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REVISION HISTORY

REVISION	**DESCRIPTION**	**DATE**
1.0	First Release	Sept 09

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1. OVERVIEW

The 7812DCDA2Q-HD series are high density, dual path down-converters with integrated distribution amplifiers. With these modules, two simultaneous HD to SD down-conversions may be performed on two different HD input signals. Each processing path provides re-clocked HD-SDI outputs in addition to down-converted SD program outputs. The SD program outputs may be software configured to output either SD-SDI (SMPTE 259M) or NTSC/PAL signals. Composite outputs may be color frame locked to a supplied bi-level black reference signal (<u>one</u> reference per card). One of the re-clocked HD-SDI outputs may be re-purposed to provide this external GENLOCK input. Alternatively, these cards can be configured to accept GENLOCK from the 7800FR FRAME REFERENCE input.

The 7812DCDA2Q-HD series accepts all popular SMPTE 292M video formats. To deliver high quality and sharp SD output signals, these modules incorporate Evertz's proprietary scaling technology. These cards also support YUV/RGB based video proc (gain and offset), RGB color legalization and video gamma correction capabilities.

Embedded audio from incoming video signals (16 channels) is de-embedded and re-embedded into the SD program outputs with audio delay matching video processing delay. Full audio proc including gain/delay/invert and channel swapping is supported. In addition, 5.1 PCM to stereo (Lt/Rt or Lo/Ro) down mixing is supported. With the 7812DCDA2Q-HD-AA, 4x analog audio outputs are available for each processing path. With the 7812DCDA2Q-HD-AES4, 2x AES outputs are available for each processing path.

When converting HD to SD, the 7812DCDA2Q-HD series transport closed caption and time code information from input to output with all necessary HD to SD translations and time code recalculations taking place. These modules support color space conversion from ITU rec. 709 to ITU rec. 601, and offer standard as well as user defined aspect ratio conversions. They also support automatic AFD based steering of aspect ratio conversions based on incoming AFD metadata and can stamp AFD signals on the output video. AFD driven transitions between particular ARC modes are frame accurate and glitch free.

Feature of the 7812DCDA2Q-HD (-AA, -AES4) are as follows:

- Dual channel HD to SD down-conversions
- Re-clocked HD-SDI outputs in addition SD PGM outputs
- SD PGM outputs can be SD-SDI or NSTC/PAL (software selectable)
- Composite outputs can be color frame locked to a supplied bi-level black reference signal
- Support for external card reference and 7800FR FRAME REF reference inputs
- Support for popular SMPTE 292M input video formats
- Evertz proprietary scaling technology
- Full video proc functions including GBR/YCrCb gain/offset and RGB color legalizer
- Video gamma correction controls
- HD to SD color space conversions (ITU Rec 709 to ITU Rec 601)
- Full support for standard and user defined aspect ratio conversions
- Fully AFD enabled for automatic and glitch free aspect ratio conversions based on AFD metadata
- Support for 16 channels embedded audio in and out
- De-embeds audio from HD input and re-embeds into SD output
- Embedded audio delay tracks video processing delay
- Full audio proc including gain, delay, invert and channel swapping

- 5.1 PCM to Stereo (Lt/Rt or Lo/Ro) down-mixing
- 4x analog audio outputs per processing channel with the –AA version of the 7812DCDA2Q-HD
- 2x AES audio outputs per processing channel with the –AES4 version of the 7812DCDA2Q-HD
- Transports closed caption and time code information from input to output with all necessary HD to SD translations and time code re-calculations taking place.
- VistaLINK® - capable offering remote control and configuration capabilities via SNMP using VistaLINK® PRO or CP-2200E Network Control Panels. VistaLINK® is available when modules are used with the 3RU 7800FR and a VistaLINK® Frame Controller

This manual will serve to cover the 7812DCDA2Q-HD, the 7812DCDA2Q-HD-AA and the 7812DCDA2Q-HD-AES4 versions.

Module	HD Re-clocked Outputs	SD-SDI Program Outputs	NSTC/PAL Program Outputs	HD to SD Processing	SD to SD Processing	Audio Outputs
7812DCDA2A-HD	Supported	Supported	Supported	Supported	Pass Through	Embedded Only
7812DCDA2Q-HD-AA	Supported	Supported	Supported	Supported	Pass Through	Embedded and 4x Analog Audio Per Path
7812DCDA2Q-HD-AES4	Supported	Supported	Supported	Supported	Pass Through	Embedded and 2x AES Per Path

1.1. FUNCTIONAL OVERVIEW

Figure 1-1 through Figure 1-3 provide the block diagrams for the 7812DCDA2Q-HD, 7812DCDA2Q-HD-AA and 7812DCDA2Q-AES4 modules.
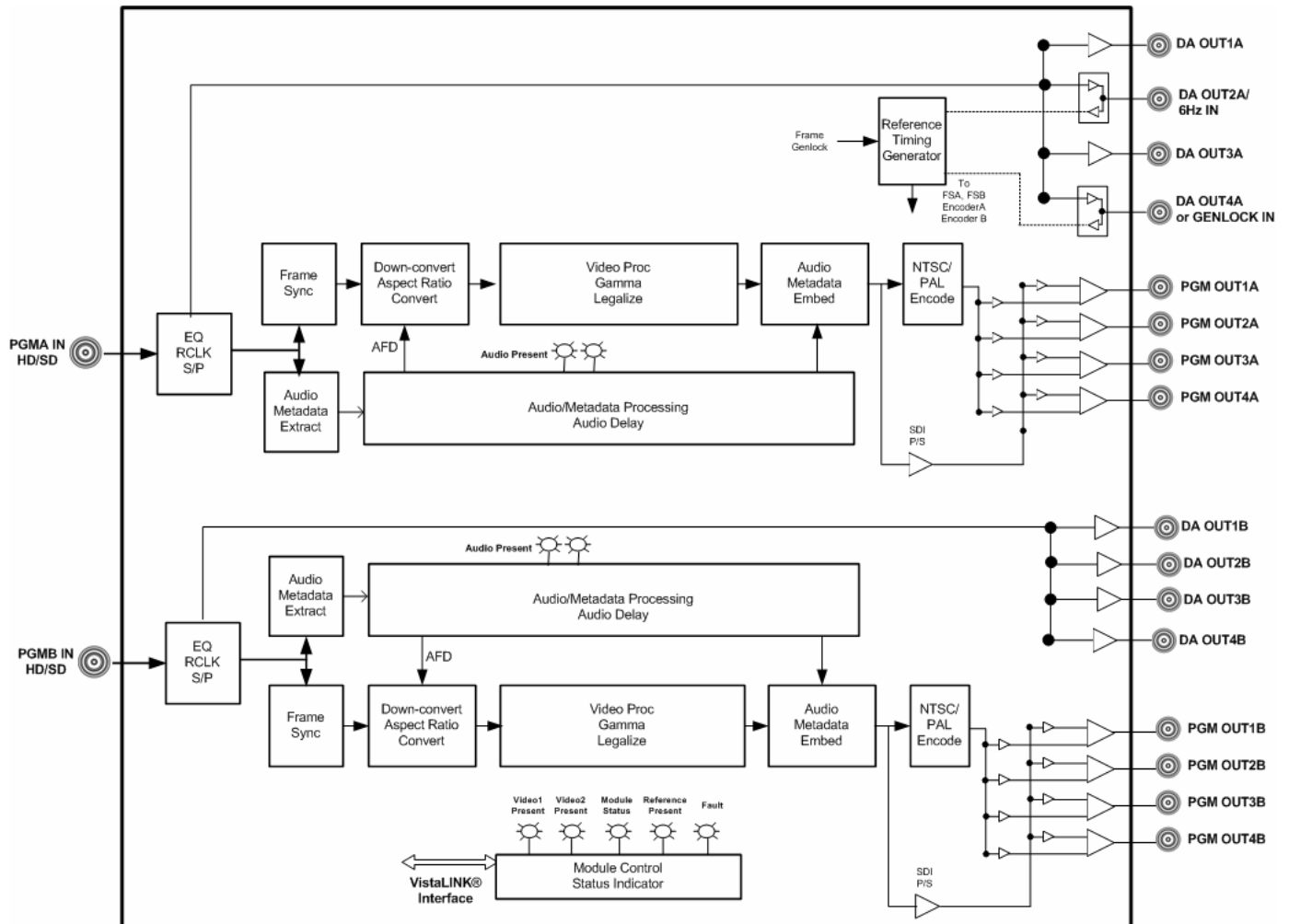
Figure 1-1: 7812DCDA2Q-HD Block Diagram

evertz
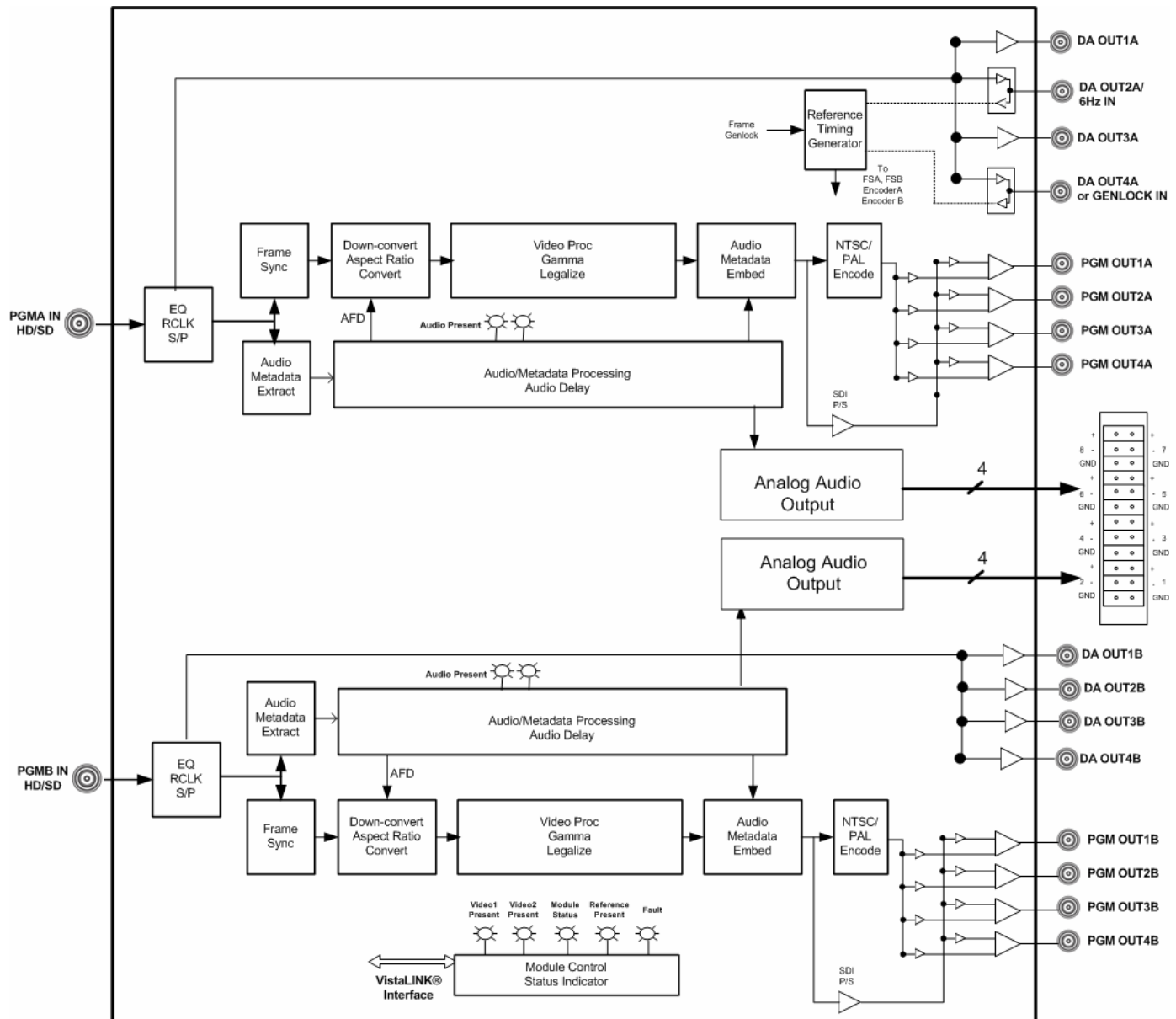
Figure 1-2: 7812DCDA2Q-HD-AA Block Diagram
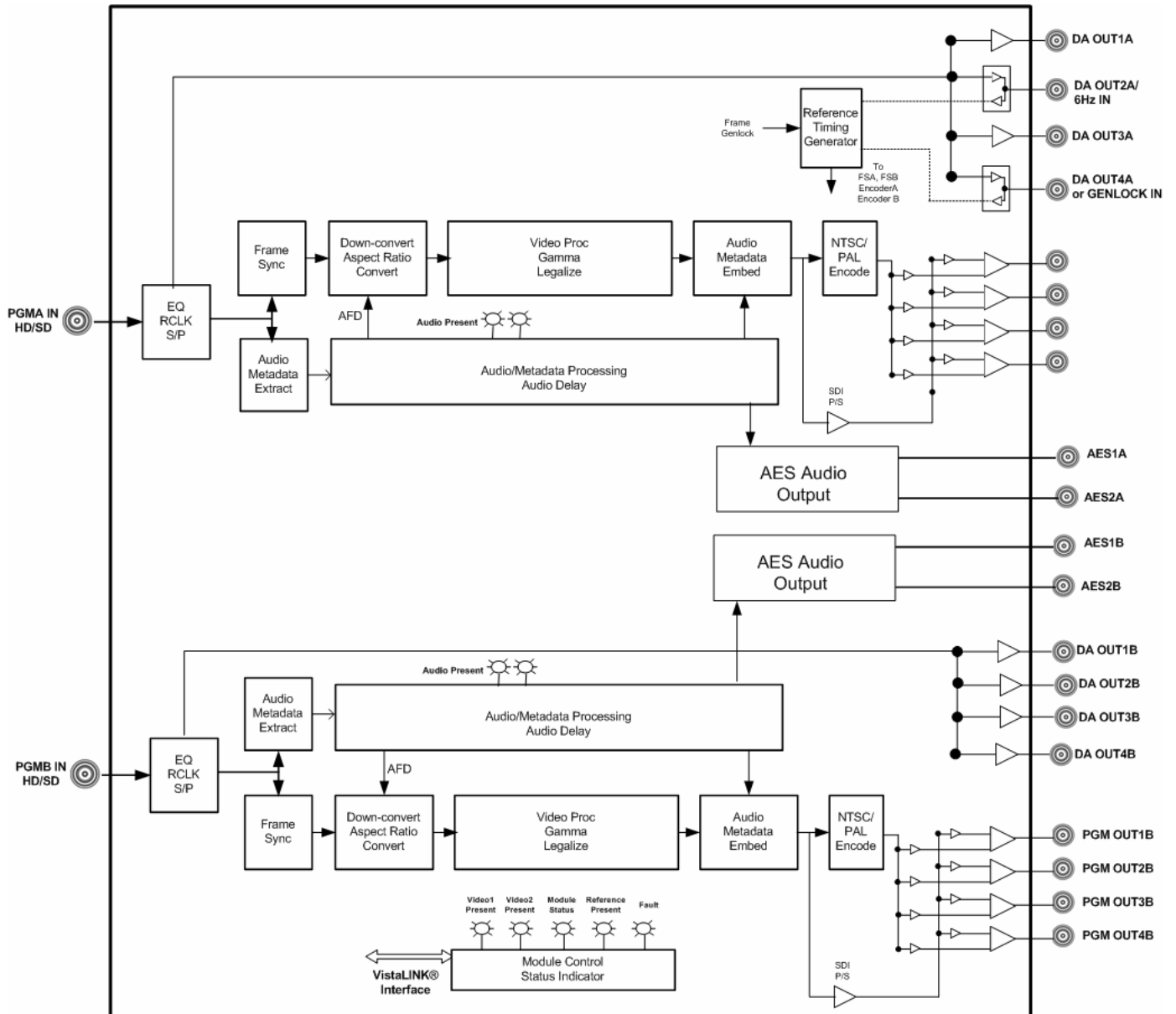
Figure 1-3: 7812DCDA2Q-HD-AES4 Block Diagram

2. INSTALLATION

All 7812DCDA2Q-HD series modules come with a companion rear plate. The 7812DCDA2Q-HD occupies one slot in the 7800FR and the 7812DCDA2Q-HD-AA/7812DCDA2Q-HD-AES4 occupies two slots in the 7800FR frame. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7800FR manual. Refer to Figure 2-1 for rear plate drawings.
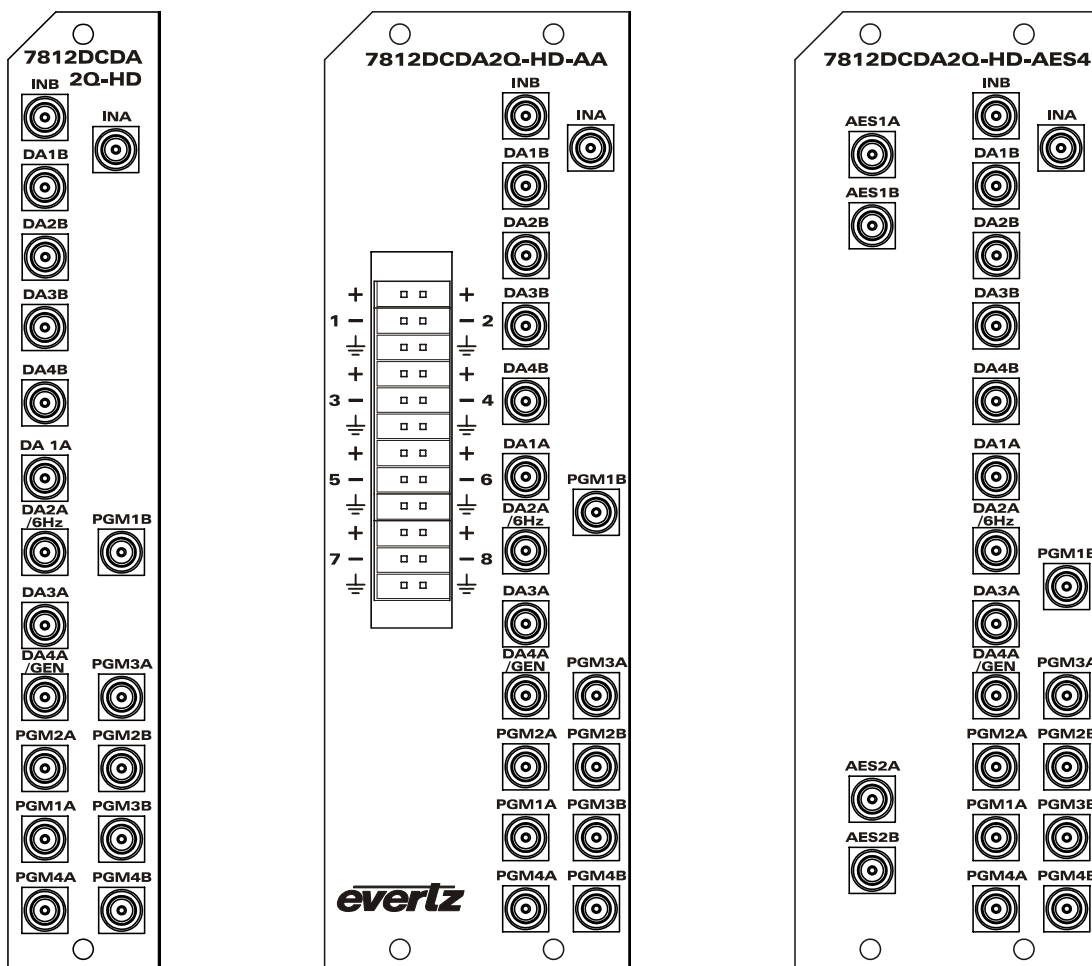
Figure 2-1: 7812DCDA2Q-HD (-AA, -AES4) Rear Panels

2.1. INPUT/OUTPUT CONNECTIONS

2.1.1. IN A Connector

Description	Program input for processing Path 1. Accepts a 10-bit serial digital video signal compatible with SMPTE 259M and SMPTE292M standards. **Note:** When SD input signals are applied to the card, the input signal is re-clocked and passed through to both the DA outputs and the program outputs essentially unmodified (video/audio processing is bypassed with SD inputs)
Connector	Mini DIN 1.0
Impedance	75 ohm nominal
Return Loss	> 15 dB to 1.5 GHz
Cable Equalization	> 400 m for SMPTE 259M-C input signals (Belden 1694) > 150 m for SMPTE 292M input signal (Belden 1694A)

2.1.2. DA1A Connector

Description	Re-clocked version of the HD/SD input signal applied to INA. Output signal is compatible with SMPTE 259M and SMPT292M.
Connector	Mini DIN 1.0
Impedance	75 ohm nominal
Return Loss	> 15 dB to 1.5 GHz
Signal Level	800 mV nominal
DC Offset	0 V ± 0.5 V
Rise/Fall Times	740 ps nominal for SD-SDI outputs 200 ps nominal for HD-SDI outputs

2.1.3. DA2A/6Hz Connector

Description	Dual function and bi-directional. When configured to be an output using VLPRO, a re-clocked version of the HD/SD input signal applied to INA will be generated on this output and will be compatible with SMPTE 292M/SMPTE 259M. When configured to be an input using VLPRO, the module will accept a 6 Hz input that can be utilized as a 6 Hz reference for both Path A and Path B video processing. **NOTE:** When this input is configured to be a 6 Hz input, the DA4A/GEN BNC will also be configured as an input.
Connector	Mini DIN 1.0
Impedance	75 ohm nominal
Return Loss	> 15 dB to 1.5 GHz
Output Signal Level	800 mV nominal
Output Signal DC Offset	0 V ± 0.5 V
Output Signal Rise/Fall Times	740 ps nominal for SD-SDI outputs 200 ps nominal for HD-SDI outputs
NOTES	SPECIAL NOTES RELATIVE TO TERMINATIONS

2.1.4. DA3A Connector

Description	Re-clocked version of the HD/SD input signal applied to INA compatible with SMPTE 259M and SMPT292M.
Connector	Mini DIN 1.0
Impedance	75 ohm nominal
Return Loss	> 15 dB to 1.5 GHz
Signal Level	800 mV nominal
DC Offset	0 V ± 0.5 V
Rise/Fall Times	740 ps nominal for SD-SDI outputs 200 ps nominal for HD-SDI outputs

2.1.5. DA4A/GEN Connector

Description	Dual function and bi-directional. When configured to be an output using VLPRO, a re-clocked version of the HD/SD input signal applied to INA will be generated on this output and will be compatible with SMPTE 259M and SMPTE 292M. When configured to be an input using VLPRO, the module will accept a bi-level black reference genlock input that can be utilized as a reference for Path 1 and Path 2. Note that when this input is configured to be a reference input, the DA2A/6 Hz BNC will also be configured as an input. Applied reference must be bi-level reference black only.
Connector	Mini DIN 1.0/2.3
Impedance	75 ohm nominal
Output Signal Level	800 mV nominal
Output DC Offset	0 V ± 0.5 V
Output Rise/Fall Times	740 ps nominal for SD-SDI outputs 200 ps nominal for HD-SDI outputs
NOTES	SPECIAL NOTES RELATIVE TO TERMINATIONS

2.1.6. PGM1A-4A Connector

Description	Program outputs #1 through #4 for processing Path 1. When configured using VLPRO to output SD-SDI signals, SMPTE 259M compatible signals will be driven out of these connectors. When configured to output composite video using VLPRO, NTSC/PAL analog video signals will be driven out these connectors. Note that PGM1A and PGM2A are linked together as a pair when setting the output-operating mode. In addition, PGM3A and PGM4A are linked together when setting the output-operating mode.
Connector	Mini DIN 1.0
Impedance	75 ohm nominal
Return Loss	> 15 dB to 1.5 GHz
SDI Output Signal Level	800 mV nominal (when outputting SMPTE 259M signals)
SDI Output DC Offset	0 V +/- 0.5 V (outputting SMPTE 259M signals)
SDI Output SDI Rise/Fall Times	740 ps nominal (outputting SMPTE 259M signals)
Analog Video Output Signals	
Frequency Response	< 0.1 dB to 4 MHz
Differential Phase	< 0.5 º

Differential Gain	< 0.5 %
SNR	> 75 dB (black video, 100 kHz to 5 MHz)

2.1.7. IN B Connector

Description	Program input for processing Path 2. Accepts a 10-bit serial digital video signal compatible with SMPTE 259M and SMPTE292M standards. Note that when SD input signals are applied to the card, the input signal is re-clocked and passed through to both the DA outputs and the program essentially unmodified (video/audio processing is by-passed with SD inputs)
Connector	Mini DIN 1.0
Impedance	75 ohm nominal
Return Loss	> 15 dB to 1.5 GHz
Cable Equalization	> 400m for SMPTE 259M-C input signals (Belden 1694A) > 150m for SMPTE 292M input signal (Belden 1694A)

2.1.8. PGM1B-4B Connector

Description	Program outputs #1 through #4 for processing Path 2. When configured using VLPRO to output SD-SDI signals, SMPTE 259M compatible signals will be driven out of these connectors. When configured to output composite video using VLPRO, NTSC/PAL analog video signals will be driven out these connectors. Note that PGM1B and PGM2B are linked together as a pair when setting the output-operating mode. In addition, PGM3B and PGM4B are linked together when setting the output operating mode.
Connector	Mini DIN 1.0
Impedance	75 ohm nominal
Return Loss	> 15 dB to 1.5 GHz
SDI Output Signal Level	800 mV nominal (outputting SMPTE 259M signals)
SDI Output DC Offset	0 V +/- 0.5 V (outputting SMPTE 259M signals)
SDI Output Rise/Fall Times	740 ps nominal (outputting SMPTE 259M signals)
Analog Video Output Signals	
Frequency Response	< 0.1 dB to 4 MHz
Differential Phase	< 0.5 °
Differential Gain	< 0.5 %
SNR	> 75 dB (black video, 100 kHz to 5 MHz)

2.1.9. DA1B-4B Connector

Description	Re-clocked version of the HD/SD input signal applied to INB compatible with SMPTE 259M and SMPT292M.
Connector	Mini DIN 1.0
Impedance	75 ohm nominal
Return Loss	> 15 dB to 1.5 GHz
Signal Level	800 mV nominal
DC Offset	0 V ± 0.5 V
Rise/Fall Times	740 ps nominal for SD-SDI outputs 200 ps nominal for HD-SDI outputs

2.1.10. ANALOG AUDIO (-AA version only) Connector

Description	4x analog outputs per video processing path
Connector	Removable terminal strip
Output Impedance	60 ohm max
Output Loads	Hi Z
Sampling Freq	48 KHz
Peak Conversion Level	0 dB FS = 18 dBu/24 dBu software selectable
Freq Response	+/- 0.1 dB (20 Hz to 20 KHz)
SNR	> 100 dB
THD+N	> 100 dB (20 Hz to 20 KHz)

2.1.11. AES1A, AES2A, AES1B, AES2B (-AES4 version only) Connector

Description	2x discrete AES outputs per path compatible with SMPTE 276M AES1A, AES2A are associated with processing path 1 AES1B, AES2B are associated with processing path 2
Connector	Mini DIN 1.0
Sample Rate	48 kHz
Impedance	75 ohm
Signal Level	1 V p-p nominal

3.   SPECIFICATIONS

3.1.   ELECTRICAL

Voltage: +12VDC
Power:
  7812DCDA2Q-HD: < 24 Watts
  7812DCDA2Q-HD-AA:
  7812DCDA2Q-HD-AES4:

EMI/RFI: Complies with FCC regulations for class A devices.
                                       Complies with EU EMC directive.

3.2.   PHYSICAL

Number of slots
7800FR Frame:
  7812DCDA2Q-HD: 1 slot (1 RU)
  7812DCDA2Q-HD-AA: 2 slots (2 RU)
  7812DCDA2Q-HD-AES4: 2 slots (2 RU)

4. STATUS LEDS

4.1. MODULE STATUS LEDS –HD, -AA, AND –AES4 VERSIONS

Figure 4-1 through Figure 4-3 depicts the status LEDs for the 7812DCDA2Q-HD, 7812DCDA2Q-HD-AA, and 7812DCDA2Q-HD-AES4 modules.
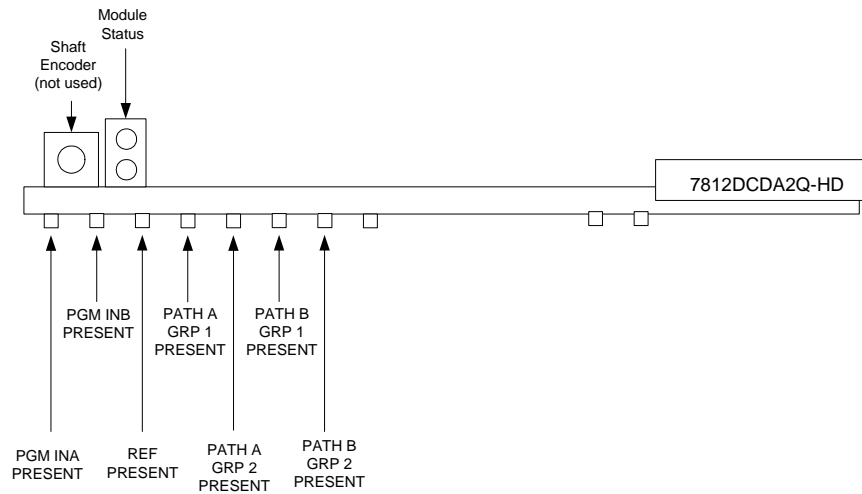
Figure 4-1: Status LEDs for 7812DCDA2Q-HD
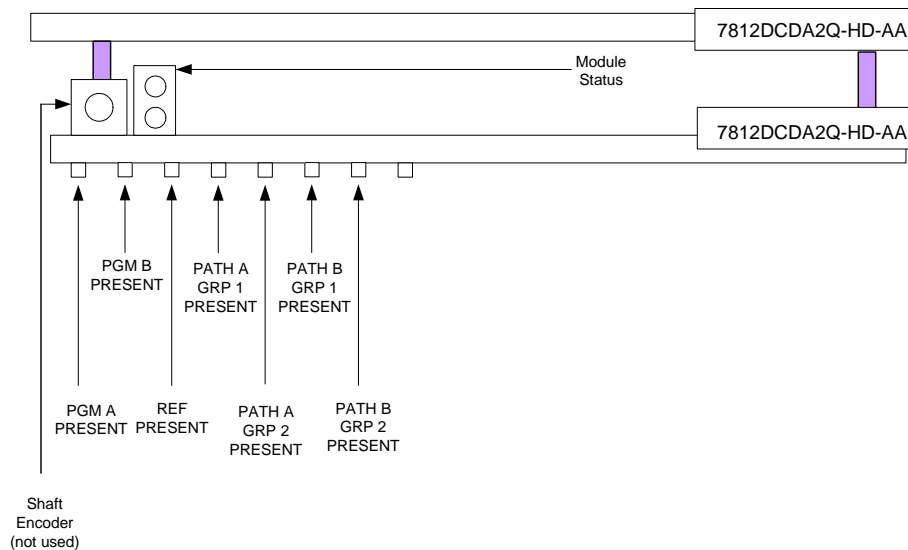
Figure 4-2: Status LEDs for 7812DCDA2AQ-HD-AA
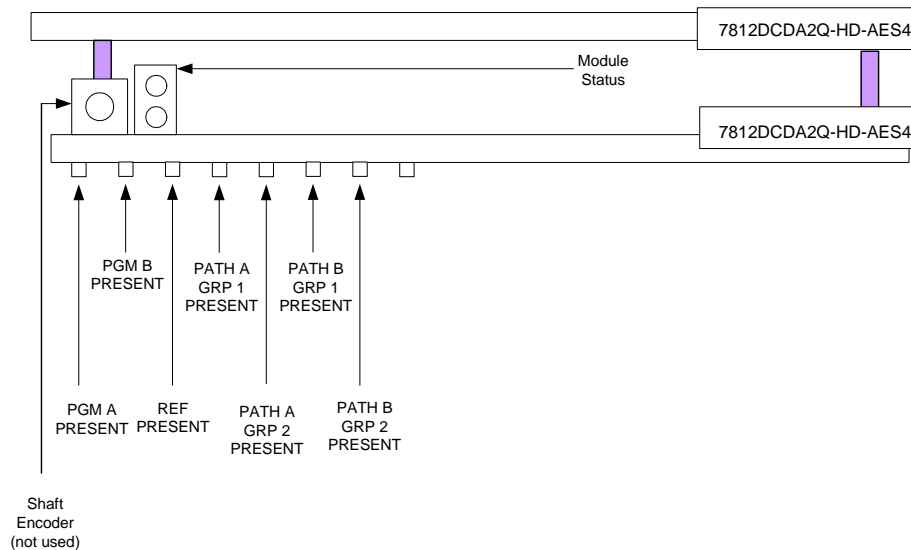
Figure 4-3: Status LEDs for 7812DCDA2AQ-HD-AES4

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 INA connector. 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 IN B connector. 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 presented to the module. It will be red when missing a reference 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).
PATH A GRP1 PRESENT:	This LED will be Green when embedded audio Group 1 is present on the input for PATH 1 and Red when embedded audio Group 1 is not present.
PATH A GRP2 PRESENT:	This LED will be Green when embedded audio Group 2 is present on the input for PATH 1 and Red when embedded audio Group 2 is not present.
PATH B GRP1 PRESENT:	This LED will be Green when embedded audio Group 1 is present on the input for PATH 2 and Red when embedded audio Group 3 is not present.
PATH B GRP2 PRESENT:	This LED will be Green when embedded audio Group 2 is present on the input for PATH 2 and Red when embedded audio Group 4 is not present.

5. OVERVIEW OF CARD CONTROL

The 7812DCDA2Q-HD (-AA and –AES4) series of products are controlled using VistaLINK® PRO. VistaLINK® PRO operates using Ethernet and SNMP control protocols. The 7812DCDA2Q-HD (-AA and –AES4) series modules **DO NOT HAVE** card edge controls. As a result, 7700FC modules must be installed in all frames that house 7812DCDA2Q-HD (-AA and –AES4) series modules. Refer to the Evertz website for the most recent firmware for the 7700FC. When using VistaLINK® PRO it is also important to ensure that the most recent 7812DCDA2Q-HD (-AA and –AES4) series ".JAR" control file is installed. Refer to the Evertz website for the most recent 7812DCDA2Q-HD (-AA) series ".JAR" file.

The following sections describe module control in terms of the parameters found within the VLPRO screens for the 7812DCDA2Q-HD-AA. As additional features and options are released, additional sections will be appended to this manual to show those control screens.

5.1. CONTROL CATEGORIES

Within *Vista*LINK® the 7812DCDA2Q-HD (-AA and –AES4) series of products have a set of high level card controls and a set of individual controls for each of the two processing paths. Refer to Figure 5-1 below to see an example of how these controls are initially presented within VistaLINK®.
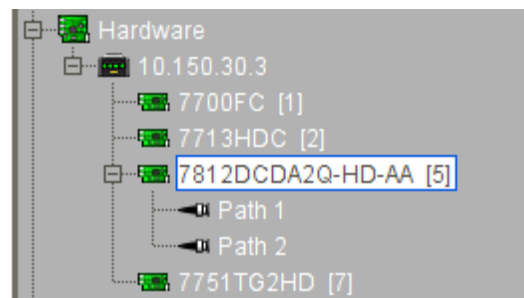
Figure 5-1: Navigation Tree

To access the high-level card controls, select the card that you wish to access (ie. 7812DCDA2Q-HD-AA as shown above) and right click using your mouse. The following two control tabs will appear as shown in Figure 5-2.
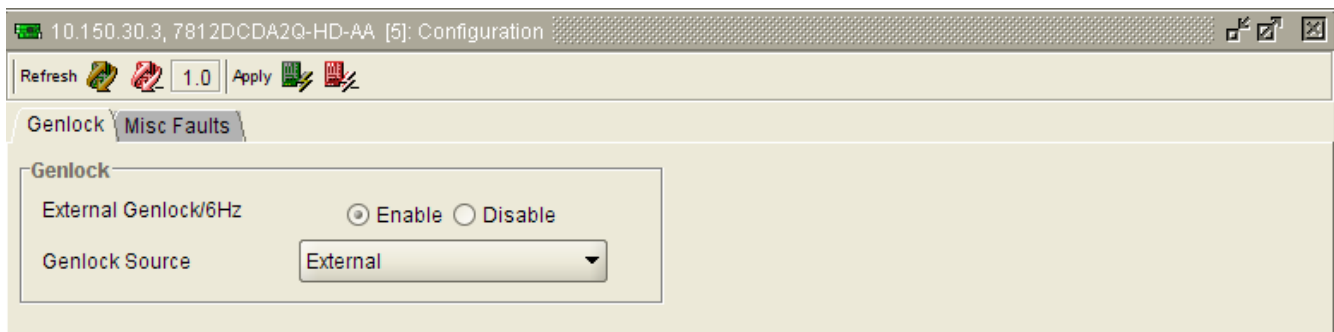
Figure 5-2: High Level Card Controls

Genlock Control Tab	Selects the source of card genlock. Selects whether DA4A/GEN operates as an input for genlock or operates as a DA output. A more detailed description can be found in later sections of this manual.
MISC Faults Control Tab	Controls for enabling and disabling misc card faults including genlock status and board temperature status. More detailed descriptions can be found in later sections of this manual.

To access the processing controls for Path 1 or Path 2, right click on the Path 1 or Path 2 icon in the navigation tree. Each processing path has the following control tabs shown in Figure 5-3.
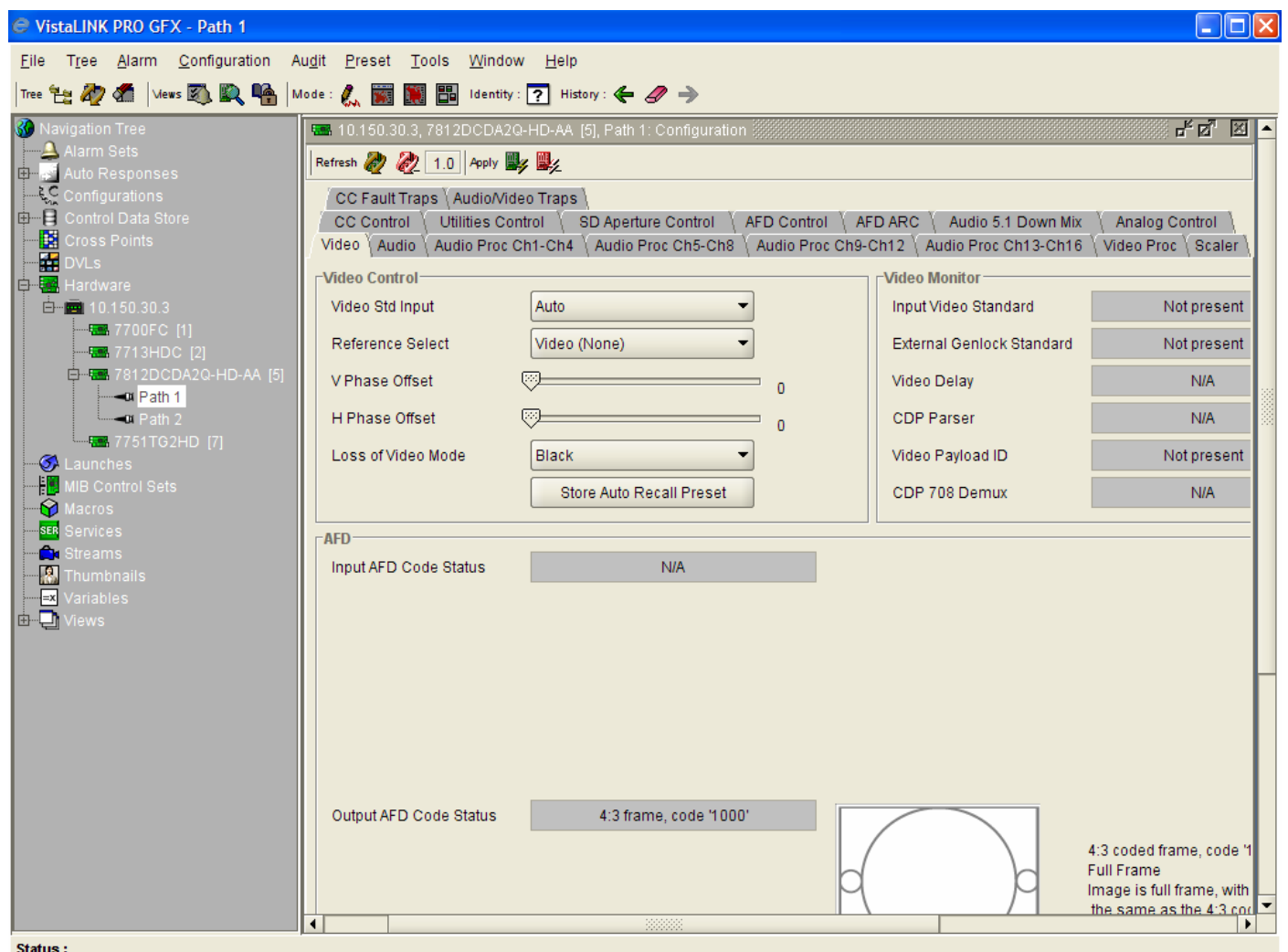
Figure 5-3: Processing Path

CONTROL TAB	DESCRIPTION
Video	Configuration for the input video standard, the source of card reference, frame sync output timing and frame sync operating mode. 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 delay and setting sample rate converter (SRC) operating modes. In addition, audio C bit processing mode is defined here. The status of several monitored audio parameters are also reported in this control tab (SRC status, video delay, audio delay)
Audio Proc Ch1-4	Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH1, CH2, CH3, CH4.
Audio Proc Ch5-Ch8	Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH5, CH6, CH7, CH8.
Audio Proc Ch9-Ch12	Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH9, CH10, CH11, CH12.
Audio Proc Ch13-16	Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH13, CH14, CH15, CH16.
Video Proc	Configuration for setting video proc controls including RGB gains/offsets, YCbCr gains/offsets, Hue, Saturation, Video Gain, Gamma and RGB colour legalization.
Scaler	Configuration for setting the module's ARC mode, the default AFD stamping mode and the default side panel colours. In addition, the H and V scaler filter bandwidths are defined in this control tab. **Note that when automatic steering of ARC modes based on AFD is enabled (within the AFD control tab), the ARC conversion controls within the SCALER control tab are disabled. Refer to the AFD Control and AFD ARC control tabs for more information. Note that when the AFD Stamp Source is set to 'Use Scaler' in the AFD Control tab, the AFD Stamp control within the Scaler control tab is disabled. Refer to the AFD Control and AFD ARC control tabs for more information.**
CC Control	Configuration for the closed captioning translation process including enabling and disabling the CC processing and setting the Loss of CC Timeout parameter.
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 (Clean or Production) to be used when performing scaling and ARC operations. Both the Clean and the Production Apertures are defined within this control tab.

AFD Control	Configuration for setting how the card will process and respond to AFD. **Note that when automatic steering of ARC modes based on AFD is enabled, the ARC conversion controls within the SCALER control tab are disabled.**
AFD ARC	Configuration for defining what aspect ratio conversions will be performed in response to incoming AFD values. Each incoming AFD code can index/select from a list of predefined ARC modes or a user defined ARC mode. These responses are defined within this control tab.
Audio 5.1 Down Mix	Configuration for defining the source audio channels for the 5.1 down-mix process and further defining the down mix type and level parameters.
Analog Control	In this control tab, you can define key parameters for the analog video and analog audio outputs. For analog video, you may define whether particular connectors output analog video or SD-SDI digital video signals (note that PGM1A/2A and PGM 3A/4A are controlled as pairs). Analog video settings including pedestal, setup, hue, brightness and video levels may also be set. Analog audio parameters defined in this control tab include audio range (18 dBu vs 24 dBu). The control tab also defines which channels of embedded audio drive which analog audio outputs.
CC Fault Traps	Configuration for enabling and disabling specific CC related traps.
Audio/Video Traps	Configuration for enabling and disabling specific Video and Audio fault traps and viewing Video and Audio trap status.

6.   CONFIGURING HIGH LEVEL CARD CONTROLS

To access high level card controls, select the card from the navigation tree that you wish to configure (ie. 7812DCDA2Q-HD-AA) and right click using your mouse. The following two control tabs will appear.
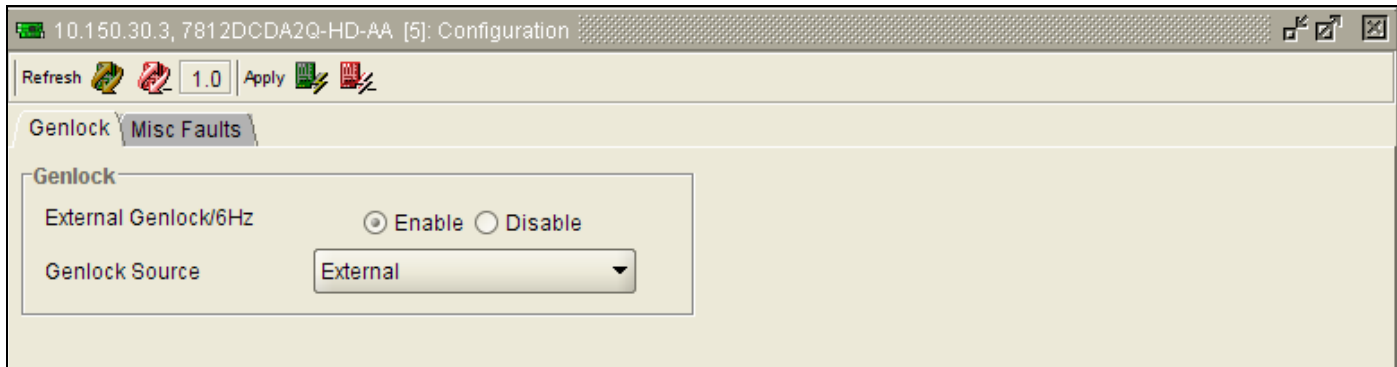
Figure 6-1: High Level Card Controls

6.1.   CONFIGURING HIGH LEVEL CARD CONTROLS – GENLOCK

The *Genlock* control tab is used to configure whether the DA2A/DA4A connectors are configured as inputs (for 6 Hz and Genlock respectively) and to also define the source of Genlock for the module.

6.1.1.   External Genlock/6 HZ

The VLPRO interface for the **External Genlock/6Hz** control appears as follows:
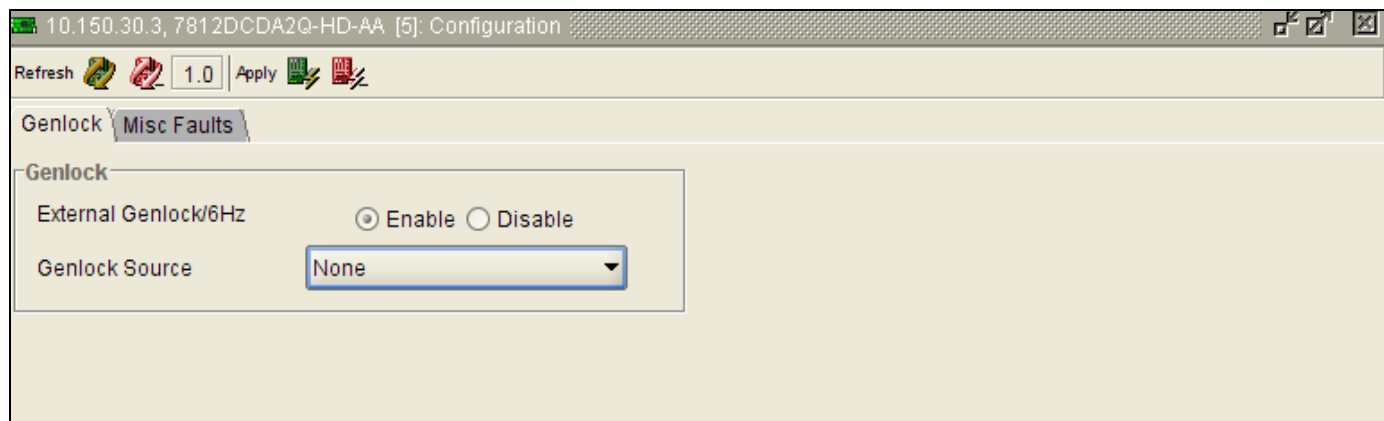
Figure 6-2: Genlock Tab

The control values for **External Genlock/6Hz** have the following meanings:

Enable	When *Enable* is selected, the DA2A and DA4A connectors will be configured as inputs so that 6 Hz and external Genlock signals can be applied to the module's rear plate.
Disable	When *Disable* is selected, the DA2A and DA4A BNCs on the module will be configured as outputs and generate a re-clocked version of the input signal applied to PGM IN A.

6.1.2. Genlock Source

The VLPRO interface for the **Genlock Source** control appears as follows:
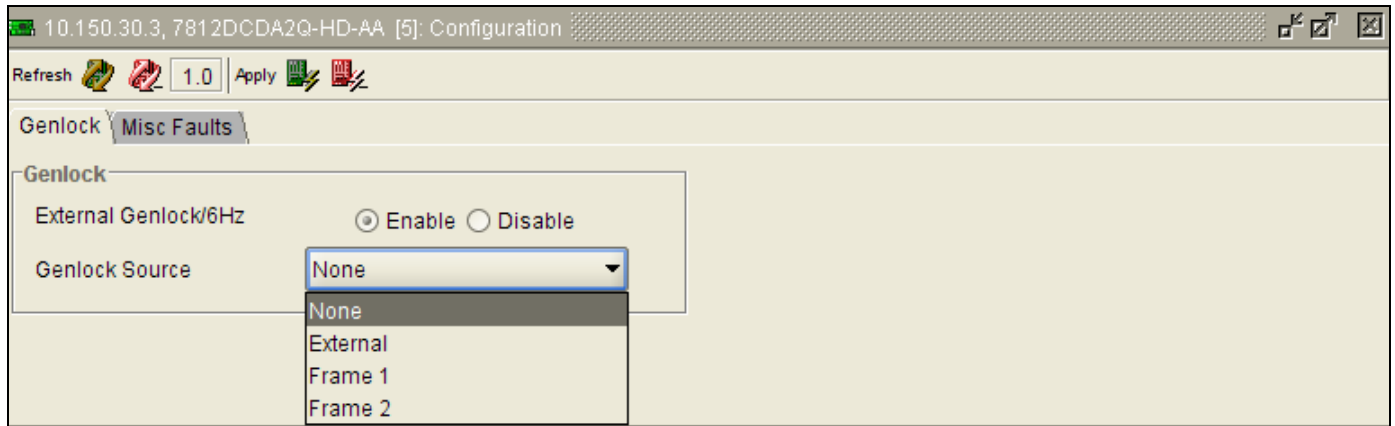
Figure 6-3: Genlock Source Control

The control values for the **Genlock Source** control have the following meanings

None	When *None* is selected, the module will lock to incoming video.
External	When *External* is selected, the module will lock to the external reference signal applied to the module's rear panel (DA4A/Genlock BNC). Reference bi-level black should only be used.
Frame 1	When *Frame 1* is selected, the module will lock to the external reference applied to the 7800 frame REF 1 input.
Frame 2	When *Frame 2* is selected, the module will lock to the external reference applied to the 7800 frame REF 2 input.

6.1.3. CONFIGURING HIGH LEVEL CARD CONTROLS – MISC FAULTS

The VLPRO interface for configuring the MISC FAULTS control tab appears as follows:
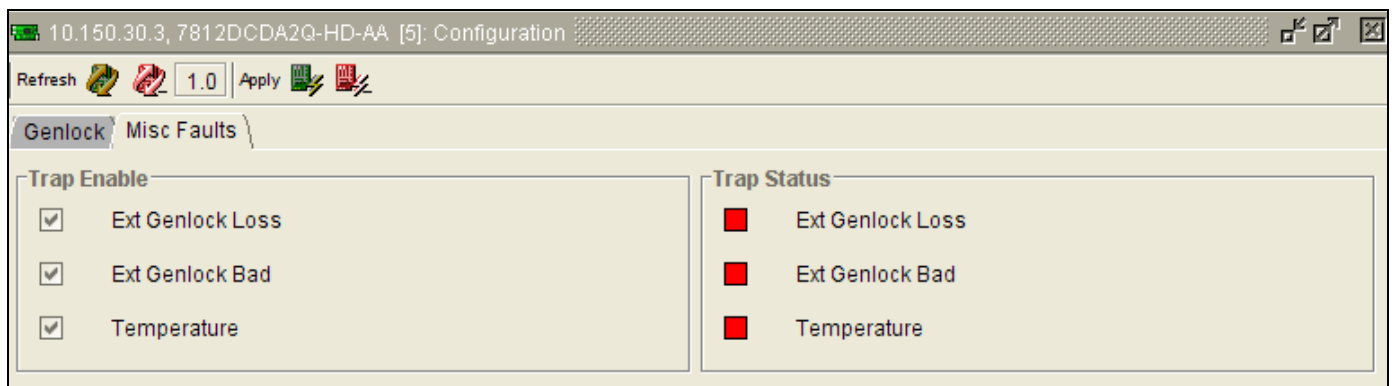
Figure 6-4: Misc Faults Tab

To enable a specific Fault trap, click the small box beside the relevant fault and ensure that a check mark appears in the box. To disable a specific Fault trap, click the small box beside the relevant fault and ensure that a check mark does not appear in the box.

7. CONFIGURING VIDEO AND AUDIO PARAMETERS

The total set of control tabs for each processing path is shown below. For the sake of brevity, only the controls for PATH 1 will be discussed in this manual, as the controls for PATH2 are identical.
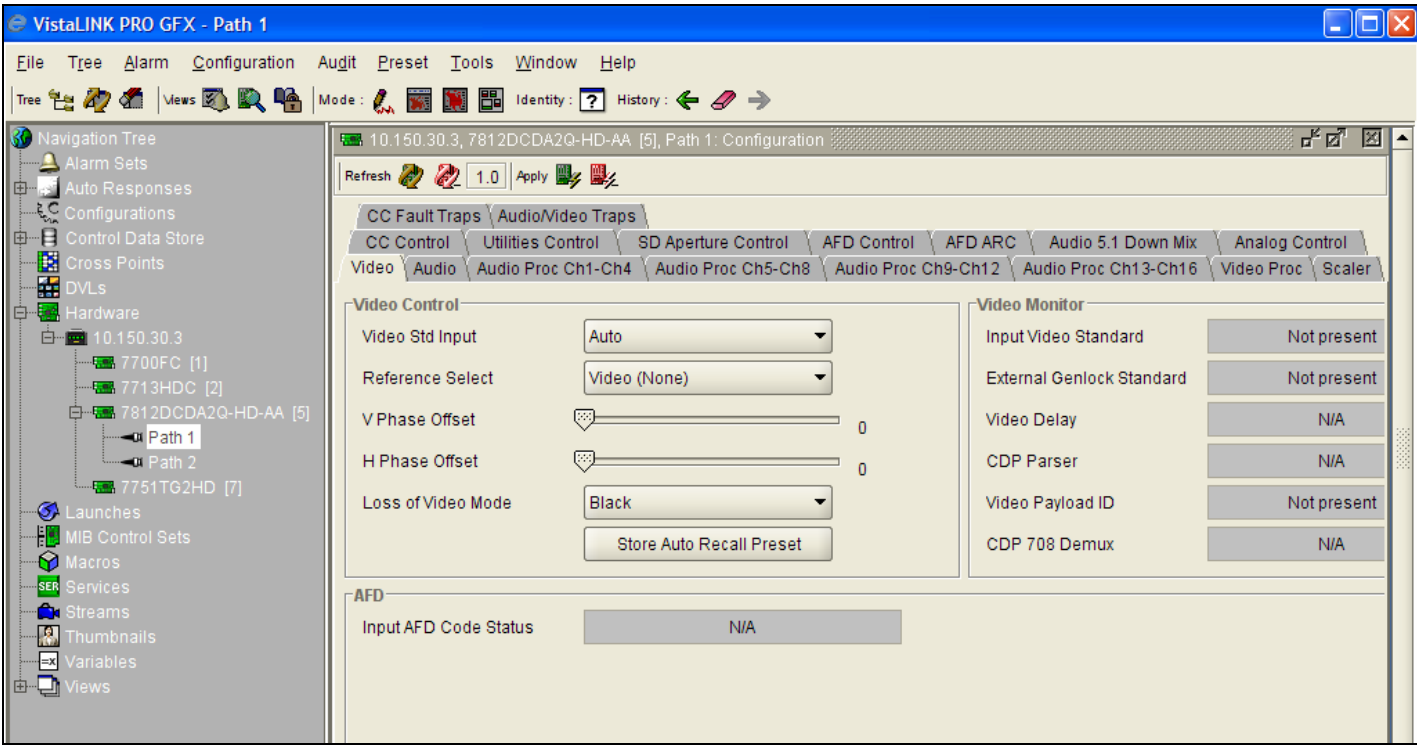
Figure 7-1: Video Tab

7.1. CONFIGURING THE VIDEO CONTROL TAB

The full *Video* control tab appears as follows in VLPRO.
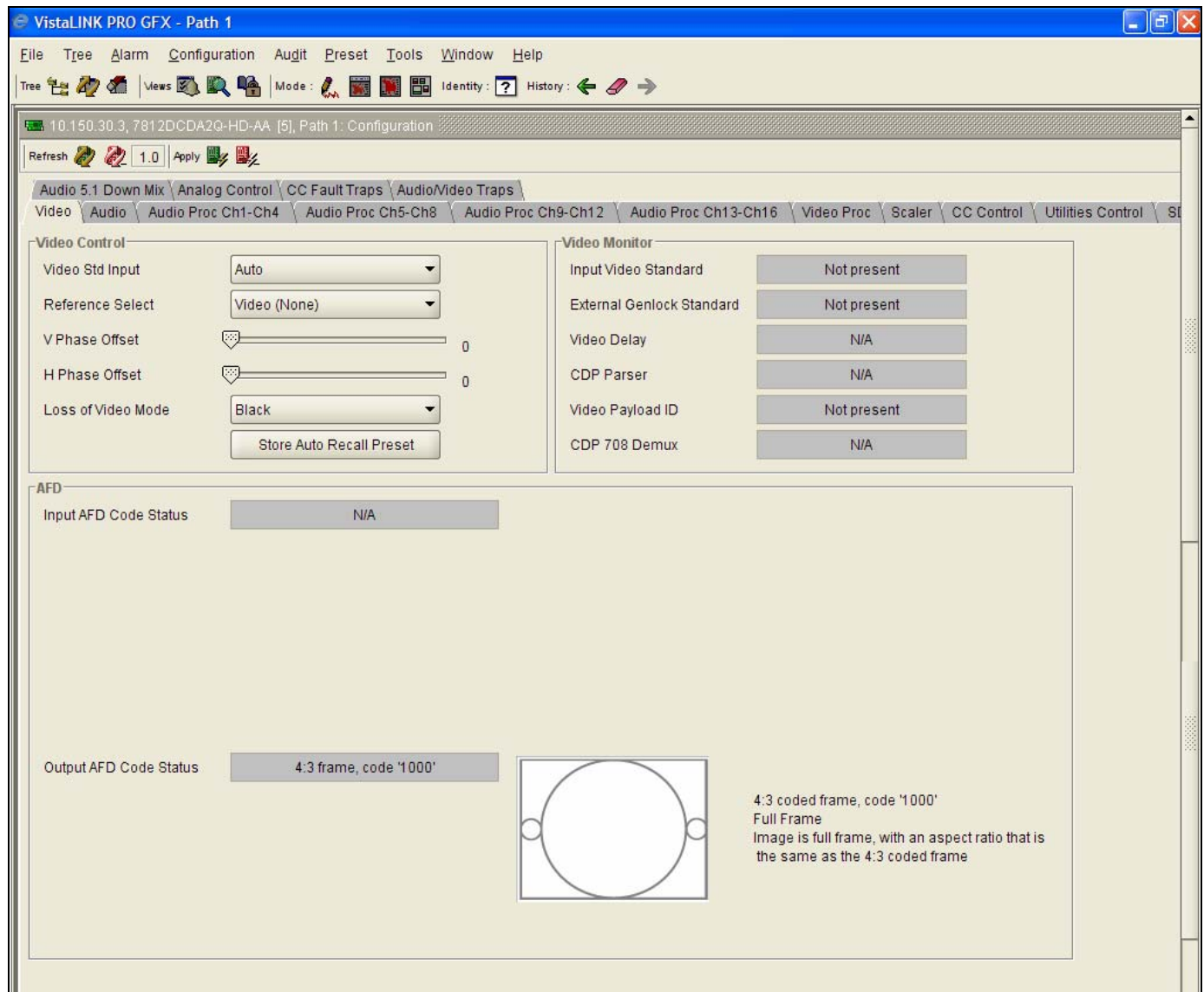
Figure 7-2: Video Tab

7.1.1. Video Std Input

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 VLPRO interface for the **Video Std Input** control appears as shown in Figure 7-3.
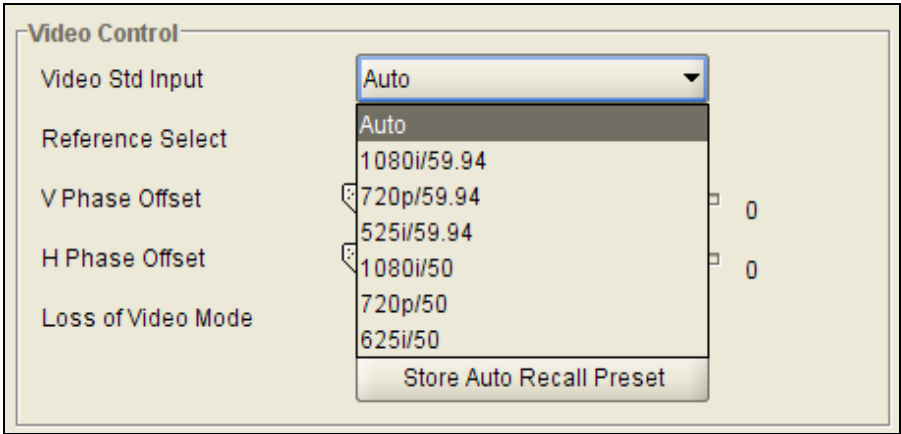
Figure 7-3: Video Standard Input Drop Down Menu

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	Automatically detect the incoming video standard
1080i/59.94	Select 1080i/59.94 as in the incoming video standard
720p/59.94	Select 720p/59.94 as in the incoming video standard
525i/59.94	Select 525i/59.94 as in the incoming video standard
1080i/50	Select 1080i/50 as in the incoming video standard
720p/50	Select 720p/50 as in the incoming video standard
625i/50	Select 625i/50 as in the incoming video standard

7.1.2. Selecting the Video Reference Source

With this control, the source of video reference for the card is selected. The VLPRO interface for the **Reference Select** control appears as follows in Figure 7-4.
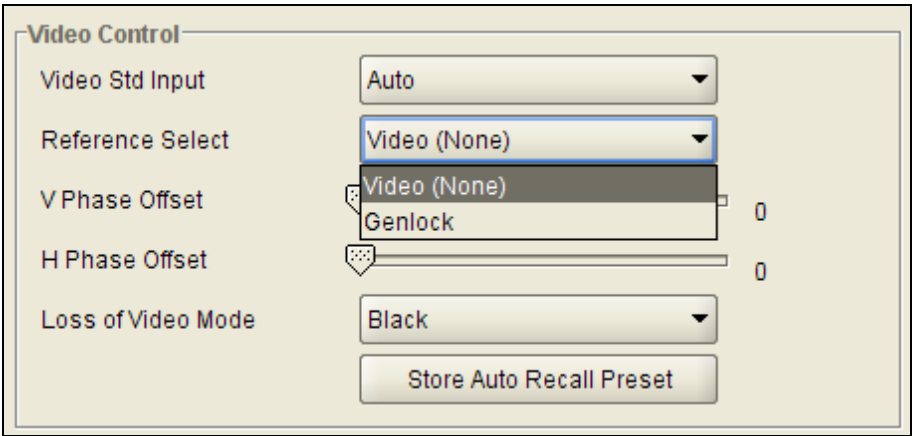
Figure 7-4: Reference Select Drop Down Menu

Video (none)	The module will lock to the incoming video signal.
Genlock	The module will lock to the selected card reference.

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

7.1.3. Setting the Vertical Phase of the Output Video

With the **V Phase Offset** control, you can set the vertical timing of the output video with respect to the selected reference. Setting this control to 0 keeps the output video frame aligned with the reference.

Increasing the value will delay the output video in one-line increments of the output video standard. In order to advance the vertical timing of the output video with respect to the reference, set the control to the maximum total number of lines of the output video format minus the number of lines that you wish to advance the output video. 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 processing delay. The VLPRO interface for changing the **V Phase Offset** control appears as shown in Figure 7-5.
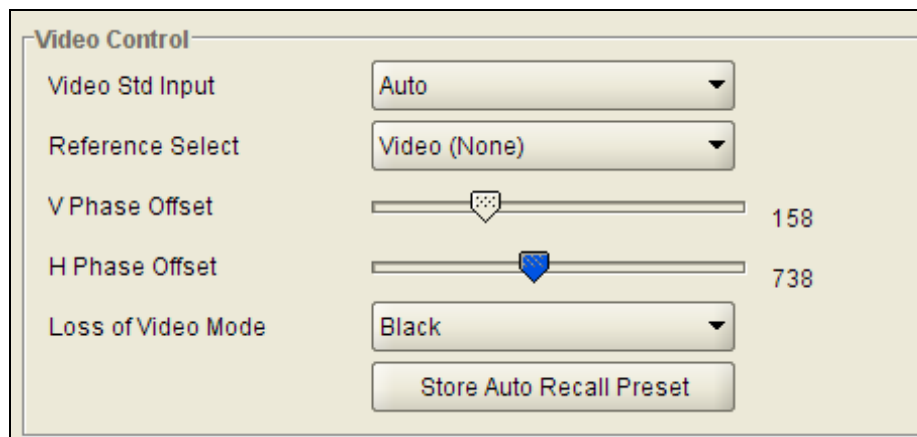
Figure 7-5: V Phase Offset Slider

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

7.1.4. Setting the Horizontal Phase of the Output Video

With the **H Phase Offset** control, you can set the horizontal timing of the output video with respect to the selected reference. Setting this control to 0 keeps the output video line aligned with the reference.

Increasing the value will delay the output video in one-sample increments. In order to advance the horizontal timing of the output video with respect to the genlock video, set the control to the maximum number of samples per line for the output video standard minus the number of samples that you wish to advance the output video. The VLPRO interface for changing the **H Phase Offset** control appears as shown Figure 7-6.
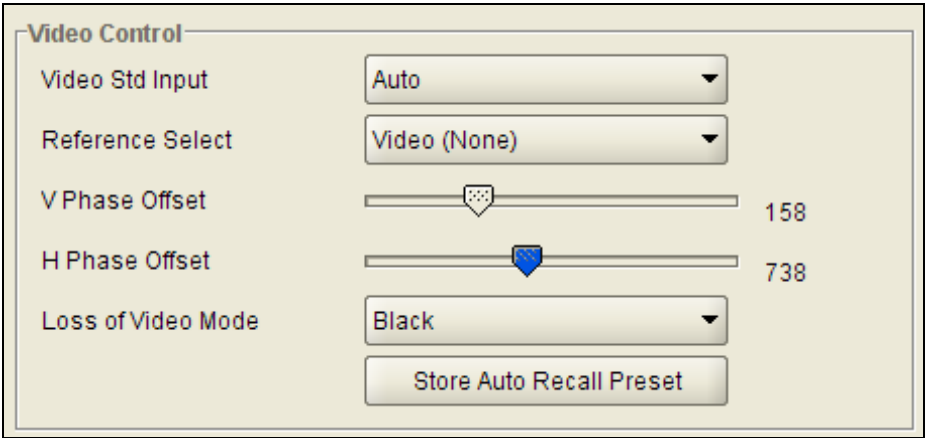
Figure 7-6: H Phase Offset Slider

7.1.5. Loss of Video Mode

This control defines the action that will be taken when the input video is lost. You can choose to freeze the output video on the last good frame of input video, force the output video to black or force the output video to blue. The VLPRO interface for changing the **Loss of Video Mode** control appears as shown in Figure 7-7.
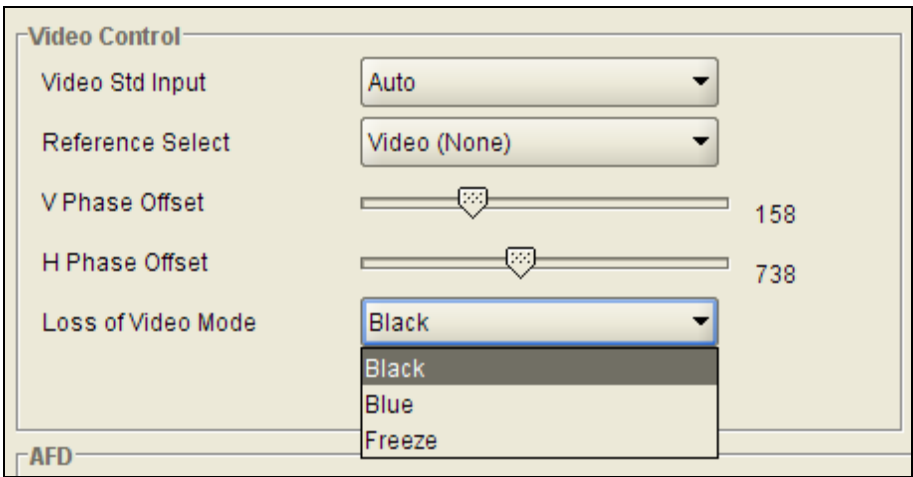
Figure 7-7: Loss of Video Mode Drop Down Menu

Black	Upon loss of video, the module's output will be forced to black.
Blue	Upon loss of video, the module's output will be forced to blue.
Freeze	Upon loss of video, the module's output will be forced to be the last good frame of input video

7.1.6. Video Monitor

The *Video Monitor* section enables the user to view the status of video related parameters. The VLPRO interface for the **Video Monitor** appears as shown in Figure 7-8.
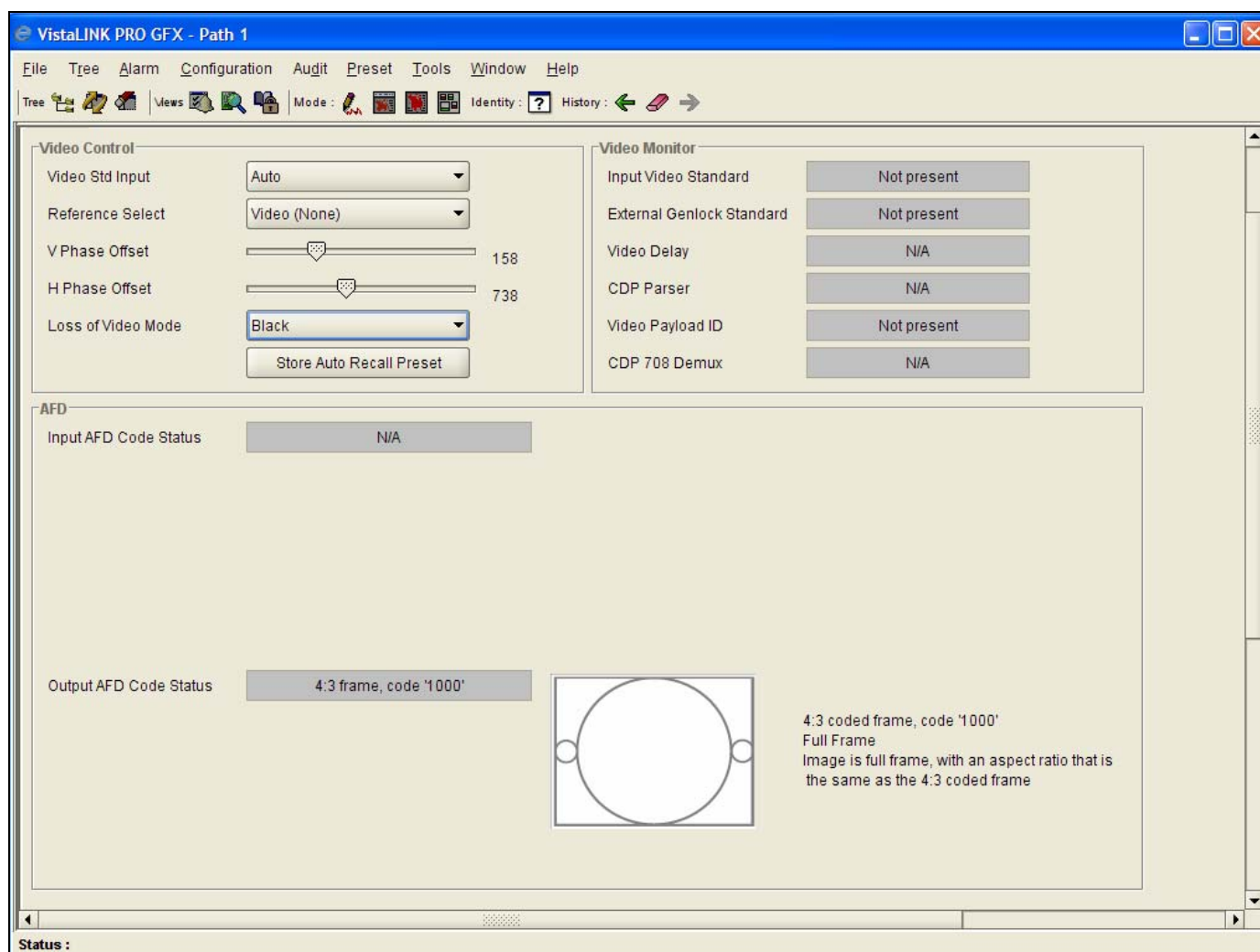
Figure 7-8: Video Monitor VLPRO Screen

Video Input Standard	The **Input Video Standard** monitor reports if a valid video signal has been presented to the card and it indicates what standard has been detected when it is present.
External Genlock Standard	The **External Genlock Standard** monitor reports if a valid video reference has been supplied to the module. When present, this monitor indicates the reference standard that is detected.
Video Delay	The **Video Delay** monitor reports video delay through the card in *ms*.
CDP Parser	The **CDP Parser** monitor displays the status of Closed Caption reading process and indicates if any syntax errors are encountered within inbound CDP packets.

Video Payload ID	The **Video Payload ID** monitor looks for valid video payload ID packets within the inbound video signal. If present, the video payload ID packets will be decoded and the standard that the ANC data packets indicate will be presented within the Video Payload ID monitor section.
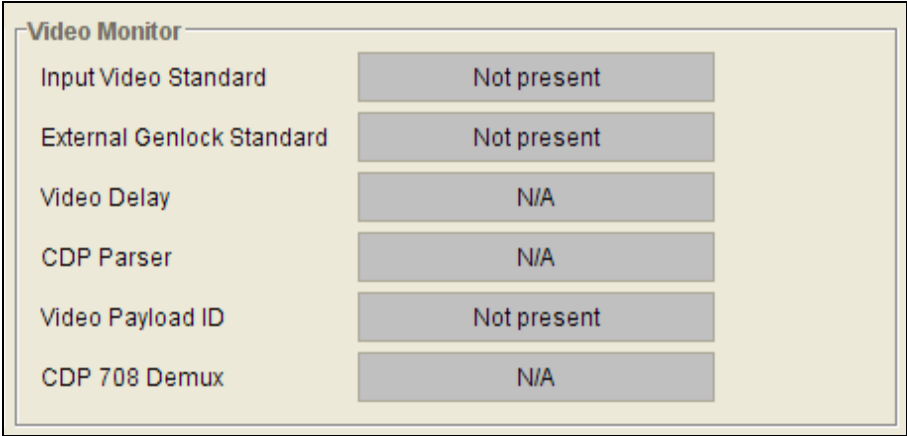
Figure 7-9: Video Monitor Features

7.1.7. Output 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 AFD code means will be presented beside the numerical AFD value. If no AFD information is present on the outgoing video signal, N/A will be displayed. The VLPRO interface for the Output AFD Code Status is shown in Figure 7-10.
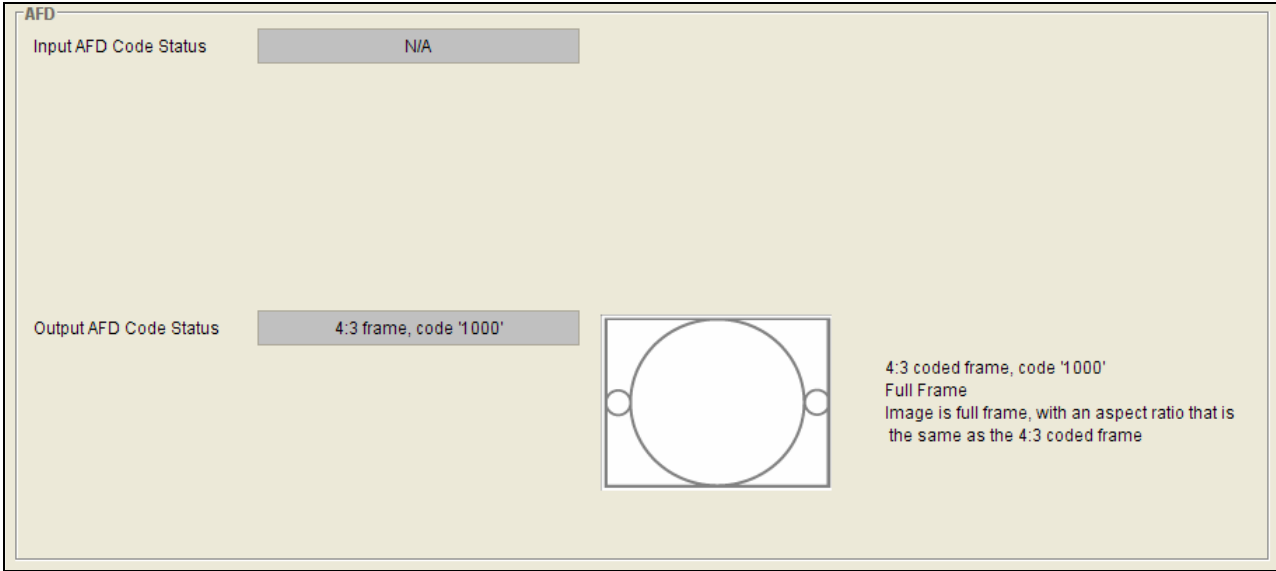
Figure 7-10: AFD Controls

7.2. CONFIGURING THE AUDIO SETTINGS

The figure below depicts the 7812DCDA2Q series internal audio architecture. Internally, 16 channels of audio are processed within the module. The 7812DCDA2Q audio path incorporates auto-sensing audio sample rate converters that will automatically go into BYPASS mode should non-PCM audio data be presented to the module. All advanced audio processing steps like 5.1 to stereo down-mixing and adjacent channel mono-mixing have simultaneous access to all 16 channels of input audio.

Finally, sixteen independent Output Channel Mixers generate sixteen channels of embedded audio output. These Output Channel Mixers perform any required audio inversions, audio gain adjustments and audio channel swapping. Using the X and Y inputs of each Output Channel Mixer, an additional level of mono-mixing is also available.

With the –AA and the –AES4 versions of the 7812DCDA2Q-HD, analog audio/AES audio outputs may also be generated. There are 4x mono analog audio outputs generated per path for the –AA version and 2x AES outputs per path for the –AES4 version. An additional layer of post Output Channel Mixer audio routing is available so that the 4x analog audio/AES outputs can have their own independent channel assignment relative to the embedded audio outputs.

Audio Architecture for 7812DCDA2A-HD (-AA and -AES4)
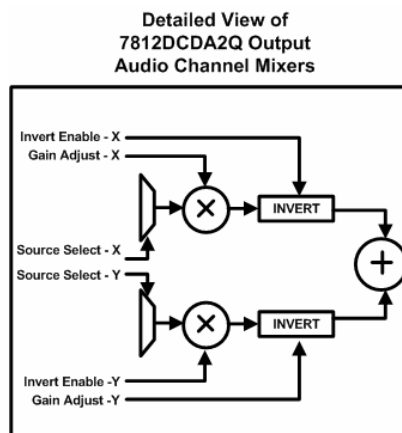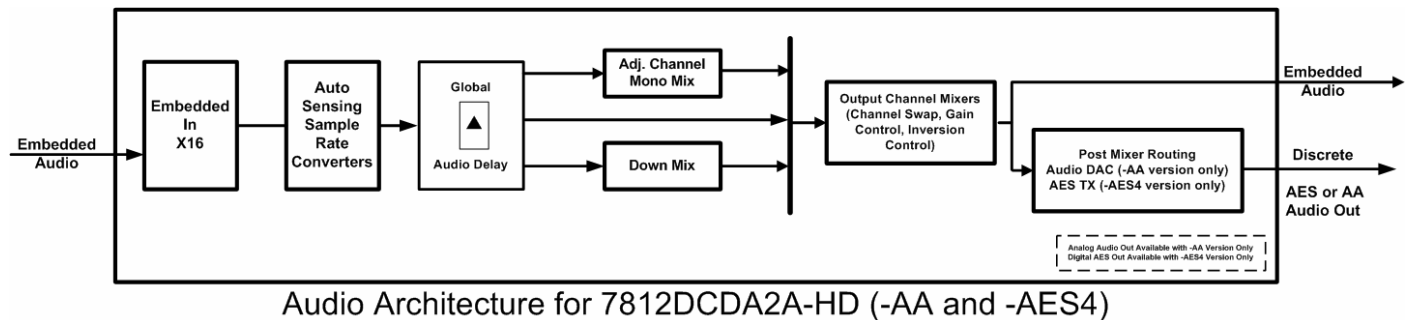
Figure 7-11: Detailed View of 7812DCDA2Q Output Audio Channel Mixers

The *Audio* control tab is used to configure the on-board audio sample rate converters and the internal audio delay block. The *Audio* menu is also used to enable and disable the four internal audio embedders and to specify C bit processing modes. SRC status, Audio Delay and Video Delay parameters are also monitored and reported in the *Audio* menu.
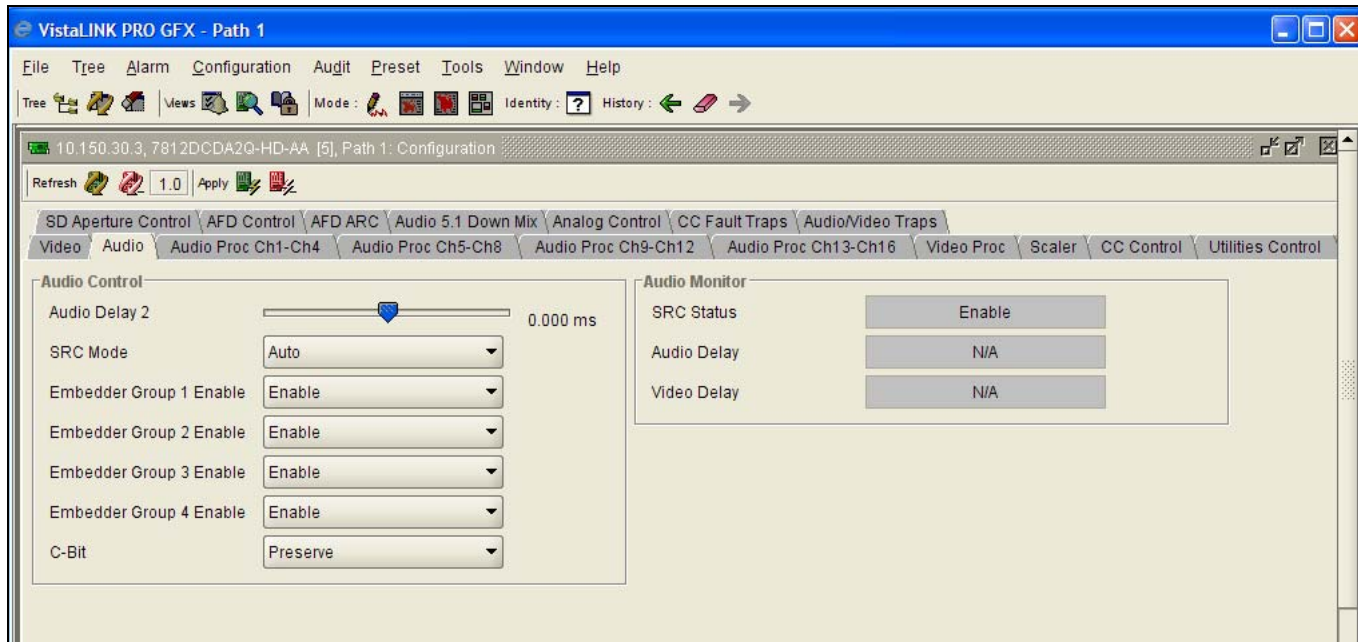
Figure 7-12: Audio Tab

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

7.2.1. Selecting The Audio Delay

This control adjusts the audio delay +/- 350 ms. This delay is relative to the delay that the module automatically inserts to match audio path and video path delays. The VLPRO interface for the **Audio Delay** control is shown in Figure 7-13.

> ✎ **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.**
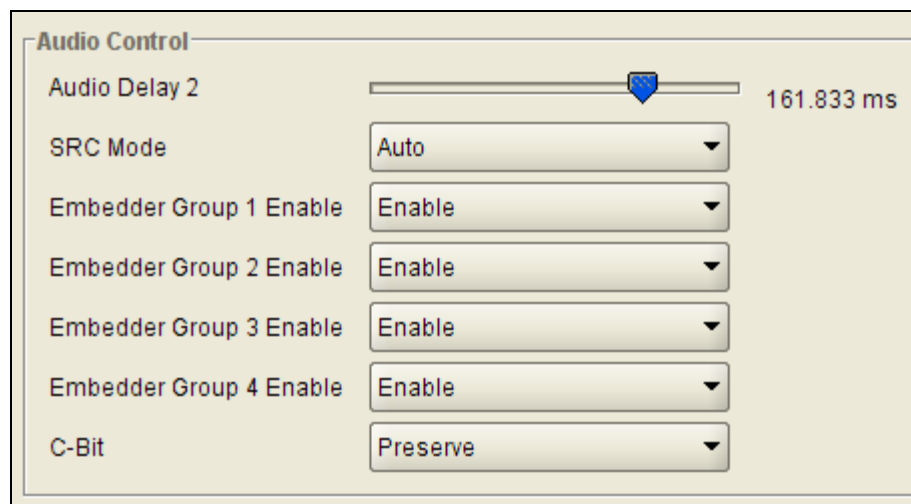
Figure 7-13: Audio Delay Control

7.2.2. Configuring the SRC Mode

The **SRC Mode** control allows the user to adjust the mode for the sample rate converters. The VLPRO interface for the **SRC Mode** control is shown in Figure 7-14.
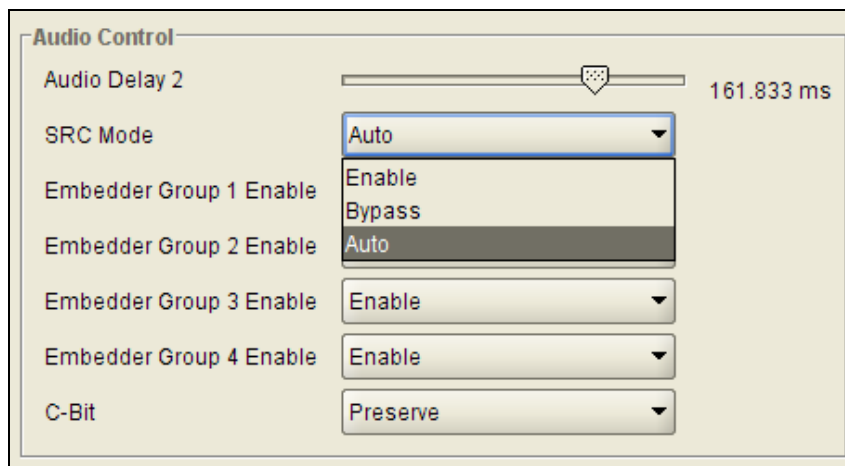
Figure 7-14: SRC Mode Control

Enable	Enables the sample rate converters for PCM audio.
Bypass	Bypasses the sample rate converters. This setting should be used for non-PCM audio.
Auto	The module will automatically detect PCM and non-PCM audio and automatically turn on/off the SRCs as required.

7.2.3. Selecting The Audio Groups That Will Be Embedded

The module has four audio embedders that each insert one group of audio into the outgoing serial digital video. For the sake of brevity, the control for Audio Embedder 1 is only discussed in this manual. Each embedder has an *enable* and *disable* function.   The VLPRO interface for the **Embedder Group 1 Enable** control is shown in Figure 7-15.
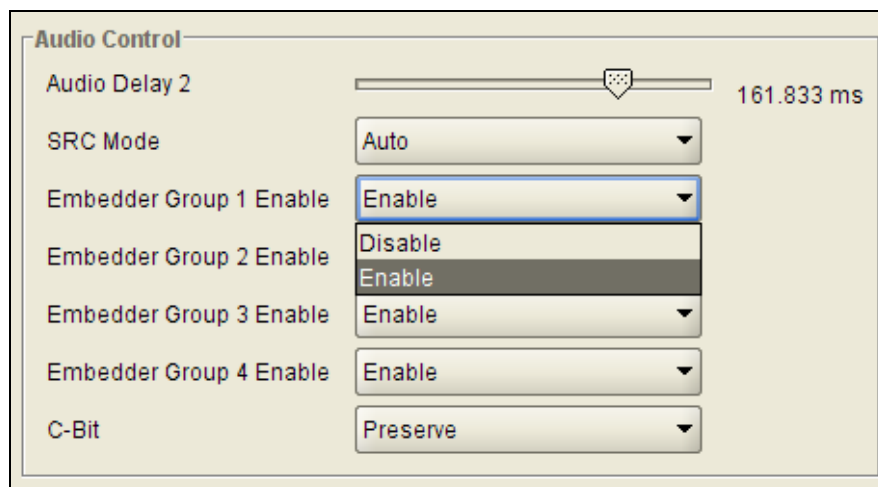
Figure 7-15: Embedder Group Control

| Disable | Audio embedding for group 1 will be disabled. |
| Enable | Audio embedding for group 1 will be enabled. |

7.2.4.   Configuring the C-Bit Control

This control enables the user to set the **C-Bit** Control. The VLPRO interface for the **C Bit** control is shown in Figure 7-16.
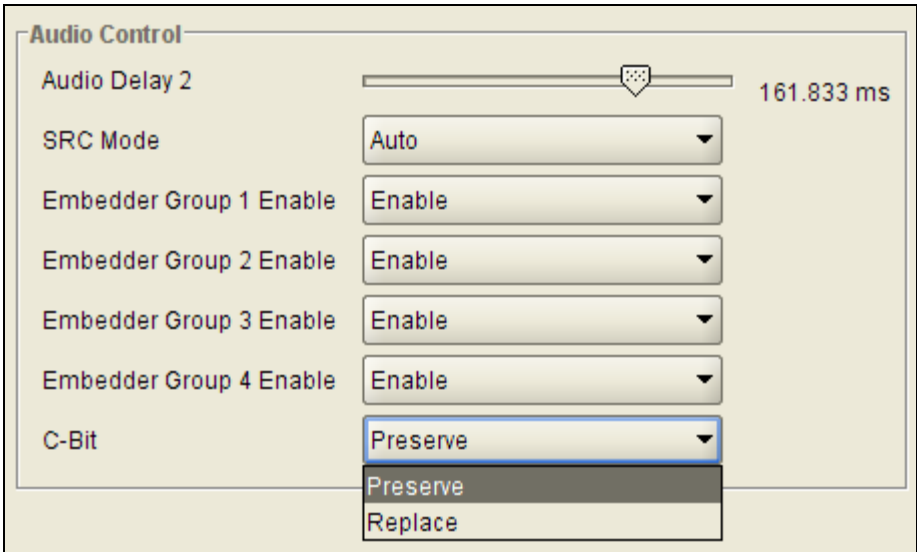
Figure 7-16: C-Bit Audio Control

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

7.2.5.   Audio Monitor Settings

The *Audio Monitor* section enables the user to monitor the status of several key video and audio parameters. The VLPRO interface for the **Audio Monitoring** section of the Audio control tab is shown in Figure 7-17.
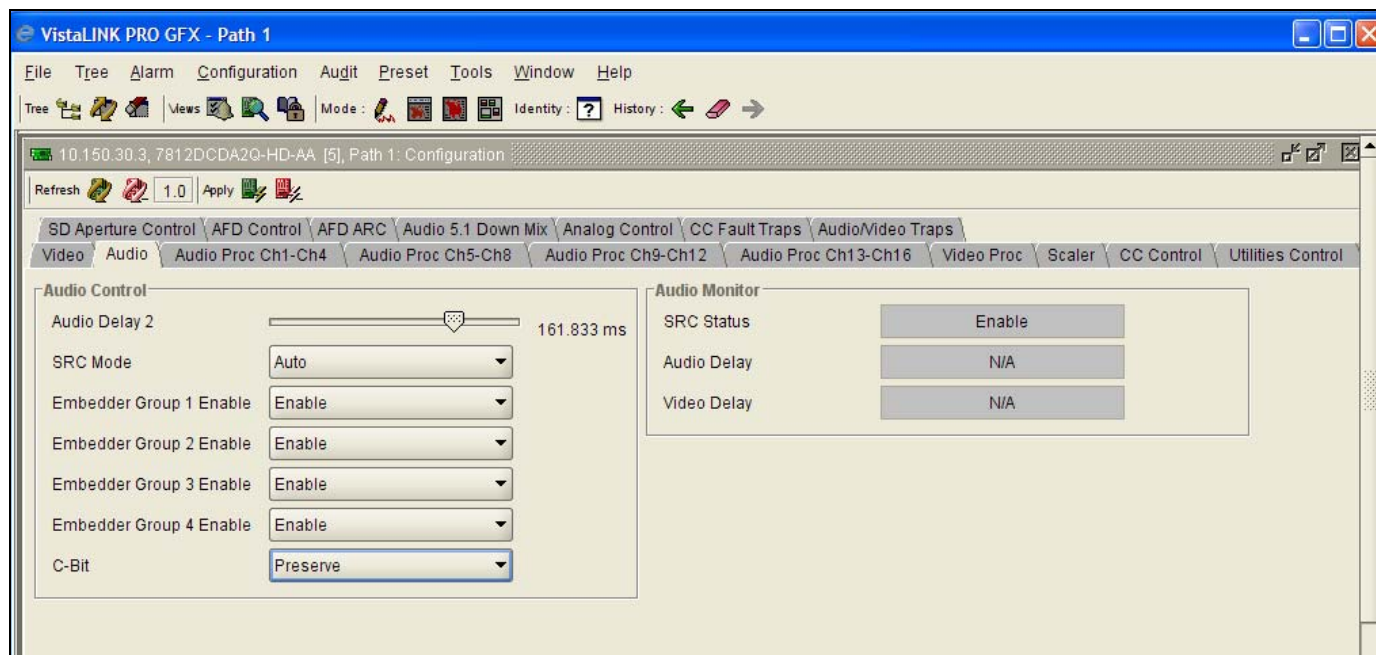
Figure 7-17: Audio Monitor VLPRO Screen

SRC Status	The *SRC Status* parameter displays the status of the Sample Rate Converters. The SRC status will display either *enable* or *bypass*.
Audio Delay	The *Audio Delay* parameter displays the delay of the audio in *ms*.
Video Delay	The *Video Delay* parameter displays the delay of the associated video in *ms*.

7.3. CONFIGURING THE AUDIO PROC CONTROL TABS

For the sake of brevity, only *Audio Proc Ch1-Ch4* control tab will be discussed in this manual. Control tabs for *Audio Proc Ch5-Ch8*, *Audio Proc Ch9-Ch12* and *Audio Proc Ch13-16* are identical in their operation. Again, for the sake of brevity, only 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.
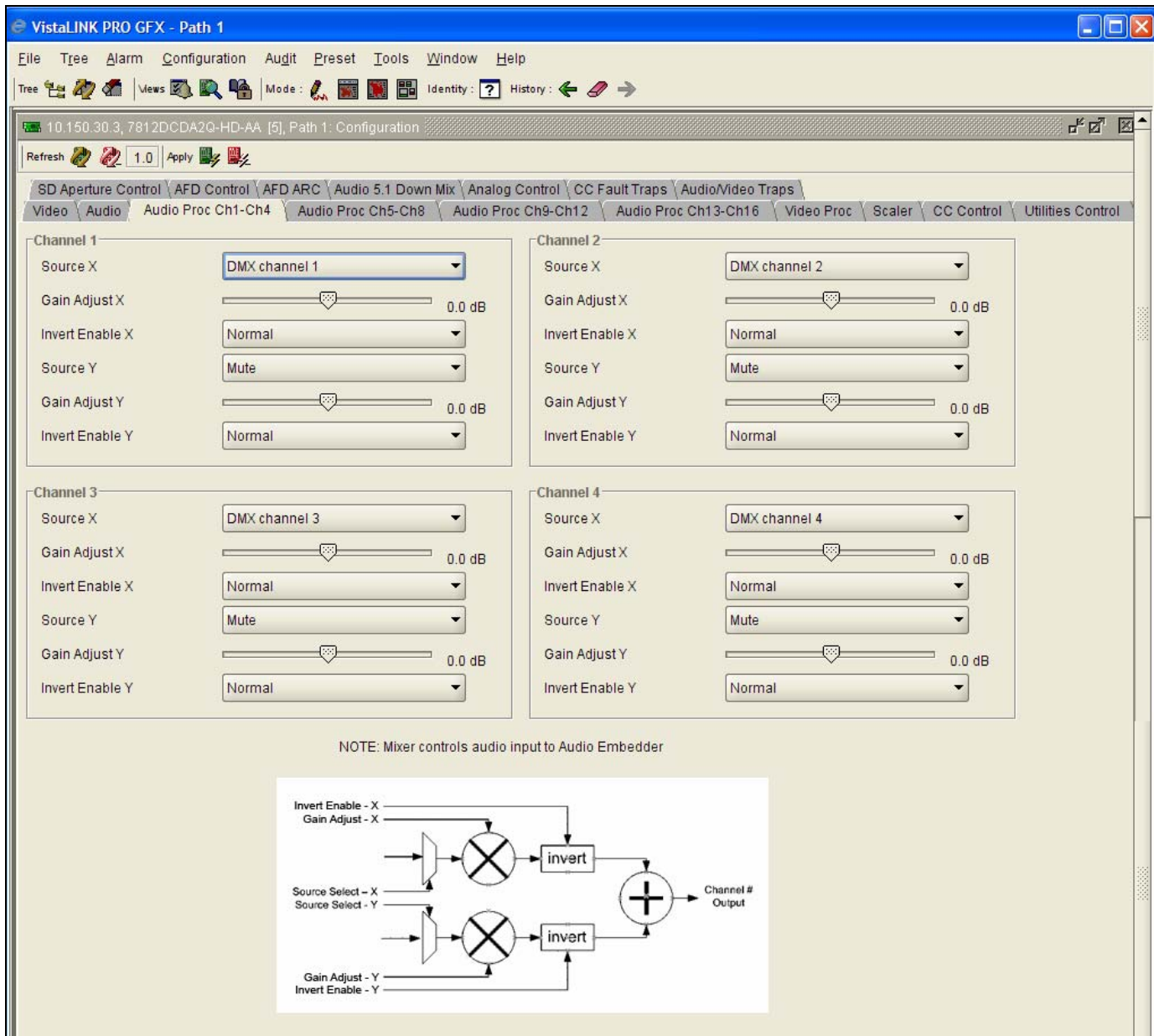
Figure 7-18: Audio Proc Ch1-Ch4

7.3.1.   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. The VLPRO interface for the **Source X control** is shown in Figure 7-19.
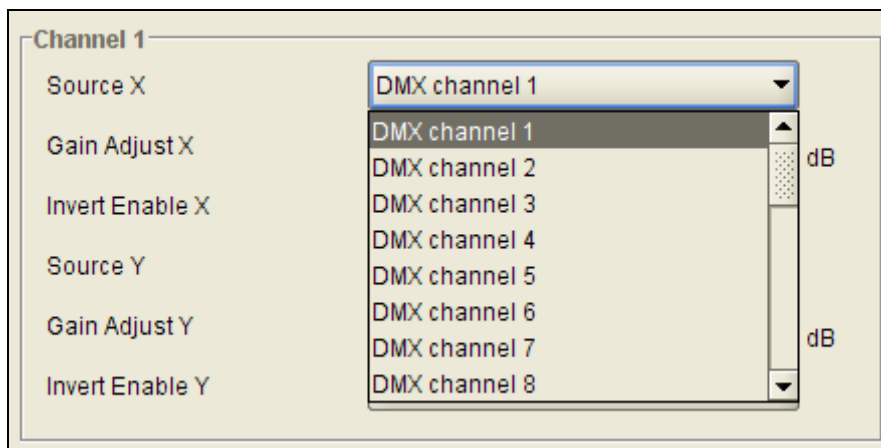
Figure 7-19: Source X Control Drop Down Menu

The full set of available channels is listed below.

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

7.3.2. 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 X** control is -24 dB to +24 dB. Gain is incremented or decremented 0.1 dB steps. The VLPRO interface for the **Gain Adjust X control** is shown in Figure 7-20.
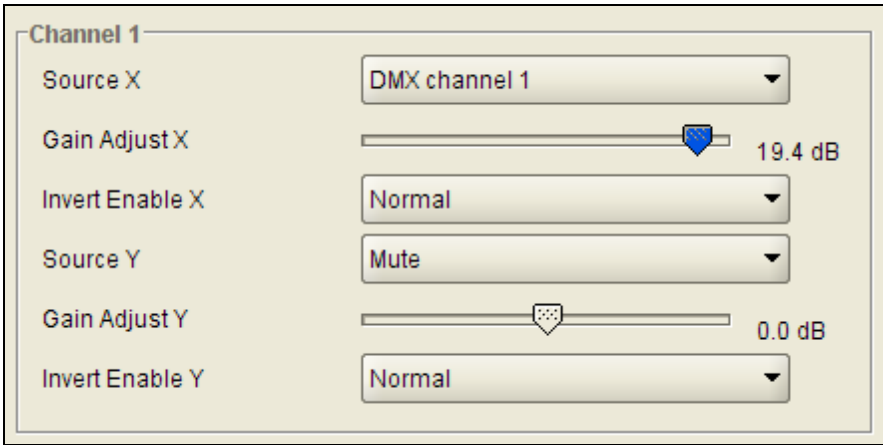
Figure 7-20: Gain Adjust X Slider

7.3.3. Invert Enable X

This control enables the user to invert the phase or pass the selected audio channels. The VLPRO interface for the **Invert X Enable** is shown in Figure 7-21.
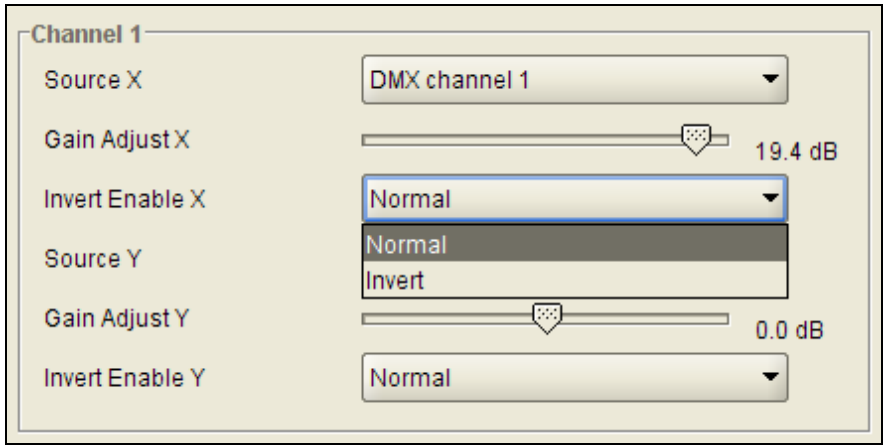
Figure 7-21: Invert Enable X Drop Down Menu

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

7.3.4. 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. The VLPRO interface for the **Source Y control** is shown in Figure 7-22.
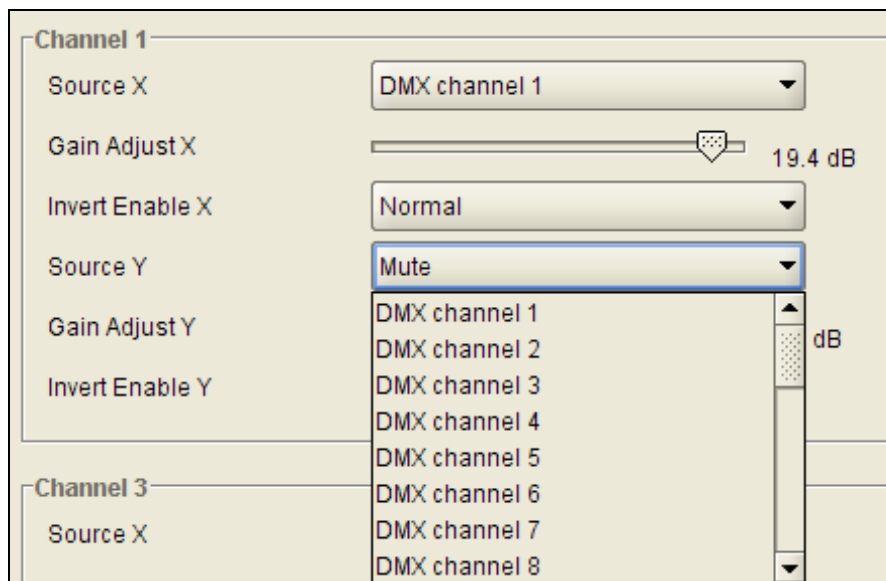
Figure 7-22: Source Y Drop Down Menu

The full set of available channels is listed below.

Source Y Input	DMX Channel 1
	DMX Channel 2
	DMX Channel 3
	DMX Channel 4
	DMX Channel 5
	DMX Channel 6
	DMX Channel 7
	DMX Channel 8
	DMX Channel 9
	DMX Channel 10
	DMX Channel 11
	DMX Channel 12
	DMX Channel 13
	DMX Channel 14
	DMX Channel 15
	DMX Channel 16
	Mono mix DMX channels 1 and 2
	Mono mix DMX channels 3 and 4
	Mono mix DMX channels 5 and 6
	Mono mix DMX channels 7 and 8
	Mono mix DMX channels 9 and 10
	Mono mix DMX channels 11 and 12
	Mono mix DMX channels 13 and 14

	Mono mix DMX channels 15 and 16
	Mute
	Down Mix L
	Down Mix R
	Down Mix Mono

7.3.5. 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 value or right to increase the value. The value range for the **Gain Adjust Y** control is -24 dB to +24 dB. Gain is adjusted in 0.1 dB increments. The VLPRO interface for the **Gain Adjust Y control** is shown in Figure 7-23.
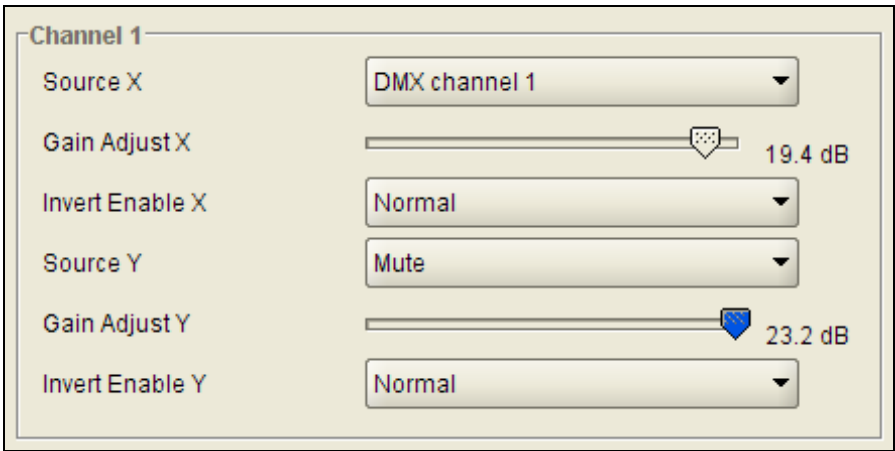
Figure 7-23: Gain Adjust Y Slider Control

7.3.6. Invert Enable Y

This control enables the user to invert the phase or pass the selected audio channels. The VLPRO interface for the **Invert Y Enable** is shown in Figure 7-24.
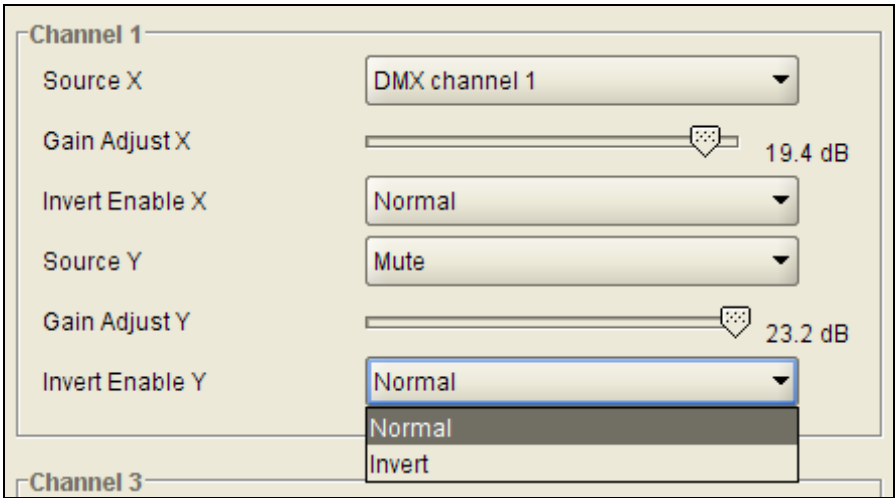
Figure 7-24: Invert Enable Y Drop Down Menu

Normal	This mode passes the audio channel through with no processing.
Invert	This mode inverts the phase of the audio channel.

7.4. CONFIGURING THE VIDEO PROCESSING FUNCTIONS

The *Video Proc* control menu is used to configure parameters associated with the video processing functions of the 7812DCDA2Q module. The video proc engine supports RGB gain/offset, Y Cr Cb gain/offset, Hue, Saturation, Brightness controls in addition to gamma correction and RGB based colour legalization.
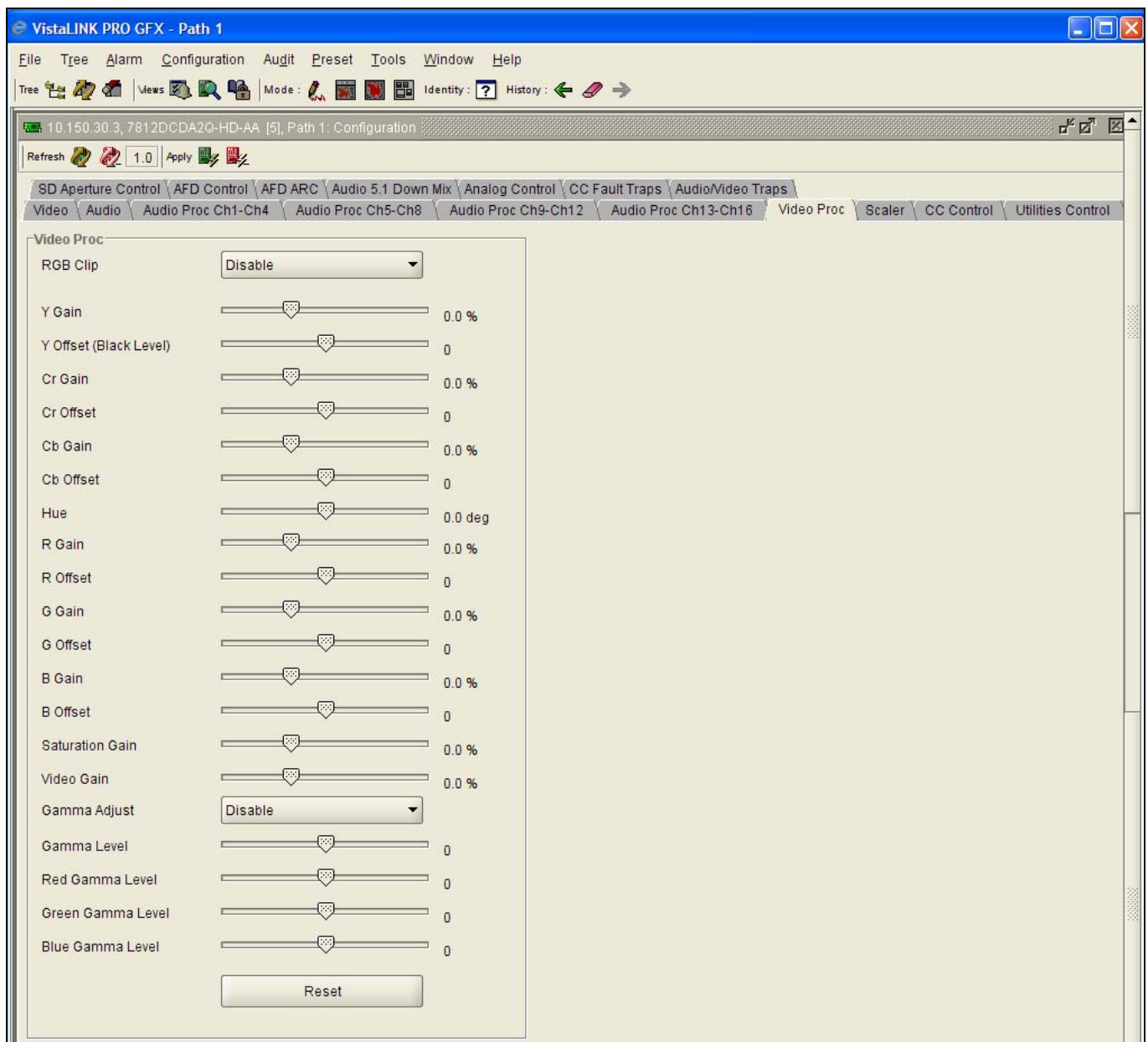
Figure 7-25: Video Proc Screen

7.4.1. Enabling the RGB Clipper

The **RGB Clip** controls the 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. The VLPRO interface for the **RGB Clip** control is shown in Figure 7-26.
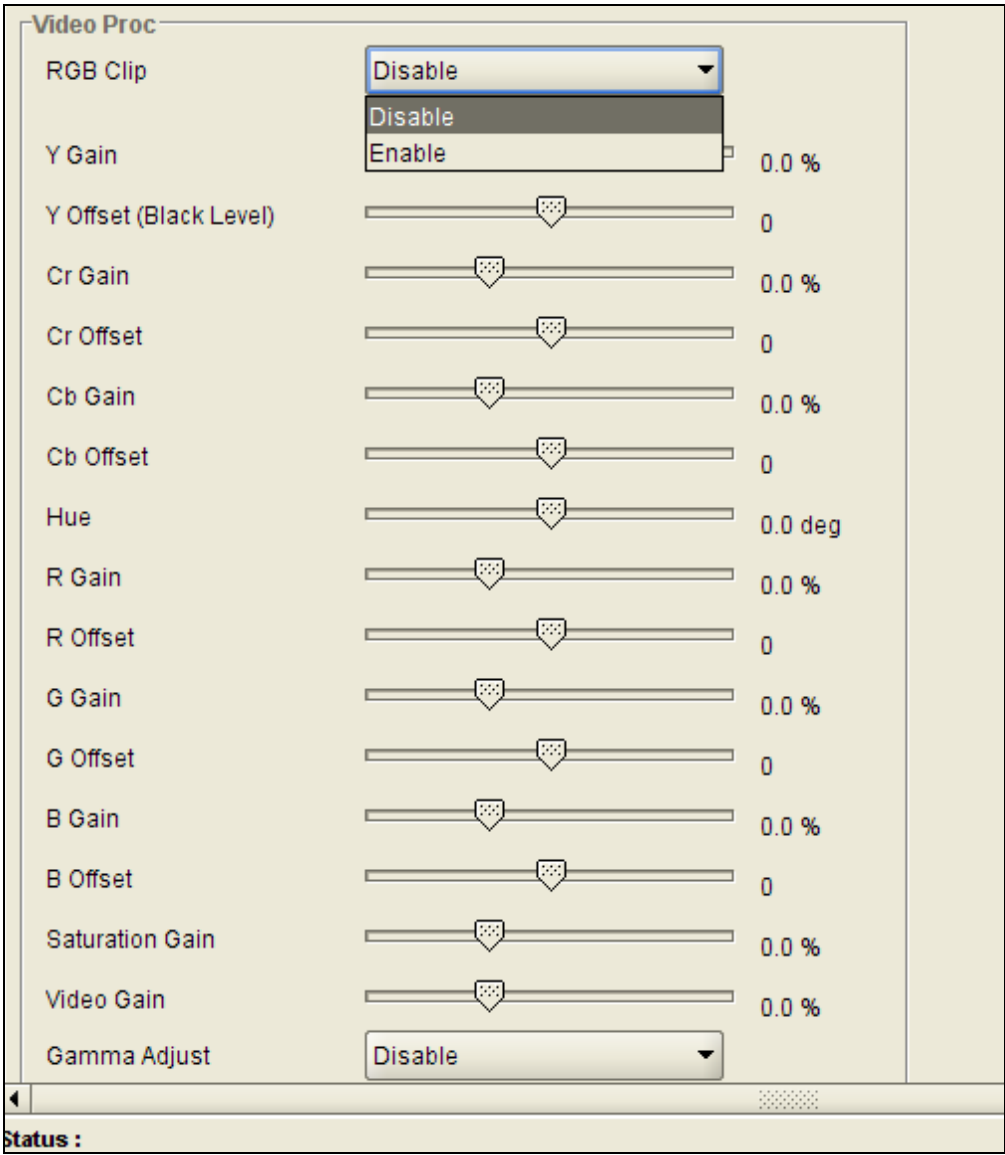
Figure 7-26: RGB Clip Control

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.

7.4.2. 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. Move the relevant slider bar to the left to decrease gain. Move the relevant slide bar to the right to increase gain. 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.
Saturation Gain	Ranges from –50% to 100% in 0.1% increments.
Video Gain	Ranges from –50% to 100% in 0.1% increments.

7.4.3. Setting the DC Offsets

There are six controls that independently set the DC Offset of R, G, B, Y, Cb, Cr. With these controls the user can adjust the DC offset of the various components with a range of +/- 200 quantization levels. Move the relevant slider bar to the left to decrease applied offset. Move the relevant slide bar to the right to increase offset.

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

7.4.4. Setting the Hue

With this control the user can adjust the Hue of the video signal.

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

7.4.5. Enabling the Gamma Adjust

The *Gamma Adjust* control enables and disables the gamma adjustment functionality of the 7812DCDA2Q series. When enabled, the module will allow the user to adjust the gamma level. If disabled, then the gamma level is set to 0. The VLPRO interface for the **Gamma Adjust** control is shown in Figure 7-27.
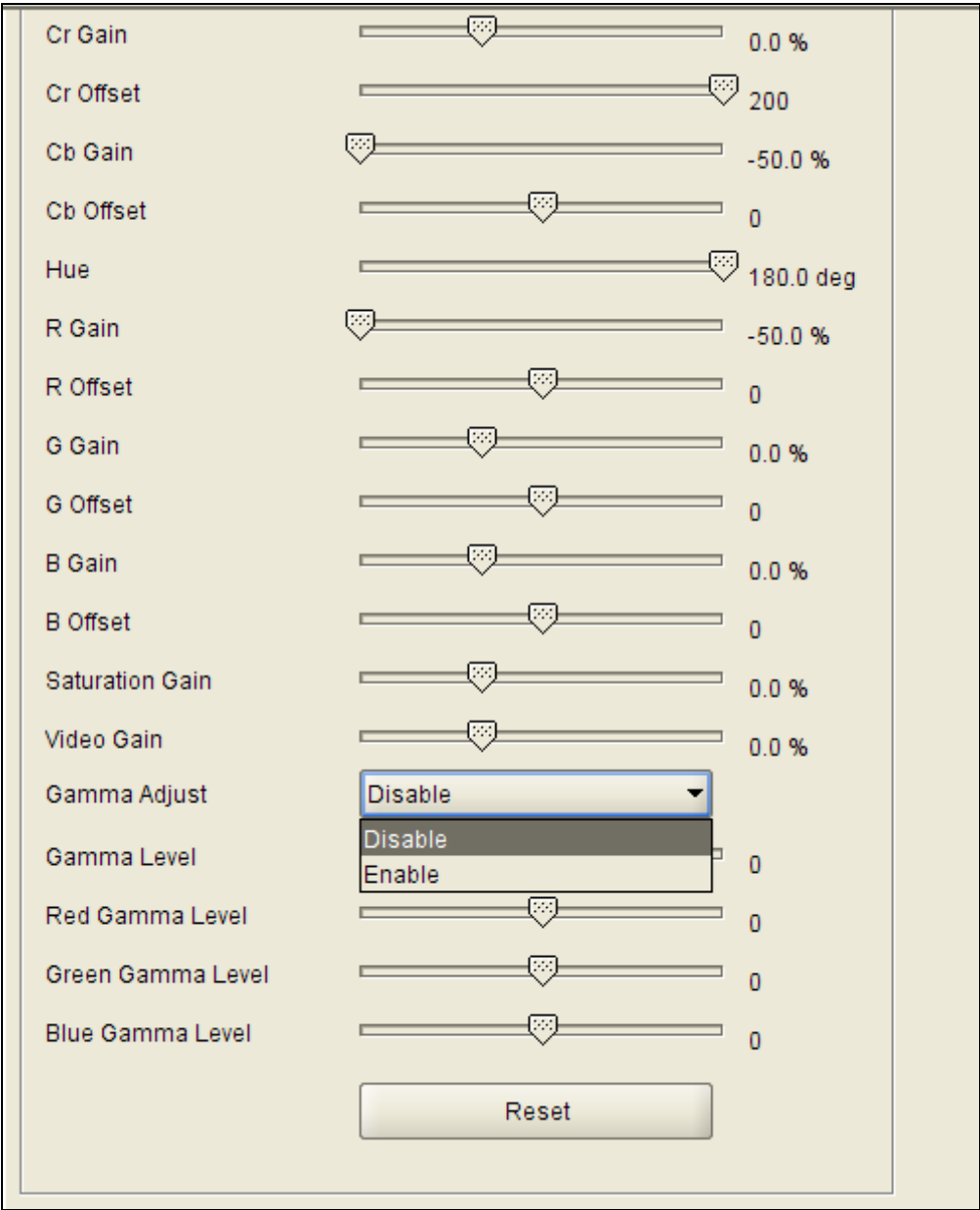
Figure 7-27: Gamma Adjust Drop Down Menu

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

7.4.6.   Setting the Gamma Level

With this control the user can adjust the overall Gamma correction factor from - 128 to + 127 in increments of 1. Move the relevant slider bar to the left or right to select the desired gamma correction factor.

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

7.4.7.   Setting the Red, Green, Blue Gamma Levels

With these controls, the user can adjust the gamma individually for Red, Green, and Blue Gamma components – 128 to + 127 in increments of 1. Move the relevant slider bar to the left or right to select the desired gamma correction factor.

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.

7.4.8.   Reset Button

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

7.5. CONFIGURING THE SCALER

The 7812DCDA2Q series products utilize a high performance multi-tap polyphase filter to perform scaling and aspect ratio conversion on the input video signal. The *Scaler* control tab is used to define the cut-off frequencies of these polyphase filters and the aspect ratio conversion that the module will perform. Static side panel colors and output AFD stamping values are also adjusted within this tab.
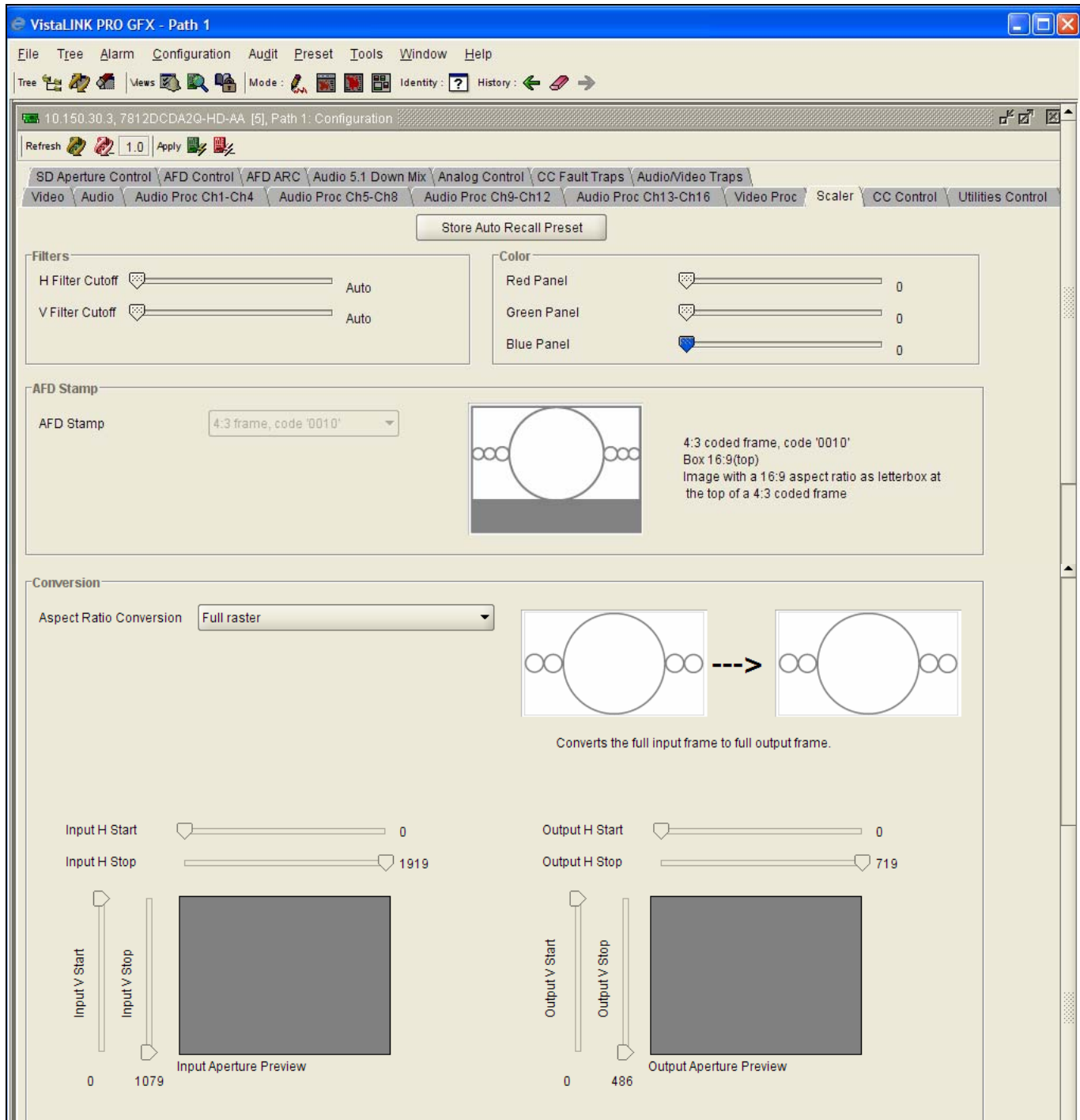
Figure 7-28: Scaler Screen

7.5.1. Setting The Color of Image Side Panels

There are three menu items used to set the module's side panel colors. Side panel colors are used to fill any space in the output image raster that is not occupied by active video. For example, "curtain" side panels are often generated on the left hand and right hand side of an image when converting 4:3 to 16:9. Individual R, G, B controls are used to define the side panel color. Move the slider to the left to select a lower value and move the slide to the right to select a higher value for any particular component.

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 color picker such as is available in Microsoft Paint to determine the desired color values.**

7.5.2. H and V Filter Settings

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 also has several unique filters that have specific enhancement profiles.

Auto	The optimal horizontal filter automatically selected to match the scaling and the aspect ratio conversion process being performed.
Levels 5….64	Selects the horizontal filter bandwidth such that each value 5 thru 64 corresponds to 1/64th the bandwidth of the input signal.
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.**

7.5.3. AFD STAMP

The AFD Stamp control allows the user to specify the AFD signal that will be stamped on the output video signal when the AFD Stamp Source control (within the AFD Control tab) is set to User AFD Stamp. When

the AFD Stamp Source control (within the AFD Control Tab) is set to 'Use Scaler', the AFD Stamp control within the Scaler control tab is disabled. There are 16 different possible AFD values to select from. The VLPRO interface for the AFD Stamp control is shown below. Note that a pictorial representation of what each individual code actually means will be presented to the right of the AFD Stamp control drop down menu.
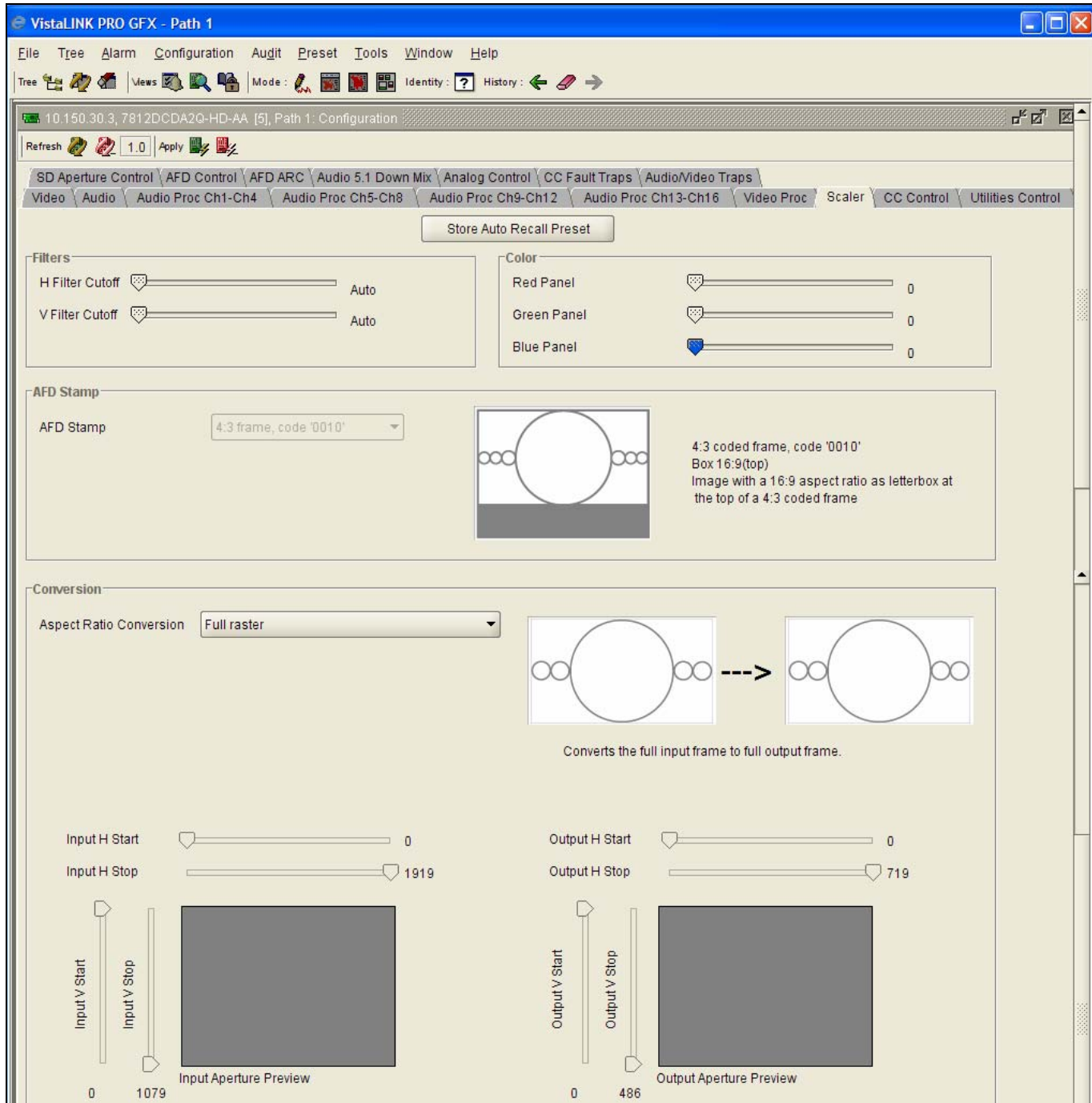
Figure 7-29: Scaler Screen

The full set of available options for the **AFD Stamp** control is listed below.

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.

7.5.4. Conversion Settings

The Aspect Ratio Conversion control selects the aspect ratio conversion that the module will perform.

It is important to understand that this control will have no effect when the AFD Input Enable control (within the AFD Control tab) is set to ENABLE. When the AFD Input Enable control is set to ENABLE, inbound AFD metadata in combination with the settings selected within the AFD ARC control tab governs all aspect ratio conversions.

The Aspect Ratio Conversion control is operational when the AFD Input Enable control (within the AFD control tab) is set to DISABLE or when inbound AFD metadata is missing and the LOSS OF AFD MODE control (within the AFD Control tab) is set to DEFAULT ARC.

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. The VLPRO interface for the Aspect Ratio Conversion control is shown in Figure 7-30.

> **Note that a pictorial representation of what each individual option actually means will be presented just to the right of the Aspect Ratio Conversion control drop down menu.**
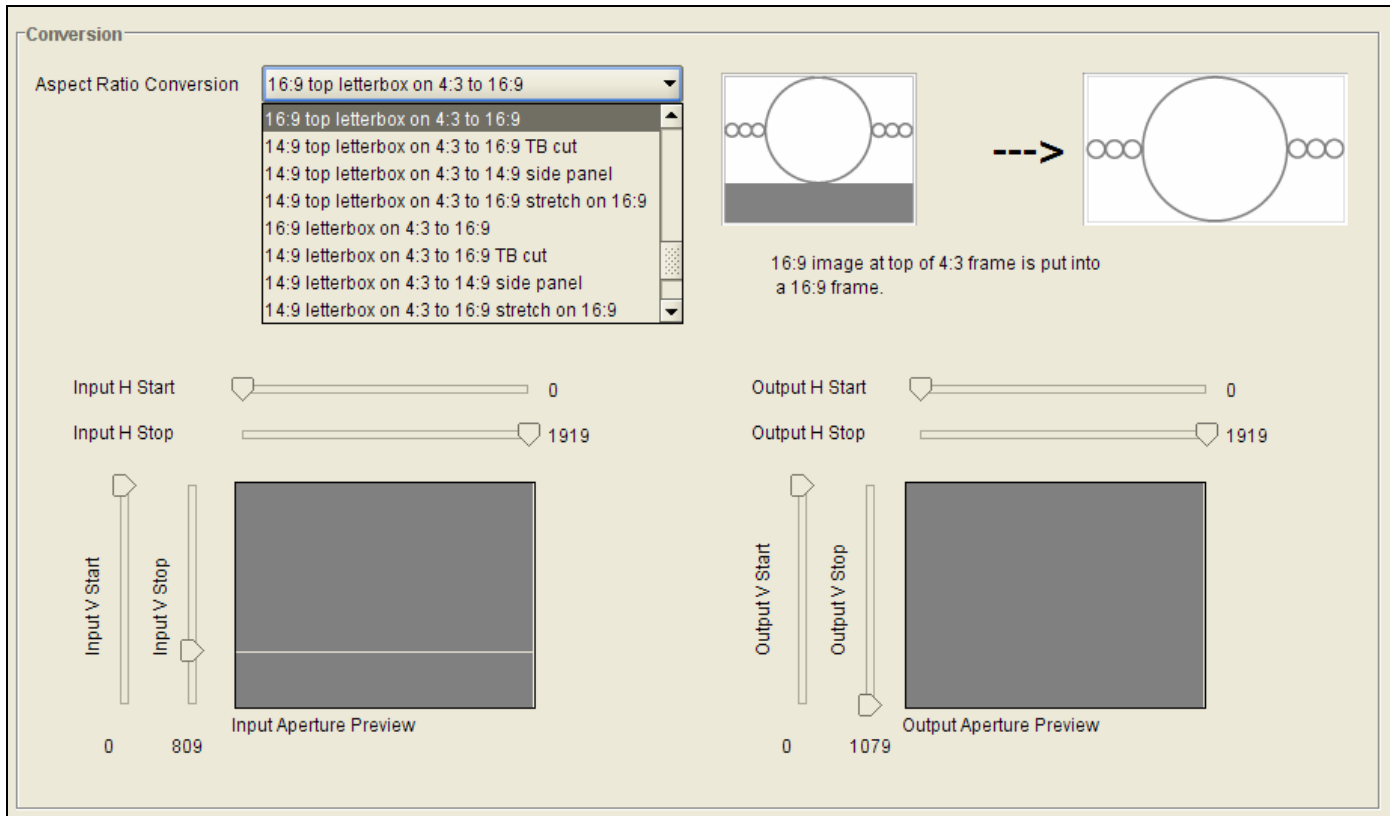
Figure 7-30: Aspect Ratio Conversion Drop Down Menu

The full list of available options for the Aspect Ratio Conversion menu is listed below.

Full Raster
User Aspect
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
13:9 Stretch to 4:3 Side Panel
14:9 Stretch to 4:3 Side Panel
16:9 Stretch to 4:3 Side Panel
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
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
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.**

7.5.5. User Aspect Ratio Setting

There are four controls that set the portion of the input picture that will be used for conversion. These controls are Input H Start, Input H Stop, Input V Start and Input V Stop. Effectively, these controls are used to define input image cropping.

There are four controls that set the output image size. These controls are Output H Start, Output H Stop, Output V Start and Output V Stop. Effectively, these controls are used to define the amount of scaling that the module will perform. They also define the position of the active video within the total output image raster.

Move the Input H Start/Input H Stop/Input V Start/Input V Stop and Output H Start/Output H Stop/Output V Start/Output V Stop sliders to the left to decrease their values and move the sliders to the right to increase their values.

As these parameters are adjusted, a real time pictorial representation of the conversion being manually defined will be displayed as shown in Figure 7-31.

Figure 7-31: Aspect Ratio

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

Output H Start/ Output H Stop:	The *Output H Start* and *Output H Stop* define how to scale the cropped input image horizontally and where to place it horizontally on the output raster. 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 (i.e. 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.

7.6.   CONFIGURING CLOSED CAPTIONING

The 7812DCDA2Q series extracts closed captioning from the input signal and translates it to the output video signal. The Closed Captioning control tab is used to configure parameters associated with the closed caption handling.
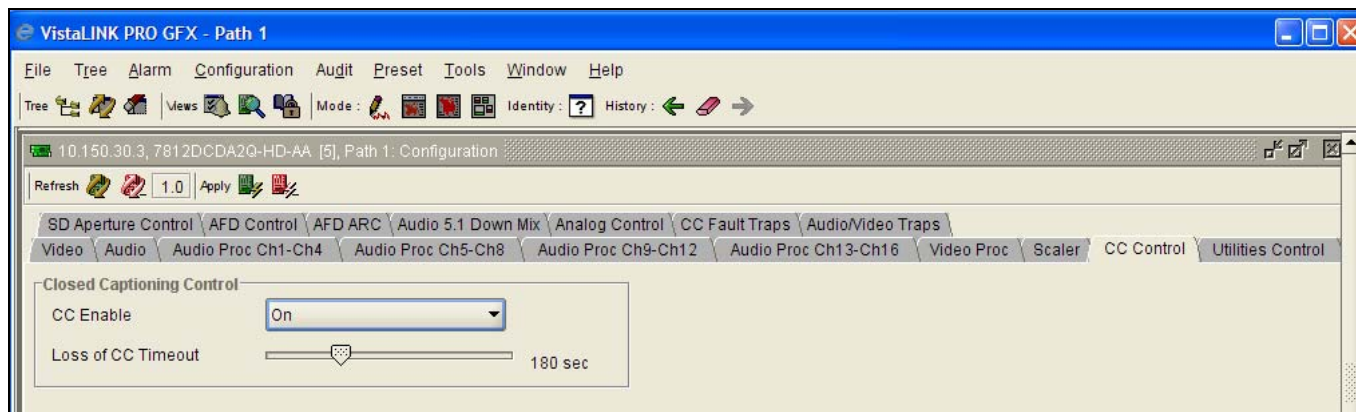
Figure 7-32: Closed Captioning Control Screen

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

7.6.1.   Enabling Closed Captioning

The **CC Enable** control enables or disables closed caption handling for the module.
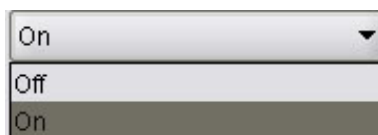
On	When set *On*, any closed captioning will be extracted from the input signal, and mapped to line 21 of the output SD video.
Off	When set *Off*, no closed captioning is encoded in the output video signal.

7.6.2.   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.

7.7.   UTILITIES

The *Utilities Control* tab is used to manage card presets. Within this control tab, you may recall a card preset, store a current card configuration to a specific preset and enable/disable the AUTO RECALL PRESETS functionality. The VLPRO interface for the Utilities control tab is shown in Figure 7-33.
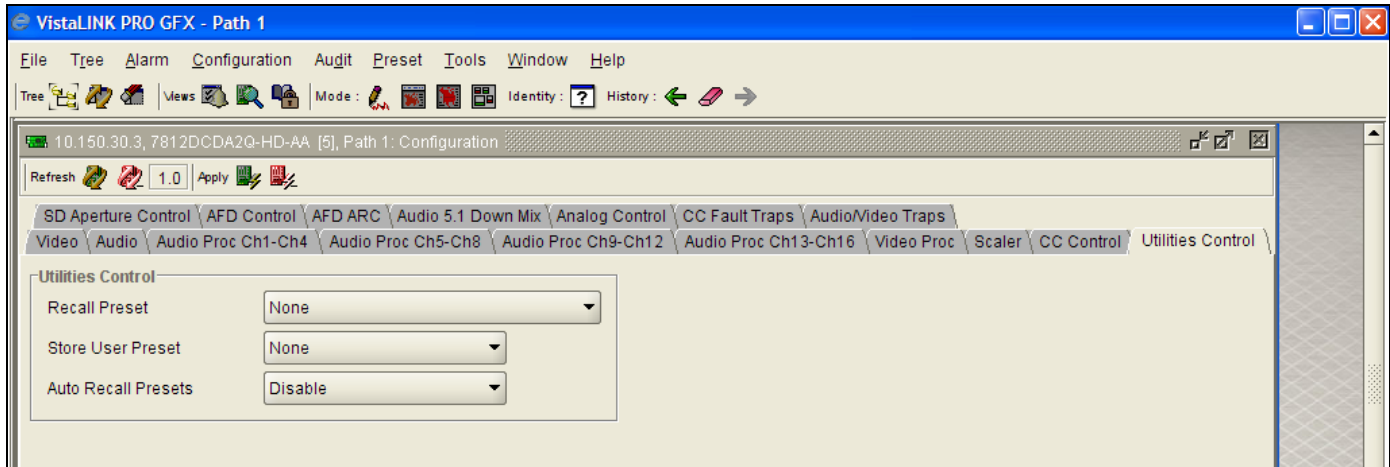
Figure 7-33: Utilities Control Screen

7.7.1.   Recalling Configurations from the User Presets

The **Recall Preset** control is used to initiate a recall of a card configuration from one of the user presets. There are 10 user presets to recall. The VLPRO interface for the Recall Preset control is shown in Figure 7-34.
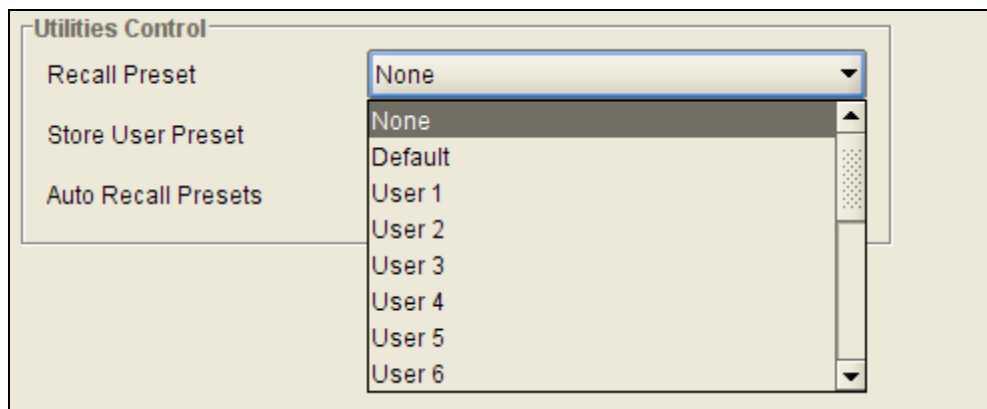
Figure 7-34: Recall Preset Drop Down Menu

The full set of available options for the **Recall Preset** control is as follows:

Default	Recall the module's factory default configuration
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

7.7.2.   Storing Configurations to User Presets

The **Store User Preset** control is used to initiate a store of the current card configuration into one of the specific user presets. To store a card configuration to a specific preset, select the preset to which you wish to store the card settings and press the **APPLY** button. There are 10 presets to which you can store. The VLPRO interface for the **Store User Preset** control is shown in Figure 7-35.
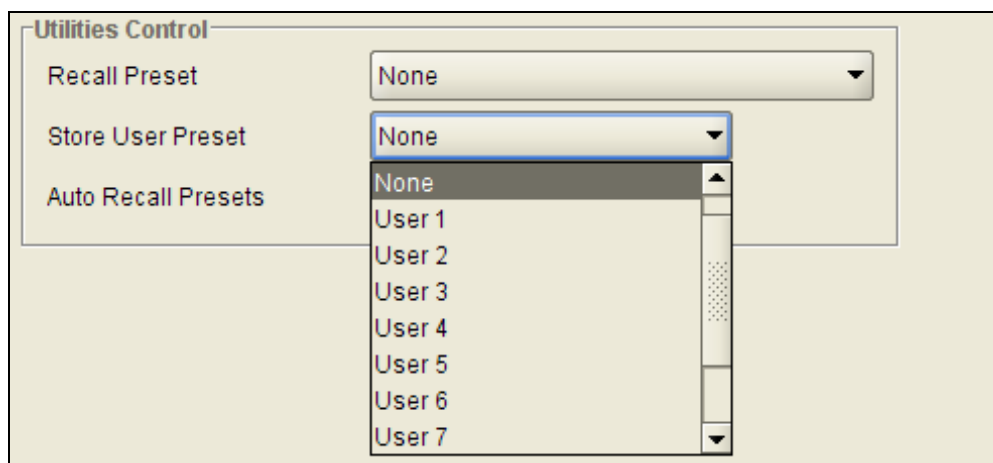
Figure 7-35: Store User Preset Drop Down Menu

The full set of options available for the **Store User Preset** control is shown below.

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

7.7.3. 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 automatically recall the relevant configuration for the relevant input/output format combinations.

Disable	Auto Recall Presets functionality is disabled.
Enable	When *Auto Recall Presets* functionality is enabled, the module will automatically recall the relevant configuration for the relevant input/output format combination.

7.8. 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 with slight differences 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.
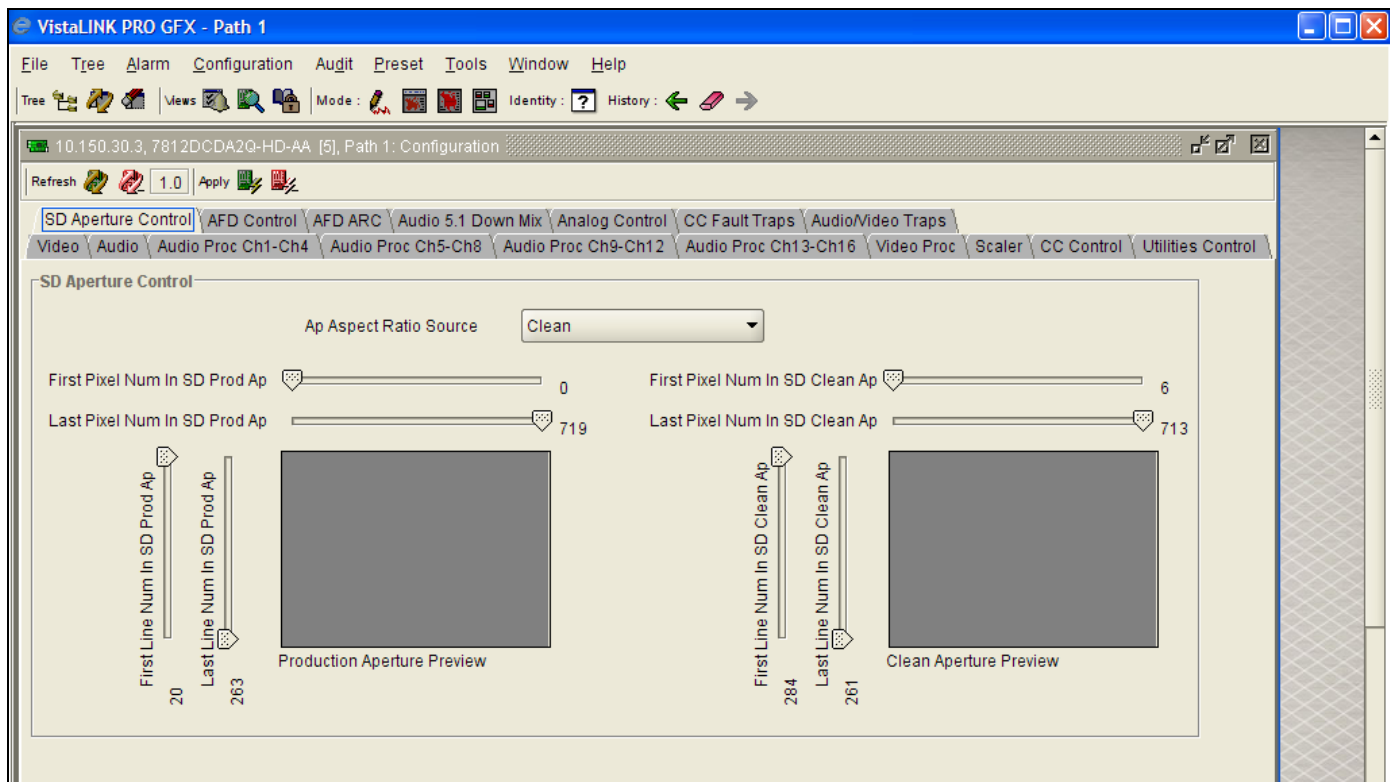
Figure 7-36: SD Aperture Control Screen

7.8.1. Selecting the SD Aperture control

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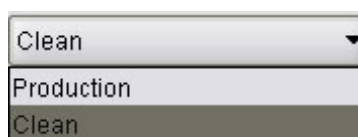
Production	Selects the *Production Aperture* to be used when converting input signals.
Clean	Selects the *Clean Aperture* to be used when converting input signals.

7.8.2. AP Aspect Ratio Settings

These controls allow the user to set the exact pixels and exact lines that are used to define the SD Clean Aperture and the SD Production Aperture.   Move the slide bars to the left to decrease a control value and move the slider bar to the right to increase a control value. A pictorial representation of the selected value will be presented in real time as various values are changed as shown in Figure 7-37.
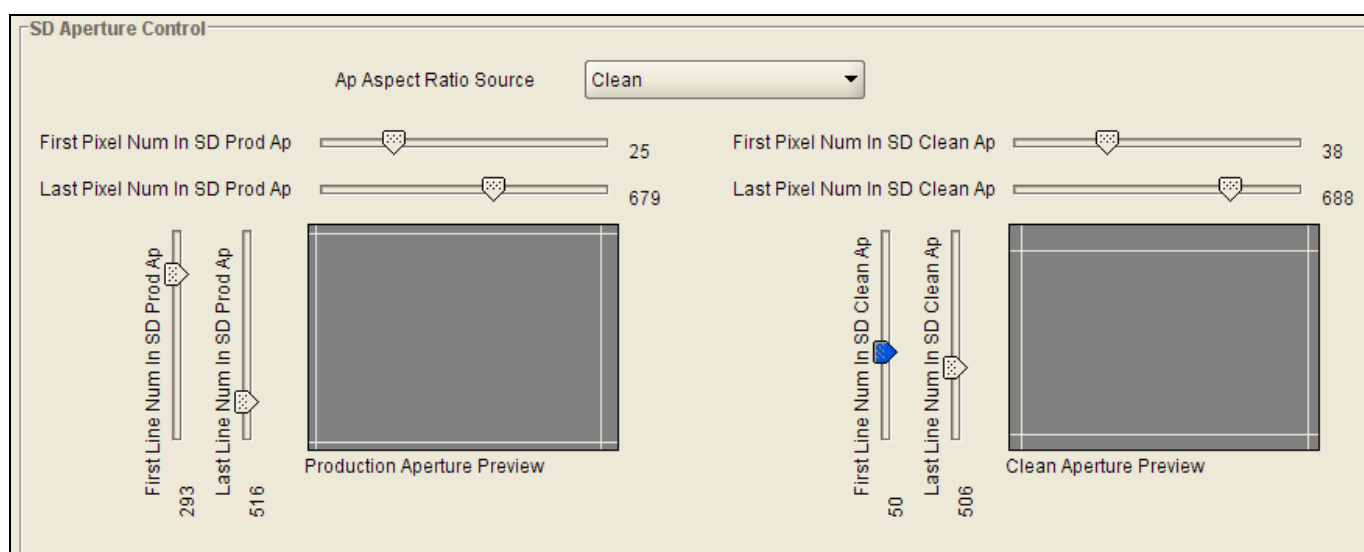
Figure 7-37: Defining a Line Number on the SD Aperture Control Screen

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.

7.9. CONFIGURING THE AFD CONTROL

The 7812DCD2Q-HD-AA 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.
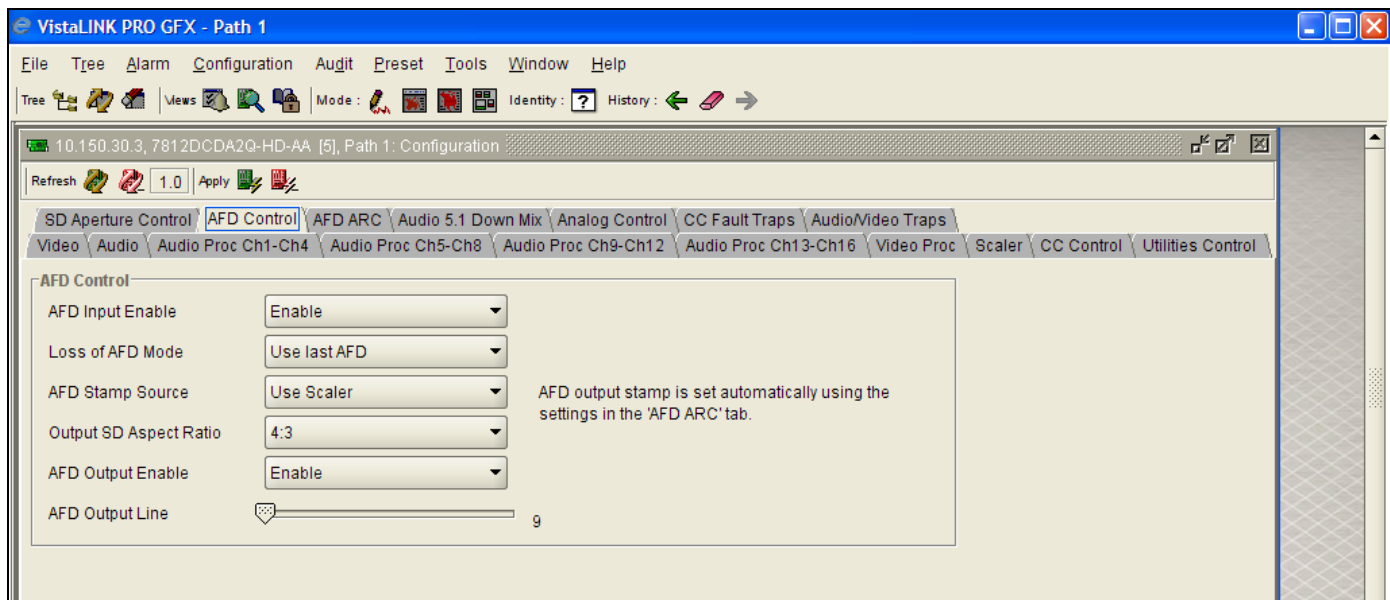
Figure 7-38: AFD Control

7.9.1. Configuring the AFD Input Enable Control

This control enables and disables the input side of AFD processing. When *Enabled*, the module will decode incoming AFD values and change its processing in response to those codes. The AFD ARC control tab is used to define the card's response for each individual incoming AFD code. 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. In this case, the ARC settings contained within the SCALER control tab are utilized.

Enable	Incoming AFD values will be decoded and the module will automatically change its processing in response to those AFD codes.
Disable	Incoming AFD values will not be decoded. When incoming AFD codes are not decoded, and automatic steering of ARC processing based on AFD presets is not possible. The ARC settings contained within the SCALER control tab are utilized.

7.9.2. 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.
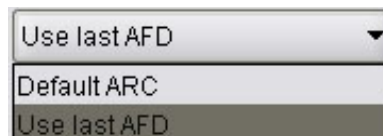
Default ARC	When incoming AFD values are absent, the ARC processing will revert to the default ARC processing as defined in the Scaler control tab.
Use Last AFD	When incoming AFD values are absent, the ARC processing will use the last valid AFD code it received to automatically steer the ARC processing.

7.9.3. 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 codes automatically generated by the scaler and its specific configuration or to stamp a user defined AFD value.
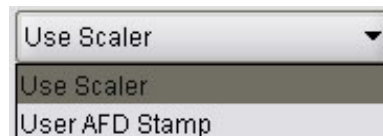
Use Scaler	AFD values stamped on the outbound video signal will be those AFD values automatically generated by the scaler and its configuration. The *AFD Stamp* control will be disabled in the Scaler control tab and the AFD ARC control tab since AFD values will automatically be generated by the scaler.
Use Last AFD	AFD values stamping on the outbound video signal will be the user specified AFD value.

7.9.4.   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.
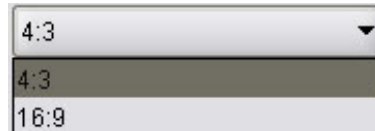
4:3	AFD codes for SD outputs will be defined with a 4:3 output image raster AFD code.
16:9	AFD codes for SD outputs will be defined with a 16:9 output image raster AFD code.

7.9.5.   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.

7.9.6.   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.

7.10.   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 7812DCDA2Q series cards for AFD, select an 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 possible incoming AFD value.
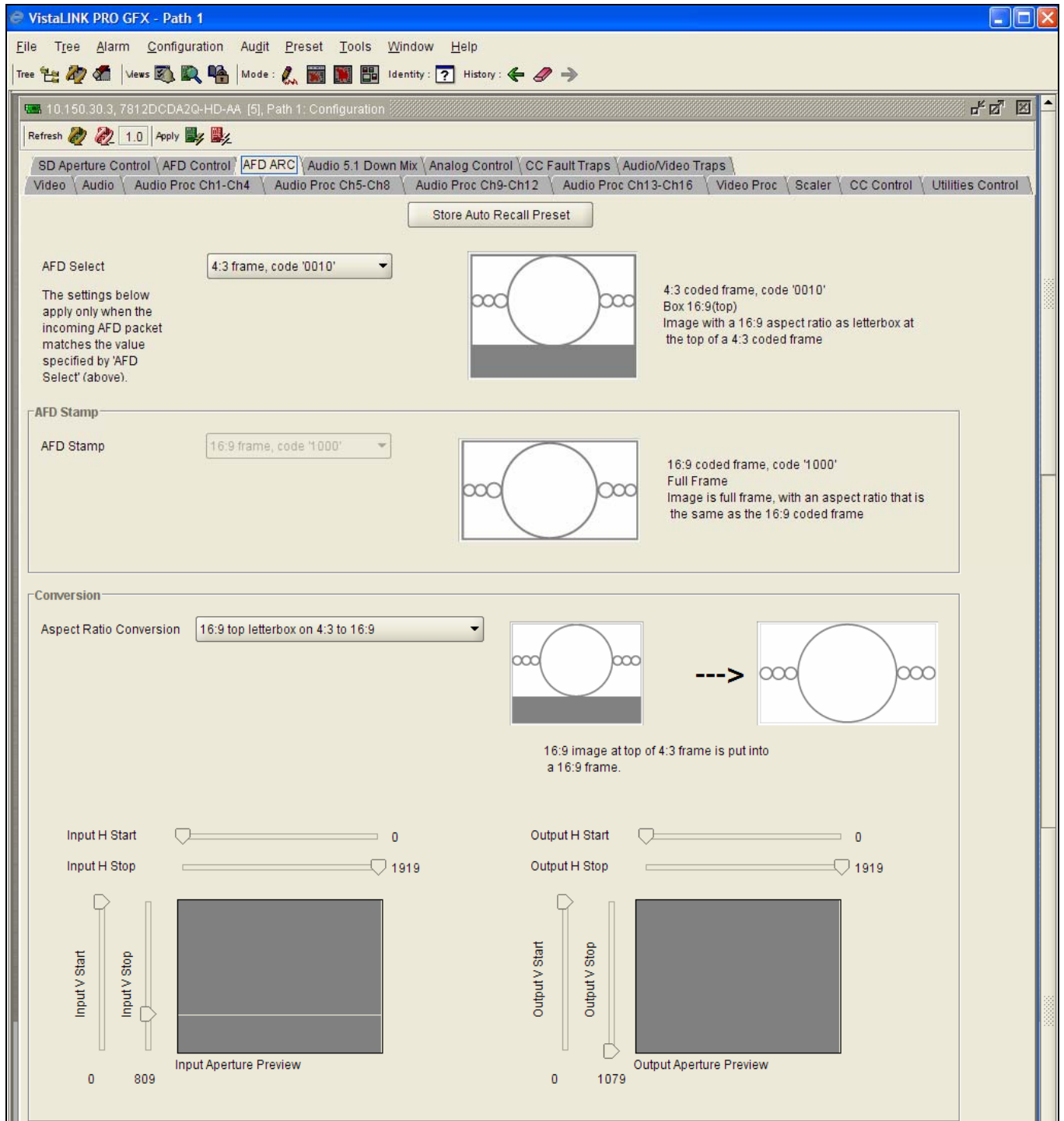
Figure 7-39: AFD ARC Screen

7.10.1. 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 menu as shown in Figure 7-40.
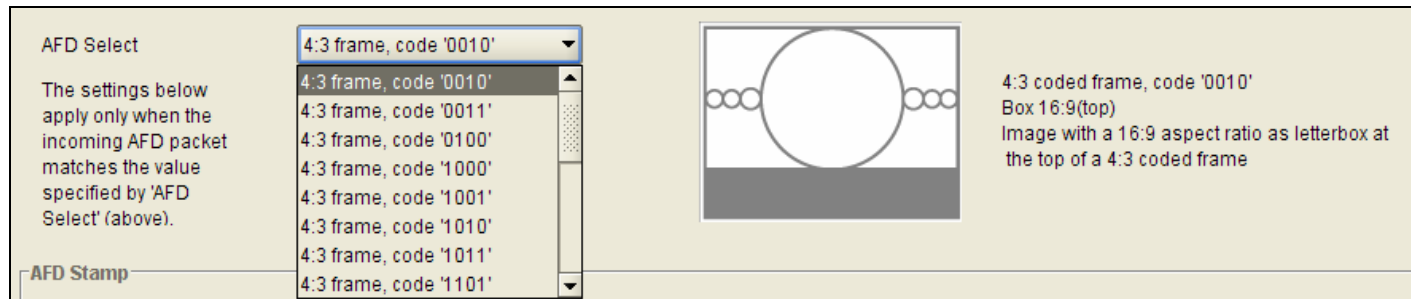
Figure 7-40: AFD Select Drop Down

The total list of available options for the AFD Select control is shown in the table below.

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'

7.10.2. 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 displayed in the right hand side of the screen as shown in Figure 7-41 below.
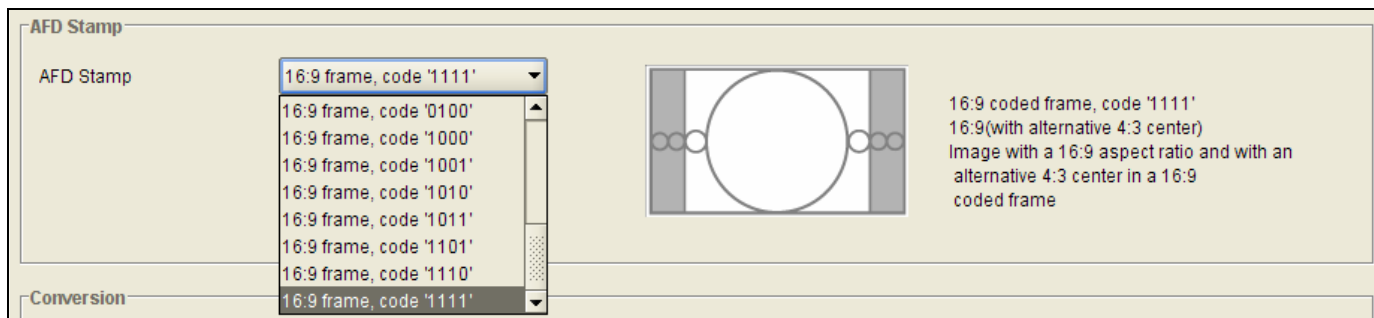
Figure 7-41: AFD Stamp Drop Down Menu

The complete set of options available for the **AFD Stamp** Control is listed in the table below.

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.

7.10.3. Conversion Settings

The Aspect Ratio Conversion control selects the aspect ratio conversion that the module will perform.

It is important to understand that this control will have no effect when the AFD Input Enable control is set to ENABLE. When the AFD Input Enable control is set to ENABLE, inbound AFD metadata in combination with the settings selected within the AFD ARC control tab governs all aspect ratio conversions.

The Aspect Ratio Conversion control is operational when the AFD Input Enable control (within the AFD control tab) is set to DISABLE or when inbound AFD metadata is missing and the LOSS OF AFD MODE control (within the AFD Control tab) is set to DEFAULT ARC.

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. The VLPRO interface for the Aspect Ratio Conversion control is shown in Figure 7-42. Note that a pictorial representation of what each individual option actually means will be presented just to the right of the Aspect Ratio Conversion control drop down menu.
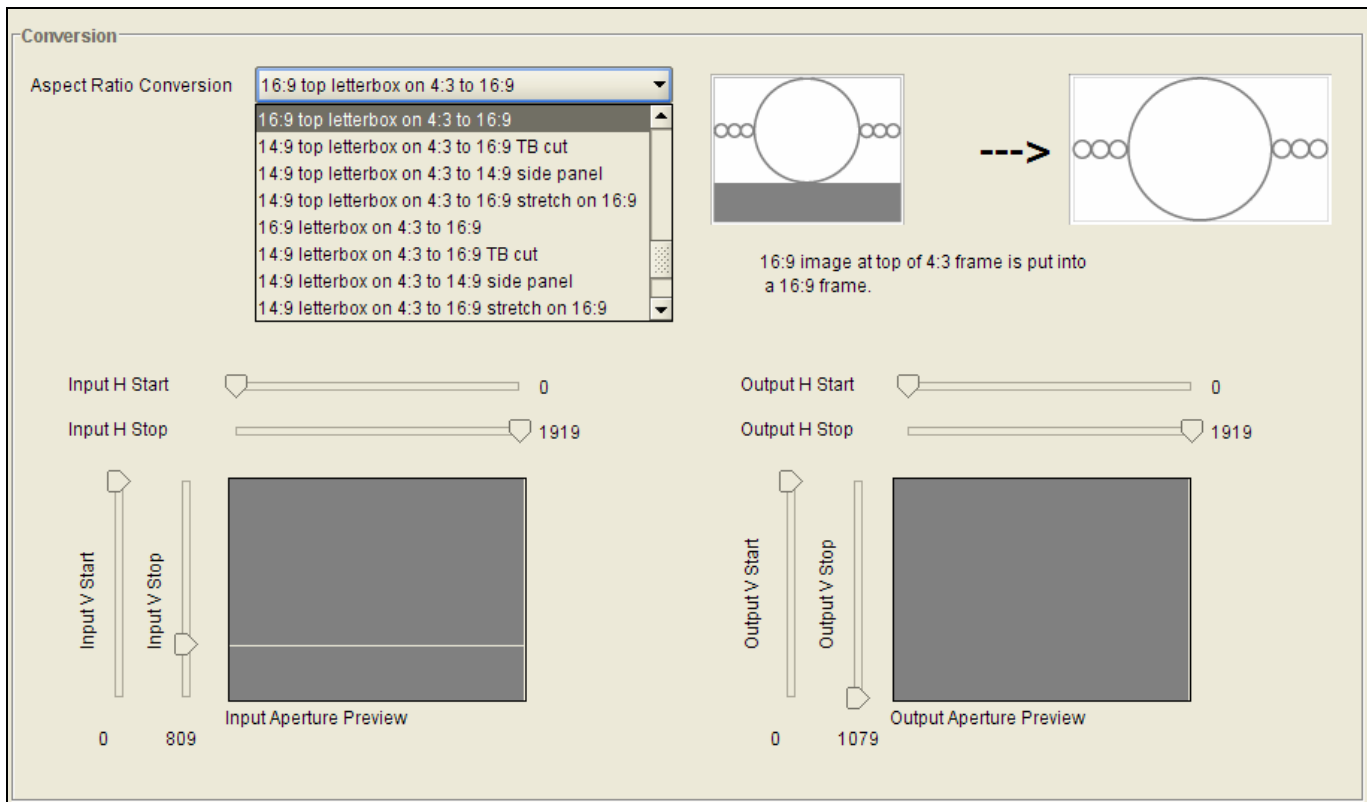
Figure 7-42: Aspect Ratio Conversion

The full list of available options for the Aspect Ratio Conversion menu is listed below.

Full Raster
User Aspect
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
13:9 Stretch to 4:3 Side Panel
14:9 Stretch to 4:3 Side Panel
16:9 Stretch to 4:3 Side Panel
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
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
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

7.10.4. User Aspect Ratio Setting

There are four controls that set the portion of the input picture that will be used for conversion. These controls are Input H Start, Input H Stop, Input V Start and Input V Stop. Effectively, these controls are used to define input image cropping.

There are four controls that set the output image size. These controls are Output H Start, Output H Stop, Output V Start and Output V Stop. Effectively, these controls are used to define the amount of scaling that the module will perform. They also define the position of the active video within the total output image raster.

Move the Input H Start/Input H Stop/Input V Start/Input V Stop and Output H Start/Output H Stop/Output V Start/Output V Stop sliders to the left to decrease their values and move the sliders to the right to increase their values.

As these parameters are adjusted, a real time pictorial representation of the conversion being manually defined will be shown. The VLPRO interface for the AFD Stamp control is shown in Figure 7-43.
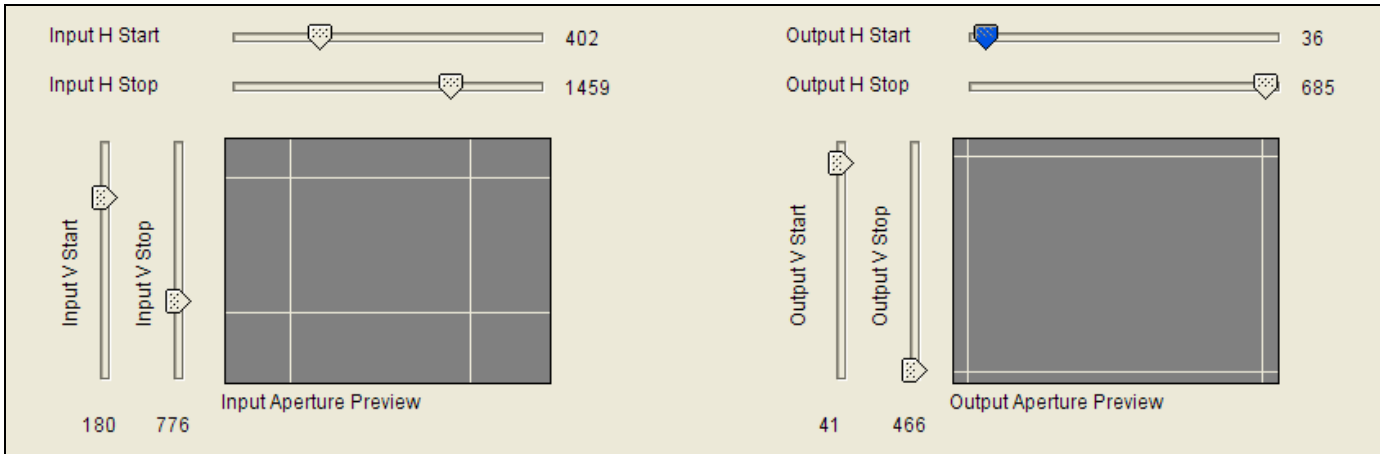
Figure 7-43: Conversion Controls

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

Output H Start/ Output H Stop:	The *Output H Start* and *Output H Stop* define how to scale the cropped input image horizontally and where to place it horizontally on the output raster. 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 (i.e. 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.**

7.11. CONFIGURING THE AUDIO 5.1 DOWN-MIX CONTROLS

The 7812DCDA2Q series modules can perform 5.1 PCM to stereo (LtRt or LoRo) down mixing.
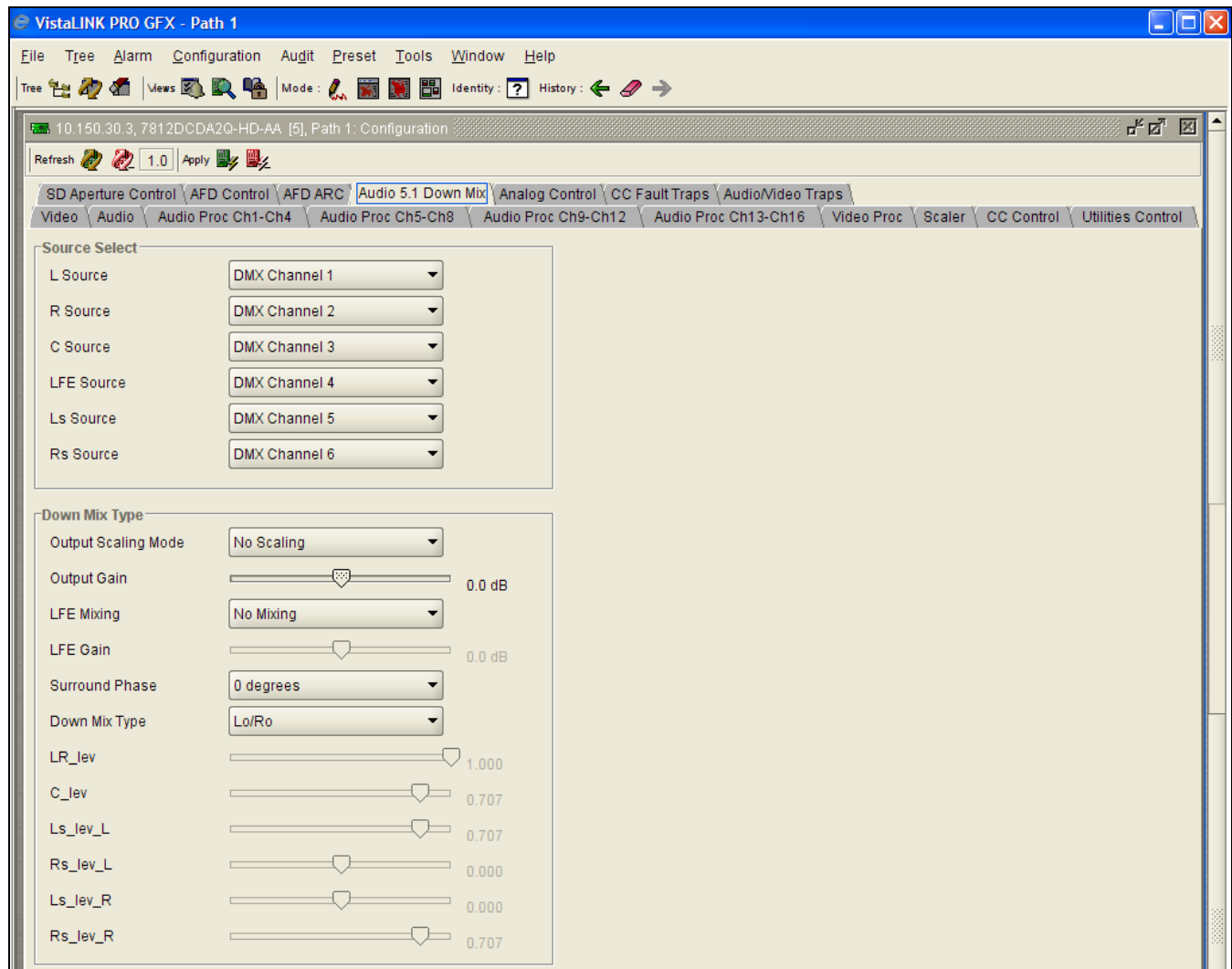
Figure 7-44: Audio 5.1 Down Mix

7.11.1. 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.
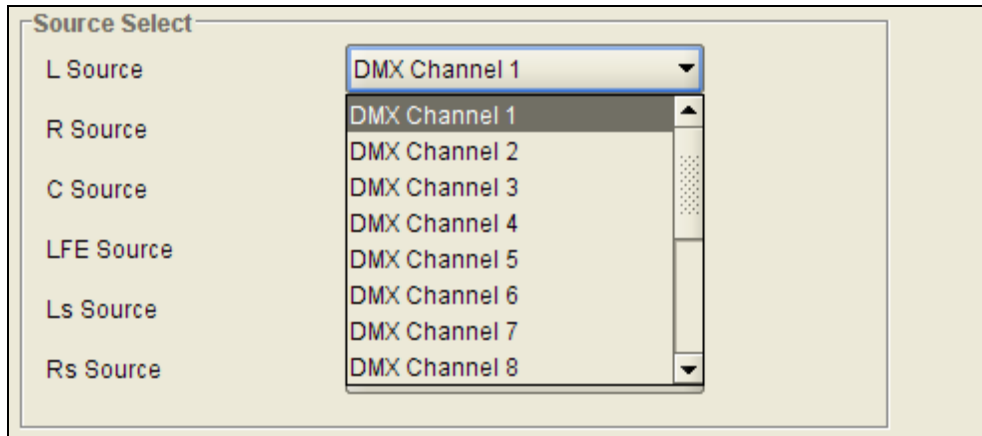
Figure 7-45: L Source Drop Down

The full list of available sources is as follows:

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

7.11.2.   Setting the Output Scaling Mode

The output scaling mode 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 the 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.

7.11.3. 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.

7.11.4. 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:
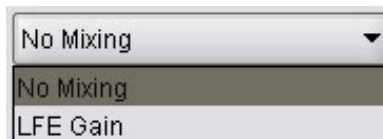
No Mixing	The LFE channel will not be included in the down-mix.
LFE Gain	The LFE channel will be included in the down-mix with gain for the LFE channel defined by the LFE Gain control.

7.11.5. Setting the Surround Phase Control

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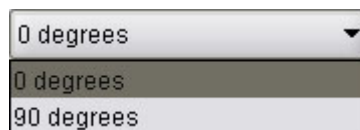
0 degrees	No phase shift is applied to the surround channels before being passed to down-mix.
90 degrees	A 90 degree phase shift is applied to the surround channels before being passed to down-mix.

7.11.6. 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.
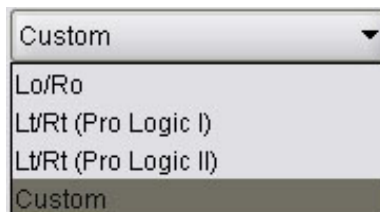
LoRo	When set to *LoRo*, the down-mixer will generate Left Only and Right Only (LoRo) stereo audio.
LtRt (Prologic I)	When set to *LtRt (Prologic I)*, the down-mixer will generate Left Total and Right Total (LtRt) Prologic I compatible stereo audio.
LtRt (Prologic II)	When set to *LtRt (Prologic II)*, 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.

7.11.7. 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 the *Down Mix Type* control section as shown below.
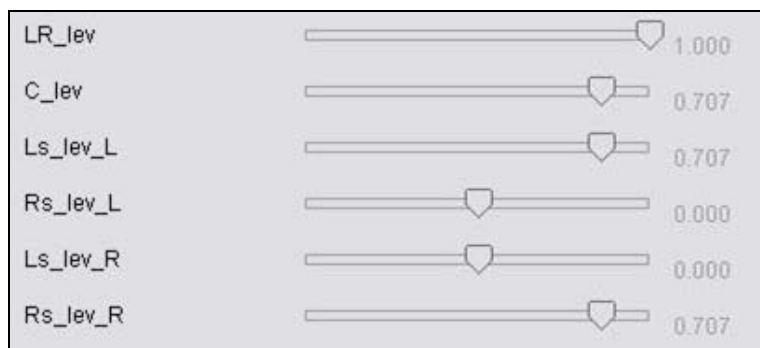
Figure 7-46: Down Mix Type Control

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.

7.12. CONFIGURING THE ANALOG OUTPUTS

The 7812DCDA2Q-HD supports analog video out and the 7812DCDA2A-HD-AA supports analog video and analog audio outputs. The VLPRO interface for configuring the analog video and audio outputs is shown in Figure 7-47.
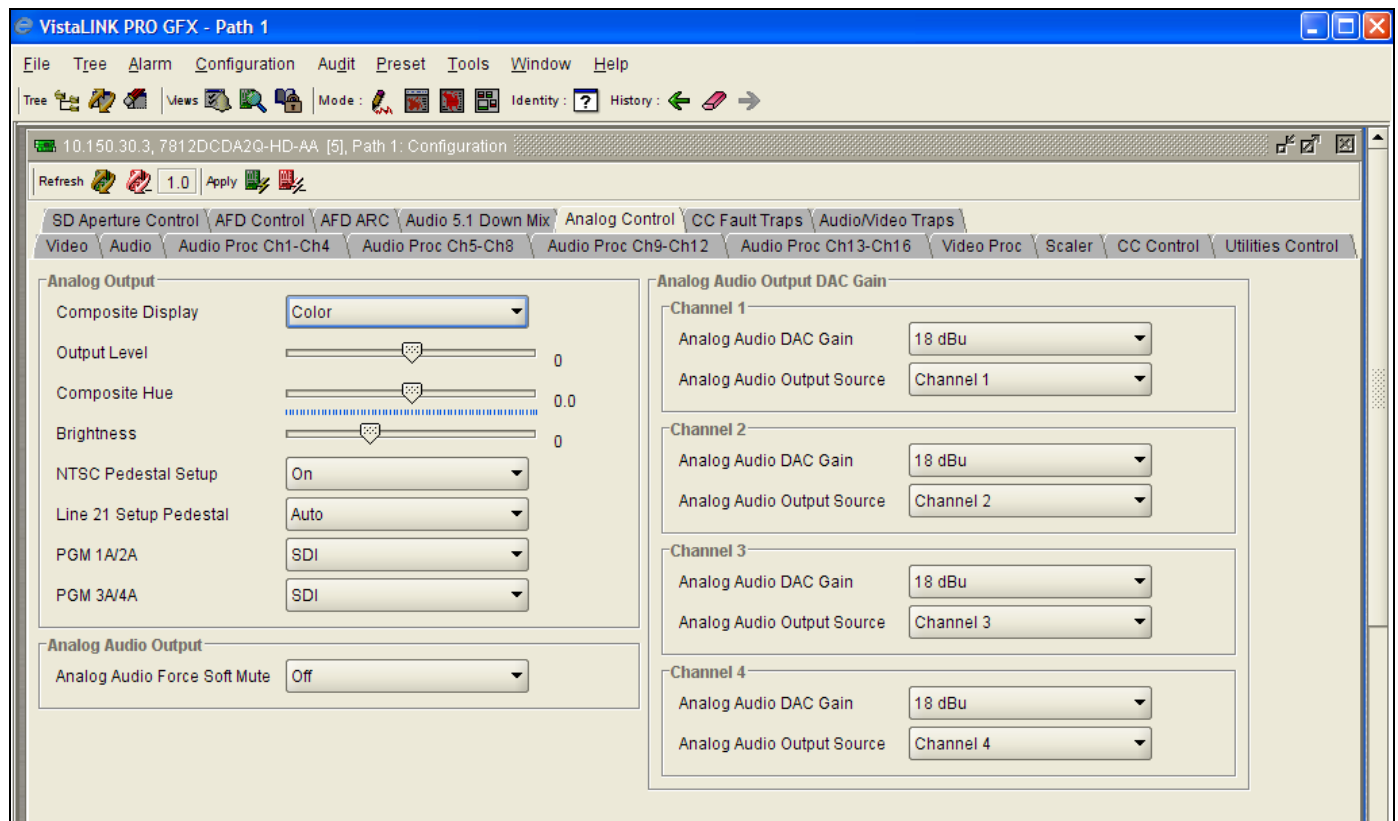
Figure 7-47: Analog Control

7.12.1. Configuring the Analog Video Output Display Mode

The *Composite Display* control allows the user to define if the composite analog video signal will be generated to support only Black and White displays or if it will be configured to support color displays.
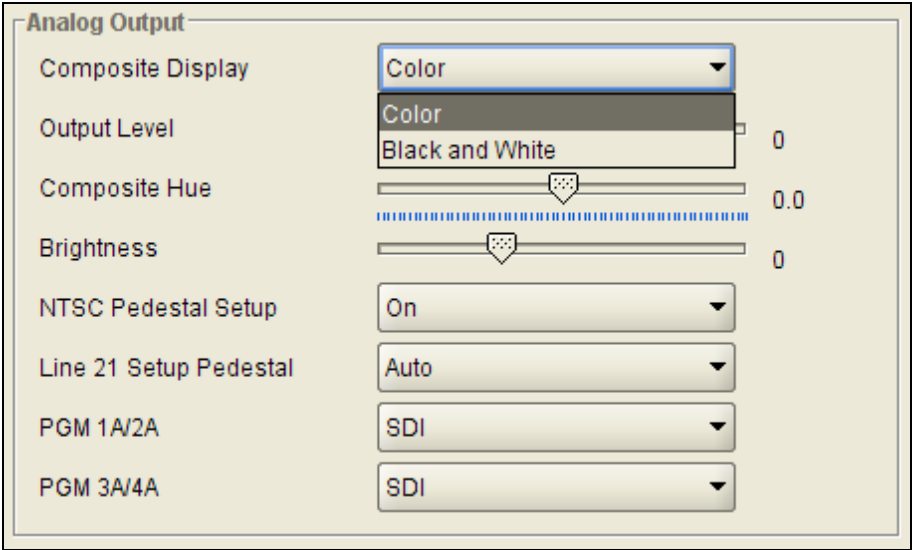
Figure 7-48: Composite Display

Colour	Composite video signal will have color information modulated onto the outgoing video signal.
Black and White	Composite video signal will NOT have color information modulated onto the outgoing video signal.

7.12.2. Configuring the Analog Video Output Level

The **Output Level** control allows the user to set gain levels for the composite analog video output. The range for this control is –100 to +100. Slide the control bar left to decrease applied gain and slide the bar right to increase the applied gain.

7.12.3. Configuring the Analog Video HUE

The **HUE** control allows the user to set the Hue for the composite analog video outputs. The range for this control is –17.5 to +17.5 degrees. Slide the control bar left to decrease applied gain and slide the bar right to increase the applied gain.

7.12.4. Configuring the Analog Video Brightness

The **BRIGHTNESS** control allows the user to set the Brightness for the composite analog video outputs. Slide the control bar left to decrease applied gain and slide the bar right to increase the applied gain.

7.12.5. Configuring the Analog Video NSTC Pedestal Setup

The **NSTC Pedestal Setup** control allows the user to choose whether setup is inserted into the outgoing composite analog video signal.

ON	Setup will be inserted into the outgoing composite analog video signal.
OFF	Setup will NOT be inserted into the outgoing composite analog video signal.

7.12.6. Configuring the Analog Video Line 21 Setup

The **Line 21 Setup Pedestal** control allows the user to choose whether setup is inserted into Line 21 of the outgoing composite analog video signals.

Auto	Setup will automatically be inserted into Line 21 of the outgoing composite analog video settings based on card configuration.
OFF	Setup will NOT be inserted into Line 21 of the outgoing composite analog video signal.

7.12.7. Configuring the Analog Video PGM1A/2A

As a pair, outputs PGM1A and PGM2A may be configured to output either SDI or composite analog video.

SDI	PGM1A and PGM2A will be configured to generate SD-SDI compliant with SMPTE 259M.
Composite	PGM1A and PGM2A will be configured to generate composite analog video.

7.12.8. Configuring the Analog Video PGM3A/4A

As a pair, outputs PGM3A and PGM4A may be configured to output either SDI or composite analog video.

SDI	PGM3A and PGM4A will be configured to generate SD-SDI compliant with SMPTE 259M.
Composite	PGM4A and PGM4A will be configured to generate composite analog video.

7.12.9. Configuring the Analog Audio DAC Gain (-AA Version)

Each processing path of the 7812DCDA2Q-HD-AA has four analog audio outputs. The controls for each analog audio output are the same. For the sake of brevity, only the controls for Channel 1 will be discussed in this manual. The output analog audio levels may be selected to be either 18 dbU or 24 dbU using the **Analog Audio DAC Gain** control.

18 dbU	The analog audio output level will be set to 18 dBU.
24 dbU	The analog audio output level will be set to 24 dBU.

7.12.10. Configuring the Analog Audio Output Source (-AA Version)

Each analog audio output may use the output of any Output Channel Mixer as the source for its audio. The VLPRO interface for this selection is shown in Figure 7-49. For the sake of brevity, only the controls for channel 1 will be discussed in this manual.

Figure 7-49: Analog Control

The full set of available options for the Analog Audio Output Source control is as follows:

Channel 1	Select the output from Output Channel Mixer 1 for the source of channel 1 analog audio.
Channel 2	Select the output from Output Channel Mixer 2 for the source of channel 1 analog audio.
Channel 3	Select the output from Output Channel Mixer 3 for the source of channel 1 analog audio.
Channel 4	Select the output from Output Channel Mixer 4 for the source of channel 1 analog audio.
Channel 5	Select the output from Output Channel Mixer 5 for the source of channel 1 analog audio.
Channel 6	Select the output from Output Channel Mixer 6 for the source of channel 1 analog audio.
Channel 7	Select the output from Output Channel Mixer 7 for the source of channel 1 analog audio.
Channel 8	Select the output from Output Channel Mixer 8 for the source of channel 1 analog audio.
Channel 9	Select the output from Output Channel Mixer 9 for the source of channel 1 analog audio.
Channel 10	Select the output from Output Channel Mixer 10 for the source of channel 1 analog audio.
Channel 11	Select the output from Output Channel Mixer 11 for the source of channel 1 analog audio.
Channel 12	Select the output from Output Channel Mixer 12 for the source of channel 1 analog audio.
Channel 13	Select the output from Output Channel Mixer 13 for the source of channel 1 analog audio.
Channel 14	Select the output from Output Channel Mixer 14 for the source of channel 1 analog audio.
Channel 15	Select the output from Output Channel Mixer 15 for the source of channel 1 analog audio.
Channel 16	Select the output from Output Channel Mixer 16 for the source of channel 1 analog audio.

7.13. CONFIGURING THE AES OUTPUTS

The 7812DCDA2Q-HD-AES4 has a specific control tab that enables the user to control the AES outputs on the card as shown in Figure 7-50.
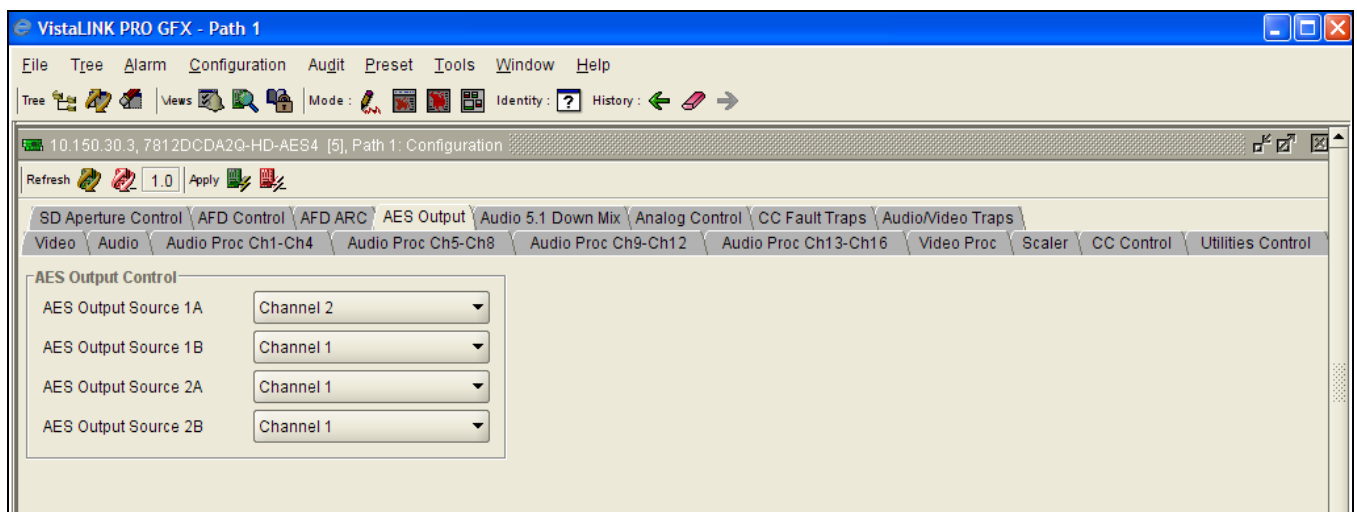
Figure 7-50: AES Output Screen

There are 2x AES outputs per processing path. AES1A and AES2A are linked to processing path 1 and AES2A and AES2B are linked to processing path 2. Within the AES Output control tab, the user may specify the source of audio for each of these AES outputs as shown in the VLPRO interface below. For the sake of brevity, only the controls for AES output 1A will be discussed in detail in this manual. Controls for other AES outputs are similar.
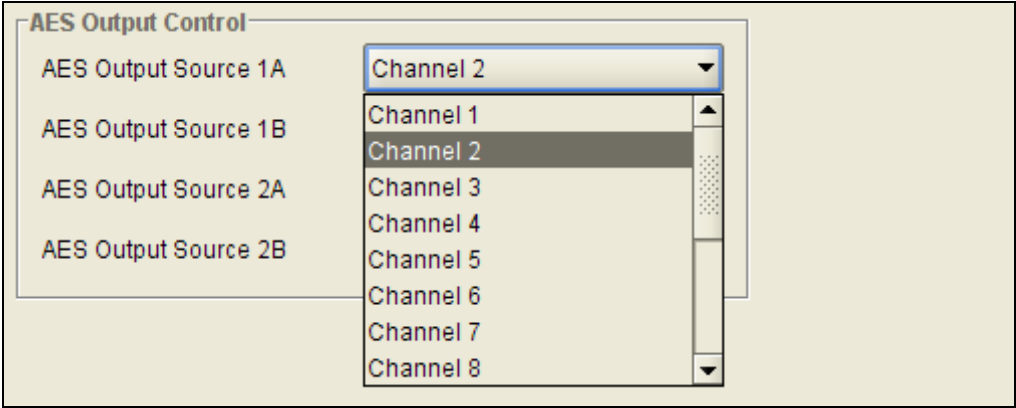
Figure 7-51: AES Output Control Drop Down Menu

The total set of available options for the **AES Output Source 1A** control is as follows:

Channel 1	Select the output from Output Channel Mixer 1 as the source of audio for AES1A
Channel 2	Select the output from Output Channel Mixer 2 as the source of audio for AES1A
Channel 3	Select the output from Output Channel Mixer 3 as the source of audio for AES1A
Channel 4	Select the output from Output Channel Mixer 4 as the source of audio for AES1A
Channel 5	Select the output from Output Channel Mixer 5 as the source of audio for AES1A
Channel 6	Select the output from Output Channel Mixer 6 as the source of audio for AES1A
Channel 7	Select the output from Output Channel Mixer 7 as the source of audio for AES1A
Channel 8	Select the output from Output Channel Mixer 8 as the source of audio for AES1A
Channel 9	Select the output from Output Channel Mixer 9 as the source of audio for AES1A
Channel 10	Select the output from Output Channel Mixer 10 as the source of audio for AES1A
Channel 11	Select the output from Output Channel Mixer 11 as the source of audio for AES1A
Channel 12	Select the output from Output Channel Mixer 12 as the source of audio for AES1A
Channel 13	Select the output from Output Channel Mixer 13 as the source of audio for AES1A
Channel 14	Select the output from Output Channel Mixer 14 as the source of audio for AES1A
Channel 15	Select the output from Output Channel Mixer 15 as the source of audio for AES1A
Channel 16	Select the output from Output Channel Mixer 16 as the source of audio for AES1A

7.14.   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 7-52: CC Fault Traps

7.15. 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.
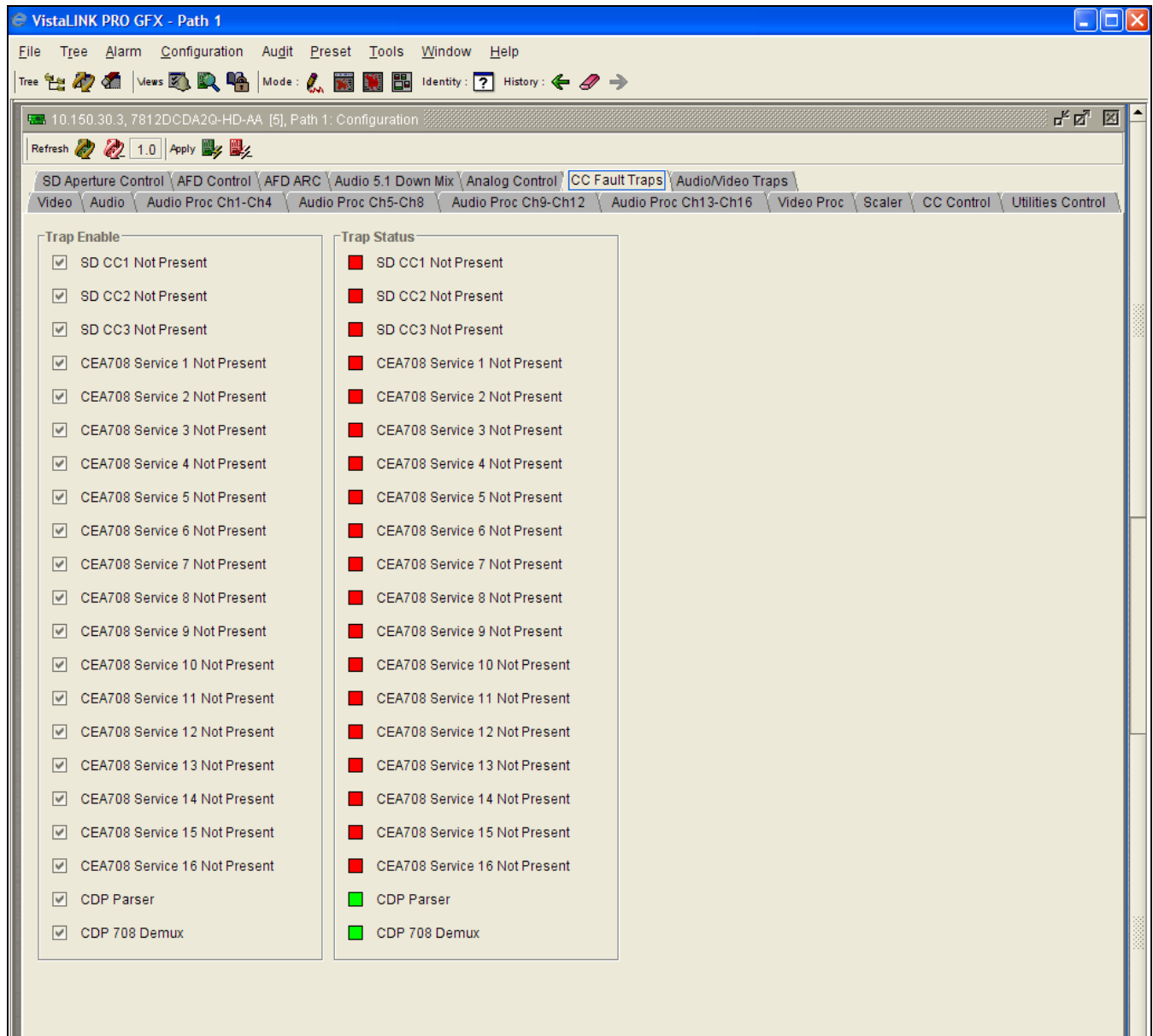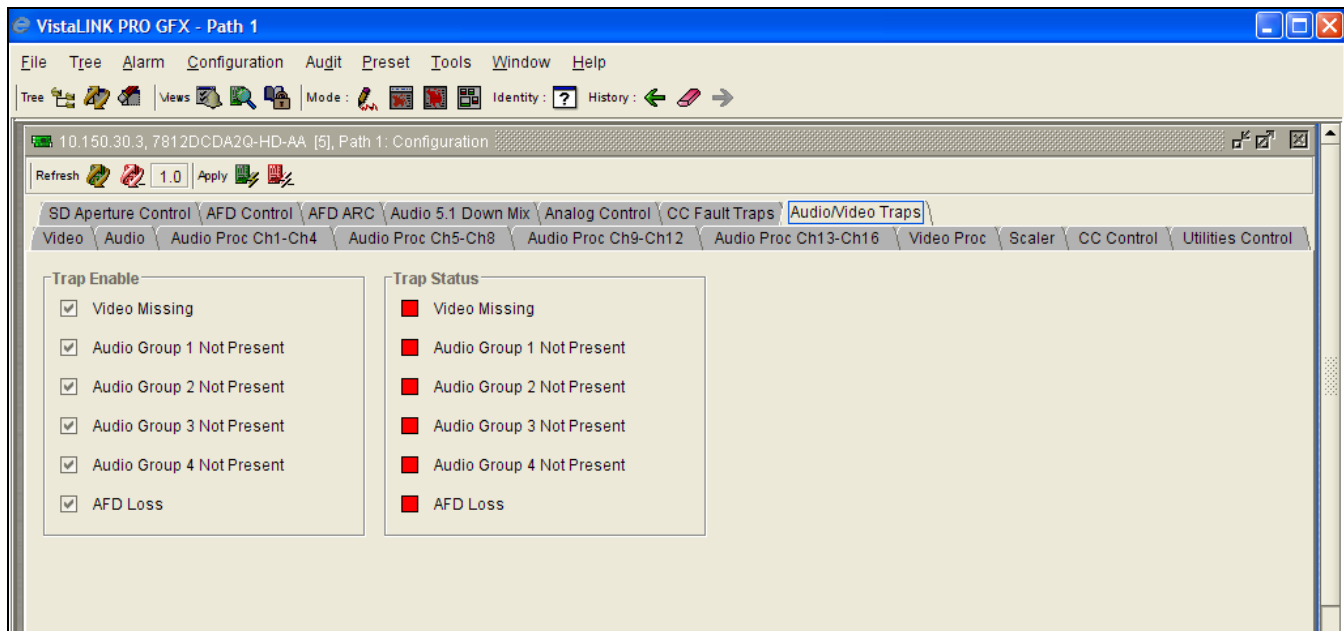

Figure 7-53: Audio/Video Traps

8. JUMPERS

The following diagrams provide the locations of the jumpers and LEDs on the 7812DCDA2Q series boards.

Figure 8-1: 7812DCDA2Q Location of Jumpers – Top View Main Module

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

FRAME STATUS: The FRAME STATUS jumper (J2002) is located near the front of the board and positioned slightly below the module's serial interface. The FRAME STATUS jumper determines whether local faults (as shown by the Local Fault indicator) will be connected to the 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.

8.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

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

UPGRADE: The UPGRADE jumper (J2000) is located on the top side of the main board 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 J2000 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto serial port header at the card edge. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* chapter.

Once the upgrade is complete, remove the module from the frame, move J2000 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 7812DCDA2Q series modules is 115,200 baud. Additional serial connection settings are as follows:

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

9. *VISTA*LINK® REMOTE MONITORING/CONTROL

9.1. WHAT IS *VISTA*LINK®?

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

There are 3 components of SNMP:

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

2. Managed devices, (such as 7707EO and 7707OE cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz *Vista*LINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC *Vista*LINK® frame controller module, which serves as the Agent.

3. A virtual database, known as the Management Information Base (MIB), lists all the variables being monitored which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the *Vista*LINK® network, see the 7700FC Frame Controller chapter.

9.2. VISTALINK® MONITORED PARAMETERS

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

Parameter	Description
Input Video Standard	Displays the current Input Video Standard.
Video Delay	Reports video delay through the card in *ms*.
CDP Parser	Displays the status of Closed Caption reading process and indicates if any syntax errors are encountered within inbound CDP packets.
Video Payload ID	Reports if a valid Video Payload ID ANC packet has been detected and indicates the format in which the video is being sent to the card.
Input AFD Code Status	Reports any detected AFD values on the incoming video signal.
Output AFD Code Status	Presents the AFD code being stamped on the output of the card (if applicable).
SRC Status	Displays the status of the Sample Rate Converters.
Audio Delay	Displays the delay of the audio in *ms*.
Video Delay	Displays the delay of the associated video in *ms*.

Table 9-1: VistaLINK® Monitored Parameters

9.3. *VISTA*LINK® CONTROLLED PARAMETERS

Parameter	Description
Video Standard Input	Selects the video input standard.
Reference Select	Sets the video or external genlock for card locking.
V Phase Offset	Sets the vertical timing of the output video with respect to the selected reference.
H Phase Offset	Sets the horizontal timing of the output video with respect to the selected reference.
Loss of Video Mode	Selects the action to take when the input video is missing.
Audio Delay 2	Adjusts the audio delay from the card nominal.
SRC Mode	Sets the mode of the sample rate converter.
Embedder Group 1 Enable	Enables or disables the Embedder Group 1.
Embedder Group 2 Enable	Enables or disables the Embedder Group 2.
Embedder Group 3 Enable	Enables or disables the Embedder Group 3.
Embedder Group 4 Enable	Enables or disables the Embedder Group 4.
C-Bit	Enables the user to pass C-Bit settings from audio input to audio outputs or enables the replacement of C-Bit settings.
Source X	Routes one of the 16 input audio channels to the X input of the selected Channel mixer.
Gain Adjust X	Sets the value of the gain from the selected source.
Invert Enable X	Inverts the phase or passes the selected audio channels.
Source Y	Routes one of the 16 input audio channels to the Y input of the selected Channel mixer.
Gain Adjust Y	Sets the value of the gain from the selected source.
Invert Enable Y	Inverts the phase or passes the selected audio channels.
RGB Clip	Enables the RGB clipper.
Y Gain	Adjusts the value of the Y Gain.
Y Offset (Black Level)	Adjusts the DC offset value of the Y component.
Cr Gain	Adjusts the value of the Cr Gain.
Cr Offset	Adjusts the DC offset value of the Cr component.
Cb Gain	Adjusts the value of the Cb Gain.
Cb Offset	Adjusts the DC offset value of the Cb component.
Hue	Adjusts the hue of the video signal. +/- 10 degrees in 0.1 degree increments.
R Gain	Adjusts the Gain value of the R component in the RGB Domain.
R Offset	Sets the Offset in the RGB Domain.

G Gain	Adjusts the Gain value of the G component in the RGB Domain.
G Offset	Sets the Offset in the RGB Domain.
B Gain	Adjusts the Gain value of the B component in the RGB Domain.
B Offset	Sets the Offset in the RGB Domain.
Saturation Gain	Sets the saturation gain level.
Video Gain	Sets the video gain level.
Gamma Adjust	Enables gamma adjust. When enabled, the module will allow the user to adjust the gamma level
Gamma Level	Sets the gamma correction level.
Red Gamma Level	Adjusts the Red Gamma levels.
Green Gamma Level	Adjusts the Green Gamma levels.
Blue Gamma Level	Adjusts the Blue Gamma levels.
H Filter Cutoff	Sets the type of the horizontal filter in the scaler.
V Filter Cutoff	Sets the type of the vertical filter in the scaler.
Red Panel	Sets the value for the R component of the background side panels.
Green Panel	Sets the value for the G component of the background side panels.
Blue Panel	Sets the value for the B component of the background side panels.
AFD Stamp	Selects the AFD signal that will be stamped on the output signal.
Aspect Ratio Conversion	Selects the aspect ratio conversion that the module will perform.
Input H Start	Sets the left side crop position.
Input H Stop	Sets the right side crop position.
Input V Start	Sets the top crop position.
Input V Stop	Sets the bottom crop position.
CC Enable	Enables closed caption handling.
Loss of CC Timeout	When video is lost, this control sets the amount of time (in seconds) before the Closed Captioning timeouts.
Recall Preset	Used to recall a current card configuration from one of the user presets.
Store User Preset	Used to store the current card configuration.
Auto Recall Preset	Enables automatic preset recall when input or output changes.
Ap Aspect Ratio Source	Selects whether the Production Aperture or the Clean Aperture is used when converting input signals.
First Pixel Num In SD Prod Ap	Defines the first active horizontal pixel for the SD Production Aperture.
Last Pixel Num In SD Prod Ap	Defines the last active horizontal pixel for the SD Production Aperture.

First Pixel Num In SD Clean Ap	Defines the first active line for the SD Production Aperture.
Last Pixel Num In SD Clean Ap	Defines the last active line for the SD Production Aperture.
First Line Num In SD Prod Ap	Defines the first active horizontal pixel for the SD Clean Aperture.
Last Line Num In SD Prod Ap	Defines the last active horizontal pixel for the SD Clean Aperture.
First Line Num In SD Clean Ap	Defines the first active line for the SD Clean Aperture.
Last Line Num In SD Clean Ap	Defines the last active line for the SD Clean Aperture.
AFD Input Enable	Enables the input side AFD processing.
Loss of AFD Mode	Configures the action that the converter will take when incoming AFD signals are lost.
AFD Stamp Source	Selects the AFD signal that will be stamped on the output signal.
Output SD Aspect Ratio	Defines whether SD outputs should be stamped with an AFD value that indicates a 16:9 or 4:3 output image raster.
AFD Output Enable	Enables the insertion of AFD packets in the outgoing video signal.
AFD Output Line	Sets the AFD Output Line level.
L Source	Assign a channel to L Source.
R Source	Assign a channel to R Source.
C Source	Assign a channel to C Source.
LFE Source	Assign a channel to LFE Source.
Ls Source	Assign a channel to Ls Source.
Rs Source	Assign a channel to Rs Source.
Output Scaling Mode	Controls whether the down mix matrixing is normalized or not.
Output Gain	Configures the output gain.
LFE Mixing	Controls whether the LFE channel is included or not in the audio down-mixing.
LFE Gain	Controls the LFE channel gain after audio is up-mixed.
Surround Phase	Controls whether a 90 degree phase shift is applied to the surround channels before being passed to the down-mix matrix.
Down Mix Type	Sets the type of audio down-mixing that will be performed.
LR_lev	Sets the LR_lev level.
C_lev	Sets the C_lev level.
Ls_lev_L	Sets the Ls_lev_L level.
Rs_lev_L	Sets the Rs_lev_L level.
Ls_lev_R	Sets the Ls_lev_R level.
Rs_lev_R	Sets the Rs_lev_R level.

Composite Display	Defines if the composite analog video signal will be generated to support only Black and White displays or if it will be configured to support color displays.
Output Level	Set the gain levels for the composite analog video output.
Composite Hue	Sets the hue for the composite analog video output.
Brightness	Sets the Brightness for the composite analog video outputs.
NTSC Pedestal Setup	Controls whether setup is inserted into the outgoing composite analog video signal.
Line 21 Setup Pedestal	Controls whether setup is inserted into line 21 of the outgoing composite analog video signal.
PGM 1A/2A	Configured together to output either SDI or composite analog video.
PGM 3A/4A	Configured together to output either SDI or composite analog video.
Analog Audio DAC Gain	Defines if the output analog audio levels will be 18 dbU or 24 dbU.
Analog Audio Output Source	Defines the desired Output Channel Mixer as the source of audio for Analog Audio.
AES Output Source 1A	Defines the desired Output Channel Mixer as the source of audio for AES1A.
AES Output Source 1B	Defines the desired Output Channel Mixer as the source of audio for AES2A.
AES Output Source 2A	Defines the desired Output Channel Mixer as the source of audio for AES3A.
AES Output Source 2B	Defines the desired Output Channel Mixer as the source of audio for AES4A.

Table 9-2: *Vista*LINK® Controlled Parameters

9.4. *VISTA*LINK® TRAPS

Parameter	Description
SD CC1 to SD CC3 Not Present	Displays the trap status of Standard Definition Closed Captioning for captions 1 to 3.
CEA708 Service 1 to CEA708 Service 16 Not Present	Displays the trap status of CEA708 Service 1 to 16.
CDP Parser	Displays the status of Closed Caption reading process and indicates if any syntax errors are encountered within inbound CDP packets.
Video Missing	Displays the status of the video missing trap.
Audio Group 1 to 4 Not Present	Displays the trap status of audio group 1 to 4.
AFD Loss	Displays the status of the AFD loss trap.
AES1 to AES8 Loss	Displays the trap status of AES1 to AES8.
Temperature	Displays the status of the temperature trap.

Table 9-3: *Vista*LINK® Trap Parameters

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