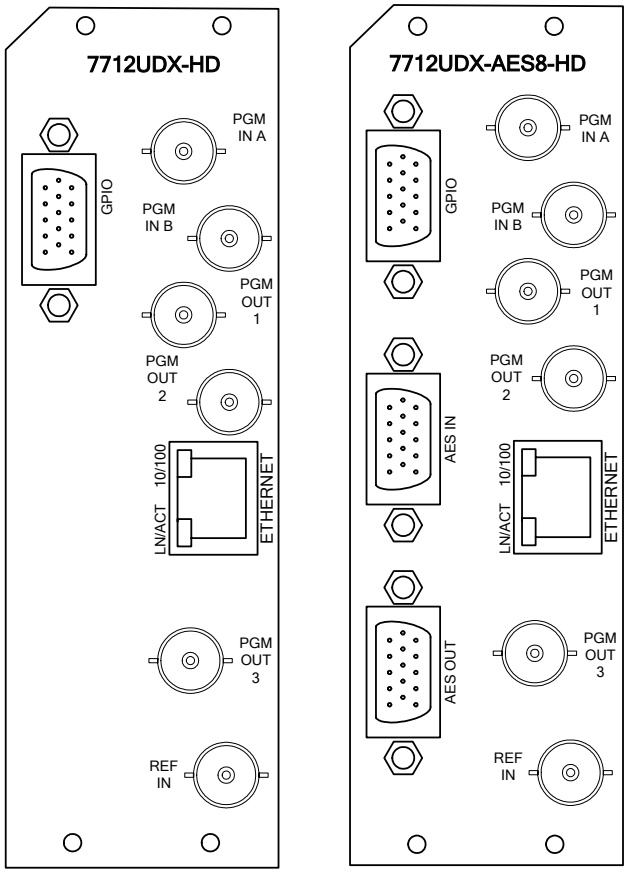


Figure 2-1: 7712UDX-HD & 7712UDX-AES8-HD Rear Panels

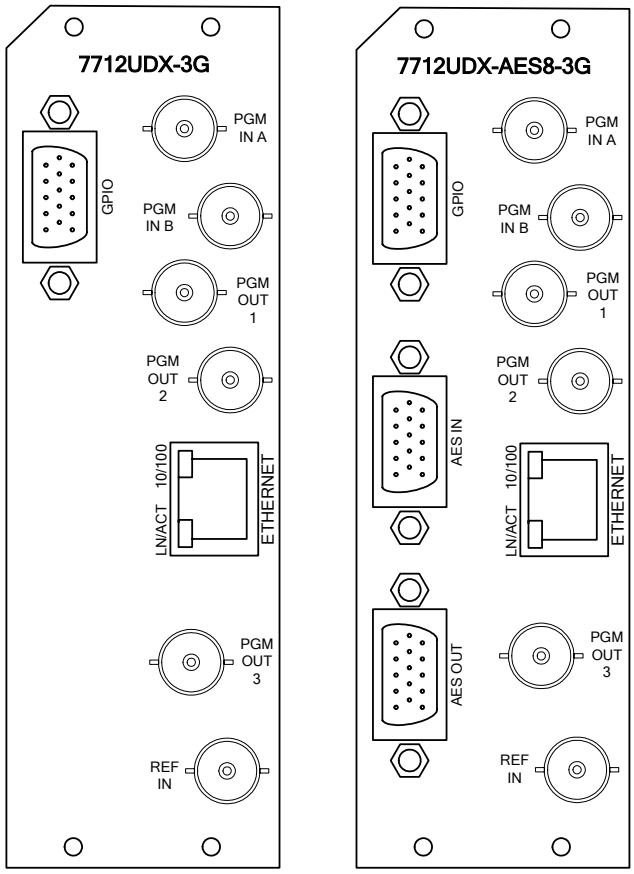


Figure 2-2: 7712UDX-3G & 7712UDX-AES8-3G Rear Panels

2.1. INPUT/OUTPUT DESCRIPTION

PGM IN A: Accepts a 10-bit serial digital video signal. –HD versions have inputs compatible with the SMPTE 259M/SMPTE292M standards. –3G* versions have inputs compatible with SMPTE 259M/SMPTE 292M/SMPTE 372M/SMPTE 425M. The module can be set to a specific video standard or set to automatically detect. PGM A or PGM B can be selected for subsequent video processing except when dual link SMPTE 372M is connected to the PGM inputs.

* 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 it to 372M dual link, the top two outputs become LINK A output and the bottom one becomes LINK B output.
Initial release will not support +CF option for 1080p59.94/50 output signals

PGM IN B: Accepts a 10-bit serial digital video signal. –HD versions have inputs compatible with the SMPTE 259M/SMPTE292M standards. –3G**** versions have inputs compatible with SMPTE 259M/SMPTE 292M/SMPTE 372M/SMPTE 425M. The module can be set to a specific video standard or set to automatically detect. PGM A or PGM B can be selected for subsequent video processing except when dual link SMPTE 372M is connected to the PGM inputs.

** References to 3G, SMPTE 424M/SMPTE 425 and single link 1080p59.94/50 refer 10 bit 4:2:2 1080p59.94/50 signals (Level type A in SMPTE 425M)
Note that PGM IN B is different from PGM IN A because PGM IN B can only support SMPTE 425M LEVEL A
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 it to 372M dual link, the top two

outputs become LINK A output and the bottom one becomes LINK B output.
Initial release will not support +CF option for 1080p59.94/50 output signals

PGM OUT1-3: These BNC connectors are used to output the converted video as serial component video. –HD versions have outputs compatible with SMPTE 292M or SMPTE 259M standard. –3G* versions have outputs compatible with SMPTE 292M or SMPTE 259M o SMPTE 372M or SMPTE 425M.

* 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 it to 372M dual link, the top two outputs become LINK A output and the bottom one becomes LINK B output. When set it to 372M dual link, the top two outputs become LINK A output and the bottom
one becomes LINK B output.
Initial release will not support +CF option for 1080p59.94/50 output signals

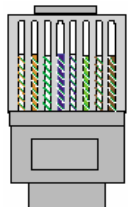
REF IN: This BNC is for connecting a bi-level or tri-level reference and is auto-detected by the module. The output video can be timed with respect to the genlock video using the *H Phase Offset* and *V Phase Offset* menu options. When no Genlock is provided, the output video is timed with respect to the input video. Reference for the 7712UDX may also be supplied via the FRAME REFERENCE (7700FR-G and 7800FR only). VLPRO is used to select either the REF BNC or the FRAME REFERENCE BNC.

ETHERNET:

Static or side panel content can be uploaded directly to the cards internal compact flash using this port. The 7712UDX is designed to be used with 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 7712UDX and the other end into a port of the supporting hub. If you are connecting the 7712UDX directly to an Ethernet port on a computer you will have to use a “crossover” cable.

The straight-through RJ-45 cable can be purchased or can be constructed using the pinout information in Table 2-1. A colour code wiring table is provided in Figure 2-3 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)

Figure 2-3: 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 7712UDX and the supporting hub is 300 ft (90 m).

Devices on the Ethernet network continually monitor the receive data path for activity as a means of checking that the link is working correctly. When the network is idle, the devices also send a link test signal to one another to verify link integrity. The rear panel is fitted with two LEDs to monitor the Ethernet connection.

10/100: This Amber LED is ON when a 100Base-TX link is last detected. The LED is OFF when a 10Base-T link is last detected (the LINK LED is ON). Upon power-up the LED is OFF as the last detected rate is not known and therefore defaults to the 10Base-T state until rate detection is completed.

LN/ACT: This dual purpose Green LED indicates that the 7712UDX-HD has established a valid linkage to its hub, and whether the 7712UDX-HD is sending or receiving data. This LED will be ON when the card has established a good link to its supporting hub. This gives you a good indication that the segment is wired correctly. The LED will BLINK when the card is sending or receiving data. The LED will be OFF if there is no valid connection.

GPIO: There are 4 General Purpose Inputs/Outputs (GPIO) on the7712 series platform. Each GPIO may be configured to be an input or configured to be an output. These GPIOs are interfaced using a 15 pin DB connector (WPAES8-BNCM-9W-6F cable).

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	Reserved	Reserved	**- -**
3	GPIO2	General Purpose Input /Output #2	Blue
4	GPIO4	General Purpose Input /Output #4	Violet
5	Reserved	Reserved	- -
6	Reserved	Reserved	- -
7	GND	Ground	- -
8	GPIO3	General Purpose Input /Output #3	Yellow
9	GND	Ground	- -
10	GND	Ground	- -
11	GND	Ground	- -
12	GND	Ground	- -
13	GND	Ground	- -
14	GND	Ground	- -
15	GND	Ground	- -
Shell	GND	Ground	- -

Table 2-1: GPIO Connector Pinout

When configured as a GPI, GPIO1-GPIO4 have the following interface.

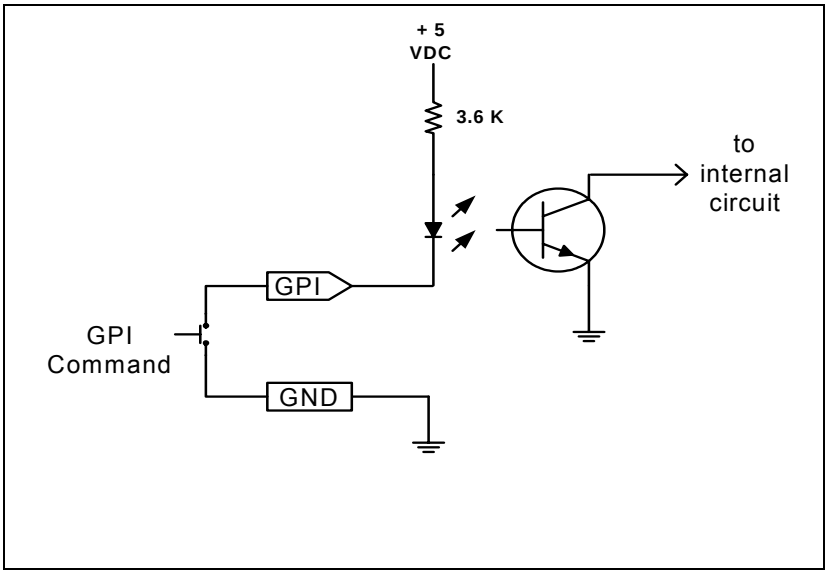


Figure 2-4: GPI Input Circuitry

When configured as a GPO, GPIO1-GPIO4 have the following interface. 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 2-5 shows the circuit for the general-purpose output.

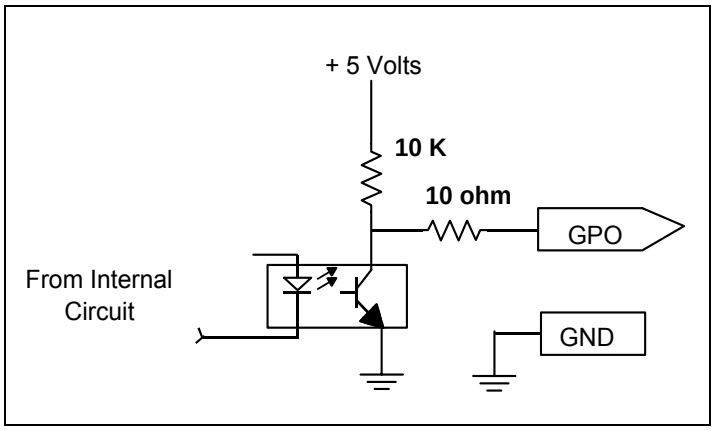


Figure 2-5: GPO Output Circuitry

3. SPECIFICATIONS

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 60169-8 Amendment 2
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

* References to 3G, SMPTE 424M/SMPTE 425 and single link 1080p59.94/50 refer 10 bit 4:2:2 1080p59.94/50 signals (mapping type 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 it to 372M dual link, the top two outputs become LINK A output and the bottom one becomes LINK B output.
Initial release will not support +CF option for 1080p59.94/50 output signals

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	3
Connector:	BNC per IEC 60169-8 Amendment 2
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 (mapping type 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 it to 372M dual link, the top two outputs become LINK A output and the bottom one becomes LINK B output.
Initial release will not support +CF option for 1080p59.94/50 output signals

3.3. REFERENCE VIDEO INPUT

Type	HD Tri-Level sync, NTSC or PAL Colour Black 1 V p-p
Connector:	BNC per IEC 60169-8 Amendment 2
Termination	75 ohm

3.4. GENERAL PURPOSE INPUTS AND OUTPUTS

Number	4 (configurable as inputs or outputs)
Type	Opto-isolated, active low with internal pull-ups to +5
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

3.5. ELECTRICAL

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

3.6. PHYSICAL

Number of slots

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

4. STATUS LEDS

4.1. MODULE STATUS LEDS –AES8 VERSION AND NON –AES8 VERSIONS

The following diagrams demonstrate the status LEDs for the 7712UDX-AES8-HD and the 7712UDX-HD. Status LEDs are the same for the 7712UDX-AES8-3G and the 7712UDX-3G.

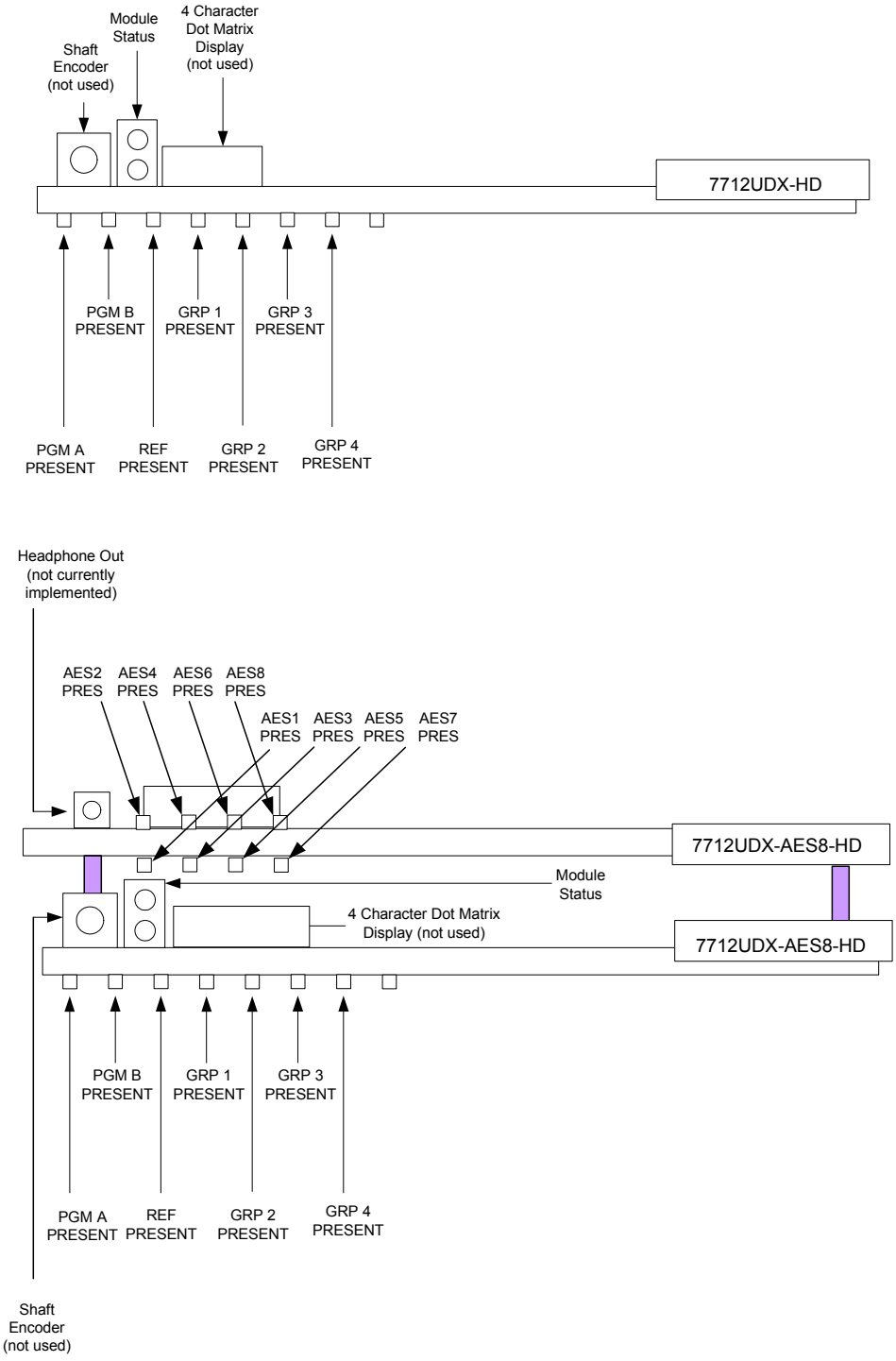


Figure 4-1: Status LEDs

MODULE STATUS	This Green LED will be on when the module is operating properly.
LOCAL FAULT	This Red LED will be on when an essential module input is missing or the module has another fault.
PGM A PRESENT	The PGM A PRESENT LED will be green when a valid input signal is present on the PGM A BNC. It will be red when missing an input signal. It will blink between red and green when an invalid input signal is presented.
PGM B PRESENT	The PGM B PRESENT LED will be green when a valid input signal is present on the PGM B BNC. It will be red when missing an input signal. It will blink between red and green when an invalid input signal is presented.
REF PRESENT	The REF PRESENT LED will be green when a valid reference signal is present on the REF IN BNC. It will be red when missing an genlock signal. It will blink between red and green when an invalid genlock signal is presented. This LED will also be red when genlocking is turned off (lock to video).
GRP1 PRESENT	The LED will be Green when embedded audio Group 1 is present and Red when embedded audio Group 1 is not present.
GRP2 PRESENT	The LED will be Green when embedded audio Group 2 is present and Red when embedded audio Group 2 is not present.
GRP3 PRESENT	The LED will be Green when embedded audio Group 3 is present and Red when embedded audio Group 3 is not present.
GRP4 PRESENT	The LED will be Green when embedded audio Group 4 is present and Red when embedded audio Group 4 is not present.
AES1 PRES	The LED will be Green when AES1 is present and Red when AES1 is not present.
AES2 PRES	The LED will be Green when AES2 is present and Red when AES2 is not present.
AES3 PRES	The LED will be Green when AES3 is present and Red when AES3 is not present.
AES4 PRES	The LED will be Green when AES4 is present and Red when AES4 is not present.
AES5 PRES	The LED will be Green when AES5 is present and Red when AES5 is not present.
AES6 PRES	The LED will be Green when AES6 is present and Red when AES6 is not present.
AES7 PRES	The LED will be Green when AES7 is present and Red when AES7 is not present.
AES8 PRES	The LED will be Green when AES8 is present and Red when AES8 is not present.

5. MODULE CONTROL

The 7712UDX series of products are controlled using Ethernet and SNMP control only. The 7712UDX-HD DOES NOT HAVE card edge controls. The following sections describe module control in terms of the parameters found within the individual pages of the VLPRO screens for the 7712UDX-HD.

5.1. CONTROL CATEGORIES

Within VistaLINK®, the 7712UDX series of products have the following main control tabs. Note that the list of control tabs listed below include several that are only presented to the user when specific hardware and software options are ordered. These specific control tabs and their association to hardware and software options are specifically noted in the Control Tab column,

CONTROL TAB	DESCRIPTION
Video	Configuration for the source of video, the input and output video standards, the source of video reference and frame sync output timing. In addition, time code source, time code read and write lines and FS operating modes are defined within this control tab. The status of several monitored video and AFD parameters are also reported in this control tab.
Audio	Configuration for enabling and disabling audio embedders, setting audio audio delay and setting sample rate converter (SRC) operating modes. In addition, C bit processing and default audio operating modes are specified within this control tab. The status of several monitored audio parameters are also reported in this control tab.
Audio Input (-AES8 versions only)	Enables configuration to select which channels of audio (AES or embedded) are processed internally within the card. Selection of which audio is processed to be done on a pair by pair basis.
Audio Proc Ch1-4	Configuration for channel swapping, audio gain and audio inversion for outbound audio channels CH1, CH2, CH3, CH4.
Audio Proc Ch5-Ch8	Configuration for channel swapping, audio gain and audio inversion for outbound audio channels CH5, CH6, CH7, CH8.
Audio Proc Ch9-Ch12	Configuration for channel swapping, audio gain and audio inversion for outbound audio channels CH9, CH10, CH11, CH12.
Audio Proc Ch13-16	Configuration for channel swapping, audio gain and audio inversion for outbound audio channels CH13, CH14, CH15, CH16.
De-interlacer Control	Configuration for setting key operating modes and key thresholds for the internal video de-interlacer.
Video Proc	Configuration for setting video proc controls including RGB gains, YCbCr gains/offsets, Hue, Saturation, Video Level, Gamma and RGB colour legalization.
Scaler	Configuration for setting scaler aspect ratio conversion (ARC) modes, default AFD stamping mode as well as default side panel colors. In addition, scaler filter bandwidths and H/V edge processing controls are defined in this control tab.
CC Control	Configuration for the closed captioning translation process including service level mapping and HD write lines.

Utilities Control	Configuration for managing card presets including storing configurations to specific user presets, recalling specific user presets and enabling/disabling Auto Recall Presets functionality.
SD Aperture Control	Configuration for setting the SD Aperture to be used when performing scaling and ARC operations including settings for both Clean and Production Apertures.
Image Enhancement	Configuration for the image enhancement process including enhancement enable/disable, detail gain, enhancement limit, horizontal band, vertical intensity, luma floor and the detail noise floor.
AFD Control	Configuration for setting how the card will process AFD.
AFD ARC	Configuration for defining what aspect ratio conversions will be performed in response to incoming AFD values. Each incoming AFD code (16 codes in total) can select from predefined list of ARC modes or a user defined ARC mode. These responses are defined within this control tab.
Noise Control	Configuration for setting noise reduction. Individual configuration for Mosquito Noise Reduction, Block Artifact Reduction and Motion Adaptive Spatial-Temporal Noise Reduction.
SCTE104	Configuration for passing or deleting incoming SCTE 104 packets and further specifying the HD write line when passing SCTE 104 packets.
CC Fault Traps	Configuration for enabling and disabling specific Close Captioning fault traps and viewing Close Captioning Trap Status.
Audio/Video Traps	Configuration for enabling and disabling specific Video and Audio fault traps and viewing Video and Audio Trap Status.
GPIO	Configuration for defining the four (4) card GPIOs as a GPI or a GPO and further defining the function of each GPIO.
Panel Logo **(+CF2G versions only)**	Configuration for cueing, playing and looping embedded side panel logos. Logo status is also reported in this control tab.
IP (+CG2G versions only)	Configures the IP address, subnet mask and default gateway. At the time of this manual's writing the Ethernet port is only used for uploading side panel content to the card's internal compact flash.
Audio 5.1 Down Mix	Configures the Audio 5.1 Down Mix parameters.
Dolby Metadata Encoder	Configures high level Dolby Metadata encoder parameters.
Dolby Metadata Control – Program 1&2	Configures the Dolby Metadata Encoder for Program 1&2.
Dolby Metadata Control – Program 3&4	Configures the Dolby Metadata Encoder for Program 3&4.

Dolby Metadata Control – Program 5&6	Configures the Dolby Metadata Encoder for Program 5&6.
Dolby Metadata Control – Program 7&8	Configures the Dolby Metadata Encoder for Program 7&8.
Up Mix Control	Configures the stereo to 5.1 Up Mix Control process.

5.2. CONFIGURING THE VIDEO CONTROLS

The *Video* control tab is used to configure the source of video, the input and output video standards, the source of video reference and frame sync output timing. In addition, time code source, time code read and write lines and FS operating modes are defined within this control tab. The status of several monitored video and AFD parameters are also reported in this control tab.

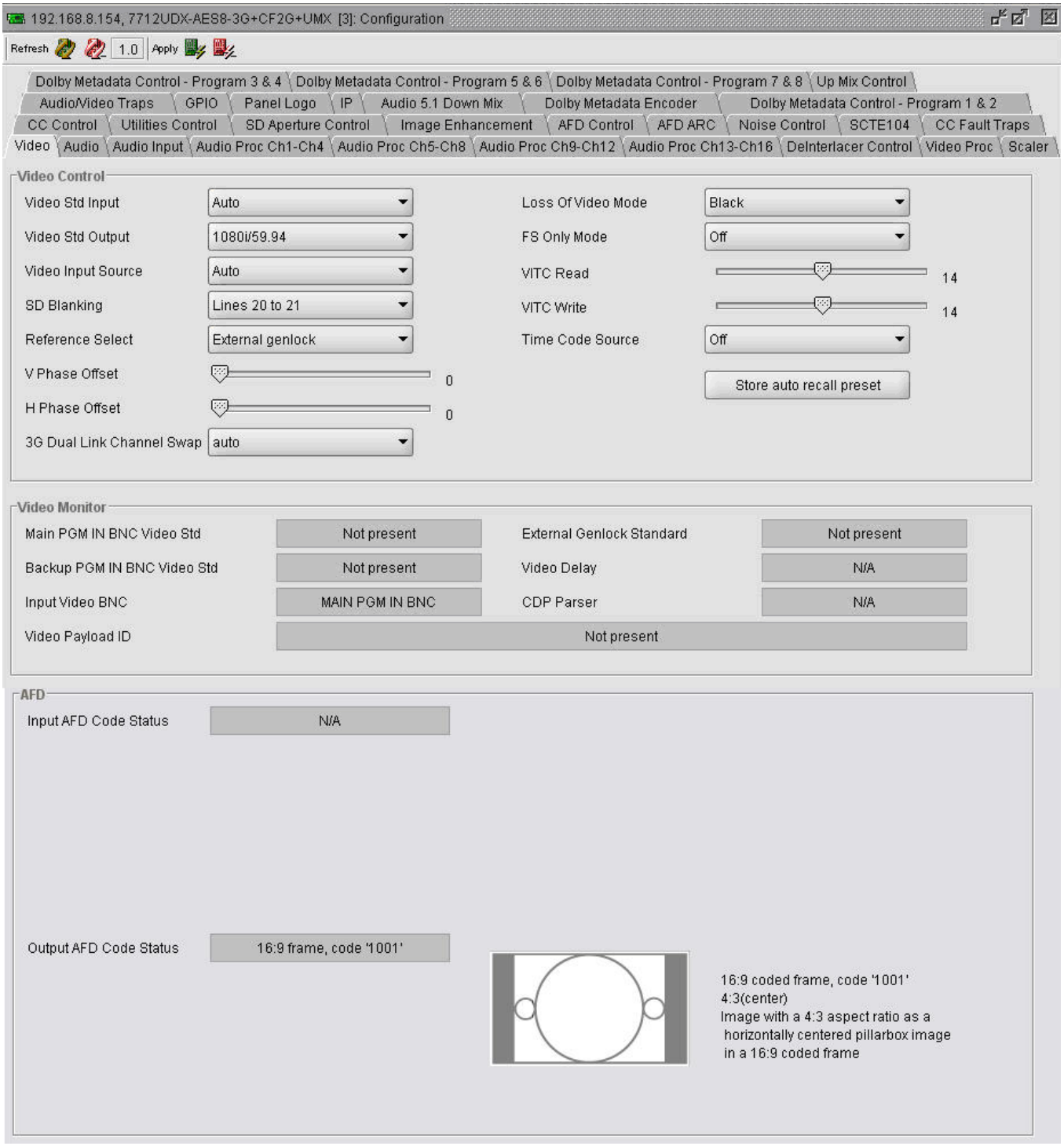
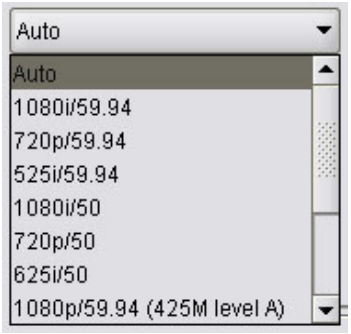


Figure 5-1: Video Tab

5.2.1. Video Control

5.2.1.1. Setting the Input Video Standard

This option selects 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. The drop down menu for ***Video Std Input*** appears as follows:



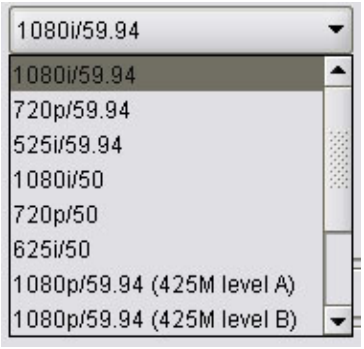
When the input standard is set to *Auto*, the module will auto detect the video standard. The full set of available input video standards include:

Auto
1080i/59.94
720p/59.94
525i/59.94
1080i/50
720p/50
625i/50
1080p/59.94 (425M level A) *
1080p/59.94 (425M level B) *
1080p/59.94 (372M dual link) *
1080p/50 (425M level A) *
1080p/50 (425M level B) *
1080p/50 (372M dual link) *

* for –3G versions only

5.2.1.2. Setting the Output Video Standard

The ***Video Std Output*** 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 (ie. standards conversion is not possible). The drop down for ***Video Std Output*** appears as follows:



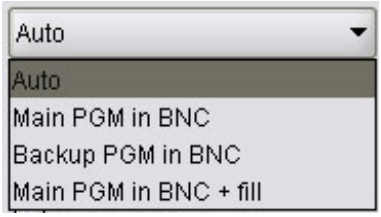
The full set of available output video standards include:

1080i/59.94
720p/59.94
525i/59.94
1080i/50
720p/50
625i/50
1080p/59.94 (425M level A) *
1080p/59.94 (425M level B) *
1080p/59.94 (372M dual link) *
1080p/50 (425M level A) *
1080p/50 (425M level B) *
1080p/50 (372M dual link) *

* for –3G versions only

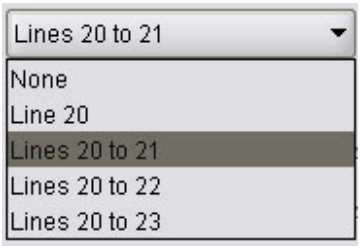
5.2.1.3. Selecting The Video Input Source

The ***Video Input Source*** control selects whether the source of input video will be the PGM IN A or the PGM IN B BNC. In this control, select *Main PGM in BNC* to process video supplied on PGM IN A through the main up/down/cross conversion path. Select *Backup PGM in BNC* to process video supplied on PGM IN B through the main up/down/cross conversion path. Select *Backup PGM in + fill BNC* to process video supplied on PGM IN A through the up/down/cross conversion path and use content supplied on the PGM IN B as the FILL input for the cards input down stream keyer. 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. The drop down for ***Video Input Source*** appears as follows:



5.2.1.4. Setting the 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. The drop down for ***SD Blanking*** appears as follows:



5.2.1.5. Selecting the Video Reference Source

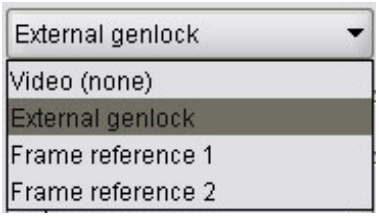
With this control, the source of video reference for the card is selected.
When the card is used in the 7700FR-G or the 7800FR Frame Reference inputs may be used.

- To select the REF IN BNC, choose External genlock.
- To select Frame Ref 1 on the 7700FR-G or the 7800FR choose Frame reference 1
- To select Frame Ref 2 on the 7700FR-G or the 7800FR choose Frame reference 2
- To select locking to the incoming video select Video (none).

Note that if the selected genlock reference disappears or is not valid, the card will lock to incoming video.

Note that when there is no input video the output video will free run.

The drop down for ***Reference Select*** appears as follows:



5.2.1.6. Setting the Vertical Phase of the Output Video

Note: The slider is available for selecting *H* and *V Phase Offsets*, and *VITC Read* and *Write*, etc. To increment by one, click right of the slider and to decrement, click left of slider. The slider can be selected and dragged across if gross movement is desired.

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 Genlock reference or incoming video if genlock is missing.

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 genlock video, 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 through-put delay between the SD input and the video output.

5.2.1.7. Setting the Horizontal Phase of the Output Video

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 Genlock 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.)

5.2.1.8. Setting the 3G Dual Link Swap

This control is used when operating with dual link 1080p 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. Use the drop down menu as shown below to select the operating mode.

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.

5.2.1.9. Loss of Video Mode

This control defines the action that must be taken when the video is loss. You can choose to freeze the last the output on the last good field of video, force the output to black or force the output to blue. The *Loss of Video Mode* drop down menu provides appears as follows:

5.2.1.10. FS Only Mode

The *FS Only Mode* controls the response of the converter when the input and output formats are the same. When set to ***Min*** the converter will operate as a frame synchronizer and will introduce the minimum possible delay in the signal path. When set to ***Match***, the converter will operate as a frame synchronizer AND will maintain the same delay through the signal path that was present before being set into the ***Match*** mode. When set to ***Off***, the frame sync only mode will be disabled and conversions between input and output formats will be enabled. Select the operating mode using the drop down menu as shown below.

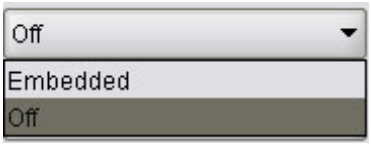
Off	When set to *Off*, the frame sync only mode will be disabled and conversions between input and output formats will be enabled
Min	When set to *Min,* the converter will operate as a frame synchronizer and will introduce the minimum possible delay in the signal path
Match	When set to Match, the converter will operate as a frame synchronizer AND will maintain the same delay through the signal path that was present before being set into the *Match* mode.

5.2.1.11. Selecting the VITC Reader and VITC Writer Lines

Using the *VITC Read* control, the user can select the line number where VITC will be read on the standard definition input video. Using the *VITC Write* control, the user can select the line number where VITC will be written on standard definition output video. The range for both controls is Line 10 through Line 18.

5.2.1.12. Time Code Source

This control selects the source of Timecode. Select *Embedded* to use RP188 ancillary time code (ATC) as the source for high definition video formats or Vertical interval time code (VITC) as the source for standard definition video formats. When *Off* is selected, there will be no timecode on the output video.



If no Timecode is detected, it will not be embedded on the output video.

5.2.2. Video Monitor

The *Video Monitor* section enables the user to view the status of video related parameters.

5.2.2.1. Main PGM IN BNC Video Standard

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.

5.2.2.2. Backup PGM IN BNC Video Standard

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.

5.2.2.3. Input Video BNC

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

5.2.2.4. Video Payload ID

Video Payload ID reports if a valid Video Payload ID ANC packet has been detected and indicates the format that the video is being sent to the card.

5.2.2.5. External Genlock Standard

External Genlock Standard reports if a valid video reference has been supplied to the REF IN BNC and indicates the standard that is detected when a valid reference is applied.

5.2.2.6. Video Delay

Video Delay reports video delay through the card in ms.

5.2.2.7. CDP Parser

This parameter displays the status of Closed Caption reading.

5.2.3. AFD Monitor

5.2.3.1. Input AFD Code Status

Any detected AFD values on the incoming video signal will be reported in this area. The detected AFD code will be presented and a pictorial representation of what that code means will be presented beside the numerical AFD value.

5.2.3.2. Input AFD Code Status

The AFD code being stamped on the output of the card (if applicable) will be presented and a pictorial representation of what that code means will be presented beside the numerical AFD value.

5.3. CONFIGURING THE AUDIO SETTINGS

The SMPTE 272M and 299M standards permit up to 4 groups of 4 audio channels (16 channels total) to be embedded into the serial digital video bitstream. The 7712 series cards can de-embed four groups of audio from the serial digital input video and re-embed four groups of audio in the outgoing video signal. The "-AES8" versions of the cards also have 8 discrete AES inputs and 8 discrete AES outputs. The AES outputs and the embedded audio outputs follow each other in terms of audio. On the input side, you may select on an audio pair by pair basis whether AES inputs or embedded audio channels are selected for subsequent processing. The 7712 series cards process 16 channels of audio. On the audio input side, the *Audio* menu is used to configure the status of the 7712 series internal audio sample rate converters and applied audio delay. On the audio output side, the *Audio* menu is used to enabled and disable the four internal audio embedders in the 7712 and specify C bit processing. SRC status and Audio Delay and Video Delay is also monitored and reported in the *Audio* menu. Sections 5.3.1 to 5.3.2 give detailed information about each of the menu items.

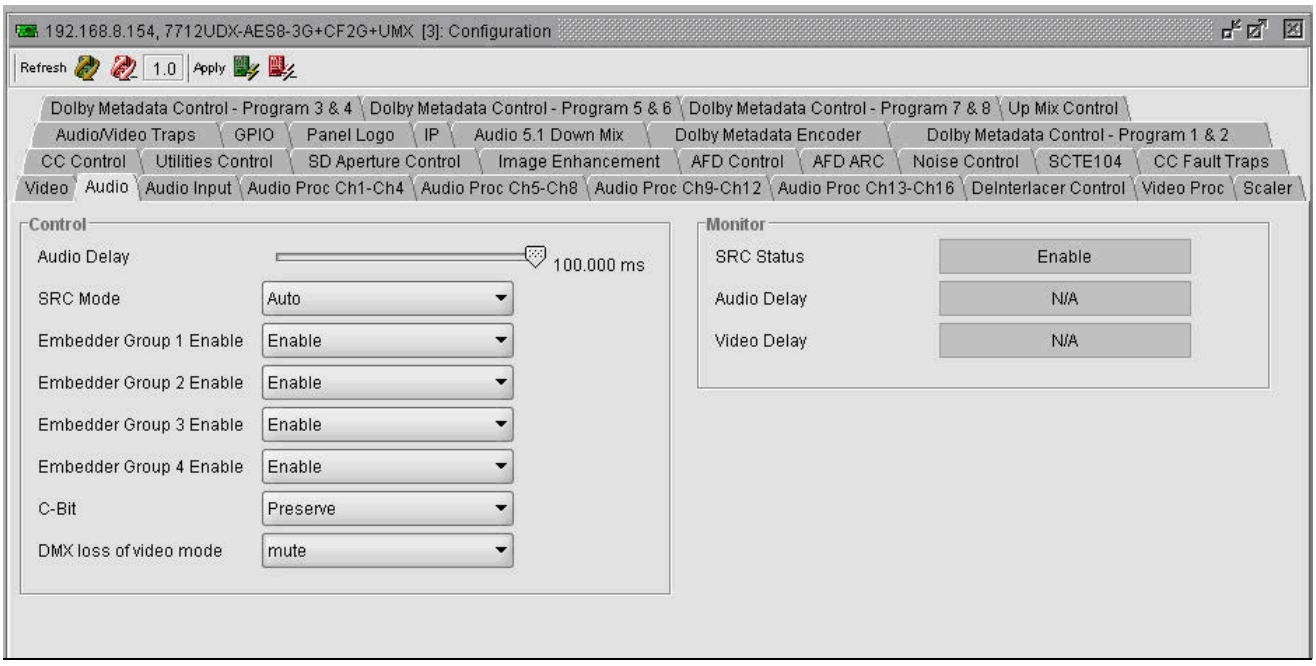


Figure 5-2: Audio Tab

Any changes to the audio settings will cause a momentary interruption on the output audio.

5.3.1. Audio Control Settings

5.3.1.1. Selecting The Audio Delay

This control adjusts the audio delay +/- 100.00 ms samples from the nominal delay necessary to match the card's video processing delay.

Note: Negative values are limited to the amount that cause the delay to be only the audio processing delay, the card does not have negative delay ability.

5.3.1.2. Configuring the SRC Mode

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

Using the *SRC Mode* drop down menu, the user can select from the following options:

Enable: Enables the SRC for PCM audio.

Bypass: Bypass the SRC. Should be used for non-PCM audio.

Auto: The module will automatically select *enable* or *bypass*.
All SRCs are set to bypass as soon as a source of non-PCM audio is detected.

5.3.1.3. Selecting The Audio Groups That Will Be Embedded

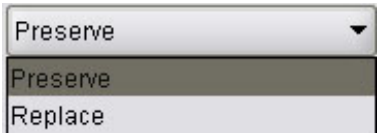
The module has four embedder groups that each inserts one group of audio on the serial digital video output. Each embedder has an enable and disable function as shown below.

When set to *Disable*, the embedder group will be disabled.

When set to *Enable*, the embedder group will be embedded on the serial video output.

5.3.1.4. Configuring the C-Bit Control

This control enables the user to set the C-Bit Control.



Using the *C-Bit Control* drop down menu, the user can select from the following options:

Preserve: This option preserves/passes the C-Bit settings from audio inputs to audio outputs.

Replace: This option replaces the C-Bit settings.

5.3.1.5. Configuring the DMX Loss of Video Mode

This control enables the user to set the action that the 7712 series product will take when there is a loss video on the input. If the video is lost, you may choose to mute the output audio or choose to pass AES input audio.

Mute: Setting this control to mute, will mute the audio if there is a loss of video.

Pass AES: Setting this control to *pass AES*, will enable the user to pass the AES audio when the input video is lost.

5.3.2. Audio Monitor Settings

The *Audio Monitor* section enables the user to view video and audio parameters that are monitored. This section is for read-only purposes and the parameters herein cannot be modified.

5.3.2.1. SRC Status

The ***SRC Status*** parameter displays the status of the Sample Rate Converters. The SRC status will display either *enable* or *disable*.

5.3.2.2. Audio Delay

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

5.3.2.3. Video Delay

The ***Video Delay*** parameter displays the delay of the associated video in ms.

5.4. CONFIGURING THE AUDIO INPUT CONTROLS*

The Audio Input tab enables the user to configure the Audio Input settings. It specifically enables the user to select, on a audio pair by pair basis, whether embedded audio or AES inputs are selected for subsequent card processing. The card processes a total of 16 channels of audio internally. For the sake of brevity, only the settings for channels 1-8 are shown. Controls for CH 9-16 are exactly the same.

* This control tab only appears in the –AES8 versions of the 7712 series cards

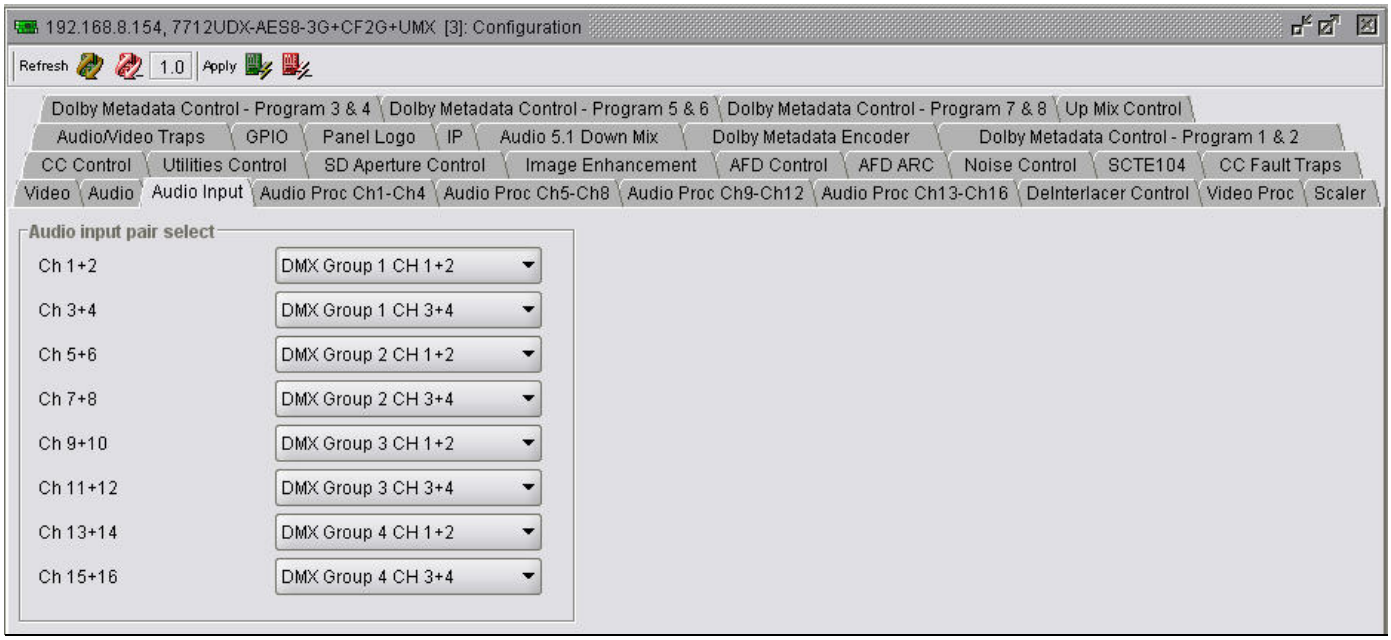
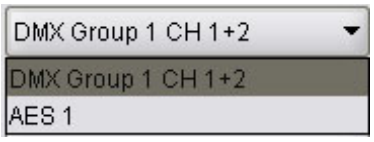


Figure 5-3: Audio Input Tab

5.4.1. Audio Input Pair Select Options

5.4.1.1. Configuring the Audio Source for Input Channel 1 and 2

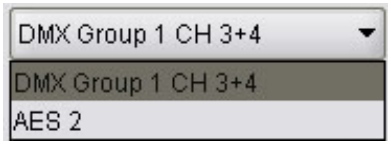
This control allows the user to configure the source for internally processed channels 1 and 2. Your options include processing embedded audio channels with Group 1 CH1+2 or AES1 input.



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

5.4.1.2. Configuring the Audio Source for Input Channel 3 and 4

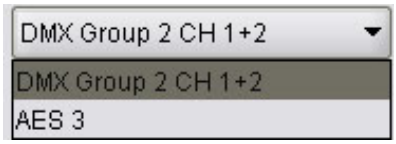
This control allows the user to configure the source for internally processed channels 3 and 4. Your options include processing embedded audio channels with Group 1 CH3+4 or AES2 input.



DMX Group 1 CH3+4	Select this option to choose embedded audio Group 1, CH3+4 for subsequent processing in the card.
AES2	Select this option to choose AES2 input for subsequent processing in the card.

5.4.1.3. Configuring the Audio Source for Input Channel 5 and 6

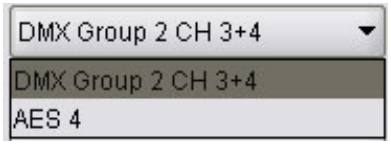
This control allows the user to configure the source for internally processed channels 5 and 6. Your options include processing embedded audio channels Group 2 CH1+2 or AES3 input.



DMX Group 2 CH1+2	Select this option to choose embedded audio Group 2, CH1+2 for subsequent processing in the card.
AES3	Select this option to choose AES3 input for subsequent processing in the card.

5.4.1.4. Configuring the Audio Source for Input Channel 7 and 8

This control allows the user to configure the source for internally processed channels 7 and 8. Your options include processing embedded audio channels with Group 2 CH3+4 or AES4 input.



DMX Group 2 CH3+4	Select this option to choose embedded audio Group 2, CH3+4 for subsequent processing in the card
AES4	Select this option to choose AES4 input for subsequent processing in the card

5.5. CONFIGURING THE AUDIO PROC CONTROLS

For the sake of brevity, only *Audio Proc Ch1-Ch4* control tab will discussed in this manual.
Controls tabs 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.

Each output channel of audio has a two input X-Y mixers that allow full audio proc including channel swapping, gain control, and inversion control. These two inputs (X and Y) are then summed together to generate the final outgoing audio channel from the card. This X-Y mixer can be used for performing such functions as mono-mixes between specific channels or mixing in audio voice-overs.

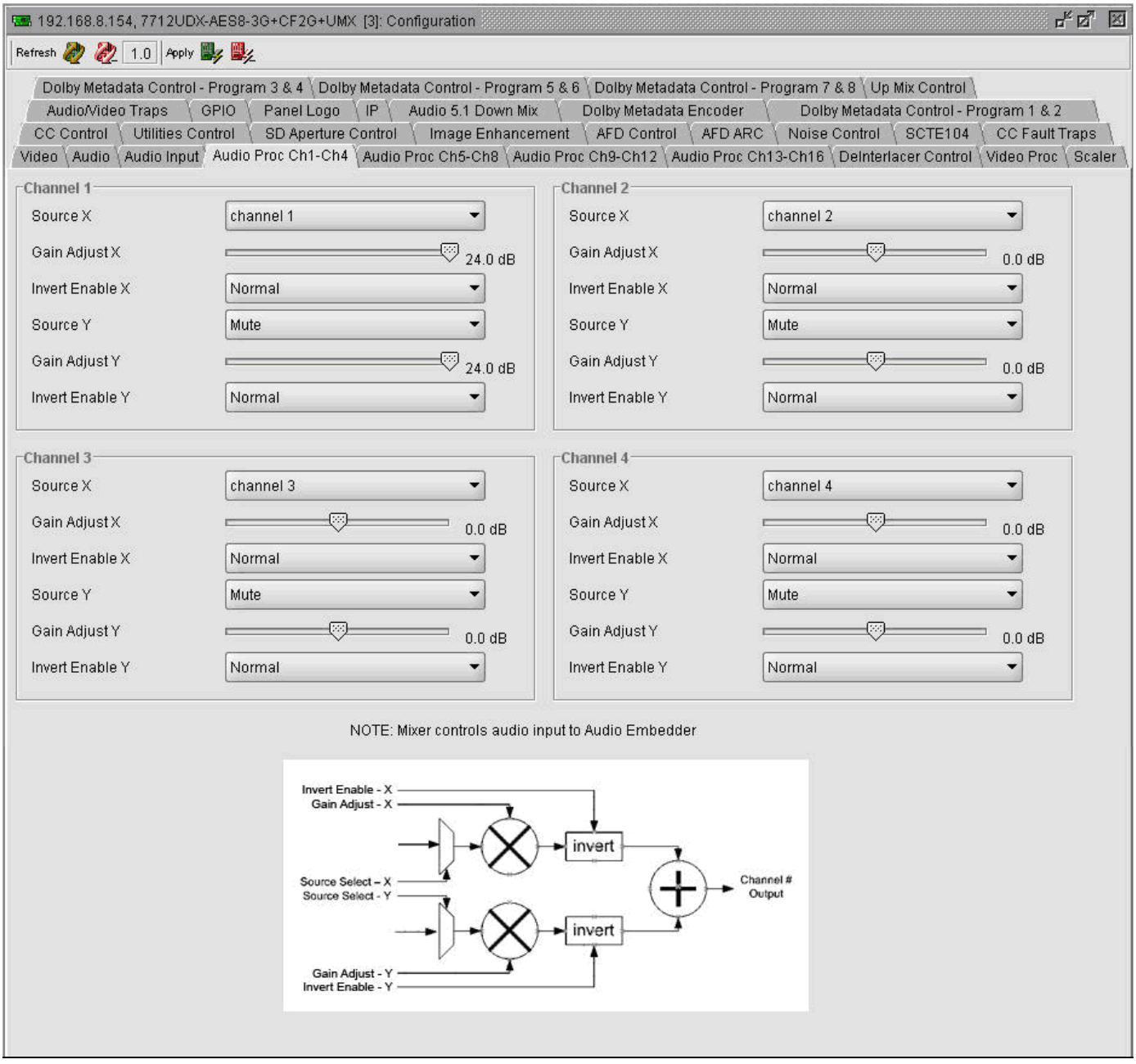
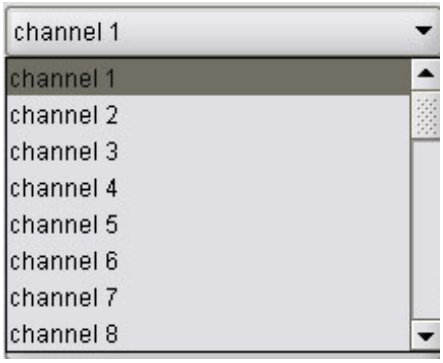


Figure 5-4: Audio Proc Ch1-Ch4 Tab

5.5.1. Source X

The *Source X* control enables the user to route one of the 16 input audio channels to the X input of the Channel 1 mixer. The user can select the channel source by selecting the desired channel from the *Source X* drop down menu as shown below.



The full set of available channels is listed below. Note that the list of available channels can depend on card option.

Source X Input	Channel 1
	Channel 2
	Channel 3
	Channel 4
	Channel 5
	Channel 6
	Channel 7
	Channel 8
	Channel 9
	Channel 10
	Channel 11
	Channel 12
	Channel 13
	Channel 14
	Channel 15
	Channel 16
	Mono mix channels 1 and 2
	Mono mix channels 3 and 4
	Mono mix channels 5 and 6
	Mono mix channels 7 and 8
	Mono mix channels 9 and 10
	Mono mix channels 11 and 12
	Mono mix channels 13 and 14
	Mono mix channels 15 and 16
	Mute
	Down Mix L
	Down Mix R
	Up Mix L Front
	Up Mix R Front
	Up Mix Center

	Up Mix LFE
	Up Mix L Surround
	Up Mix R Surround
	Up Mix Delayed L In
	Up Mix Delayed R In

5.5.2. Gain Adjust X

The *Gain Adjust X* control enables the user to set the value of the gain from 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 adjust control is -24 dB to +24 dB. Gain is incremented or decremented 0.1 dB steps.

5.5.3. Invert Enable X

This control enables the user to invert the phase or pass the selected audio channels. The *Invert Enable X* drop down menu appears as follows:

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

5.5.4. Source Y

The Source Y control enables the user to route one of the 16 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 as shown below.

Source Y Input	Channel 1
	Channel 2
	Channel 3
	Channel 4
	Channel 5

	Channel 6
	Channel 7
	Channel 8
	Channel 9
	Channel 10
	Channel 11
	Channel 12
	Channel 13
	Channel 14
	Channel 15
	Channel 16
	Mono mix channels 1 and 2
	Mono mix channels 3 and 4
	Mono mix channels 5 and 6
	Mono mix channels 7 and 8
	Mono mix channels 9 and 10
	Mono mix channels 11 and 12
	Mono mix channels 13 and 14
	Mono mix channels 15 and 16
	Mute
	Down Mix L
	Down Mix R
	Up Mix L Front
	Up Mix R Front
	Up Mix Center
	Up Mix LFE
	Up Mix L Surround
	Up Mix R Surround
	Up Mix Delayed L In
	Up Mix Delayed R In

5.5.5. Gain Adjust Y

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

5.5.6. Invert Enable Y

This control enables the user to invert the phase or pass the selected audio channels. The Invert Enable Y drop down menu appears as follows:

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

5.6. CONFIGURING THE DEINTERLACER

The *Deinterlacer* controls are used to configure parameters associated with the video de-interlacer. Video de-interlacing is performed so that scaling/aspect ratio conversion can occur in the progressive domain. Scaling/aspect ratio conversion in the progressive domain is the highest quality way to perform up/down/cross conversion. Sections 5.6.1 to 5.6.5 give detailed information about each of the menu items.

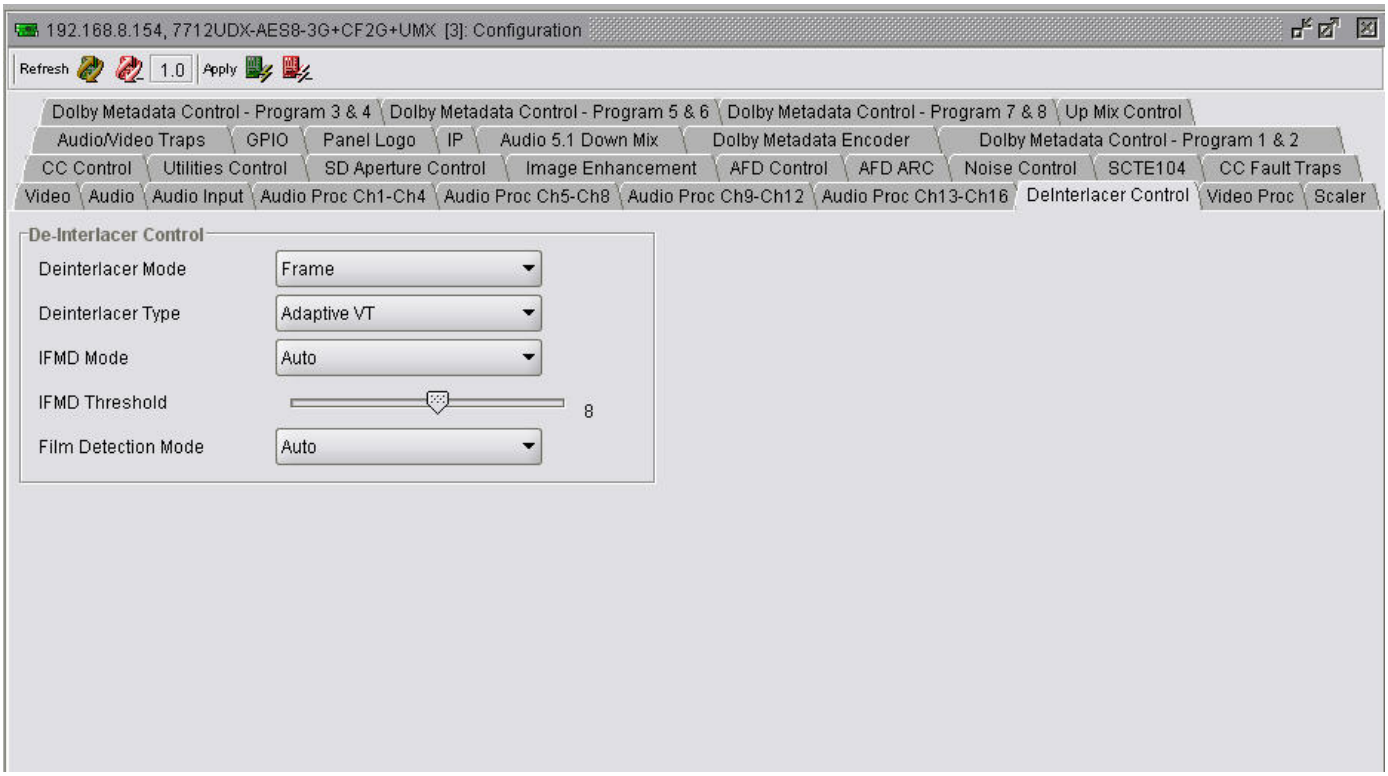
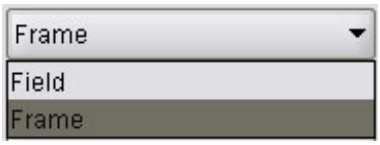


Figure 5-5: DeInterlacer Control Tab

5.6.1. Setting the Deinterlacer Mode

With this control, you can 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 that appears as follows.

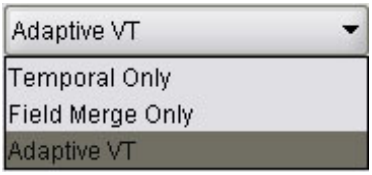


Field	In *Field* mode the de-interlacer works on a field-by-field basis.
Frame	In *Frame* mode the de-interlacer works on a complete frame basis.

Note: In an Up conversion, this control is ignored and is defaulted to frame mode. The deinterlacer will automatically switch between frame and field accordingly to the image.

5.6.2. Setting the DeInterlacer Type

This control enables the user to set 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 Temporal filtering is only used to interpolate the 480i to 480p pixels.
Field Merge Only	When de-interlacing field 1 and field 2 are merged together with no filtering performed to interpolate 480i to 480p.
Adaptive VT	When de-interlacing pixel adaptive, spatial and temporal filtering will be performed when interpolating 480i to 480p. This is the highest quality mode of operation and is the recommended settings.

5.6.3. Setting the 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 following drop down menu.

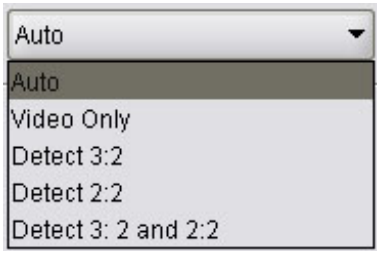
Disable	No motion adaptive processing will take place and all pixels will be treated as static
Field Merge Only	Per pixel motion processing will take place and de-interlacing filters will be automatically changed based on the amount of per pixel detected motion.
Adaptive VT	Per pixel motion processing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

5.6.4. Setting the IFMD Threshold

With this control, the user can change the threshold of what is deemed motion for the deinterlacer. The user can set the IFMD threshold by moving the threshold slider control left or right, to their desired value. 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.

5.6.5. Setting the Film Detection Mode

The 7712 series 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. The ***Film Detection Mode*** drop down menu enables the user to set the film operating mode as shown below:



Auto	The card will automatically detect video sequences, embedded 3:2 sequences, and embedded 2:2 sequence. Processing will be automatically adapted to the detect content.
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.

5.7. CONFIGURING THE VIDEO PROCESSING FUNCTIONS

The *Video Proc* control menu is used to configure parameters associated with the video processing functions of the cross converter. Sections 5.7.1 to 5.7.8 give detailed information about each of the menu items.

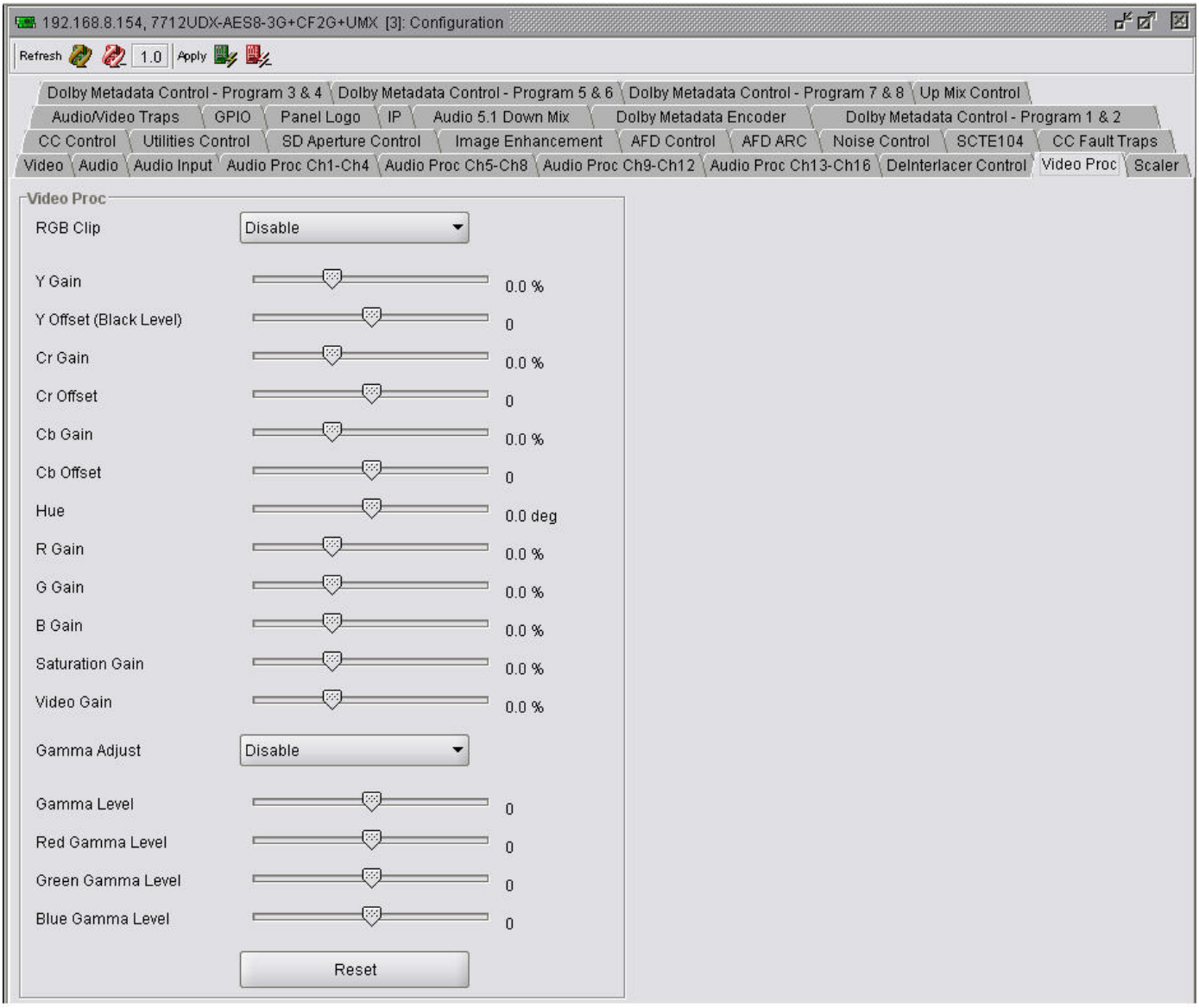


Figure 5-6: Video Proc Tab

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.

5.7.1. Enabling RGB Clipper

The ***RGB Clip*** controls 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.

Enable	The module will clip any illegal levels of R, G, and B (individually) to their respective Black and White Levels
Disable	Video will pass through this processing block un-modified and illegal RGB values will pass.

5.7.2. Setting the 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, 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

5.7.3. Setting the DC Offsets

There are three controls that set the DC Offset of each component of the video. With these controls the user can adjust the DC offset of the 3 components in the Y Cr Cb domain in +/- 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

5.7.4. Setting the Hue

With this control the user can 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. Hue can be applied to SD input signals and HD input signals.

Hue Ranges from –180 to 180 degrees in 0.1 degree increments

5.7.5. Enabling Gamma Adjust

The *Gamma Adjust* control enables and disables the gamma adjustment functionality of the modules. When enabled, the module will allow the user to adjust the gamma level. If disabled, then the gamma level is set to 0.

Enable	The ability to adjust the gamma of the video signal is enabled. Gamma Level, Red Gamma Level, Green Gamma Level, Blue Gamma Levels controls are enabled.
Disable	The ability to adjust the gamma of the video signal is disabled. Gamma Level, Red Gamma Level, Green Gamma Level, Blue Gamma Levels controls are disabled.

5.7.6. Setting the Gamma Level

With this control the user can adjust the Gamma correction factor from - 128 to + 127 in steps of 1.

Gamma Level Ranges from –128 to 127 in 1 level increments.

5.7.7. Setting the Red, Green, Blue Gamma Levels

With these controls, the user can 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.

5.7.8. Reset Button

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

5.8. CONFIGURING THE SCALER

The up/down/cross converter utilizes a high performance multi-tap polyphase filter 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 filters associated with the polyphase filter to define the aspect ratio conversion and the output image size. In addition, the control tab contains specific controls for how sharp vertical or horizontal edge transitions are handled so that any image ringing is minimized. Static side panel colours and output AFD stamping values are adjusted within this tab. Sections 5.8.1 to 5.8.5 provide detailed information about the menu items.

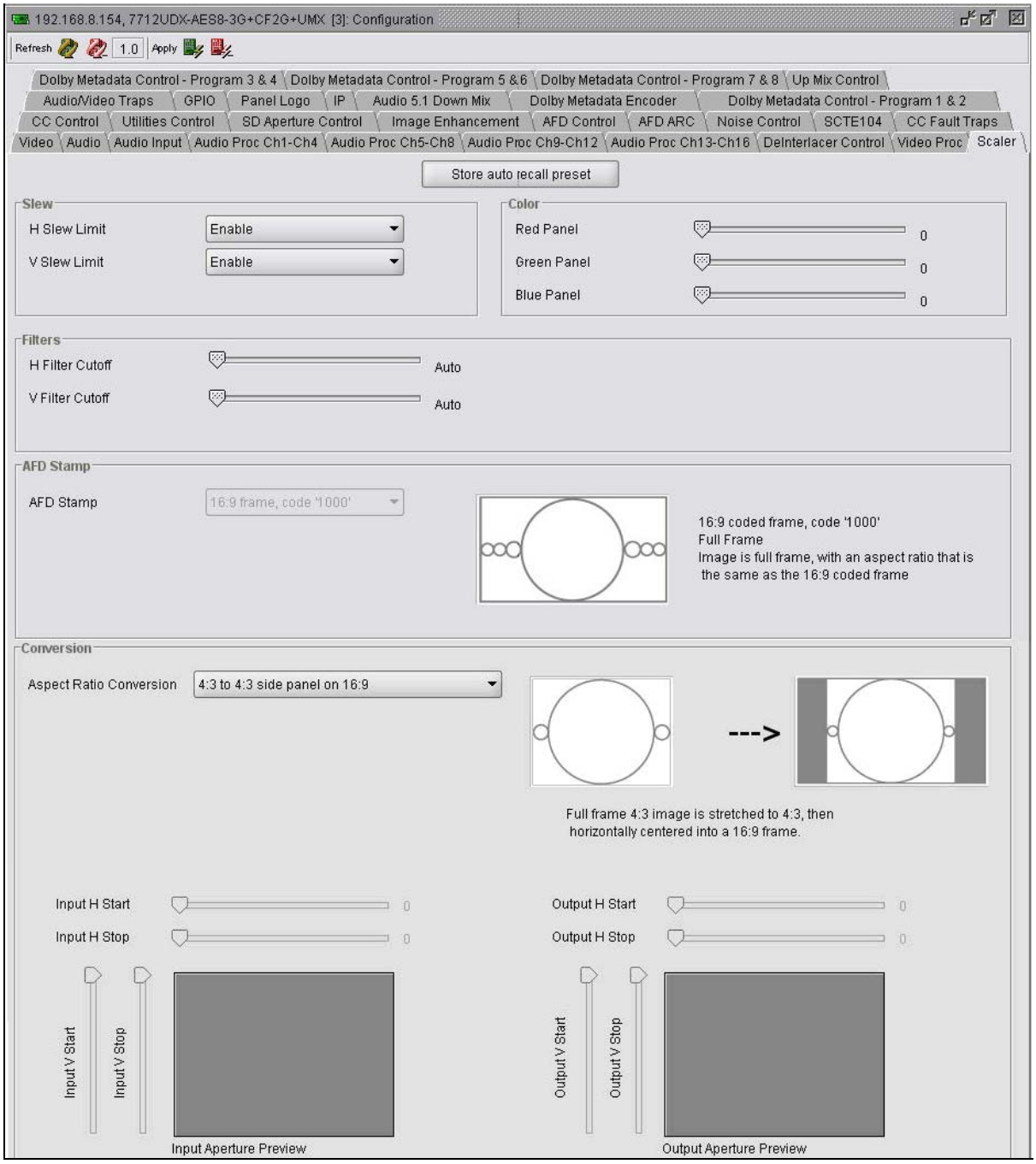


Figure 5-7: Scaler Tab

5.8.1. Slew Settings

5.8.1.1. Slew Limits

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.

The *H Slew Rate limit* control manages sharp horizontal edge transitions.

Enable	Sets the sharp horizontal transitions so that ringing around such transitions are minimized.
Disable	Edge processing is disabled.

The *V Slew Rate limit* control manages sharp horizontal edge transitions.

Enable	Sets sharp vertical transitions so that ringing around such transitions are minimized.
Disable	Edge processing is disabled.

5.8.2. Set the Colour of the Letterbox Panels

There are three menu items used to set the panel colour. Panel colours are used to fill any “un-used” space in the output image raster when aspect ratio conversions are performed (ie. 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.

R Sets the value for the R component of the background side panels with a range of 0 to 255.
G Sets the value for the G component of the background side panels with a range of 0 to 255.
B Sets the value for the B component of the background side panels 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.

5.8.3. Filter Settings

5.8.3.1. Setting the Scaler Filter Sharpness

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.

The *H Filter Cutoff*, controls the Horizontal filter bandwidth. It also has several unique filters that have specific enhancement profiles.

Levels 1….64	Selects the horizontal filter bandwidth such that each value 1 thru 64 corresponds to 1/64th the bandwidth of the input signal.
Auto	The optimal horizontal filter automatically selected to match the scaling and aspect ratio conversion process being performed.
Enhance HF 1 db	High frequencies within the image are enhanced by 1 dB
Enhance HF 2 dB	High frequencies within the image are enhanced by 2 dB
Mid Band Boost 1 dB	Mid band frequencies within the image are enhanced by 1 dB
Mid Band Boost 2 dB	Mid band frequencies within the image are enhanced by 2 dB

The *V Filter Cutoff*, controls the Vertical filter bandwidth.

Levels 1….64	Selects the horizontal filter bandwidth such that each value 1 thru 64 corresponds to 1/64th the bandwidth of the input signal.
Auto	The optimal horizontal filter automatically selected to match the scaling and aspect ratio conversion process being performed.

Note: Aliasing will cause diagonal edges to be jagged.

5.8.4. AFD Stamp

The ***AFD Stamp*** 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. There are 16 different possible AFD values that may be selected from.

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.

5.8.5. Conversion Settings

5.8.5.1. Setting the Aspect Ratio Conversion

The *Aspect Ratio* menu 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.

5.8.5.2. 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.

There are four registers for each output video standard that define 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 place 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 place it vertically on the output raster. The image will be stretched to fill the height. (E.g. For 1080i, the range of values are 0 to 539. The range of values for 720p output is 0 to 719).

Changes to any vertical aspect parameters will cause the video output to be interrupted momentarily. To achieve minimum process delay, the internal timing is automatically adjusted to achieve the desired aspect settings.

5.9. CONFIGURING CLOSED CAPTIONING

The 7712UC series extracts closed captioning from the input signal and translates it to the output video signal. The *Closed Captioning* menus are used to configure parameters associated with the closed caption handling. Sections 5.9.1 to 5.9.4 give detailed information about each of the parameters.

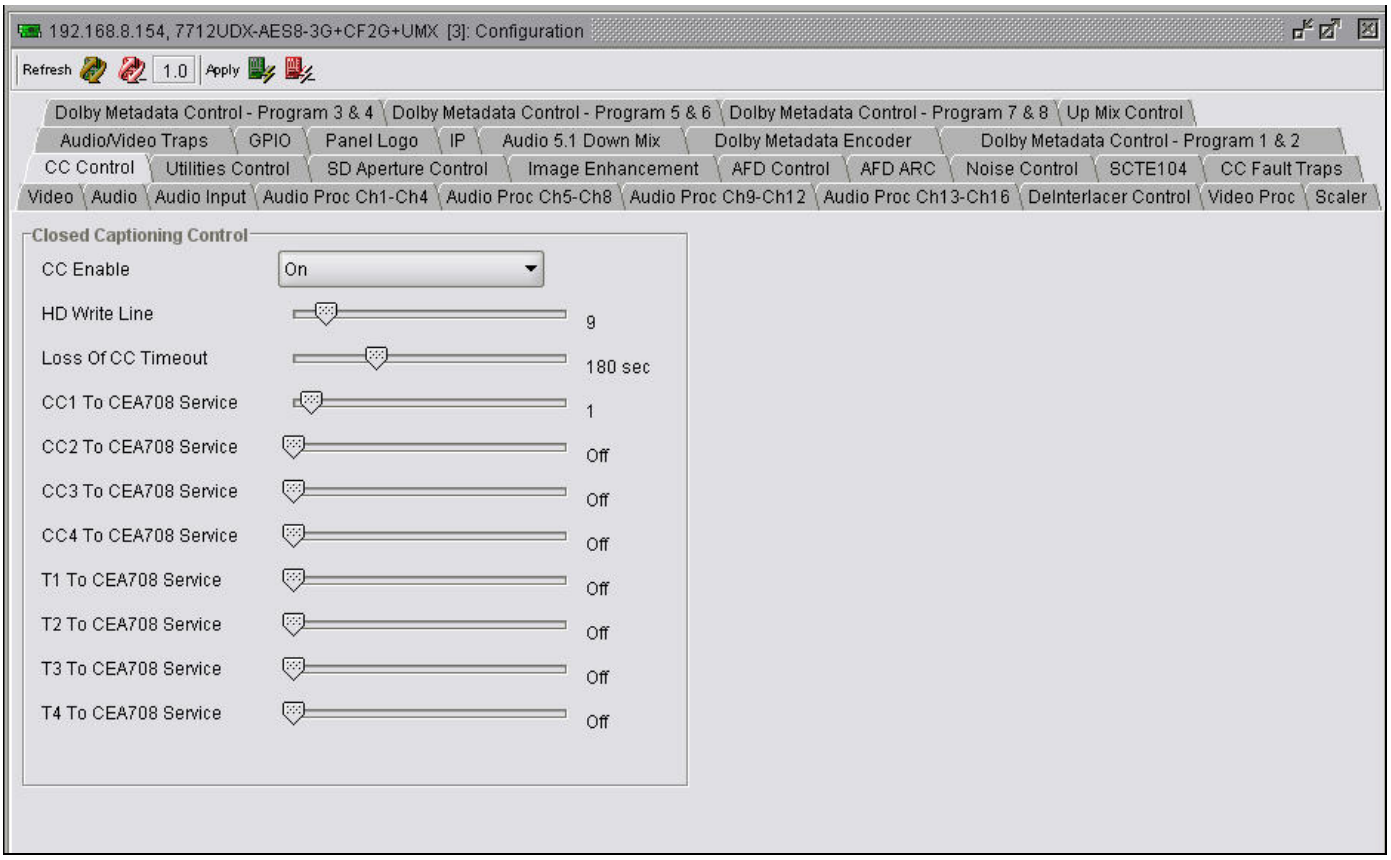


Figure 5-8: CC Control Tab

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

5.9.1. Enabling Closed Captioning

This parameter will enable closed caption handling for the module.

On	When turned *On*, any closed captioning will be extracted from the input signal, and mapped to line 21 if the output video is SD, or to the designated HD write line (see section 5.9.2) if the output video is HD.
Off	When turned *Off*, no closed captioning is encoded in the output video signal.

5.9.2. Setting the HD Write Line

The HD Write Line parameter will set the HD line where the HD VANC captions are inserted on the output HD video as per SMPTE 334M.

5.9.3. Setting the Loss of CC Timeout

This parameter 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.

5.9.4. Setting the Caption Services in CEA708

There are eight controls that will map closed caption and text channels into CEA708 caption services. For simplicity, only the selection control for the *CC1 to CEA708 Service* control will be shown in the manual. This parameter will map CC1 into an CEA708 Caption Service. Currently, the modules only support 16 services (1 to 16). When set to off, the CC1 is not mapped to any CEA708 Caption Service.

Off	CC1 will not be mapped to a CEA708 Service
1	CC1 will be mapped CEA708 Service 1
2	CC1 will be mapped CEA708 Service 2
3	CC1 will be mapped CEA708 Service 3
4	CC1 will be mapped CEA708 Service 4
5	CC1 will be mapped CEA708 Service 5
6	CC1 will be mapped CEA708 Service 6
7	CC1 will be mapped CEA708 Service 7
8	CC1 will be mapped CEA708 Service 8
9	CC1 will be mapped CEA708 Service 9
10	CC1 will be mapped CEA708 Service 10
11	CC1 will be mapped CEA708 Service 11
12	CC1 will be mapped CEA708 Service 12
13	CC1 will be mapped CEA708 Service 13
14	CC1 will be mapped CEA708 Service 14
15	CC1 will be mapped CEA708 Service 15
16	CC1 will be mapped CEA708 Service 16

5.10. UTILITIES

The *Utilities Control* tab is used to control the presets. The user can configure the *Recall Preset*, *Store User Preset*, and *Auto Recall Presets*.

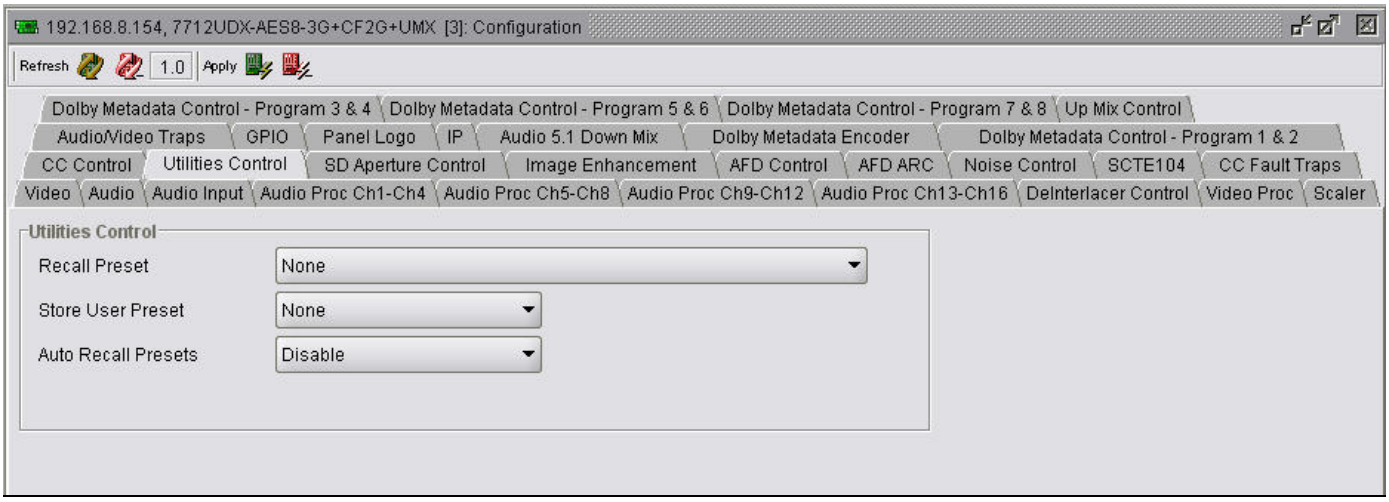


Figure 5-9: Utilities Control

5.10.1. Storing and Recalling Configurations to the User Presets or the Factory Preset

The 7712 series converter can manage 10 user presets. These 10 presets can store the complete set of card control save parameters defined when Auto Recall Presets from the on screen menu.

The current state of the card will be forgotten if it has not been saved to a preset before a recall is performed.

There will be a slight disturbance in the operation of the card and the on-screen display while the new preset is being recalled.

5.10.1.1. Recalling Configurations from the User Presets

This control is used to initiate a recall of the current card configuration from one of the user presets. There are 10 user presets to recall.

Preset 1	Recall User Preset 1
Preset 2	Recall User Preset 2
Preset 3	Recall User Preset 3
Preset 4	Recall User Preset 4
Preset 5	Recall User Preset 5
Preset 6	Recall User Preset 6
Preset 7	Recall User Preset 7
Preset 8	Recall User Preset 8
Preset 9	Recall User Preset 9
Preset 10	Recall User Preset 10

5.10.1.2. Storing Configurations from the User Presets

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. There are 10 presets to which you can store.

Preset 1	Store to User Preset 1
Preset 2	Store to User Preset 2
Preset 3	Store to User Preset 3
Preset 4	Store to User Preset 4
Preset 5	Store to User Preset 5
Preset 6	Store to User Preset 6
Preset 7	Store to User Preset 7
Preset 8	Store to User Preset 8
Preset 9	Store to User Preset 9
Preset 10	Store to User Preset 10

5.10.1.3. Auto Recall Presets For Specific Video Input/Output Standard Combination

The Auto Recall Presets functionality is used to automatically store and recall card configurations for specific combinations of video input and output combinations. When *Auto Recall Presets* functionality is enabled, the module will maintain a "running memory" of card configurations for each unique set of video input and output standards. Each time a particular combination of video input/output standards is selected, the module will automatically recall the last know card configuration for that combination.

NOTE:
The Auto Recall Presets functionality should be used with care. All card parameters are recalled when a new combination of video input/output standards 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 combination of video input/output standards. It will not be stored for all operating modes. When a new combination of video input/output standards is detected, a new value for that particular card parameter may be recalled (the value that was previously set for that combination). Parameters must be specifically set for each combination of video input/output standards if you desire the same parameter value to be recalled all the time. This also includes items like GPIO settings and defines which User Presets they recall. If the GPIO is not specifically set for each and every possible combination of video input/output standards the GPIO functions could change when new video input/output standard is detected.

Disable	Auto Recall Presets functionality is disabled.
Enable	The module will maintain a "running memory" of card configurations for each unique set of video input and output standards. Each time a particular combination of video input/output standards is selected, the module will automatically recall the last know card configuration for that combination.

5.11. CONFIGURING THE SD APERTURE CONTROL

The precise definition of "active region" for an SD input signal may vary. This is due to the fact that 525i signals have been defined slightly differently in different 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.

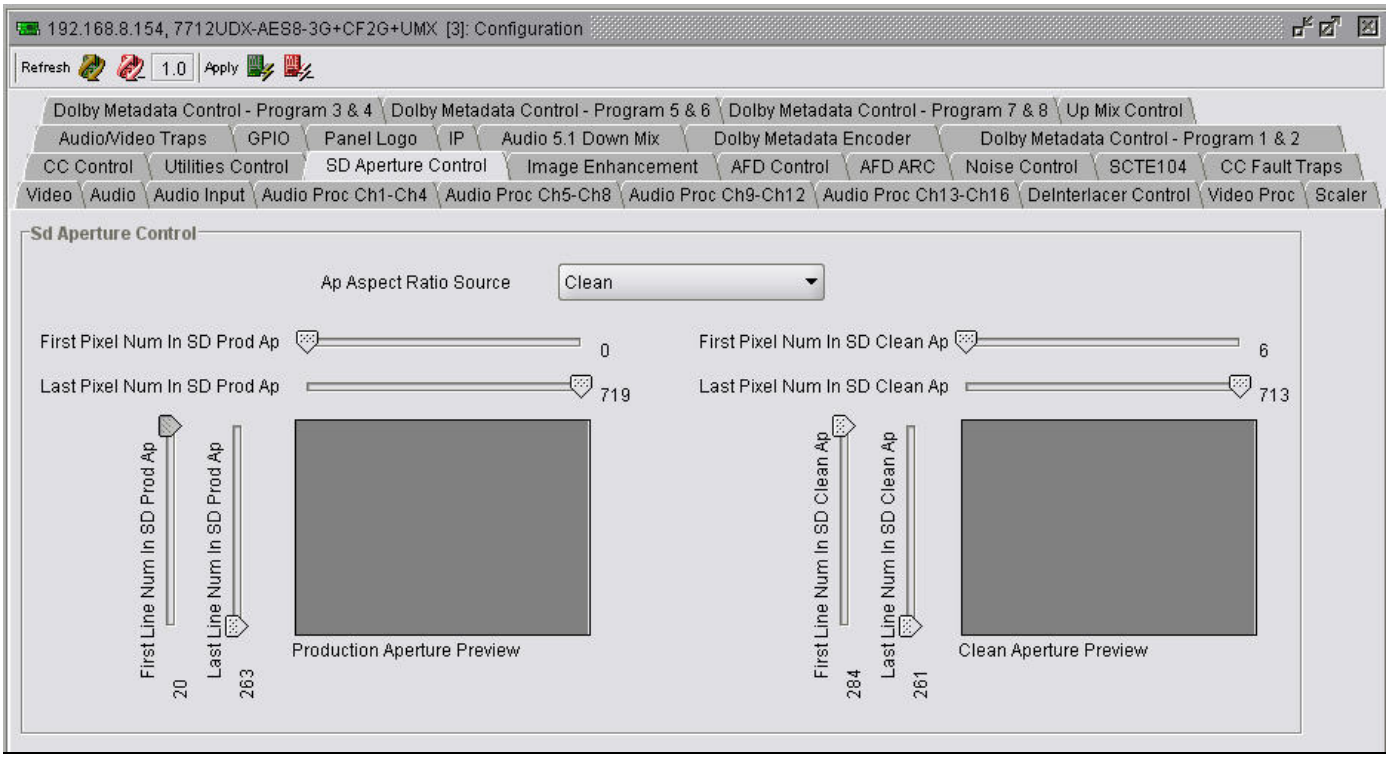
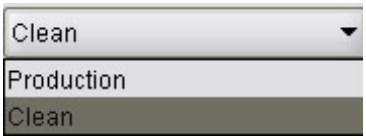


Figure 5-10: SD Aperture Control Tab

5.11.1. Selecting Ap Aspect Ratio Source

The AP 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.

5.11.1.1. Ap Aspect Ratio Settings

These controls allow the user to define the exact pixels and exact lines that are used to define the SD Clean Aperture and the SD Production Aperture.

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.

5.12. CONFIGURING THE IMAGE ENHANCEMENT CONTROL

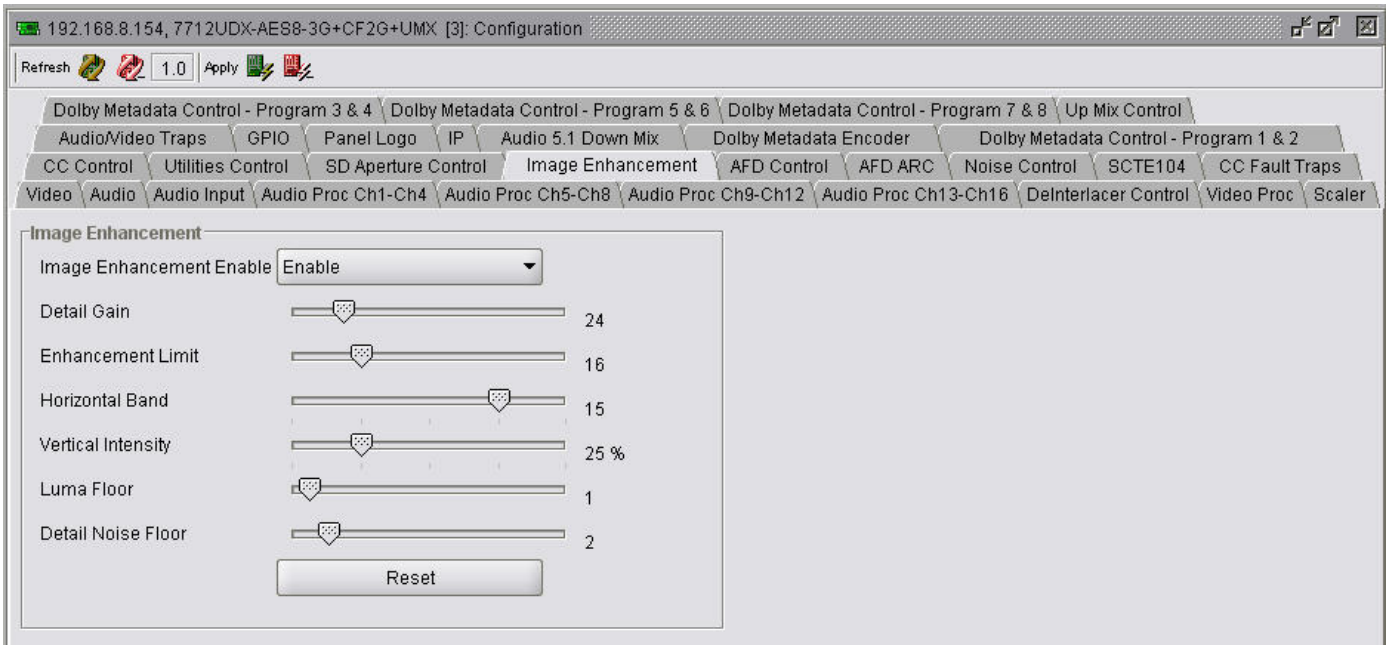


Figure 5-11: Image Enhancement Tab

5.12.1.1. 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.

Enable	Enables the image enhancement process.
Disable	Disables the image enhancement process.

5.12.2. Setting the Detail Gain

This control selects 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 0-50. Higher values will normally distort the image beyond the range that is normally considered acceptable.

5.12.3. Setting the Enhancement Limit

This control selects the largest detail value to be added back into the signal. The range is from 0 to 63. Detail that has a value larger than this value will be clipped.

5.12.4. Setting the Horizontal Band

This control selects the Horizontal frequency band to be enhanced.

Selects 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.

5.12.5. Setting the Vertical Intensity

This control selects 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.

5.12.6. Setting the Luma Floor

This control selects the minimum Luma value that will be enhanced with a range of 0 to 15. Pixels with a value below this floor will be left untouched.

5.12.7. Setting the 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.

By pressing the *Reset* button, all Image Enhancement Controls will return to their default setting.

5.13. CONFIGURING THE AFD CONTROL

The 7712 series of converters have the ability to read incoming AFD values, automatically adapt ARC processing based on the inbound AFD value and stamp outgoing AFD values.

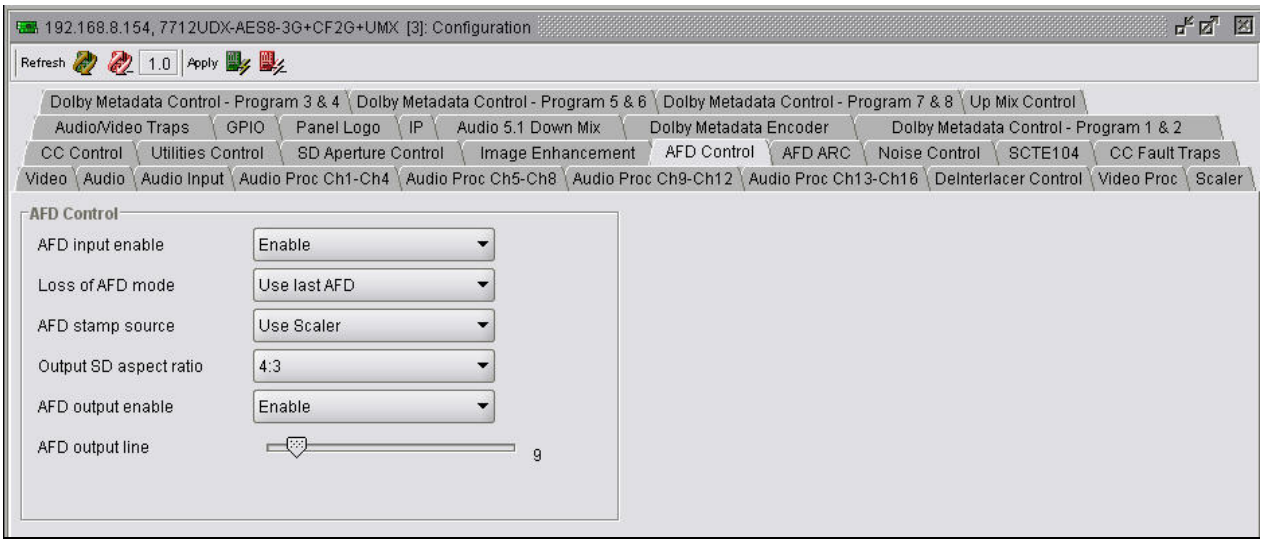


Figure 5-12: AFD Control Tab

5.13.1. Configuring the AFD Input Enable Control

This control enables and disables the input side 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.

Enable	Incoming AFD values will be decoded and the module will adapt its processing to those AFD codes.
Disable	Incoming AFD values will not be decoder. When incoming AFD codes are not decoded, automatic steering of ARC processing based on AFD presets is not possible.

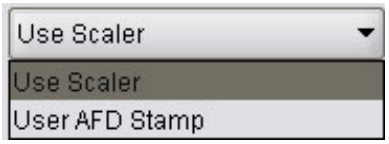
5.13.2. Setting the Loss of AFD Mode Control

This control enables the user to configure the action that the converter will take when incoming AFD signals are lost. The user can set this action by selecting one of the options from the drop down menu.

Default ARC	When incoming AFD values are absent, the ARC processing will revert to the Default ARC processing as defined in the Scaler control tab.
Use Last AFD	When incoming AFD values are absent, the ARC processing will use the last valid AFD code it received to automatically steer the ARC processing.

5.13.3. Setting the AFD Stamp Source

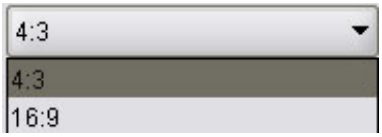
This control enables the user to set the source for output AFD stamping. The user may configure the card to use the AFD value automatically generated by the scaler and its setting or to stamp a user defined AFD value.



Use Scaler	AFD values stamped on the outbound video signal will be those AFD values automatically generated by the scaler and its settings. The *AFD Stamp* control will be disabled in the Scaler control tab and the AFD ARC control tab since AFD values will automatically be generated by the scaler.
Use Last AFD	AFD values stamping on the outbound video signal will be the user specified AFD value.

5.13.4. Setting the 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.



4:3	AFD codes for SD outputs will be defined with a 4:3 output image raster AFD code.
Use Last AFD	AFD codes for SD outputs will be defined with a 16:9 output image raster AFD code.

5.13.5. Configuring the AFD Output Enable Control

This control enables and disables the insertion of AFD packets in the outgoing video signal.

Disable	AFD codes will not be inserted into the outgoing video signal.
Enable	AFD codes will be inserted into the outgoing video signal.

5.13.6. Setting the AFD 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.

5.14. CONFIGURING THE AFD ARC CONTROLS

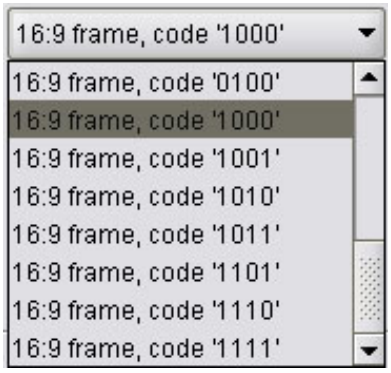
The AFD ARC control tab is the key control tab that enables the user to define the automatic steering of Aspect Ratio Conversions in response to incoming AFD values. For each incoming AFD code, the user may specify a unique scaler operating mode and a unique output AFD code. In this way, incoming AFD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

To properly configure the 7712 series cards for AFD, select a AFD code using the *AFD Select* drop down menu. This corresponds to the inbound AFD value to which a specific scaler response must be defined. 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. Further, 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. Perform this process for each incoming AFD value.

Figure 5-13: AFD ARC Tab

5.14.1. Setting the 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 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.

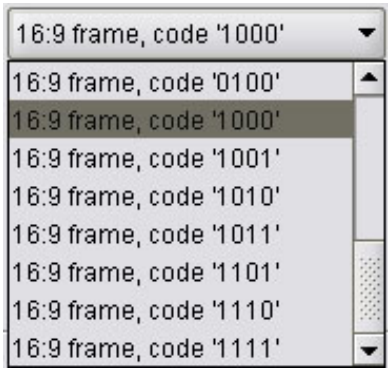


There are 16 AFD codes in total to select from:

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'

5.14.2. Setting the AFD Stamp

This control enables the user to specify the outgoing AFD code. This 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 16 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.

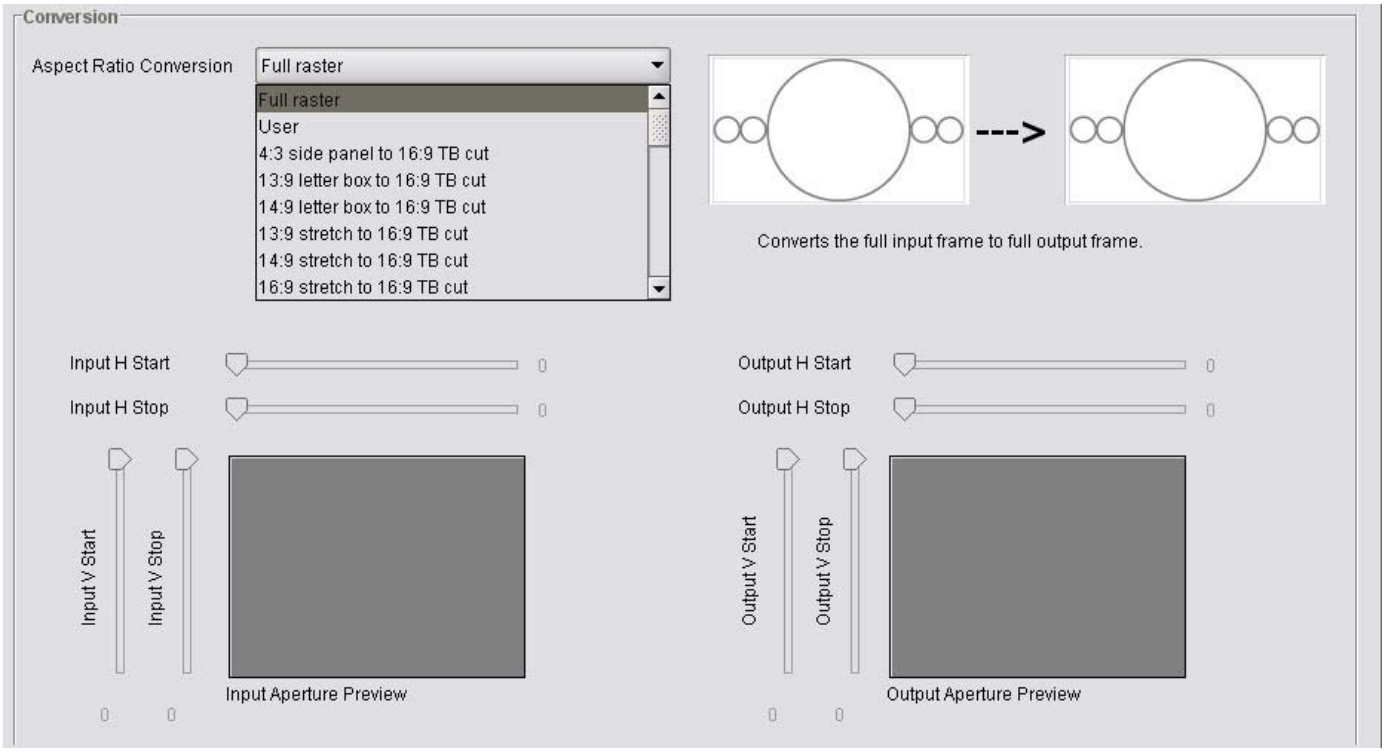


16:9 frame, code '0010'	AFD code 16:9 frame, code '0010' will be inserted into the outgoing video.
16:9 frame, code '0011'	AFD code 16:9 frame, code '0011' will be inserted into the outgoing video.
16:9 frame, code '0100'	AFD code 16:9 frame, code '0100' will be inserted into the outgoing video.
16:9 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.

5.14.3. Conversion Settings

5.14.3.1. Setting the 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 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**	

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* defines 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* defines 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* defines 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. (E.g. For 1080i, the range of values are 0 to 539. The range of values for 720p output is 0 to 719).

5.15. CONFIGURING THE NOISE CONTROLS

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 7712 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.

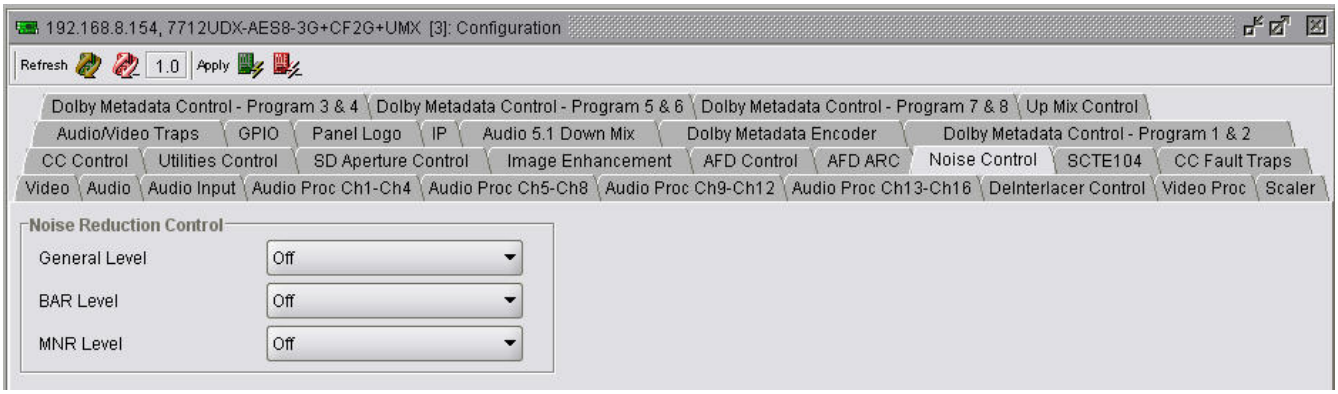
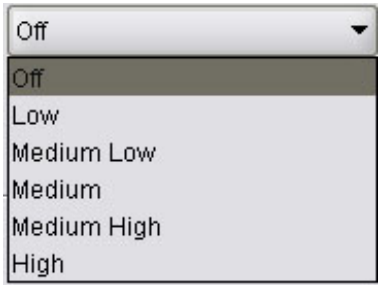


Figure 5-14: Noise Control Tab

5.15.1. Setting the Noise Reduction Levels

The General Noise reduction, the BAR noise reducer and the MNR noise reducer all have their individual controls; *Bar Level*, and the *MNR Level*. For the sake of brevity, only the *General Noise Reducer* will be discussed in this manual.

The *General Level* controls 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 as shown below.



Off	General noise reduction will not be enabled
Low	A Low level of general noise reduction will be applied
Medium Low	A Medium Low level of general noise reduction will be applied
Medium	A Medium level of general noise reduction will be applied
Medium High	A Medium High level of general noise reduction will be applied
High	A High level of general 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

5.16. CONFIGURING THE SCTE104

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

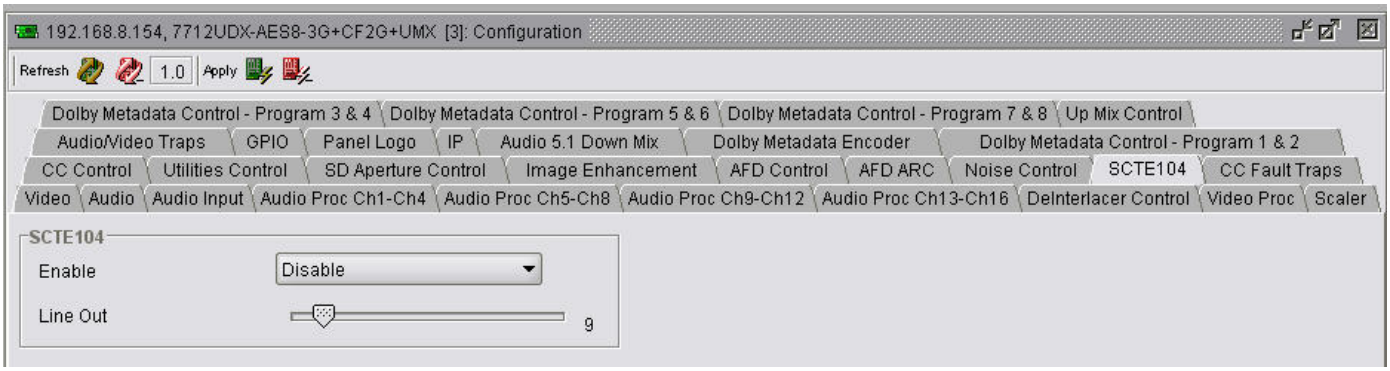


Figure 5-15: SCTE104 Tab

5.16.1. Enabling the SCTE104 Control

The ***Enable*** 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

5.16.2. Setting the Line Out

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.

5.17. SETTING THE CC FAULT TRAP CONTROLS

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.

The *Trap Status* section defines whether a trap is present or missing. If the box is green, then the corresponding trap is present. If the box is red, then the corresponding trap is missing.

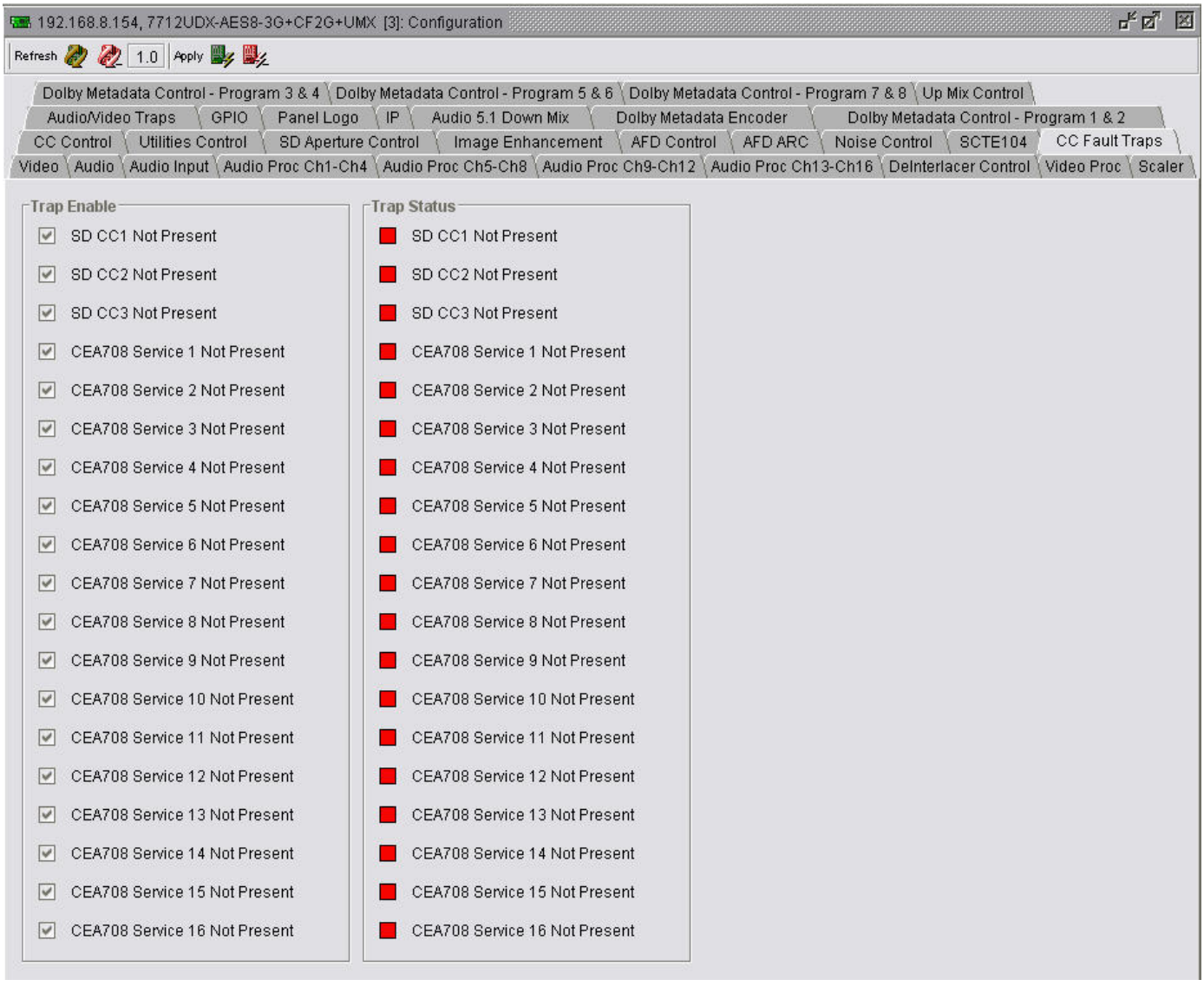


Figure 5-16: CC Fault Traps Tab

5.18. SETTING THE AUDIO/VIDEO TRAPS

This control allows the user to enable Audio and Video 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.

The *Trap Status* section defines whether a trap is present or missing. If the box is green, then the corresponding trap is present. If the box is red, then the corresponding trap is missing.

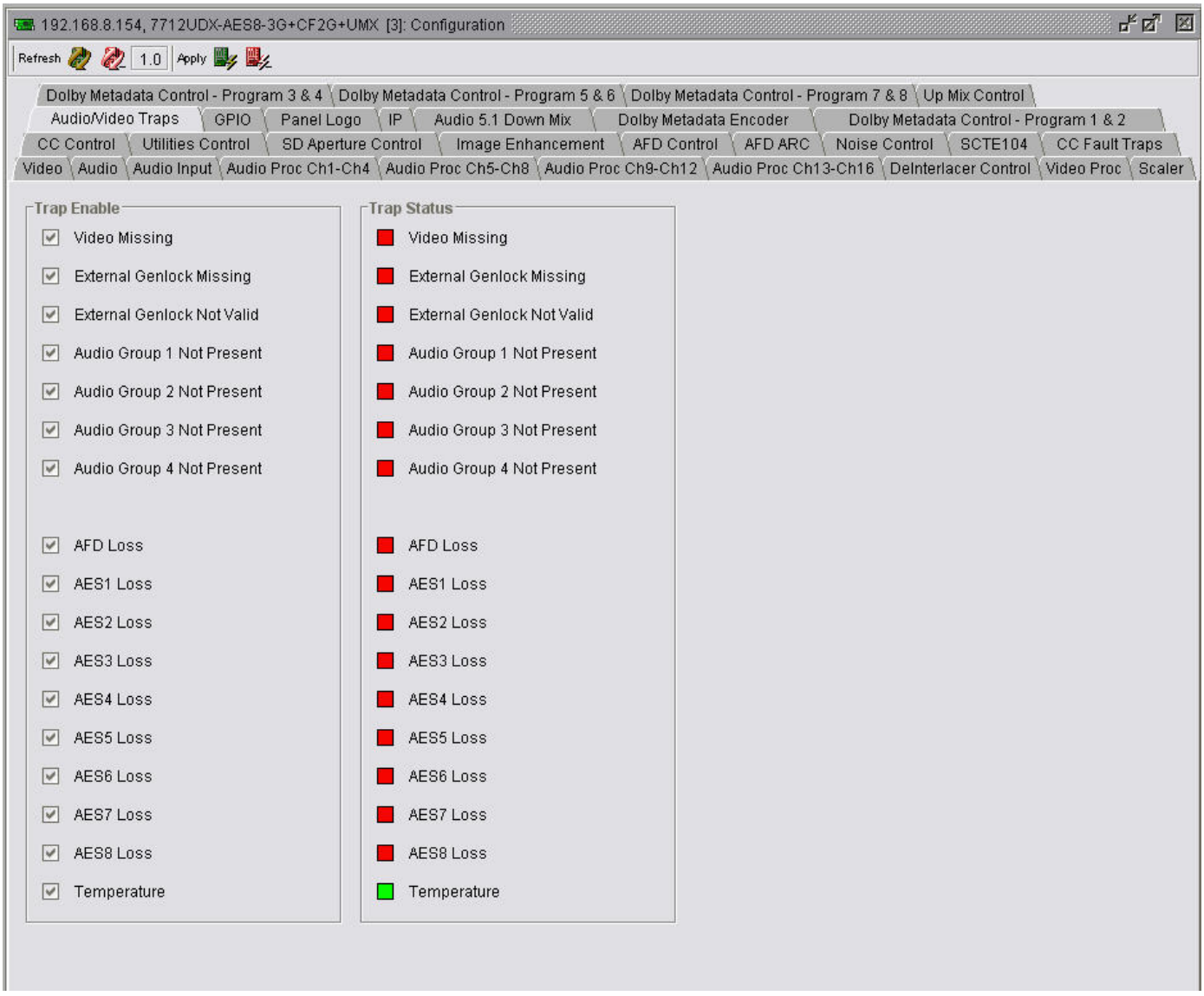


Figure 5-17: Audio/Video Traps Tab

5.19. CONFIGURING THE GPIO CONTROLS

This 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. GPIO2-4 operate 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.

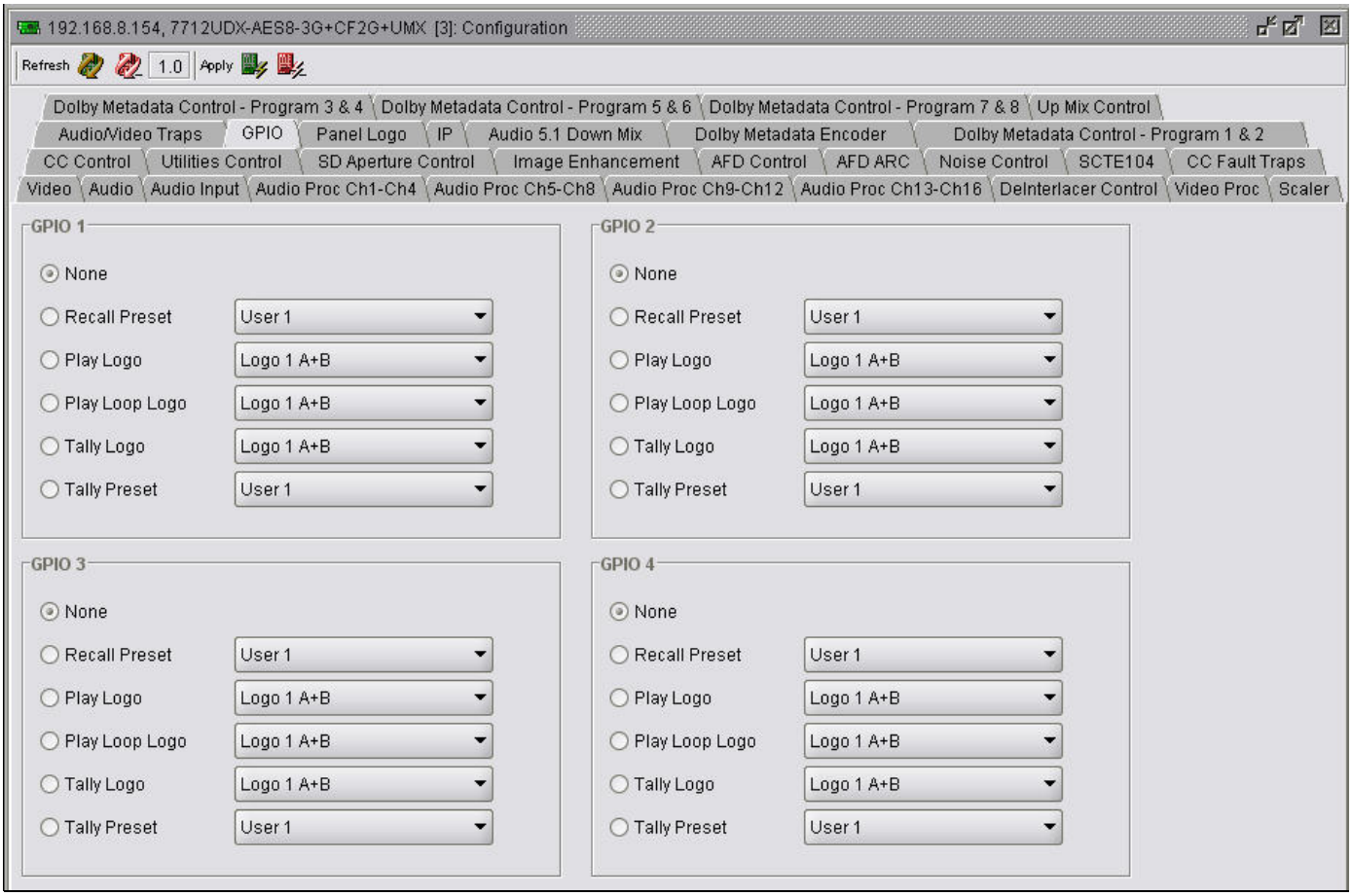
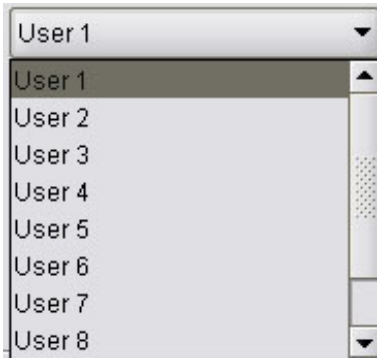


Figure 5-18: GPIO Tab

5.19.1. Recall Presets via GPIs

To use GPIO1 as a GPI and to further configure it for recalling a card preset, click on the round circle beside the words “Recall Preset”. Ensure that a black dot is present inside this circle. The 7712 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.



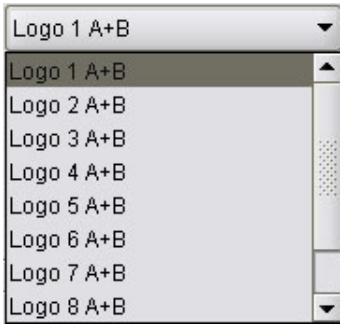
User1	Recall User Preset 1
User2	Recall User Preset 2
User3	Recall User Preset 3
User4	Recall User Preset 4
User5	Recall User Preset 5
User6	Recall User Preset 6
User7	Recall User Preset 7
User8	Recall User Preset 8
User9	Recall User Preset 9
User10	Recall User Preset 10

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.

5.19.2. Play Logo Settings

To use GPIO1 as a GPI and to further configure it for playing a particular logo, click on the round circle beside the words “Play Logo”. Ensure that a black dot is present inside this circle. The 7712 series converter modules can support 8 logo sets which 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)

5.19.3. Play Logo Loop Settings

To use GPIO1 as a GPI and to further configure it for playing and looping a particular logo, click on the round circle beside the words “Play Loop Logo”. Ensure that a black dot is present inside this circle. The 7712 series converter modules can support 8 logo sets which 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)

5.19.4. Tally Logo Settings

To use GPIO1 as a GPO, and to further configure it's tallying or indicating when a particular logo is playing, click on the round circle beside the words "Tally Logo". Ensure that a black dot is present inside this circle. The 7712 series converter modules support 8 logo 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)

5.19.5. Tally Preset Settings

To use GPIO1 as a GPO and to further configure it tallying or indicating when a card preset has been selected, click on the round circle beside the words "Tally Preset". Ensure that a black dot is present inside this circle. The 7712 series converter modules support 10 card presets whose status can be reported in this way.

User1	Tally status of User Preset 1
User2	Tally status of Preset 2
User3	Tally status of Preset 3
User4	Tally status of Preset 4
User5	Tally status of Preset 5
User6	Tally status of Preset 6
User7	Tally status of Preset 7
User8	Tally status of Preset 8
User9	Tally status of Preset 9
User10	Tally status of Preset 10

5.20. CONFIGURING THE PANEL LOGO CONTROLS

The 7712 series cards support up to 10 sets of side panels. For the sake of brevity, only the controls for Logo 1 A+B will be discussed in this manual. All other logos operate in the same way.

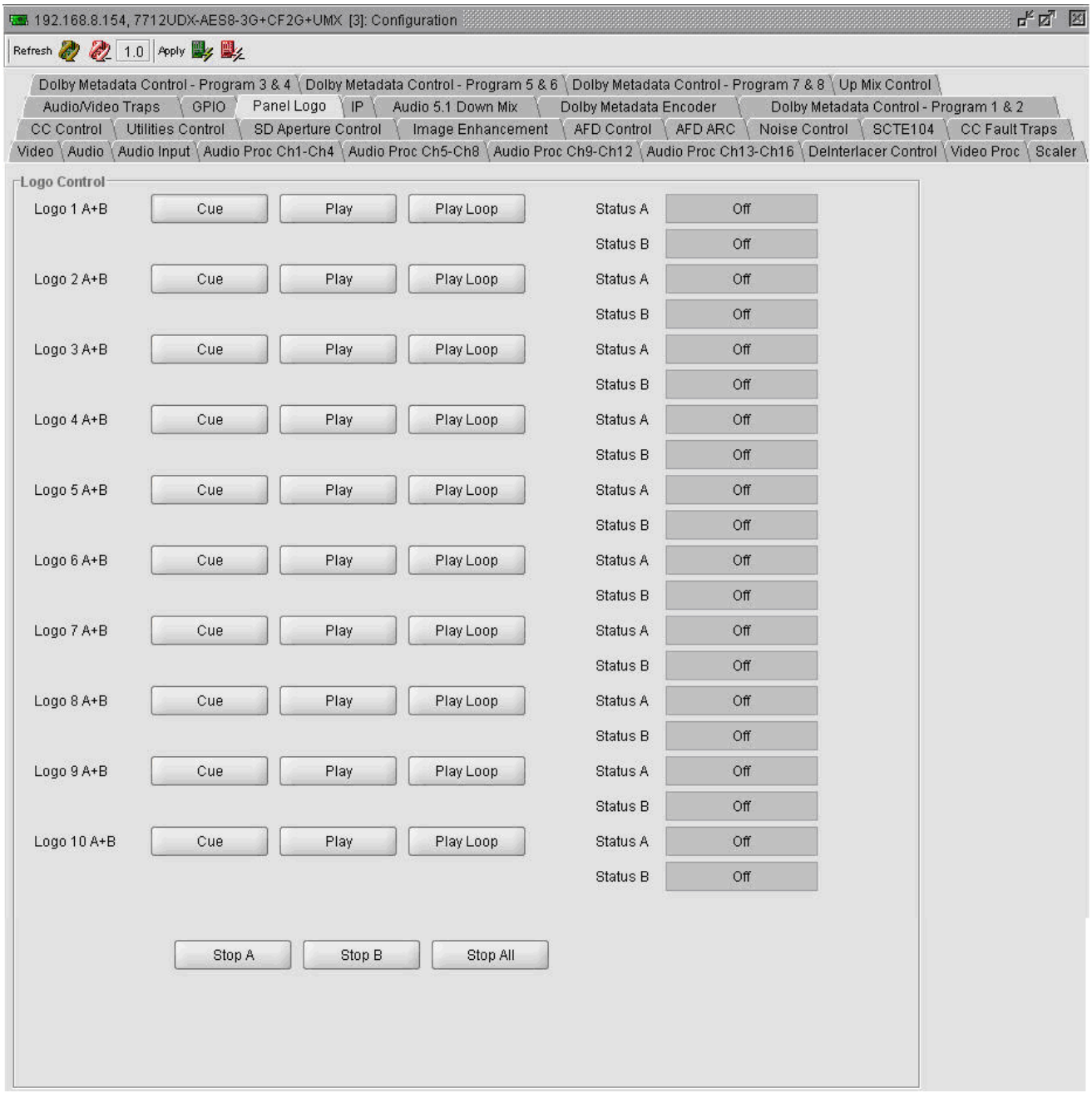


Figure 5-19: Panel Logo Tab

CUE: Selecting this button will enable the user to cue a Logo 1 A+B. This will load the selected logo into the device's memory cache. When the cued process is complete, the Status A and Status B boxes will turn green and indicated "Cued". This process may take several minutes to complete depending on the size of Logo 1 A+B. Note that the left hand side logo is cued first and then the right hand side logo is cued second.

PLAY: Selecting this button will enable the user to play the selected media file on the device. The logo will be played only once when this button is pushed. When the logo is playing the Status A and Status B boxes will be green and indicated “Playing”.

PLAY LOOP: Selecting this button will enable the user to play and loop the selected media file on the device. The logo will be played and continuously looped until stopped. When the logo is playing the Status A and Status B boxes will be green and indicated “Playing”.

STOP A: The *Stop A* button causes the module to stop playing the left hand side logo.

STOP B: The *Stop A* button causes the module to stop playing the right hand side logo.

STOP All: The *Stop All* button causes the module to stop playing the left and right hand side logo.

5.21. SETTING THE IP CONTROLS

This tab enables the user to set the IP address of the Ethernet port on the rear panel of the module. At the time of this manual’s writing, this Ethernet port is solely used for managing side panel/logo content. It is not intended to deliver card control and monitoring functionality (ie. VLPRO control)

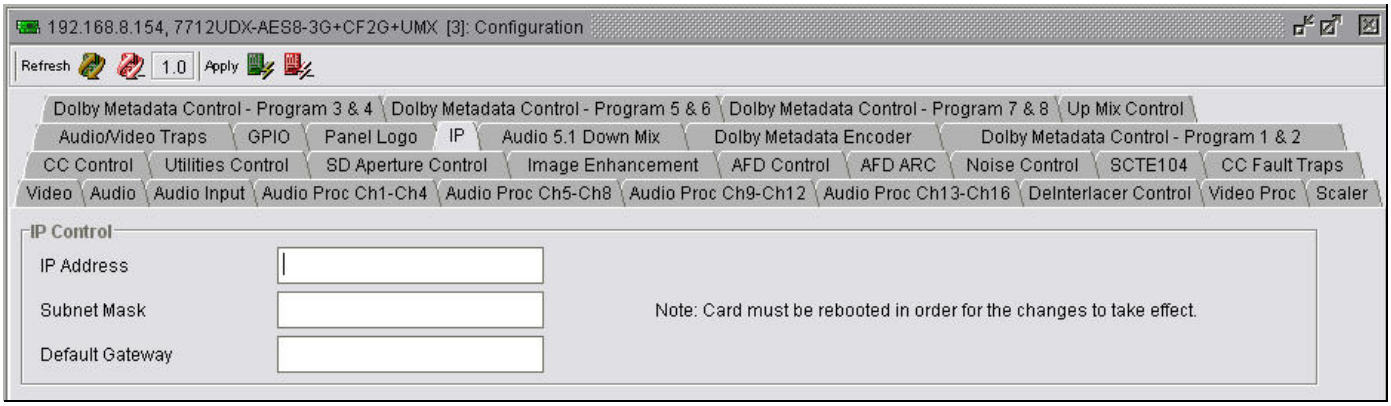


Figure 5-20: IP Tab

IP Address: This field enables the user to set the IP address. To set the IP address enter the address into this field.

Subnet Mask: This field enables the user to set the subnet mask. To set the mask enter the subnet mask into this field.

Default Gateway: This field enables the user to set the default gateway. To set the default gateway enter the gateway value into this field.

Please note that the user must reboot the card in order for these changes to take effect.

5.22. CONFIGURING THE AUDIO 5.1 DOWN MIX CONTROLS

The 7712 series modules can perform 5.1 PCM to stereo (LtRt or LoRo) down mixing.

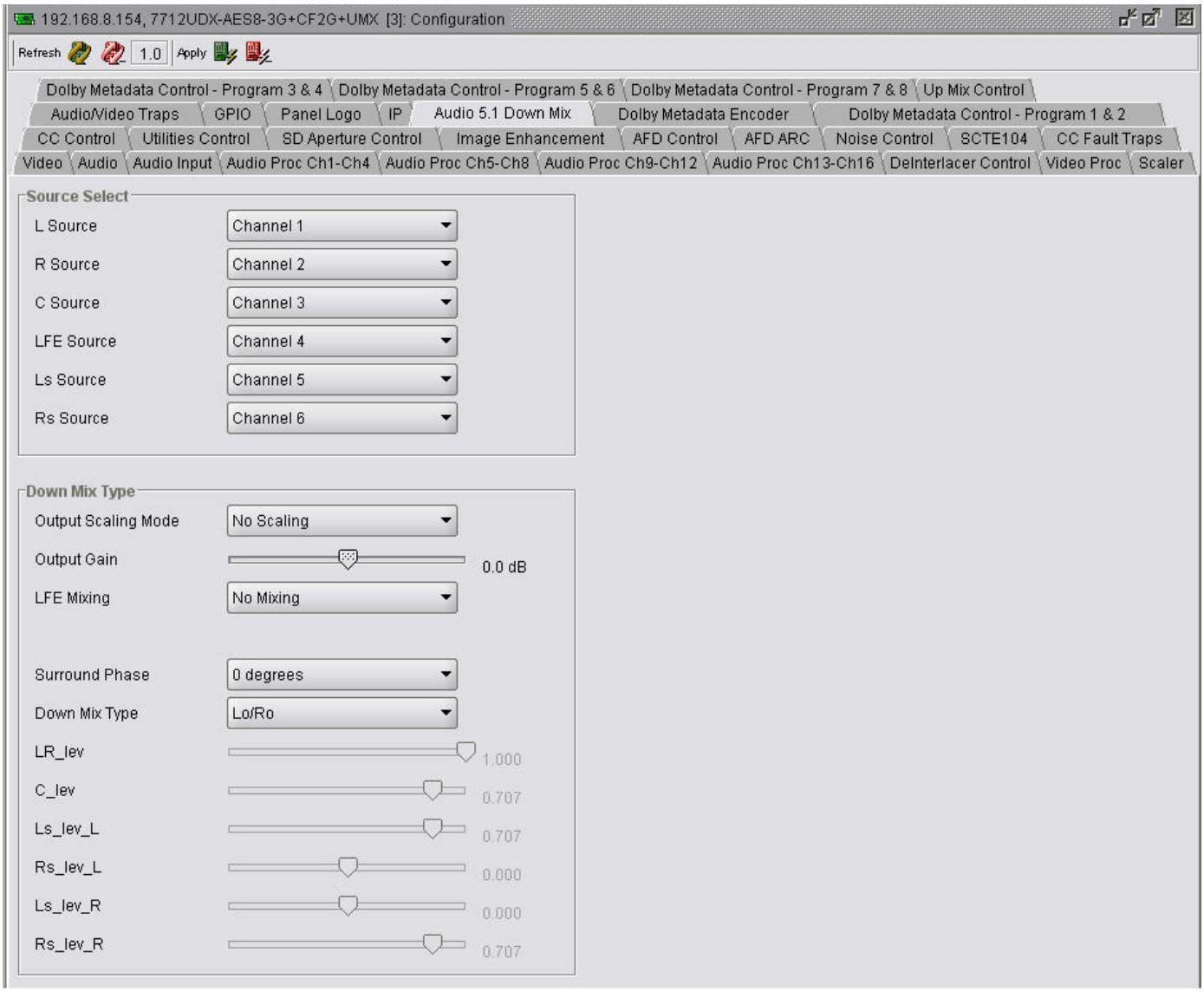


Figure 5-21: Audio 5.1 Down Mix Tab

5.22.1. Setting the Source Select Controls

The *Source Select* section enables the user to assign a particular channel to be used as a particular audio source in the down mix. The following sources are available in the source select section: L Source, R Source, C Source, LFE Source, Ls Source, and Rs Source. Each of these sources can be assigned a channel using the appropriate drop down menu. For sake of brevity, only the L Source selection process is shown

To assign a channel to *L Source*, navigate to the source and select a channel from the adjacent drop down menu. The following sources of audio are available:

Channel 1	Select Channel 1 for the L Source
Channel 2	Select Channel 2 for the L Source
Channel 3	Select Channel 3 for the L Source
Channel 4	Select Channel 4 for the L Source
Channel 5	Select Channel 5 for the L Source
Channel 6	Select Channel 6 for the L Source
Channel 7	Select Channel 7 for the L Source
Channel 8	Select Channel 8 for the L Source
Channel 9	Select Channel 9 for the L Source
Channel 10	Select Channel 10 for the L Source
Channel 11	Select Channel 11 for the L Source
Channel 12	Select Channel 12 for the L Source
Channel 13	Select Channel 13 for the L Source
Channel 14	Select Channel 14 for the L Source
Channel 15	Select Channel 15 for the L Source
Channel 16	Select Channel 16 for the L Source

5.22.2. Setting the Down Mix Type Controls

5.22.2.1. Setting the Output Scaling Mode

This controls whether the down mix matrixing is normalized or not. Select *Overflow Scaling* from the drop down menu to normalize the matrix coefficients. 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 input, but clipping may occur when input sound level is close to 0dB FS. The *Output Scaling Mode* drop down provides the following options:

No Scaling	If no normalization is applied, the stereo down-mix usually sounds at the similar levels as the 5.1 audio input, but clipping may occur when input sound level is close to 0dB FS.
Overflow Scaling	Select *Overflow Scaling* to normalize the matrix coefficients. 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.

5.22.2.2. Setting the Output Gain

This control enables the user to configure the output gain. To adjust the output gain control, drag the slider right to increase the gain value or drag the slider left to decrease the gain control. The output gain ranges from -20 dB to +20 dB in 0.1 dB increments.

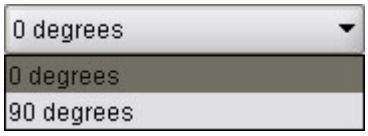
5.22.2.3. Setting the LFE Mixing Control

This control enables the user to control whether the LFE channel is included or not in the audio down-mixing. Note that the LFE Gain control is in effect only when LFE Gain is selected. The *LFE Mixing Control* drop down menu provides the following options:

No Mixing	The LFE channel will not be included in the down-mix.
LFE Gain	The LFE channel will be included in the down-mix with gain for the LFE channel defined by the LFE Gain control.

5.22.2.4. Setting the Surround Phase Control

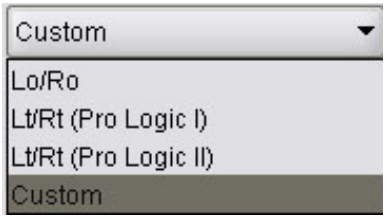
This control manages whether or a 90 degree phase shift is applied to the surround channels before being passed to down-mix matrix. Select 0 degree if no 90-degree phase shift is needed. It is required that surround channels are 90-degree phase shifted for Dolby Prologic I decoding, but if surround channels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



0 degrees	No phase shift is applied to the surround channels before being passed to down
90 degrees	A 90 degree phase shift is applied to the surround channels before being passed to down

5.22.2.5. Setting the Down Mix Type Control

This control enables 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.



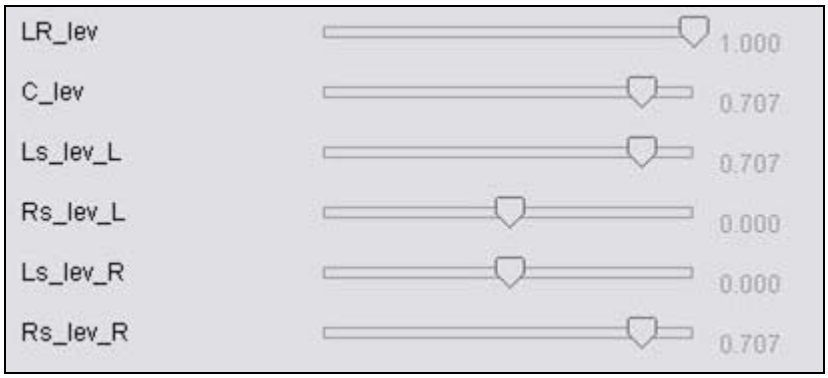
LoRo	When set to *LoRo*, the down-mixer will generate Left Only and Right Only (LoRo) stereo audio.
LtRt (Prologic I)	When set to *LtRt (Prologic I)*, the down-mixer will generate Left Total and Right Total (LtRt) Prologic I compatible stereo audio.
LtRt (Prologic II)	When set to *LtRt (Prologic II),* the down-mixer will generate Left Total and Right Total (LtRt) Prologic II compatible stereo audio.
Custom	When set to *custom*, the down-mixer will generate Left and Right channels of audio using the custom down-mixing equations.

5.22.2.5.1. Custom Down Mix Type Control Settings

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

L = (LR_lev * L + C_lev * C + Ls_lev_L * Ls{0°/90°} + Rs_lev_L * Rs{0°/90°} + lfe_gain * LFE) * gain / norm
R = (LR_lev * R + C_lev * C + Ls_lev_R * Ls{0°/90°} + Rs_lev_R * Rs{0°/90°} + lfe_gain * LFE) * gain / 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_lev_L, Rs_lev_L, Ls_lev_R and Rs_lev_R** are custom specified user coefficients . These custom down-mixing coefficients are controlled using the appropriate slider bars in *Down Mix Type* control section as shown below.



LR_lev Ranges from 1.000 to –1.000 in increments of .001 increments.
C_lev Ranges from 1.000 to –1.000 in increments of .001 increments.
Ls_lev_L Ranges from 1.000 to –1.000 in increments of .001 increments.
Rs_lev_L Ranges from 1.000 to –1.000 in increments of .001 increments.
Ls_lev_R Ranges from 1.000 to –1.000 in increments of .001 increments.
Rs_lev_R Ranges from 1.000 to –1.000 in increments of .001 increments.

5.23. CONFIGURING THE DOLBY METADATA ENCODER CONTROLS

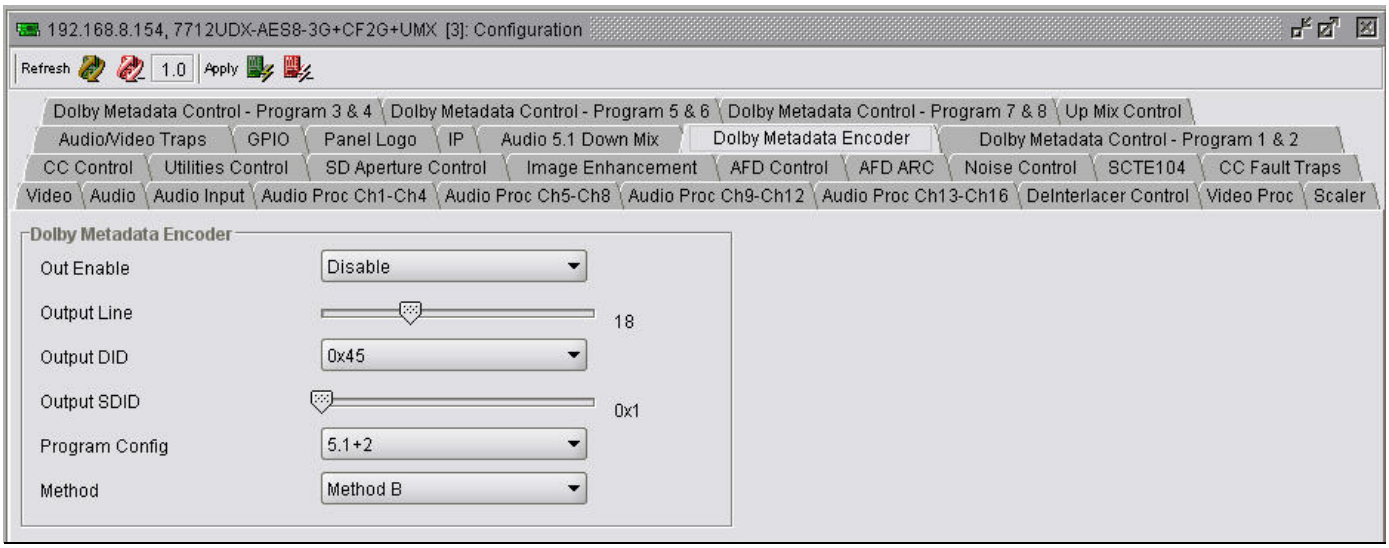


Figure 5-22: Dolby Metadata Encoder Tab

5.23.1. Setting the Out Enable Control

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.

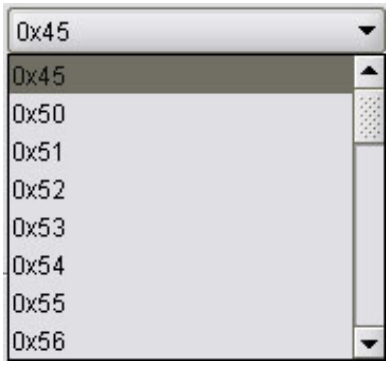
Enable	Dolby Metadata authoring and insertion will be enabled.
Disable	Dolby Metadata authoring and insertion will not be enabled

5.23.1.1. Setting the Output Line Control

This control enables the user to adjust the *Output Line* value of the Dolby Metadata Encoder. 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.

5.23.1.2. Setting the Output DID Control

This control sets the *Output DID* for the Dolby Metadata ancillary data packets. Use the drop down menu as shown below to pick the desired DID.



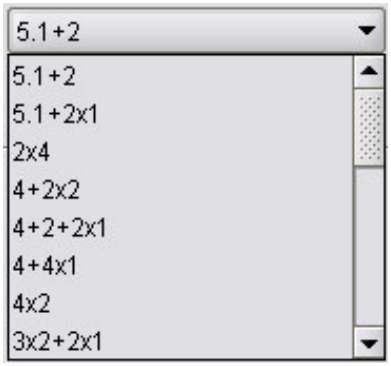
0x45	0x45 is selected for the DID for the Dolby Metadata ANC data packet.
0x50	0x50 is selected for the DID for the Dolby Metadata ANC data packet.
0x51	0x51 is selected for the DID for the Dolby Metadata ANC data packet.
0x52	0x52 is selected for the DID for the Dolby Metadata ANC data packet.
0x53	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.

5.23.1.3. Setting the SDID Control

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 to0xFF. The default value is 0x1.

5.23.1.4. Setting the Program Config Control

This control enables the user to set the control for the program configuration of the Dolby Metadata encoder. This parameter defines how the audio channels are grouped within a Dolby bitstream. Up to eight channels can be grouped together in individual programs, where each program contains its own metadata. The default setting is *5.1 + 2*. Using the drop down-menu, select the appropriate audio program configuration.



5.1+2 (2 programs)	5.1+2 is selected for the program Dolby Metadata program configuration.
5.1+2x1 (3 programs)	5.1+2x1 is selected for the program Dolby Metadata program configuration.
2x4 (2 programs)	2x4 is selected for the program Dolby Metadata program configuration.
4+2x2 (3 programs)	4+2x2 is selected for the program Dolby Metadata program configuration.
4+2+2x1 (4 programs)	4+2+2x1 is selected for the program Dolby Metadata program configuration.
4+4x1 (5 programs)	4+4x1 is selected for the program Dolby Metadata program configuration.
4x2 (4 programs)	4x2 is selected for the program Dolby Metadata program configuration.
3x2+2x1 (5 programs)	3x2+2x1 is selected for the program Dolby Metadata program configuration.
2x2+4x1 (6 programs)	2x2+4x1 is selected for the program Dolby Metadata program configuration.
2+6x1 (7 programs)	2+6x1 is selected for the program Dolby Metadata program configuration.
8x1 (8 programs)	8x1 is selected for the program Dolby Metadata program configuration.
5.1 (1 program)	5.1 is selected for the program Dolby Metadata program configuration.
4+2 (2 programs)	4+2 is selected for the program Dolby Metadata program configuration.
4+2x1 (3 programs)	4+2x1 is selected for the program Dolby Metadata program configuration.
3x2 (3 programs)	3x2 is selected for the program Dolby Metadata program configuration.
2x2+2x1 (4 programs)	2x2+2x1 is selected for the program Dolby Metadata program configuration.
2+4x1 (5 programs)	2+4x1 is selected for the program Dolby Metadata program configuration.
6x1 (6 programs)	6x1 is selected for the program Dolby Metadata program configuration.
4 (1 program)	4 is selected for the program Dolby Metadata program configuration.
2x2 (2 programs)	2x2 is selected for the program Dolby Metadata program configuration.
2+2x1 (3 programs)	2+2x1 is selected for the program Dolby Metadata program configuration.
4x1 (4 programs)	4x1 is selected for the program Dolby Metadata program configuration.
7.1 (1 program)	7.1 is selected for the program Dolby Metadata program configuration.
7.1 screen (1 program)	7.1 screen is selected for the program Dolby Metadata program configuration.

5.23.1.5. Setting the Method Control

This control enables the user to set the method that is used for Dolby Metatdata formatting. There are two methods for Dolby Metadata insertion as outlined in SMPTE standard SMPTE 2020 . These two methods are called Method A and Method B. Using the drop down menu, the user can set the Method to A or B for Dolby Metadata insertion.

Method A	Use SMPTE 2020 Method A process for Dolby Metadata insertion.
Method B	Use SMPTE 2020 Method B process for Dolby Metadata insertion.

5.24. CONFIGURING THE DOLBY METADATA CONTROL PROGRAMS

There are eight unique programs for which Dolby Metadata may be specified. For simplicity, only *Dolby Metadata Programs 1* will be shown in this manual. Dolby Program 1 settings will be discussed below in sections 5.24.1 to 5.24.24. Many definitions are based on Dolby Metadata Guide (Issue 3) S05/14660/16797 and all due credits are hereby given to Dolby Laboratories.

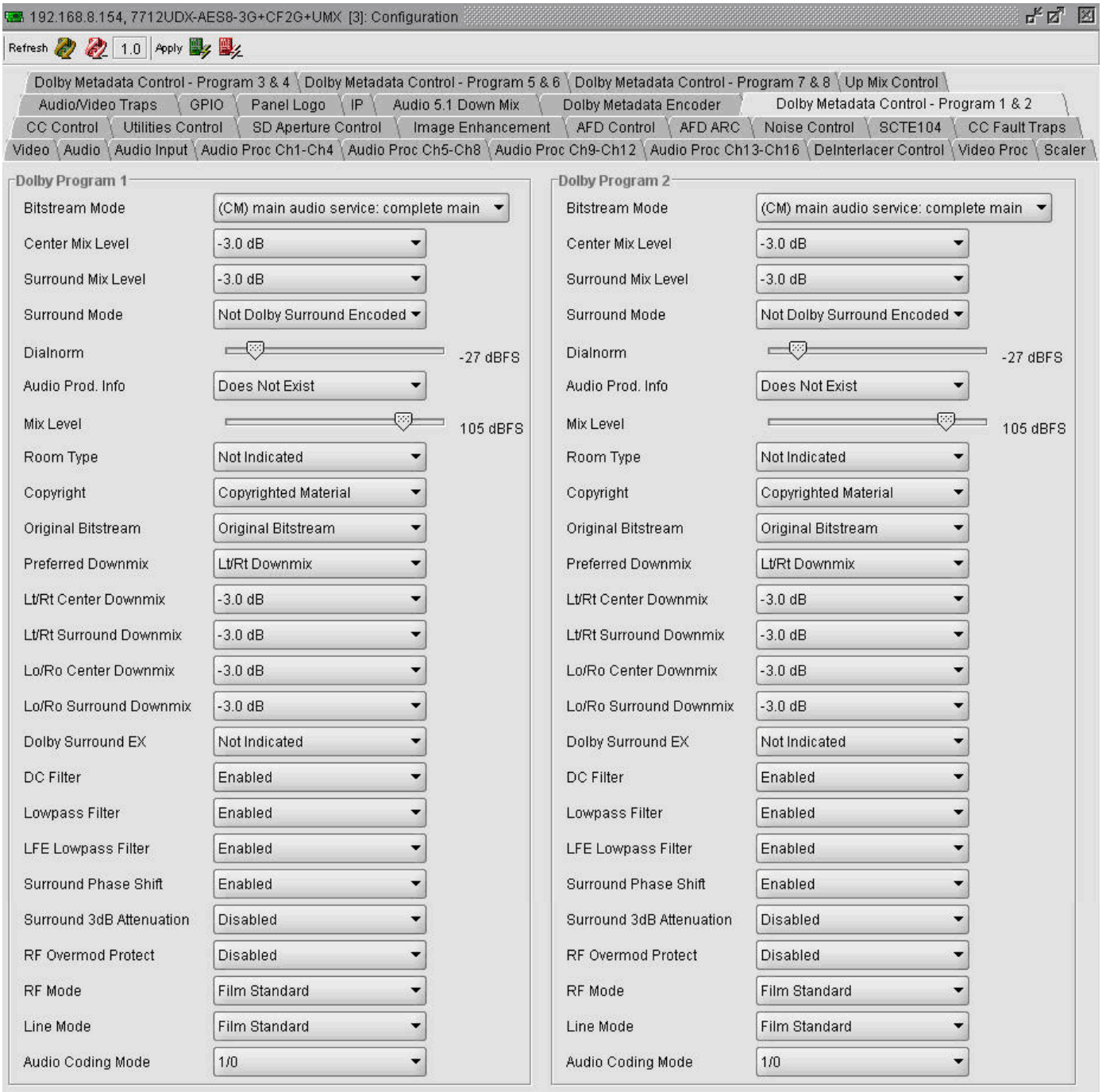
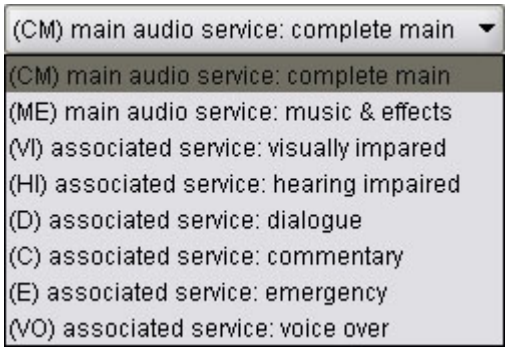


Figure 5-23: Dolby Metadata Control – Program 1 & 2 Tab

5.24.1. Setting the Bitstream Mode

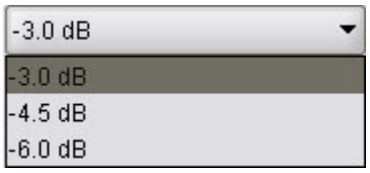
This control enables the user to set the bit-stream mode for Program 1. This parameter describes the audio service contained within the Dolby bit-stream. A complete audio program may consist of a main audio service (a complete mix of all the program audio), an associated audio service compromising a 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).

5.24.2. Setting the Centre Mix Level

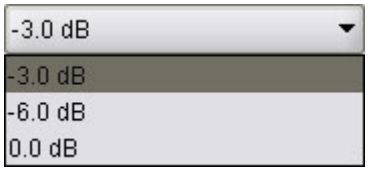
This control enables the user to author the centre mix level for program 1 of the Dolby Stream. Select the appropriate control from the drop down menu.



- 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.

5.24.3. Setting the Surround Mix Level

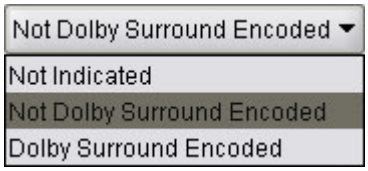
This control enables the user to author the surround mix level of the Dolby Stream. When the encoded audio has one or more Surround channels, but the consumer does not have surround speakers, this parameter indicates the nominal down-mix level for the Surround channel(s) with respect to the Left and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



- 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.

5.24.4. Setting the 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.



Not indicated	There is no indication either way.
Not Dolby Surround Encoded	The bitstream contains information that was not encoded in Dolby Surround. The bitstream contains information that was encoded in Dolby Surround. After Dolby Digital decoding, the bitstream is decoded using Pro Logic.
Dolby Surround Encoded	The bitstream contains information that was encoded in Dolby Surround. After Dolby Digital decoding, the bitstream is decoded using Pro Logic.

5.24.5. Setting the Dialnorm Control

This control enables the user to author the ***Dialnorm level*** of the Dolby bistream. 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 with increments of 1 dBFS . The default value is -27 dBFs.

5.24.6. Setting the Audio Prod Info

This control enables the user to author the ***Audio Prod****. 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.

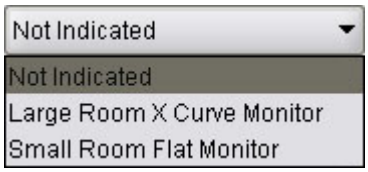
Does Not Exist	Mixing Level and Room Type parameters are invalid and should be ignored.
Exists	Mixing Level and Room Type parameters are valid.

5.24.7. Setting the Mix Level

This control allows the user to author the ***Mix Level*** for the Dolby bit-stream. The Mixing 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.

5.24.8. Setting the 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.



Not Indicated	Not Indicated.
Large Room X Curve Monitor	Large Room X Curve Monitor used during final mixing.
Small Room Flat Monitor	Small Room used during final mixing with flat equalization.

5.24.9. Setting the 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.

Not Copyrighted	Indicates the material is not copyrighted material.
Copyrighted Material	Indicates the material is copyrighted.

5.24.10. Setting the 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. The *Original Bitstream* drop down menu has the following options:

Not Copyrighted	Indicate the material is not copyrighted material.
Copyrighted Material	Indicate the material is copyrighted.

5.24.11. Setting the Preferred Down Mix

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. The *Preferred Down Mix* drop down menu has the following options:

Not Indicated	Not Indicated
LtRt Downmix	Lt/Rt Preferred
LoRo Downmix	Lo/Ro Preferred

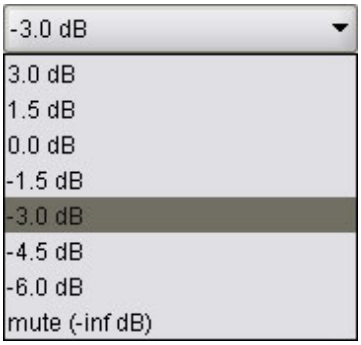
5.24.12. Setting the Lt/Rt Centre Down Mix

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 an Lt/Rt output. The *Lt/Rt Centre Down Mix* menu provides the following options:

3.0 dB	3.0 dB level shift applied to the Center channel
1.5 dB	1.5 dB level shift applied to the Center channel
0.0 dB	0.0 dB level shift applied to the Center channel
-1.5 dB	-1.5 dB level shift applied to the Center channel
-3.0 dB	-3.0 dB level shift applied to the Center channel
-4.5 dB	-4.5 dB level shift applied to the Center channel
-6.0 dB	-6.0 dB level shift applied to the Center channel
Mute	-999 dB level shift applied to the Center channel

5.24.13. Setting the Lt/Rt Surround Control

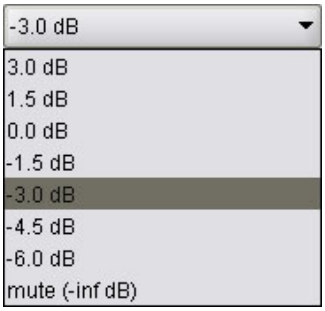
This control allows the user to author the LtRt Surround Control metadata for the Dolby bit-stream. This parameter indicates the level shift applied to the Surround channels when downmixing to an Lt/Rt output. The ***Lt/Rt Surround Control*** drop down menu provides the following options:



3.0 dB	3.0 dB level shift applied to the Surround channels
1.5 dB	1.5 dB level shift applied to the Surround channels
0.0 dB	0.0 dB level shift applied to the Surround channels
-1.5 dB	-1.5 dB level shift applied to the Surround channels
-3.0 dB	-3.0 dB level shift applied to the Surround channels
-4.5 dB	-4.5 dB level shift applied to the Surround channels
-6.0 dB	-6.0 dB level shift applied to the Surround channels
Mute	-999 dB level shift applied to the Surround channels

5.24.14. Setting the Lo/Ro Centre Control

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 an Lo/Ro output. When Extended BSI parameters are active, this parameter replaces the Center Down-mix Level parameter in the universal parameters.



3.0 dB	3.0 dB level shift applied to the Center channel
1.5 dB	1.5 dB level shift applied to the Center channel
0.0 dB	0.0 dB level shift applied to the Center channel
-1.5 dB	-1.5 dB level shift applied to the Center channel
-3.0 dB	-3.0 dB level shift applied to the Center channel
-4.5 dB	-4.5 dB level shift applied to the Center channel
-6.0 dB	-6.0 dB level shift applied to the Center channel
Mute	-999 dB level shift applied to the Center channel

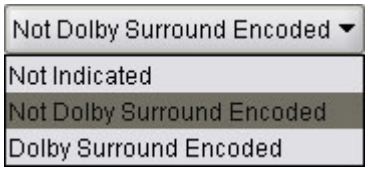
5.24.15. Setting the Lo/Ro Surround Control

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 an Lo/Ro output. When Extended BSI parameters are active, this parameter replaces the Surround Down-mix Level parameter in the universal parameters. The *Lo/Ro Surround Control* drop down menu provides the following options.

3.0 dB	3.0 dB level shift applied to the Surround channels
1.5 dB	1.5 dB level shift applied to the Surround channels
0.0 dB	0.0 dB level shift applied to the Surround channels
-1.5 dB	-1.5 dB level shift applied to the Surround channels
-3.0 dB	-3.0 dB level shift applied to the Surround channels
-4.5 dB	-4.5 dB level shift applied to the Surround channels
-6.0 dB	-6.0 dB level shift applied to the Surround channels
Mute	-999 dB level shift applied to the Surround channels

5.24.16. Setting the Dolby Surround EX Control

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 behavior is similar to that of the Dolby Surround Mode parameter. The *Dolby Surround EX Control* drop down menu provides the following options:



Not Indicated	Not Indicated
Not Dolby Surround Encoded	Not Surround EX
Dolby Surround Encoded	Dolby Surround EX

5.24.17. Setting the DC Filter Control

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. The *DC Filter Control* drop down menu provides the following options:

Disable	Filter was disabled
Enable	Filter was enabled.

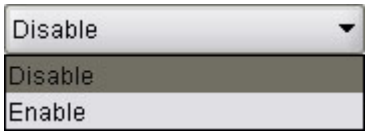
5.24.18. Setting the Lowpass Filter Control

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. The *Lowpass Filter Control* drop down menu provides the following options:

Disable	Filter was disabled
Enable	Filter was enabled.

5.24.19. Setting the LFE Lowpass Filter Control

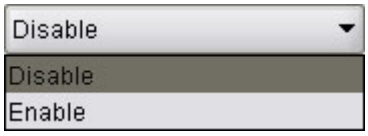
This control allows the user to author the LFE Lowpass Filter metadata for the Dolby bit-stream. This parameter determines whether a 120 Hz eighth-order low-pass filter is applied to the LFE channel input of a Dolby Digital encoder prior to encoding. It is ignored if the LFE channel is disabled. This 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. The *LFE Lowpass Filter Control* drop down menu provides the following options:



Disable	Filter was disabled
Enable	Filter was enabled.

5.24.20. Setting the Surround Phase Shift Control

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 an 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 an Lt/Rt output that can be decoded with Pro Logic to L, C, R, 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 Enabled. The *Surround Phase Shift Control* drop down menu provides the following options:



Disable	Filter was disabled
Enable	Filter was enabled.

5.24.21. Setting the Surround 3dB Attenuation Control

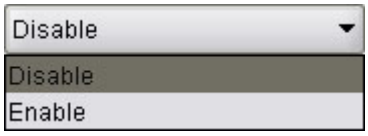
This control allows the user to author the ***3 dB Attenuation Control*** metadata for the Dolby bit-stream. The Surround 3 dB Attenuation parameter determines whether the Surround channel(s) are attenuated 3 dB before encoding. The attenuation actually takes place inside the Dolby Digital encoder. It 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. The *Surround 3dB Attenuation* drop down menu provides the following options:

Disable	Filter was disabled
Enable	Filter was enabled.

5.24.22. Setting the RF Overmod Protect Control

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 overmodulation 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.*

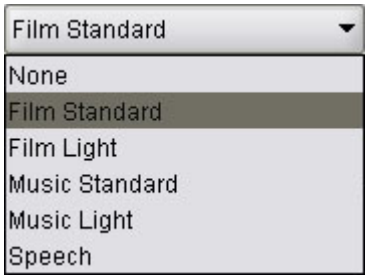
The *RF Overmod Protect* drop down menu provides the following options:



Disable	Filter was disabled
Enable	Filter was enabled.

5.24.23. Setting the RF Mode

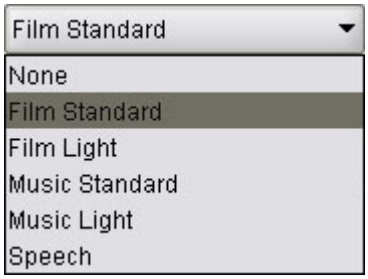
This control allows the user to author the ***RF Mode*** metadata for the Dolby bit-stream. Six preset DRC profiles are available for content producers: Film Light, Film Standard, Music Light, Music Standard, Speech, and None. The *RF Mode* drop down menu provides the following options:



Film Light	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)
Film Standard	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)
Music Light (No early cut range)	Music Light (No early cut 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)
Music Standard	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)
Speech	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)
None	No DRC profile selected. The dialogue level parameter *(dialnorm)* is still applied

5.24.24. Setting the 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. The *Line Mode* drop down menu provides the following options:



Film Light	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)
Film Standard	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)
Music Light (No early cut range)	Music Light (No early cut 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)
Music Standard	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)
Speech	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)
None	No DRC profile selected. The dialogue level parameter *(dialnorm)* is still applied

5.25. CONFIGURING THE UP MIX CONTROL

With the +UMX option the 7712 series of converters can up mix stereo audio to 5.1 surround sound audio.

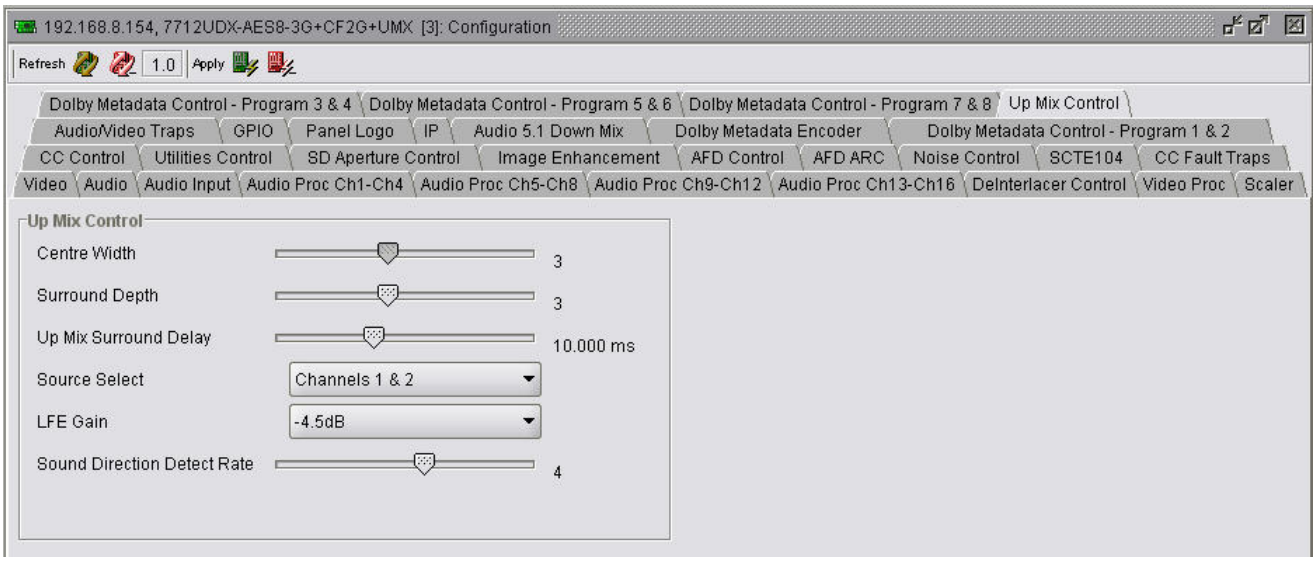


Figure 5-24: Up Mix Control Tab

5.25.1. Setting the Centre Width

The ***Centre Width*** 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.

5.25.2. Setting the Surround Depth

The ***Surround Depth*** 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.

5.25.3. Setting the Up Mix Surround Delay

This ***Up Mix Surround Delay*** 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.

The value range is 4 ms to 20ms in increments of .021 ms. The default value is 10 ms.

5.25.4. Setting the Source Select Control

The *Source Select* control enables the user to select the source of audio from which the 5.1 surround sound audio will be generated. Use the drop down menu to select the appropriate source. The following are the available sources of audio.

Channel 1 & 2	Select channels 1 & 2 as the source of audio for the up-mixer
Channel 3 & 4	Select channels 3 & 4 as the source of audio for the up-mixer
Channel 5 & 6	Select channels 5 & 6 as the source of audio for the up-mixer
Channel 7 & 8	Select channels 7 & 8 as the source of audio for the up-mixer
Channel 9 & 10	Select channels 9 &10 as the source of audio for the up-mixer
Channel 11 & 12	Select channels 11 & 12 as the source of audio for the up-mixer
Channel 13 & 14	Select channels 13 & 14 as the source of audio for the up-mixer
Channel 15 & 16	Select channels 15 & 16 as the source of audio for the up-mixer

5.25.5. Setting the LFE Gain

This 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

5.25.6. Setting the Sound Direction Detect Rate

The ***Sound Direction Detect Rate*** 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 un-natural. 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.

6. JUMPERS

Figure 6-1 and Figure 6-2 provide the locations of the jumpers and LEDs on the 7712 series boards.

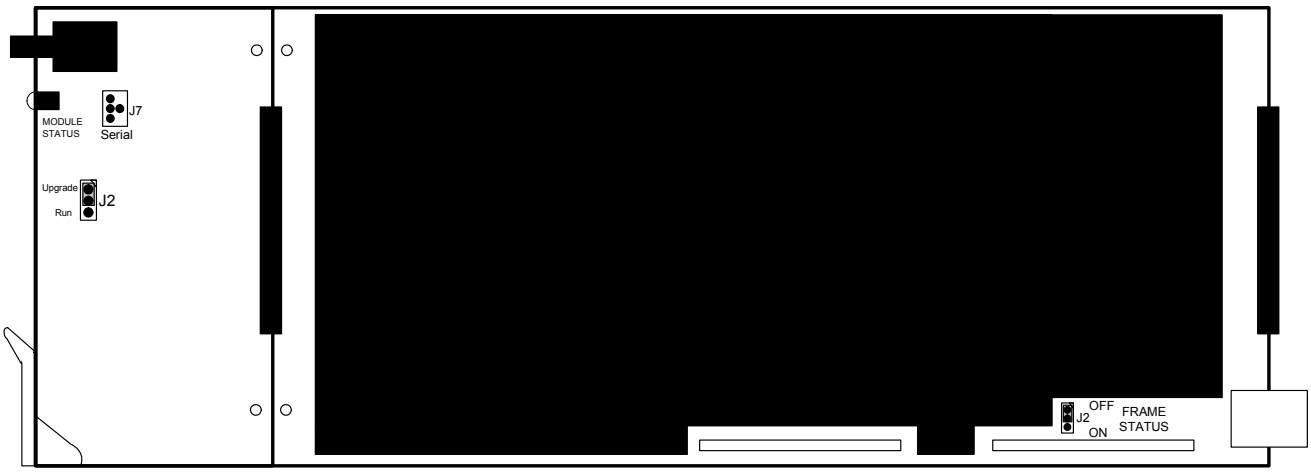


Figure 6-1: Location of Jumpers – Top View Main Module

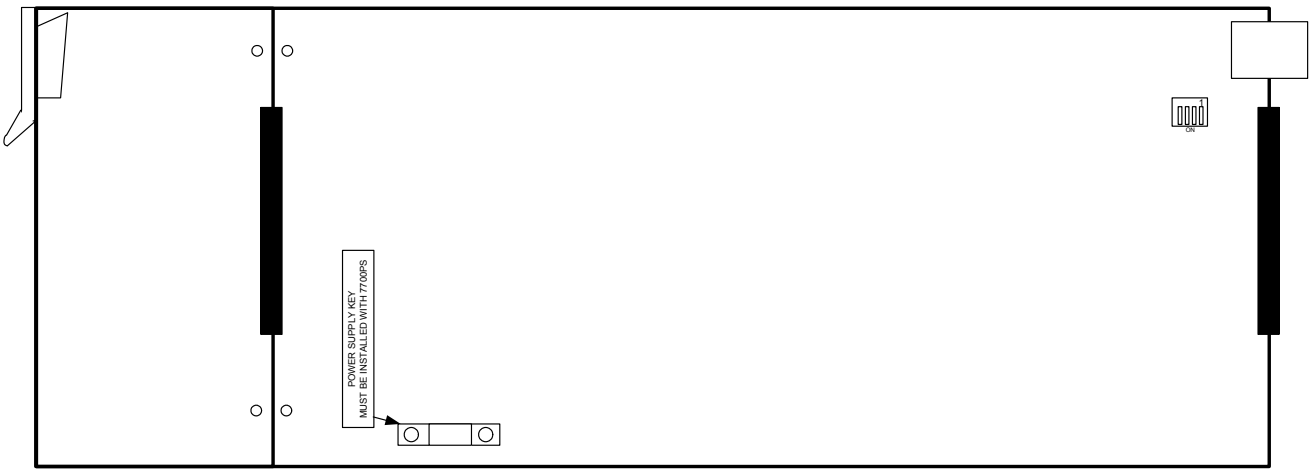


Figure 6-2: Location of Jumpers – Bottom View Main Module

6.1. 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.

6.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

Firmware updates can be performed using the **UPGRADE** jumper.

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 7712 series modules is 115,200 baud. Additional serial connection settings are as follows:

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

6.3. SELECTING WHETHER THE GENLOCK REFERENCE INPUT IS TERMINATED

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

6.4. 7712 Series “Slot Blocker”

The 7712 series modules are designed to take two slots in the Evertz 7800FR frame. The 7800FR frame has higher per slot power ratings than the Evertz 7700FR-C. When a 7712 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 the “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. The “Slot Blocker” must be installed for the card to power-up in the 7700FR-C. 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.

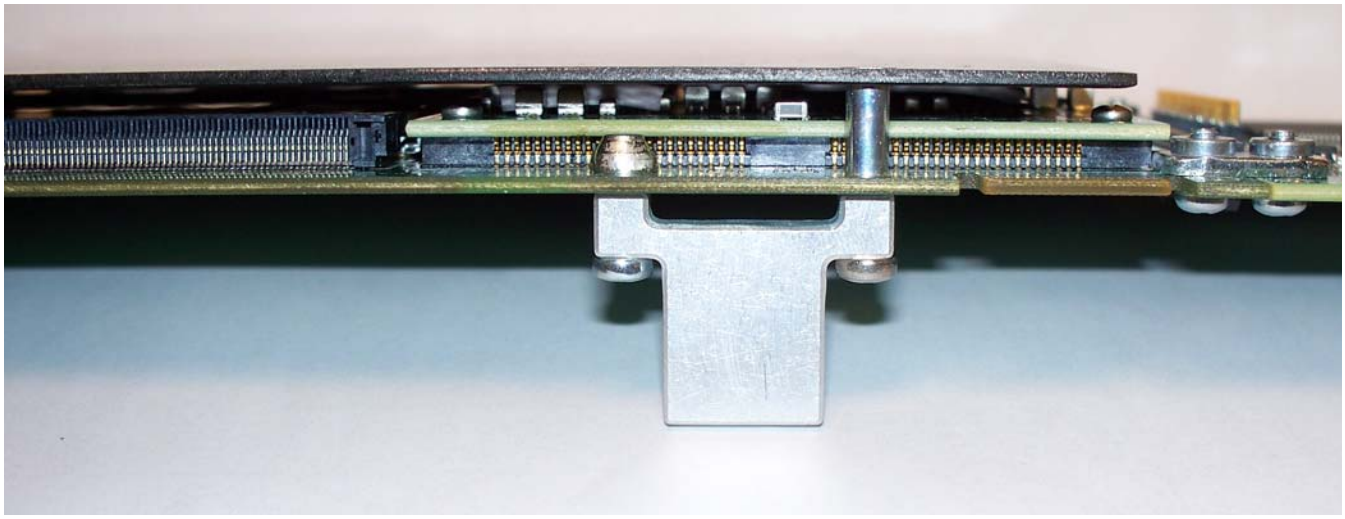


Figure 6-3:Slot Blocker Installed

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