

7800/7700 MultiFrame Manual 7814 Series Dual HDTV Up/Down/Cross Converters User Manual

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EVERTZ MICROSYSTEMS LTD.

5292 John Lucas Drive
Burlington, Ontario
Canada L7L 5Z9

Phone: +1 905-335-3700
Sales: sales@evertz.com Fax: +1 905-335-3573
Tech Support: service@evertz.com Fax: +1 905-335-7571
Web Page: <http://www.evertz.com>



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	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

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WARNING

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

WARNING

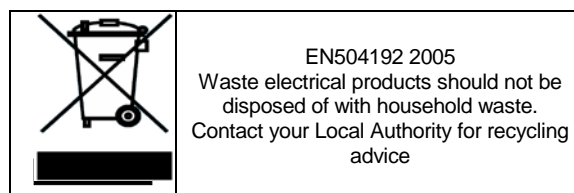
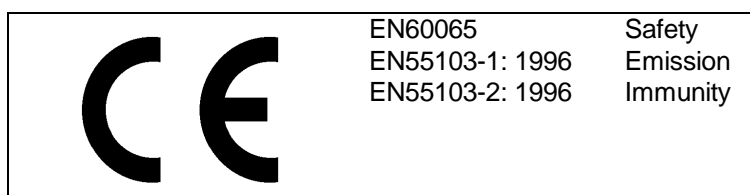
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NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

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



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NOTE

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

TABLE OF CONTENTS

1.	OVERVIEW	1
1.1.	FUNCTIONAL DESCRIPTION.....	4
1.2.	PRODUCT OPTIONS	7
2.	INSTALLATION.....	9
2.1.	INPUT/OUTPUT CONNECTIONS.....	11
2.2.	ETHERNET CONNECTIONS.....	12
2.3.	GPIO CONNECTOR.....	13
2.4.	AES INPUTS.....	15
2.5.	AES OUTPUTS.....	16
3.	SPECIFICATIONS.....	17
3.1.	SERIAL DIGITAL VIDEO INPUT	17
3.2.	SERIAL DIGITAL VIDEO OUTPUT	17
3.3.	REFERENCE VIDEO INPUT	17
3.4.	GENERAL PURPOSE INPUTS AND OUTPUTS	18
3.5.	AES INPUTS.....	18
3.6.	AES OUTPUTS.....	18
3.7.	ELECTRICAL	18
3.8.	PHYSICAL.....	18
4.	STATUS LEDS.....	19
4.1.	MODULE STATUS LEDS –AES8 VERSION AND NON –AES8 VERSIONS	19
5.	MODULE CONTROL.....	21
5.1.	CONTROL CATEGORIES.....	21
6.	HIGH LEVEL CARD CONTROLS	27
6.1.	GENERAL CONTROL TAB.....	27

6.2. REFERENCE CONTROL TAB	28
6.2.1. Genlock Control.....	28
6.2.2. Global Status.....	29
6.2.3. Global Genlock Traps.....	29
6.2.4. Auto Reference Fail-over.....	29
6.3. IP CONTROL TAB.....	32
6.3.1. IP Configuration through VLPro.....	32
6.3.2. IP Configuration through serial com port (Not Implemented at time of writing)	32
6.4. CHANGE PRODUCT TAB.....	33
6.4.1. Directly Set	33
6.4.2. Script Set.....	33
6.5. GPIO CONTROL TAB	34
6.5.1. GPIO 1	34
6.6. FIBER CONTROL TAB (-F OPTION ONLY)	35
6.6.1. Fiber Rx.....	35
6.6.2. Fiber Tx.....	35
6.6.3. Trap Status.....	35
7. CONFIGURING THE VIDEO PATH CONTROLS.....	37
7.1. VIDEO CONTROL TAB.....	38
7.1.1. Video Control.....	39
7.1.2. Video Monitor	43
7.1.3. Video Traps	43
7.2. VIDEO PROCESSING TAB.....	44
7.2.1. Video Proc.....	45
7.3. COLOUR LEGALIZE TAB (+ICL2).....	47
7.3.1. Colour Legalize.....	47
7.4. IMAGE ENHANCEMENT TAB.....	49
7.4.1. Image Enhancement	49
7.5. NOISE REDUCTION TAB	51
7.5.1. Temporal Noise Reduction Levels	51
7.6. DEINTERLACER CONTROL TAB.....	52
7.6.1. De-Interlacer Control	52
7.6.2. Deinterlacer Status	54
7.7. AFD TAB	55
7.7.1. AFD Control.....	55
7.7.2. AFD Present Traps.....	57
7.8. AFD MONITOR TAB.....	58
7.8.1. SMPTE2016-1 Monitor	58

7.9. SD APERTURE CONTROL TAB	59
7.9.1. SD Aperture Control	59
7.10. USER ARC	61
7.10.1. ARC Configuration.....	61
7.10.2. Conversion Controls	62
7.11. AFD ARC CONTROLS	65
7.11.1. AFD Select	66
7.11.2. AFD Stamp	67
7.11.3. AFD Stamp Settings	67
7.11.4. Conversion Settings.....	68
7.12. SCALER TAB	70
7.12.1. Slew Settings	71
7.12.2. Colour Controls.....	71
7.12.3. Filter Settings.....	72
7.12.4. AFD Stamp Settings	72
7.12.5. Conversion Settings.....	74
7.13. 7814 AUDIO ARCHITECTURE	76
7.14. AUDIO TAB	78
7.14.1. Audio Control.....	78
7.14.2. Audio Monitor Settings.....	80
7.14.3. Audio Present Traps	80
7.15. EMBEDDED AUDIO INPUT CORRECTION TAB	81
7.15.1. Channel X.....	81
7.16. AES AUDIO INPUT CORRECTION TAB	82
7.16.1. Channel X.....	82
7.17. EMBEDDED AUDIO MIXER TAB	83
7.17.1. Channel 1	84
7.18. AES AUDIO MIXER TAB	88
7.18.1. Channel 1	89
7.19. DOWN MIX CONTROL TAB	93
7.19.1. Control.....	93
7.20. DOWNMIX MIXER TAB	96
7.20.1. Source Select Controls	97
7.21. AUTO UP MIX CONTROL TAB (+UMX2)	101
7.21.1. UpMix Control	101
7.22. UPMIX MIXER TAB	104
7.22.1. Source Select Controls	105
7.23. INTELLIGAIN OVERVIEW	109

7.24. INTELLIGAIN MIXER TAB	110
7.24.1. Source Select Controls	111
7.25. INTELLIGAIN™ CONFIGURATION TAB	115
7.25.1. Configuration	116
7.26. INTELLIGAIN™ PROGRAM CONTROL TAB	120
7.26.1. Program Configuration Control	121
7.26.2. Intelligain	122
7.26.3. Intelligain Leveler	122
7.26.4. Compander	123
7.26.5. Peak Limiter	124
7.26.6. Intelligain Program Monitor	124
7.26.7. Thresholds	126
7.27. INTELLIGAIN™ TRAPS TAB	127
7.28. REFERENCE TAB	128
7.28.1. Reference Control	128
7.28.2. Reference Monitor	129
7.28.3. Reference Traps	129
7.29. TIME CODE TAB	130
7.29.1. Time Code Control	130
7.30. CLOSED CAPTIONING CONTROL TAB	132
7.30.1. Closed Captioning Control	132
7.30.2. CDP Status	134
7.31. CC FAULT TRAP CONTROLS	135
7.32. ANC PASSTHRU TAB	136
7.32.1. ANC Index Select	136
7.32.2. ANC PassThru	136
7.33. PRESETS CONTROL TAB	139
7.33.1. Preset Control	139
8. JUMPERS	143
8.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS	143
8.2. 7814 SERIES “SLOT BLOCKER”	144
9. VISTALINK® REMOTE MONITORING/CONTROL	145
9.1. WHAT IS VISTALINK®?	145
9.2. VISTALINK® MONITORED PARAMETERS	146
9.3. VISTALINK® CONTROLLED PARAMETERS	148

9.4. **VISTALINK[®] TRAPS** 157

Figures

Figure 1-1: 7814 Series Block Diagram (-HD, -3G and -AES8 Versions)	5
Figure 1-2: 7814 Series Audio Block Diagram (-AES8 Versions)	6
Figure 2-1: 7814XXX-XX-2 Rear Plate Layout & 7814XXX-AES8-XX-2 Rear Plate Layout.....	9
Figure 2-2: 7814XXX-XX-F-2 Rear Plate Layout & 7814XXX-AES8-XX-F-2 Rear Plate Layout	10
Figure 2-4: Colour Code Wiring for the Current RJ 45 Standards.....	12
Figure 2-5: GPI Input Circuitry	14
Figure 2-6: GPO Output Circuitry.....	14
Figure 4-1: Status LEDs	19
Figure 5-1: Navigation Tree	21
Figure 5-2: High Level Card Controls.....	21
Figure 5-3: Path 1 and 2 Processing Path	23
Figure 6-1: High Level Card Controls.....	27
Figure 6-2: Misc Faults Tab	27
Figure 6-3: Genlock Source Control	28
Figure 6-4: Prioritized Reference Fail Over Options.....	29
Figure 6-5: IP Control	32
Figure 6-6: Change Product Tab	33
Figure 7-1: Video Tab.....	37
Figure 7-2: Video Tab.....	38
Figure 7-3: Video Proc Tab.....	44
Figure 7-4: Colour Legalize Tab	47
Figure 7-5: Image Enhancement Tab	49
Figure 7-6: Noise Control Tab.....	51
Figure 7-7: Deinterlacer Control Tab.....	52
Figure 7-8: AFD Control Tab.....	55
Figure 7-9: SMPTE2016-1 Monitor Tab	58
Figure 7-10: SD Aperture Control Tab	59
Figure 7-11: SD Aperture Control	60
Figure 7-12: User AFD Tab	61
Figure 7-13: Image Cropping and Output Image Size.....	64
Figure 7-14: AFD ARC Tab.....	65
Figure 7-15: AFD Select	66
Figure 7-16: AFD Code Description	67
Figure 7-17: Pictorial Representation.....	68
Figure 7-18: Conversion Screen	68
Figure 7-19: Scaler Tab	70
Figure 7-20: Pictorial Representation.....	73
Figure 7-21: Aspect Ratio Conversion	74
Figure 7-22: Internal 7814 Series Audio Architecture.....	77
Figure 7-23: Audio Tab	78
Figure 7-24: Audio Input Correction Tab.....	81
Figure 7-25: Audio Input Correction Tab.....	82
Figure 7-26: Audio Proc Ch1-Ch4 Tab.....	83
Figure 7-27: Audio Proc Ch1-Ch4 Tab.....	88
Figure 7-28: Audio 5.1 Down Mix Tab.....	93
Figure 7-29: Down Mix Mixer Tab	96
Figure 7-30: Up Mix Control Tab.....	101
Figure 7-31: Up Mix Mixer Tab.....	104
Figure 7-32: Intelligain Mix Mixer Tab	110

Figure 7-33: IntelliGain™ Configuration Tab	115
Figure 7-34: Program 1 Configuration View	121
Figure 7-35: IntelliGain™ Traps Tab	127
Figure 7-36: Card Reference Tab	128
Figure 7-37: Time Code Control Tab	130
Figure 7-38: CC Control Tab.....	132
Figure 7-39: CC Fault Traps Tab	135
Figure 7-40: ANC PassThru Tab	136
Figure 7-41: Utilities Control Tab	139
Figure 8-1: Location of Jumpers – Top View Main Module	143
Figure 8-2: Location of Jumpers – Bottom View Main Module	143
Figure 8-3: Slot Blocker	144

Tables

Table 1-1: Control Interface Differences between 7814 Converters Depending on Product Variation/Ordering Options	1
Table 1-2: Control Interface Differences between 7814 Converters Depending on Product Variation/Ordering Options	8
Table 2-1: GPIO Connector Pin out	13
Table 2-2: AES Input Audio Connector Pin out	15
Table 2-3: AES Output Audio Connector Pin out	16
Table 7-1: IntelliGain™ Configuration Options	115
Table 7-2: Abbreviations	117
Table 7-3: Relationship between Audio Programs and Audio Channels	117
Table 7-4: Relationship between Program Configuration Mode and Audio Programs	120
Table 9-1: VistaLINK® Monitored Parameters	147
Table 9-2: VistaLINK® Controlled Parameters.....	156
Table 9-3: VistaLINK® Trap Parameters	157

REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	First Release	Jan 2014
1.1	Added Anc PassThru, Fiber, GPIO	May 2014
1.1.1	Correction to Table 7-3	Feb 2015
1.1.2	Correction to Section 2.1	Oct 2016
1.1.3	Updated Table 2-1	Oct 2018

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1. OVERVIEW

The 7814 series of products are Dual Broadcast Quality Up/Down/Cross Converters that convert between common SD/SMPTE 259M and HD/SMPTE 292M video signals. The 7814UDX-HD-2 and 7814UDX-AES8-HD-2 have full up/down/cross conversion capabilities whereas the 7814UC-HD-2/7814UC-AES8-HD-2 has up-conversion capabilities and the 7814HDC-HD-2/7814HDC-AES8-HD-2 have down-conversion capabilities. In addition, the 7814XC-HD-2/7814XC-AES8-HD-2 has cross conversion capabilities. The following table outlines the basic functionality provided by each module. Note that with the –3G versions of these cards, convert between SD/SMPTE 259M, HD/SMPTE 292M and single link 1920x1080p59.94/50 video signals that are supported*.

Module	SD to HD	HD to SD	HD To HD (DF)	SD to SD (SF)	HD to HD (SF)	SD to 3G	HD to 3G	3G to SD	3G to HD	3G To 3G
7814UDX-HD-2 7814UDX-AES8-HD-2	•	•	•	•	•	OB	OB	OB	OB	OB
7814UDX-3G-2 7814UDX-AES8-3G-2	•	•	•	•	•	•	•	•	•	•
7814UC-HD-2 7814UC-AES8-HD-2	•	OB	OB	•	•	OB	OB	OB	OB	OB
7814UC-3G-2 7814UC-AES8-3G-2	•	OB	OB	•	•	•	•	OB	OB	•
7814XC-HD-2 7814XC-AES8-HD-2	OB	OB	•	OB	•	OB	OB	OB	OB	OB
7814XC-3G-2 7814XC-AES8-3G-2	OB	OB	•	OB	•	•	•	OB	OB	•
7814HDC-2 7814HDC-AES8-HD-2	OB	•	OB	•	•	OB	OB	OB	OB	OB
7814HDC-3G-2 7814HDC-AES8-3G-2	OB	•	OB	•	•	OB	OB	•	•	•

- = Normal Operation
- OB = Outputs Black
- SF = Same format (1080i to 1080i)
- DF = Difference format (720p to 1080i or 1080i to 720p)

Table 1-1: Control Interface Differences between 7814 Converters Depending on Product Variation/Ordering Options

This manual will serve to cover the 7814UDX, the 7814UC, the 7814XC and the 7814HDC base products as well as the –AES8, –3G,

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

All 7814 series modules include integrated frame synchronization capabilities and have an external Genlock input for adjusting output video timing. In addition, the cards support FRAME REFERENCE inputs as supported on the 7700FR-G and the 7800FR. Upon loss of an input signal, the integrated frame synchronizers may be set to FREEZE on the last frame of good video or to output BLACK video or BLUE video. The 7814UDX series incorporates advanced motion adaptive spatial-temporal (3D) noise reduction. The 7814UDX series also incorporates new de-interlacing technologies for superior resolution and artifact reduction:

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

The 7814 series supports broadcast quality scaling resources and provides standard as well as completely user defined aspect ratio conversions. In addition, these modules support AFD (SMPTE 2016) based steering of aspect ratio conversions and can re-stamp AFD signals on the output video. AFD driven transitions between particular ARC modes are frame accurate and glitch free. These modules support automatic colour space conversion (ITU rec. 709 ↔ ITU rec. 601) as appropriate for the particular conversion being performed.

A wide range of YCbCr/RGB video proc capabilities are integrated into the 7814 series products. These include YCbCr gain and offset controls in addition to RGB based gain/colour legalization/gamma correction capabilities. Video level, Hue and Saturation controls are also available.

The 7814 series products support 16 channels of embedded audio per path. Embedded audio is processed with audio delay that matches video delay. Additional audio delay is also available. Full audio proc capabilities are supported including per channel audio gain, audio routing/channel swapping and inversion control. Surround sound (5.1 PCM) to stereo down mixing is supported (Lt/Rt or LoRo). The -AES8 versions of the 7814 series modules support 8x discrete AES inputs and support 8x AES outputs per path. AES outputs can carry different audio than the audio that is being embedded. For more advanced applications, advanced audio processing elements are available like the stereo to 5.1 up mixing (+UMX) and IntelliGain Loudness Management (+IG).

These modules are SNMP and VistaLINK® capable when used in conjunction with a 7700FC/7800FC frame controller card in slot 1 of the 7800FR. In addition, card control can also be performed using a mini-adjent Jar and a direct connection to the rear panels Ethernet port (Not available at time of writing).

Summary of 7814 Series Features:

- Dual path processing in a single modular form factor
- Broadcast quality up/down/cross conversions between common SD/SMPTE 259M and HD/SMPTE 292M video formats
- Optional support to convert to/from common 3G/SMPTE424M 1080p signal formats (-3G versions)
- Integrated frame sync capabilities and external reference input for phasing of output video
- Support for 7700FR-G and 7800FR FRAME REFERENCE inputs
- Upon loss of video frame syncs may set to FREEZE mode or output black or blue video
- Evertz proprietary detail enhancement for optimum picture sharpness
- Leading edge video noise reduction technologies:
 - 3D pixel adaptive spatial-temporal noise reduction
- New generation de-interlacing technologies:
 - Pixel adaptive motion processing to maintain maximum vertical resolution
 - Advanced directional edge interpolation to minimize “jaggies” typically seen when converting interlaced video to progressive video
 - Advanced film mode processing for mathematically lossless de-interlacing of video content with embedded 3:2 and 2:2 pull-down
- Wide range video proc functions including both RGB gains/offsets and YCbCr gains/offsets
- Internal RGB colour legalizer (+ICL2)
- Overall and per component RGB video gamma correction controls
- Dedicated Ethernet port
- Supports all required colour space conversions (rec. 601 to 709)
- Supports standard and user defined aspect ratio conversions
- Fully AFD enabled with frame accurate and glitch free AFD driven transitions between ARC modes
- 16 channel embedded audio support per path
- Supports 8 external AES inputs and 8 AES outputs per Path (-AES8 version only)
- Audio delay tracks video delay
- Full audio proc and channel swapping
- Optional Stereo to 5.1 surround sound up-mix (+UMX2)
- Optional Intelligain Loudness Management (+IG2)
- 5.1 surround sound to stereo (Lt/Rt and Lo/Ro) down-mix
- Transfers closed caption and time information from input to output with all required SD ↔ HD data translations and time code re-calculations.
- SNMP and VistaLINK[®] capable when used in conjunction with a 7700FC/7800FC for remote monitoring, control and configuration capabilities using VistaLINK[®] PRO, CP-2116E or CP-2232E Control Panels.

1.1. FUNCTIONAL DESCRIPTION

SD or HD video can be supplied to the PGM A or PGM B input for either path. Either PGM A or PGM B may be selected for video processing and up/down/cross conversion. With the –3G versions of these modules, single link 1920x1080p59.94/50 signals may be supplied to converter inputs. 7814 series modules support 10 bit 4:2:2, 1920x1080p59.94 single link signals with Level A or Level B formatting per SMPTE 425M. All modules include integrated frame synchronization capabilities and have an external genlock input for adjusting output video timing. In addition, the cards support FRAME REFERENCE inputs as supported on the 7700FR-G and the 7800FR.

The video signal selected for processing (PGM A or PGM B) is routed through a number of advanced processing stages including frame synchronization, audio/Dolby metadata extraction, noise reduction, de-interlacing, aspect ratio conversion, up/down/cross conversion, video proc adjustment and detail enhancement. De-embedded audio is re-inserted into the outgoing video signal with audio delay matching video path processing delay.

Within the audio processing block, audio delay is matched to track video delay. In addition, channel swapping, gain and inversion processing is available. Down-mixed audio is also generated in this block. 8x AES inputs and 8x AES outputs are supported per path on –AES8 versions of all modules. AES outputs can carry different audio than the audio that is being embedded. On –AES8 versions, stereo to 5.1 up mixing is also supported with the +UMX2 option.

Figure 1-1, provides the block diagram for the UDX, the UC, the XC and the HDC variations of the 7814 series products. Figure 1-2 depicts the audio processing block on all -AES8 variations of the 7814 series products

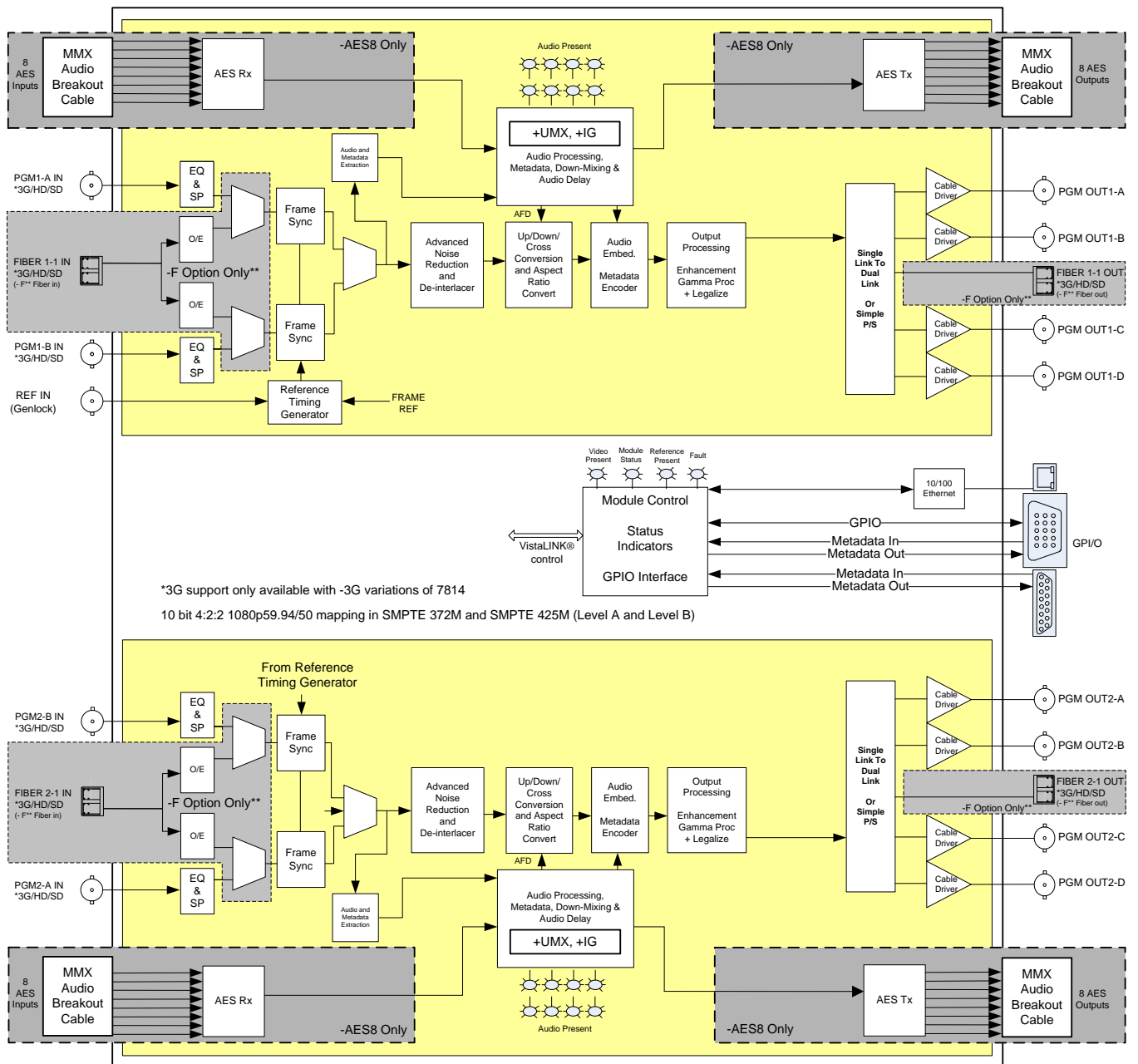


Figure 1-1: 7814 Series Block Diagram (-HD, -3G and -AES8 Versions)

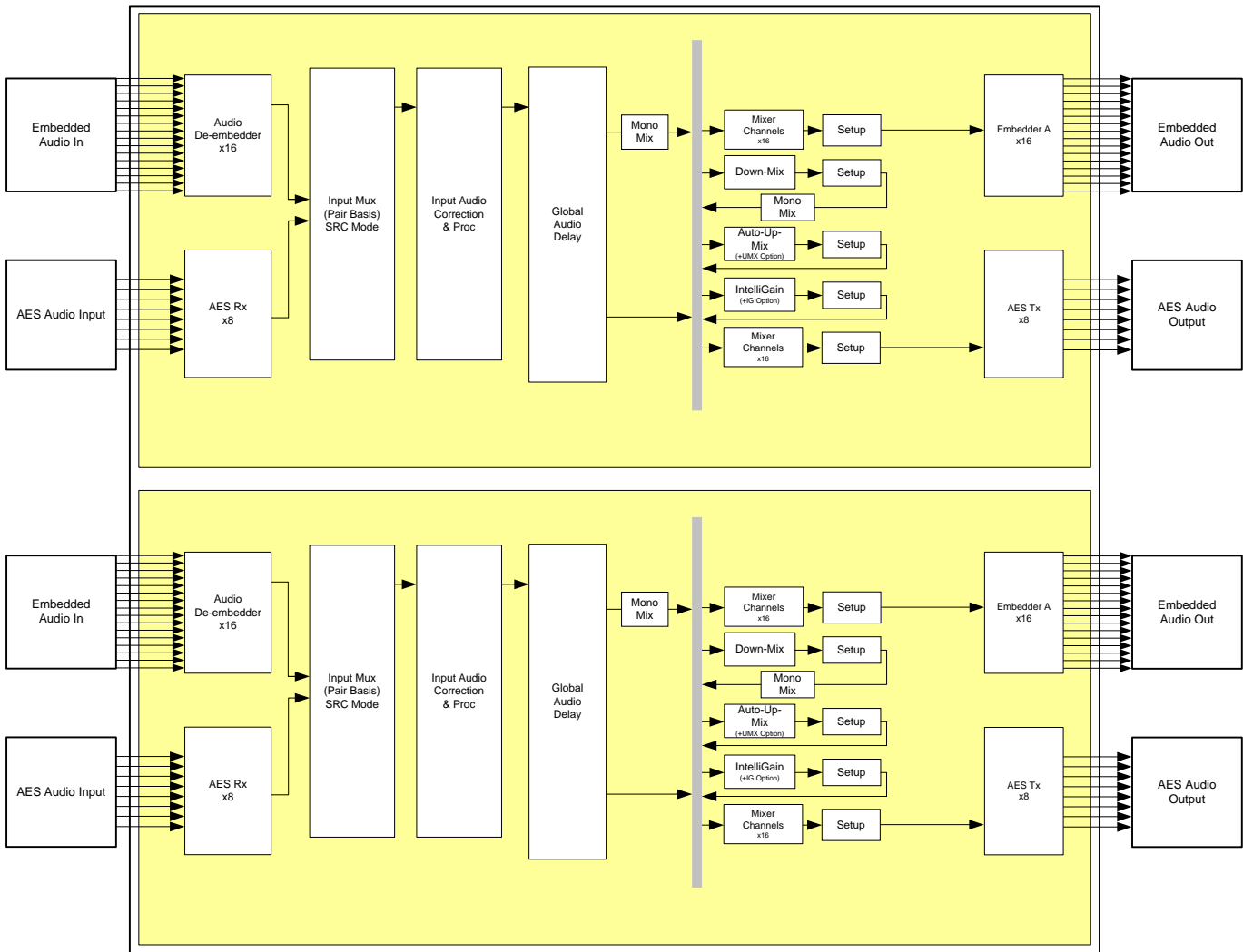


Figure 1-2: 7814 Series Audio Block Diagram (-AES8 Versions)

1.2. PRODUCT OPTIONS

This manual covers all variations and ordering options for the 7814 series platform. The majority of card controls are common across all products variations (7814UDX, 7814UC, 7814XC, 7814HDC) and ordering options. A small number of items change depending on the product variation and ordering option. The following chart provides a list of available product variations/ordering options and outlines what module control changes based on each.

Options	Description
-AES8	<ul style="list-style-type: none"> ● AUDIO control tab "DMX Loss of Video Mode" control is available only with –AES8 versions ● AUDIO INPUT control tab AUDIO INPUT control tab is available only with –AES8 versions ● AUDIO PROC CH1-CH4/CH 5-CH8/CH9-CH12/CH13-16 control tabs All selectable options under “Source X” and “Source Y” controls within AUDIO PROC CH1-CH4 control tab are labeled slightly differently than non-AES versions. In –AES8 versions, selectable options are labeled as <i>Channel 1...N</i> rather than <i>DMX Channel 1...N</i>. This is done to reflect that –AES8 versions of 7814 modules include an up-front audio selector that chooses whether to process de-embedded audio or AES audio for a particular channel pair. ● AUDIO 5.1 DOWN MIX control tab All selectable options in the “L Source”, “R Source”, “C Source”, “LFE Source”, “Ls Source”, “Rs Source” controls within the AUDIO 5.1 DOWN MIX control tab are labeled slightly differently than non AES versions. In the –AES8 versions, selectable options are labeled as <i>Channel 1...N</i> rather than <i>DMX Channel 1...N</i>. This does not to reflect that the –AES8 versions of the modules include an up-front audio selector that chooses whether to process de-embedded audio or AES audio for a particular channel pair. ● AUDIO/VIDEO TRAPS control tab Traps for "AES 1" through "AES 8" audio inputs
-F	<ul style="list-style-type: none"> ● VIDEO control tab Under the “<i>Video Input Source</i>” control, the option to select the Main PGM source and Fiber PGM source.
+UMX2	<ul style="list-style-type: none"> ● AUDIO PROC CH1-4/CH5-8/CH9-12/CH13-16 control tabs Within the “Source X” and “Source Y” controls selection of Up Mix L Front, Up Mix R Front, Up Mix Centre, Up Mix LFE, Up Mix L Surround, Up Mix R Surround, Up Mix Delayed L In, Up Mix Delayed R In is supported only when the +UMX is present. ● UP MIX CONTROL tab The UP MIX control tab is only present with the +UMX option
+IG2	<ul style="list-style-type: none"> ● INTELLIGAIN CONFIGURATION control tab The IntelliGain™ control tab displays the top-level IntelliGain™ control interface. There are a number of parameters that control both the Intelligent leveler and the on-board dynamic processor (compander, expander, limiter)

	<p>● IG PROGRAM CONTROL tab igChannel1, igChannel2, igChannel3, igChannel4, igChannel5, igChannel6, igChannel7, and igChannel8 are valid only when +IG and -AES8 appear in the card name.</p>
<p>+ICL2</p>	<p>● COLOUR LEGALIZE control tab The Colour Legalize control tab displays the control for Soft Clip, Max RGB, Min RGB, High Knee, Low Knee, Negative Compression and Compression Ratio Controls</p>

Table 1-2: Control Interface Differences between 7814 Converters Depending on Product Variation/Ordering Options

The following can assist in the customization and ordering options:
 7814 {UDX/UC/HDC/XC} [-AES8] {-HD / -3G} [-F] [(+UMX2)] [+ICL2] [(+IG2)]

Explanation of notation: / = or, { } = mandatory, [] = optional, () = option requires -AES8

2. INSTALLATION

All 7814 series modules come with a companion rear plate and occupy two slots in the 7800FR frame or three slots in the 7700FR-C. If a 7814 series module is installed in a 7700FR-C without the “slot blocker” installed, the card will not power-up and will show RED on its main status LED. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR manual. Refer to section 8.2 of this manual for more information on the 7814 series slot blocker. Refer to Figure 2-1 for 7814 series rear plate layouts.



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

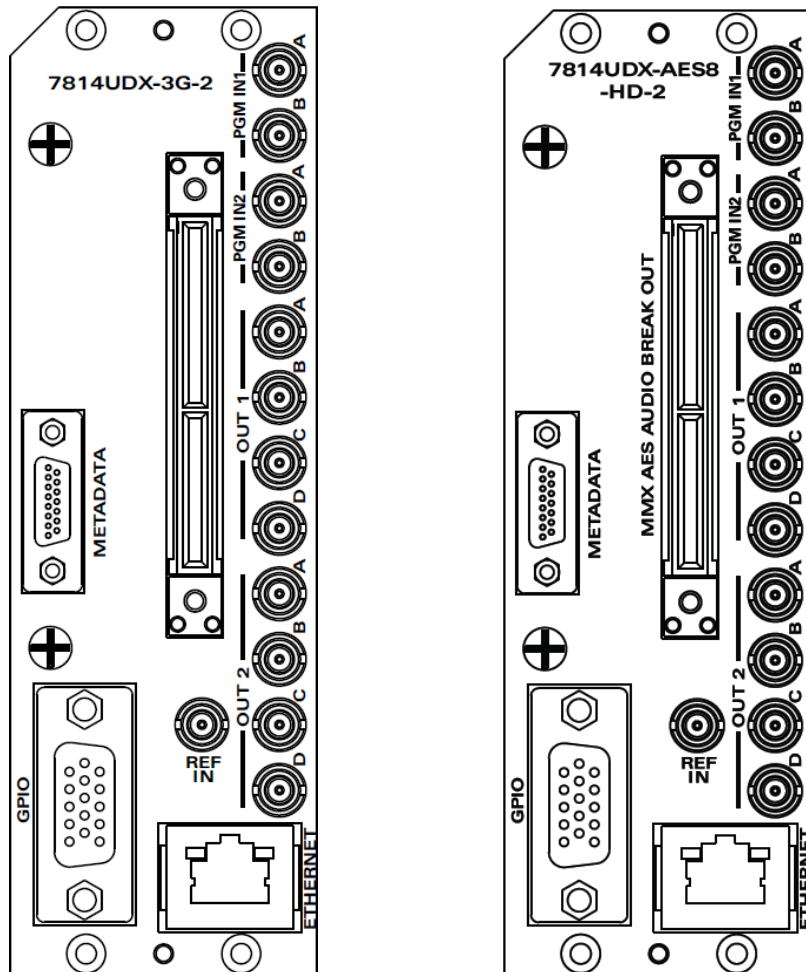


Figure 2-1: 7814XXX-XX-2 Rear Plate Layout & 7814XXX-AES8-XX-2 Rear Plate Layout

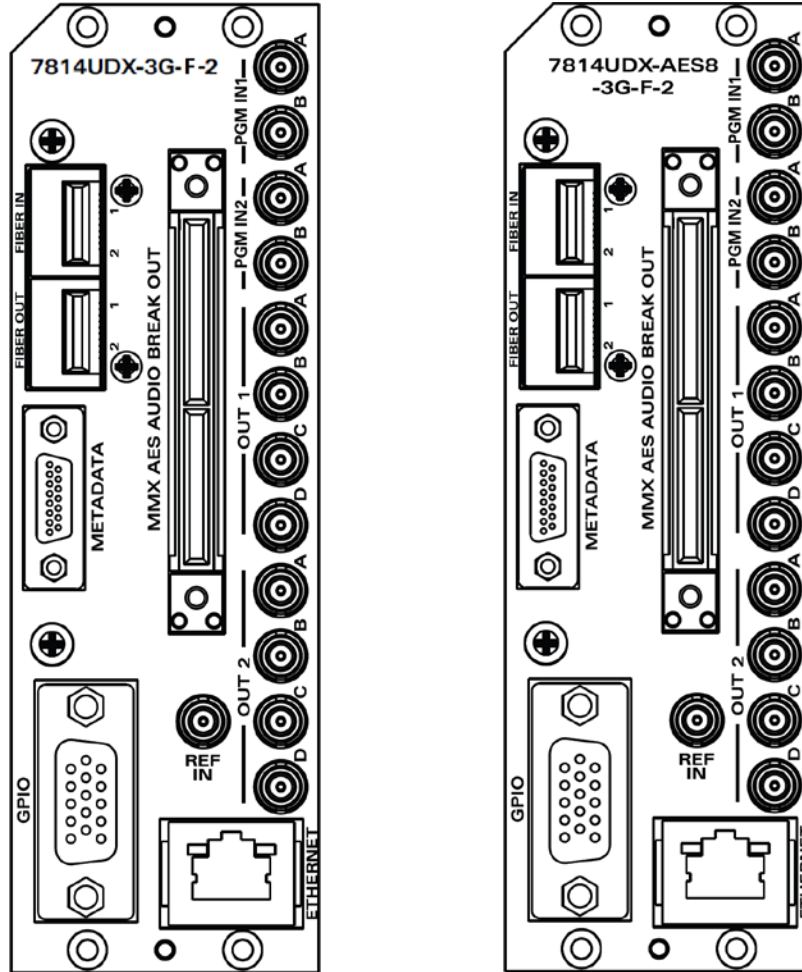


Figure 2-2: 7814XXX-XX-F-2 Rear Plate Layout & 7814XXX-AES8-XX-F-2 Rear Plate Layout

2.1. INPUT/OUTPUT CONNECTIONS

PGM IN1/2 A: Accepts a 10-bit serial digital video signal. –HD versions have inputs compatible with both SMPTE 259M and SMPTE 292M standards. –3G versions have inputs compatible with SMPTE 259M, SMPTE 292M, SMPTE 372M and SMPTE 425M*. The module can be set to receive a specific video standard or set to automatically detect the supplied input video standard. PGM A or PGM B can be selected for subsequent video processing.

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

PGM IN1/2 B: Accepts a 10-bit serial digital video signal. –HD versions have inputs compatible with both SMPTE 259M and SMPTE 292M standards. –3G versions have inputs compatible with SMPTE 259M, SMPTE 292M, SMPTE 372M and SMPTE 425M*. The module can be set to receive a specific video standard or set to automatically detect the supplied input video standard. PGM A or PGM B can be selected for subsequent video processing.

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

PGM OUT1 A/B/C/D: These DIN connectors are used to output video as serial component video. –HD versions have outputs compatible with SMPTE 292M or SMPTE 259M standard. –3G versions have outputs compatible with SMPTE 292M or SMPTE 259M or SMPTE 372M.

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

PGM OUT2 A/B/C/D: These DIN connectors are used to output video as serial component video. –HD versions have outputs compatible with SMPTE 292M or SMPTE 259M standard. –3G versions have outputs compatible with SMPTE 292M or SMPTE 259M or SMPTE 372M.

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

REF IN: This DIN is for connecting a bi-level or tri-level reference. The Reference format is auto-detected by the module. Output video can be timed with respect to the supplied reference using the *H Phase Offset* and *V Phase Offset* module controls. When no reference is provided, the output video is timed with respect to the input video. Reference may also be supplied via the 7700FR-G and 7800FR FRAME REFERENCE inputs. VLPRO is used to select either the card's external reference or the FRAME REFERENCE DIN.

2.2. ETHERNET CONNECTIONS

All 7814 series modules are designed to use either 10Base-T (10 Mbps) or 100Base-TX (100 Mbps) also known as *Fast Ethernet*, twisted pair Ethernet cabling systems. When connecting for 10Base-T systems, category 3, 4, or 5 UTP cable as well as EIA/TIA – 568-100Ω STP cable may be used. When connecting for 100Base-TX systems, category 5 UTP cable is required. Make the network connection by plugging one end of a “straight through” cable into the RJ-45 receptacle of the 7814 modules and the other end into a port of the supporting hub. If you are connecting the 7814 series module directly to an Ethernet port on a computer, you will have to use a “crossover” cable.

Straight-through RJ-45 cables can be purchased or can be constructed using the pin out information in Table 2-1. A colour code-wiring table is provided in Figure 2-4 for the current RJ-45 standards (AT&T 258A or EIA/TIA 258B colour coding shown). Also, refer to the notes following the table for additional wiring guide information.

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

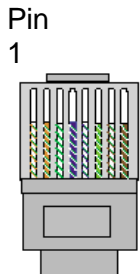


Figure 2-4: Colour Code Wiring for the Current RJ 45 Standards

Note the following cabling information for this wiring guide:

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

The maximum cable run between the 7814 series modules and the supporting hub is 300 ft (90 m).

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

2.3. GPIO CONNECTOR

There are 8 General Purpose Inputs/Outputs (GPIOs) on the 7814 series modules. Each GPIO may be configured to be an input or configured to be an output. These GPIOs are interfaced using a 15-pin DB connector and an associated breakout cable (cable part # WPAES8-DINM-9W-6F). NOTE: The GPIO breakout cable is not included with the module when purchased. Table 2-1 shows the Pin-out of this connector is as follows:

GPIO DB CONNECTOR			
DB-15 Pin	Name	Description	Colour
1	GPIO1	General Purpose Input /Output #1	Red
2	LTC Tx (not used)	External LTC Out	Green
3	GPIO2	General Purpose Input /Output #2	Blue
4	GPIO4	General Purpose Input /Output #4	Purple
5	6 Hz in (not used)	External 6 Hz In	Orange
6	LTC Rx	External LTC IN 1	White
7	Metadata Tx	Metadata Out	A2 DIN PIN
8	GPIO3	General Purpose Input /Output #3	Yellow
9	GPIO8	General Purpose Input /Output #8	- -
10	Metadata Rx	Metadata In	- -
11	GPIO5	General Purpose Input /Output #5	A1 DIN PIN
12	GPIO6	General Purpose Input /Output #6	- -
13	Metadata Tx	Metadata Out	- -
14	GPIO7	General Purpose Input /Output #7	A4 DIN PIN
15	Metadata Rx	Metadata In	A3 DIN PIN
Shell	GND	Ground	- -

Table 2-1: GPIO Connector Pin out

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

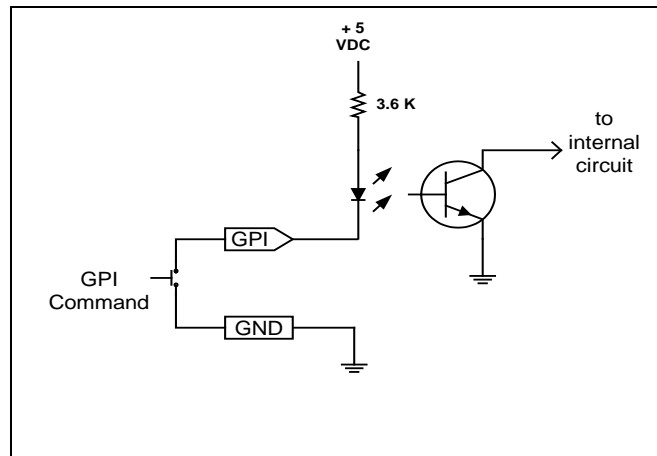


Figure 2-5: GPI Input Circuitry

When a particular GPIO is configured to be a GPO, the interface shown below shall apply. The GPO is active low with internal pull up (10k Ohm) resistors to +5V. When the output goes low, it is able to sink up to 10mA. When high, the signal will go high (+5V). **Do not draw more than 100µA from the output.** Figure 2-6 shows the circuit for the general-purpose output.

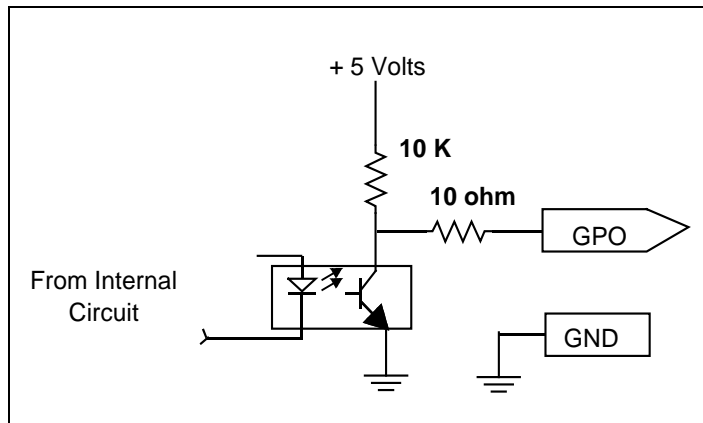


Figure 2-6: GPO Output Circuitry

2.4. AES INPUTS

The –AES8 versions of 7814 series modules support 8x AES inputs per path and are interfaced using a Multi-path Module Conversion breakout (MMX breakout) connector and a breakout cable. The part number for the cable is #WP/1M/MMX-AUDIO. One MMX audio breakout cable is included when the –AES8 option is ordered. The pin-out of the MMX connector is shown in Table 2-2.

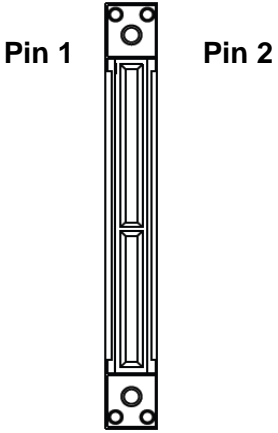
		PIN #	Name	Description
		1	GND	Ground
2	GND	Ground		
3	AES OUT1 1	AES Output 1 Path 1 – Unbalanced		
4	AES OUT1 2	AES Output 2 Path 1 – Unbalanced		
7	GND	Ground		
8	GND	Ground		
9	AES OUT1 3	AES Output 3 Path 1 – Unbalanced		
10	AES OUT1 4	AES Output 4 Path 1 – Unbalanced		
13	GND	Ground		
14	GND	Ground		
15	AES OUT1 5	AES Output 5 Path 1 – Unbalanced		
16	AES OUT1 6	AES Output 6 Path 1 – Unbalanced		
19	GND	Ground		
20	GND	Ground		
21	AES OUT1 7	AES Output 7 Path 1 – Unbalanced		
22	AES OUT1 8	AES Output 8 Path 1 – Unbalanced		
25	GND	Ground		
26	GND	Ground		
27	AES OUT2 1	AES Output 1 Path 2 – Unbalanced		
28	AES OUT2 2	AES Output 2 Path 2 – Unbalanced		
31	GND	Ground		
32	GND	Ground		
33	AES OUT2 3	AES Output 3 Path 2 – Unbalanced		
34	AES OUT2 4	AES Output 4 Path 2 – Unbalanced		
37	GND	Ground		
38	GND	Ground		
39	AES OUT2 5	AES Output 5 Path 2 – Unbalanced		
40	AES OUT2 6	AES Output 6 Path 2 – Unbalanced		
43	GND	Ground		
44	GND	Ground		
45	AES OUT2 7	AES Output 7 Path 2 – Unbalanced		
46	AES OUT2 8	AES Output 8 Path 2 – Unbalanced		

Table 2-2: AES Input Audio Connector Pin out

2.5. AES OUTPUTS

The –AES8 versions of 7814 series modules support 8x AES outputs per path and are interfaced using a Multi-path Module Conversion breakout (MMX breakout) connector and a breakout cable. The part number for the cable is # WP/1M/MMX-AUDIO. One MMX audio breakout cable is included when the –AES8 option is ordered. The pin-out of MMX connector is shown in Table 2-3.

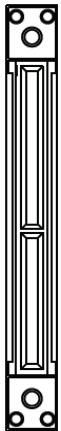
		PIN #	Name	Description
		49	GND	Ground
50	GND	Ground		
51	AES IN1 A	AES Input 1 Path 1 – Unbalanced		
52	AES IN2 A	AES Input 2 Path 1 – Unbalanced		
55	GND	Ground		
56	GND	Ground		
57	AES IN3 A	AES Input 3 Path 1 – Unbalanced		
58	AES IN4 A	AES Input 4 Path 1 – Unbalanced		
61	GND	Ground		
62	GND	Ground		
63	AES IN5 A	AES Input 5 Path 1 – Unbalanced		
64	AES IN6 A	AES Input 6 Path 1 – Unbalanced		
67	GND	Ground		
68	GND	Ground		
69	AES IN7 A	AES Input 7 Path 1 – Unbalanced		
70	AES IN8 A	AES Input 8 Path 1 – Unbalanced		
73	GND	Ground		
74	GND	Ground		
75	AES IN1 B	AES Input 1 Path 2 – Unbalanced		
76	AES IN2 B	AES Input 2 Path 2 – Unbalanced		
79	GND	Ground		
80	GND	Ground		
81	AES IN3 B	AES Input 3 Path 2 – Unbalanced		
82	AES IN4 B	AES Input 4 Path 2 – Unbalanced		
85	GND	Ground		
86	GND	Ground		
87	AES IN5 B	AES Input 5 Path 2 – Unbalanced		
88	AES IN6 B	AES Input 6 Path 2 – Unbalanced		
91	GND	Ground		
92	GND	Ground		
93	AES IN7 B	AES Input 7 Path 2 – Unbalanced		
94	AES IN8 B	AES Input 8 Path 2 – Unbalanced		

Table 2-3: AES Output Audio Connector Pin out

3. SPECIFICATIONS

3.1. SERIAL DIGITAL VIDEO INPUT

Standard:	270 Mb/sec SMPTE 259M 1.485 Gb/sec SMPTE 292M (1080i/720 @ 59.94 or 50 Hz) 2.970 Gb/sec SMPTE 425M* (-3G versions only)
Number of Inputs:	2 (PGM A and PGM B)
Connector:	DIN 1.0/2.3 CECC 22 230, DIN 47297 and DIN 41626
Signal Level:	1V nominal
Input Equalization:	Automatic to 300m @ 270 Mbs with Belden 1694 or equivalent Automatic to 100m @ 1.485 Gbs with Belden 1694 or equivalent Automatic to 80m @ 2.970 Gbs with Belden 1694 or equivalent (-3G version only)
Return Loss:	> 15 dB to 1.5 GHz > 10 dB to 3.0 GHz

3.2. SERIAL DIGITAL VIDEO OUTPUT

Standard:	270 Mb/sec SMPTE 259M 1.485 Gb/sec SMPTE 292M (1080i/720 59.94 or 50 Hz) 2.970 Gb/sec SMPTE 425M* (-3G versions only)
Number of Outputs:	3
Connector:	DIN 1.0/2.3 CECC 22 230, DIN 47297 and DIN 41626
Signal Level:	800 mV nominal
SD Rise/Fall Times:	740 ps nominal
HD Rise/Fall Times:	200 ps nominal
Return Loss:	> 15 dB to 1.5 GHz > 10 dB to 3.0 GHz

3.3. REFERENCE VIDEO INPUT

Type:	HD Tri-Level sync, NTSC or PAL Colour Black 1 V p-p
Connector:	DIN 1.0/2.3 CECC 22 230, DIN 47297 and DIN 41626
Termination:	75 ohm

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

3.4. GENERAL PURPOSE INPUTS AND OUTPUTS

Number:	8 (configurable as inputs or outputs)
Type:	Opto-isolated, active low with internal pull-ups to +5 V
Connector:	DB 15
Signal Level:	Closure to ground
Input Function:	User preset select or side pane fill on/off
Output Function:	Panel on/off tally

3.5. AES INPUTS

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

3.6. AES OUTPUTS

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

3.7. ELECTRICAL

Voltage:	+12VDC
Power:	41 Watts
EMI/RFI:	Complies with FCC regulations for class A devices. Complies with EU EMC directive.

3.8. PHYSICAL

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

4. STATUS LEDS

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

Figure 4-1 depicts status LEDs for the 7814UDX-3G-2 and 7814UDX-AES-3G-2 series modules. LEDs are in the same position and perform the same function for all variations of the 7814 including UDX, UC, XC and HDC versions.

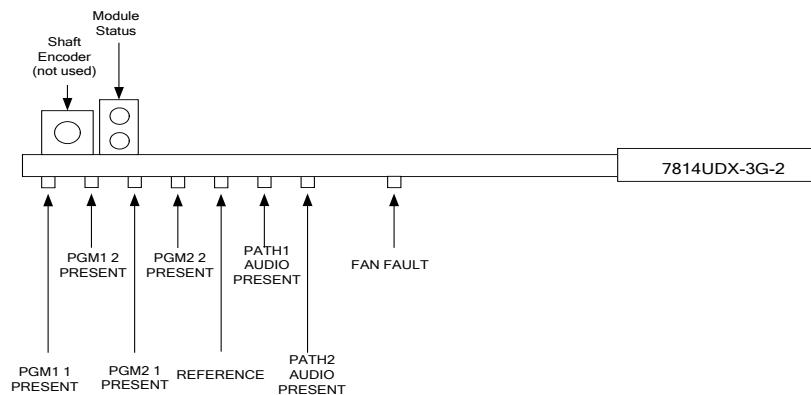


Figure 4-1: Status LEDs

- MODULE STATUS:** This Green LED will be On when the module is operating properly.
- LOCAL FAULT:** This Red LED will be On when an essential module input is missing or the module has another fault.
- PGM1 1 PRESENT:** The **PGM1 1 PRESENT** LED will be green when a valid input signal is present on the **PGM1 1**. It will be off when missing an input signal.
- PGM1 2 PRESENT:** The **PGM1 2 PRESENT** LED will be green when a valid input signal is present on the **PGM1 2**. It will be off when missing an input signal.
- PGM2 1 PRESENT:** The **PGM2 1 PRESENT** LED will be green when a valid input signal is present on the **PGM2 1**. It will be off when missing an input signal.
- PGM2 2 PRESENT:** The **PGM2 2 PRESENT** LED will be green when a valid input signal is present on the **PGM2 2**. It will be off when missing an input signal.
- PATH1 AUDIO PRESENT:** The **PATH1 AUDIO PRESENT** LED will be green when a valid audio signal is detected in embedded Audio group 1 on the first processing path of the module. It will be off if no audio is detected in Audio group one.
- PATH1 AUDIO PRESENT:** The **PATH1 AUDIO PRESENT** LED will be green when a valid audio signal is detected in embedded Audio group 1 on the first processing path of the module. It will be off if no audio is detected in Audio group one.
- REF PRESENT:** The **REF PRESENT** LED will be green when a valid reference signal is present on the REF IN DIN. It will be off when missing a reference signal.
- FAN FAULT** This LED will be green when both on-board fans are operational. If one or both on-board fans fail this LED will be off.

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5. MODULE CONTROL

The 7814 series of products are controlled using VistaLINK® Pro. VistaLINK® PRO operates using Ethernet and SNMP control protocols. The 7814 series modules DO NOT HAVE card edge controls. As a result, 7700FC/7800FC modules must be installed in all frames that house 7814 series modules. Refer to the Evertz website for the most recent firmware for the 7700FC/7800FC. When using VistaLINK® PRO it is also important to ensure that the most recent 7814 series “.JAR” control file is installed. Refer to the Evertz website for the most recent 7814 series “.JAR” file.

For the sake of brevity, the following sections describe module controls in terms of the parameters found within the VLPRO screens for the 7814UDX-AES8-3G-2+UMX2+ICL2+IG2. The vast majority of controls are the same for the UC, the XC and HDC versions of 7814 series modules. Exceptions to this are outlined in section 1.2 of this manual. 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 VistaLINK® the 7814UDX-AES8-3G-2+ICL2+UMX2+IG2 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®.

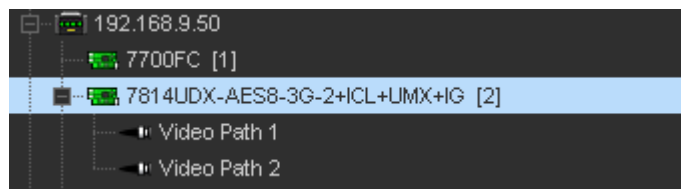


Figure 5-1: Navigation Tree

To access the high-level card controls, select the card that you wish to access (i.e. 7814UDX-AES8-3G-2+ICL2+UMX2+IG2 as shown above) and right click using your mouse and select “View Configuration”. The following six control tabs will appear as shown in **Figure 5-2**.

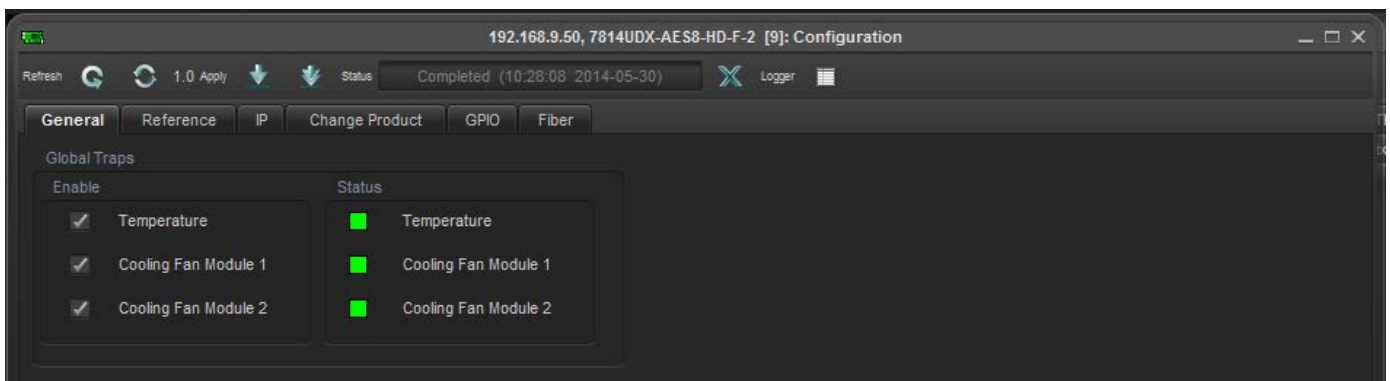


Figure 5-2: High Level Card Controls

General	Contains status traps for module operation including Module temperature, Cooling Fan Module 1 and Cooling Fan Module 2. A more detailed description can be found in later sections of this manual.
Reference Control Tab	Selects the source of the card genlock. Selects which reference input is to be used (e.g. Card, Frame Ref 1/2). A more detailed description can be found in later sections of this manual.
IP	Configuration for defining the IP address, subnet mask and default gateway for the card's Ethernet port. At the time of this manual's writing, the Ethernet port is only used for use with a mini-agent for VistaLINK®. A more detailed description can be found in later sections of this manual.
Change Product	Some options can be purchased from sales and added to the 7814 without hardware upgrades. A more detailed description can be found in later sections of this manual.
GPIO	Contains controls for setting up and configuring the GPIO interface on the rear plate. Each GPIO can be configured as either an input or output. GPIO Status information is also available on this Tab.
Fiber (-F option Only)	The Fiber control Tab gives monitoring ability for the SFP modules inserted into the rear-plate. These include SFP part number, Firmware, Version, Laser Rx receive power and Laser Tx wavelengths. Fiber traps are also configured on this Tab.

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 and select “View Configuration”. Each processing path has the following control tabs shown in **Figure 5-3** for path 1 and path 2. As controls for path 2 are identical as controls for path 1, for sake of brevity only controls for path 1 will be described in the manual.

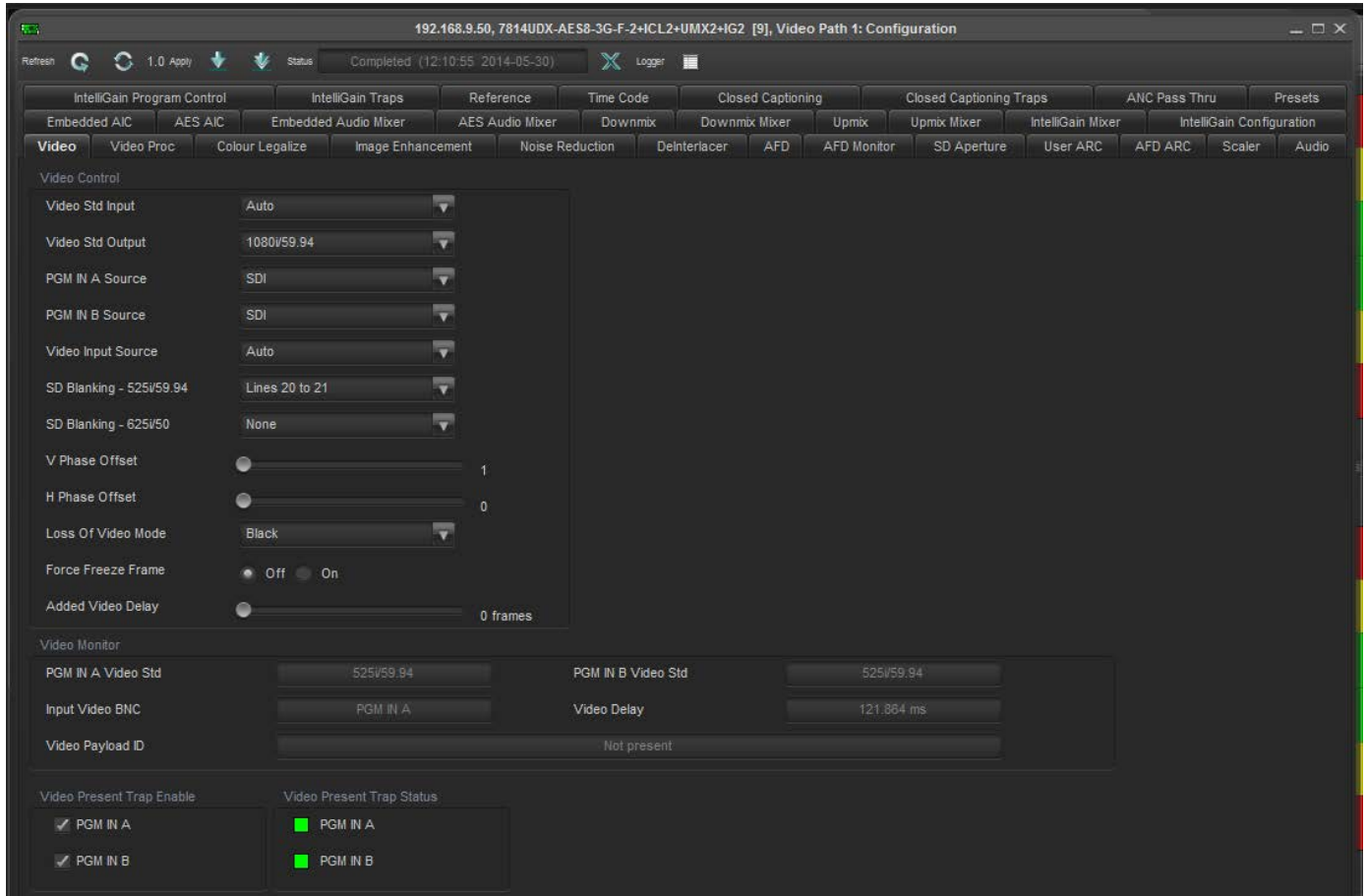


Figure 5-3: Path 1 and 2 Processing Path

Within *VistaLINK*®, the 7814 series of products have the following main control tabs:

CONTROL TAB	DESCRIPTION
Video	Configuration for the source of video, the input and output video standards and frame sync output timing. The status of several monitored video parameters are also reported in this control tab. In addition, Video Present input traps can also be found in the control tab.
Video Proc	Configuration for setting video proc controls including YCbCr gains/offsets, RGB gains/offsets, Hue, Saturation, Video Level, Gamma and RGB colour legalization.
Card Reference	Configuration of the source of video reference, and the prioritized reference fail over, and reference priority selections.
Colour Legalize (+ICL2 option)	Configuration for Colour Legalizer controls including soft clip enable/disable, Max RGB, Min RGB, high knee, low knee, negative compression, and compression ratio
Image Enhancement	Configuration for the image enhancement process including enhancement enable/disable, detail gain, enhancement limit, horizontal band, vertical intensity, luma floor and the detail noise floor.
Noise Control	Configuration for setting noise reduction for Motion Adaptive Spatial-Temporal Noise Reduction.
De-interlacer Control	Configuration for setting key operating modes and key thresholds for the internal video de-interlacer.
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. Note that when the AFD Stamp Source is set to 'Use Scaler', the AFD Stamp control within the Scaler control tab is disabled.
AFD Monitor	SMPTE2016-1 Monitor - Monitoring tab used to display the incoming/outgoing Active Format Description (AFD)
SD Aperture Control	Configuration for setting the SD Aperture to be used when performing scaling and ARC operations including independent settings for both Clean and Production Apertures.
USER ARC	Configuration for defining and naming custom user aspect ratios.
AFD ARC	Configuration for defining what aspect ratio conversions will be performed in response to incoming AFD values. Each incoming AFD code can select from the predefined list of ARC modes or a user defined ARC mode. These responses are defined within this control tab.
Scaler	Configuration for setting the scaler aspect ratio conversion (ARC) mode, the default AFD stamping mode and the default side panel colours. In addition, scaler filter bandwidths and H/V edge processing controls 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.
Audio	Configuration for enabling and disabling audio embedders, setting audio delay and setting sample rate converter (SRC) operating modes. In addition, C bit processing and default audio operating modes are specified within this control tab. The status of several monitored audio parameters are also reported in this control tab.

Embedded AIC (Audio Input Correction)	<p>Channel 1 - 8 - Configuration for user correction of the audio input for Ch1 – Ch8 including Gain, inversion and Channel delay for embedded audio.</p> <p>Channel 9 - 16 - Configuration for user correction of the audio input for Ch9 – Ch16 including Gain, inversion and Channel delay for embedded audio.</p>
AES AIC (Audio Input Correction)	<p>Channel 1 - 8 - Configuration for user correction of the audio input for Ch1 – Ch8 including Gain, inversion and Channel delay for AES Audio.</p> <p>Channel 9 - 16 - Configuration for user correction of the audio input for Ch9 – Ch16 including Gain, inversion and Channel delay for AES Audio.</p>
Embedded Audio Mixer	<p>Channels 1 - 4 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH1, CH2, CH3, CH4.</p> <p>Channels 5 - 8 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH5, CH6, CH7, CH8.</p> <p>Channels 9 - 12 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH9, CH10, CH11, CH12.</p> <p>Channels 13 - 16 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH13, CH14, CH15, CH16.</p>
AES Audio Mixer	<p>Channels 1 - 4 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH1, CH2, CH3, CH4.</p> <p>Channels 5 - 8 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH5, CH6, CH7, CH8.</p> <p>Channels 9 - 12 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH9, CH10, CH11, CH12.</p> <p>Channels 13 - 16 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels CH13, CH14, CH15, CH16.</p>
Down Mix	<p>Configuration for defining the source of audio channels for the 5.1 down-mix process and further defining the down mix type and level parameters.</p>
Downmix Mixer	<p>Channels L, R, C - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels L, R, C.</p> <p>Channels LFE, Ls, Rs - Configuration for channel swapping, audio gain, audio inversion and mono mixing for outbound audio channels LFE, Ls, Rs.</p>
UpMix Control (+UMX2)	<p>Configures the source audio channel for stereo to 5.1 up-mixing and further defining key up-mix algorithm parameters. Auto Up-mix will automatically detect whether a stereo or 5.1 audio is applied at the input</p>
UpMix Mixer (+UMX2)	<p>Channels L, R, C, LFE - Configuration for channel swapping, audio gain, audio inversion and mono mixing for inbound audio channels L, R, C, LFE on the Up-mix Block.</p> <p>Channels Ls, Rs, Pass L, Pass R - Configuration for channel swapping, audio gain, audio inversion and mono mixing for inbound audio channels Ls, Rs, Pass L, Pass R on the Up-mix Block.</p>

<p>IntelliGain Mixer (+IG Only)</p>	<p>Module 1 – Configuration for the first IntelliGain module.</p> <p>Channels 1 - 4 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for inbound audio channels CH1, CH2, CH3, CH4 on the IntelliGain block.</p> <p>Channels 5 - 8 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for inbound audio channels CH5, CH6, CH7, CH8 on the IntelliGain block.</p> <p>Module 2 – Configuration for the second IntelliGain module.</p> <p>Channels 1 - 4 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for inbound audio channels CH1, CH2, CH3, CH4 on the IntelliGain block.</p> <p>Channels 5 - 8 - Configuration for channel swapping, audio gain, audio inversion and mono mixing for inbound audio channels CH5, CH6, CH7, CH8 on the IntelliGain block.</p>
<p>IntelliGain Configuration (+IG Only)</p>	<p>Configuration used to set up the IntelliGain controls including Program Configuration Source, Content Attack and Release times, Comander Attack and Release Times and IntelliGain Audio Sources.</p>
<p>IntelliGain Program Control (+IG Only)</p>	<p>As IntelliGain™ detects valid audio programs, the VistaLINK® program configuration tabs will become activated. The user interface and program configuration tabs are identical.</p> <p>IG-Program 1, 2, 3, 4, 5, 6, 7, 8 – Configures the IntelliGain™ Program 1, 2, 3, 4, 5, 6, 7, 8 settings, including IntelliGain state, Leveler Controls, Comander controls, Peak limiter, Maximum Gain, threshold settings and Monitoring.</p>
<p>IntelliGain Traps (+IG Only)</p>	<p>The IntelliGain Traps are used to alert VistaLINK of all the traps for Minor, Major and Critical loudness for each of the IntelliGain programs.</p>
<p>Time Code</p>	<p>Configuration for timecode related selection controls including D-VITC and ANC related timecode source selections and write lines.</p>
<p>CC Control</p>	<p>Configuration for the closed captioning translation process including service level mapping and HD write lines.</p>
<p>CC Fault Traps</p>	<p>Configuration for enabling and disabling specific Closed Captioning fault traps and viewing Close Captioning trap status.</p>
<p>ANC Pass Thru</p>	<p>Configuration for enabling passing of specified ANC data not normally processed by the module can be passed using these controls.</p>
<p>Presets</p>	<p>Configuration for managing card presets including storing configurations to specific user presets, recalling specific user presets and enabling/disabling Auto Recall Presets functionality.</p>

6. HIGH LEVEL CARD CONTROLS

To access high-level card controls, select the card from the navigation tree that you wish to configure (i.e. 7814UDX-AES8-3G-2) and right click using your mouse and select “View Configuration”. The following six control tabs will appear.

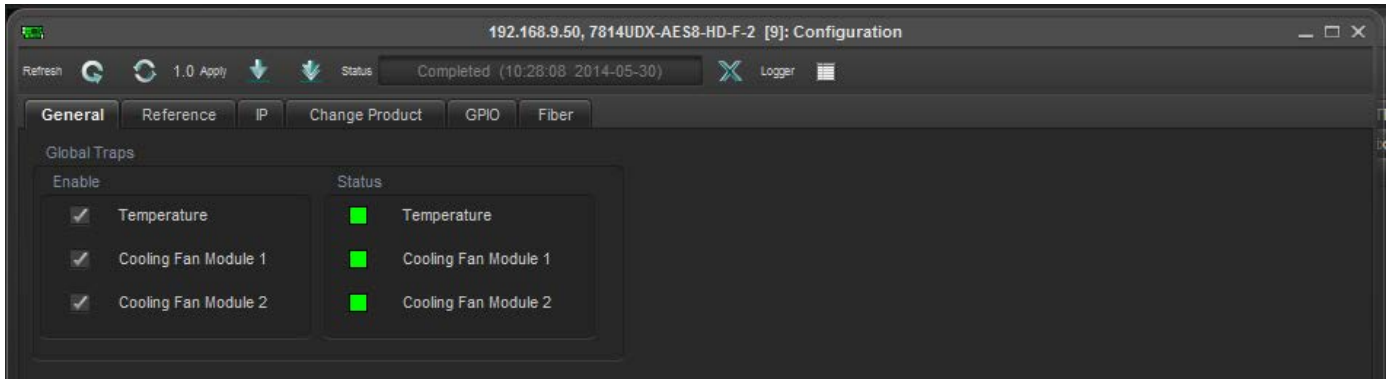


Figure 6-1: High Level Card Controls

6.1. GENERAL CONTROL TAB

The VLPRO interface for configuring the GENERAL control tab appears as follows:

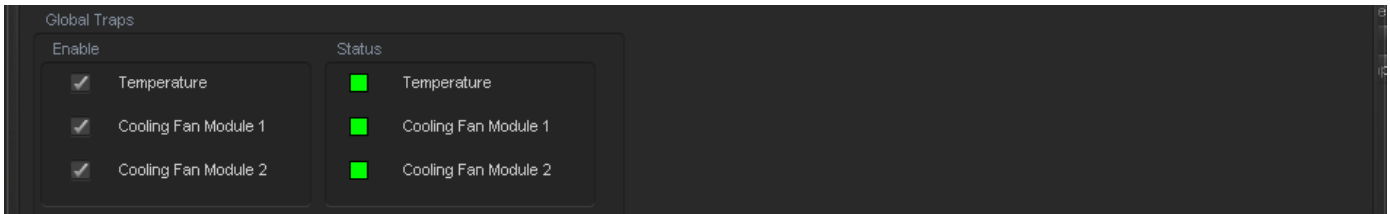
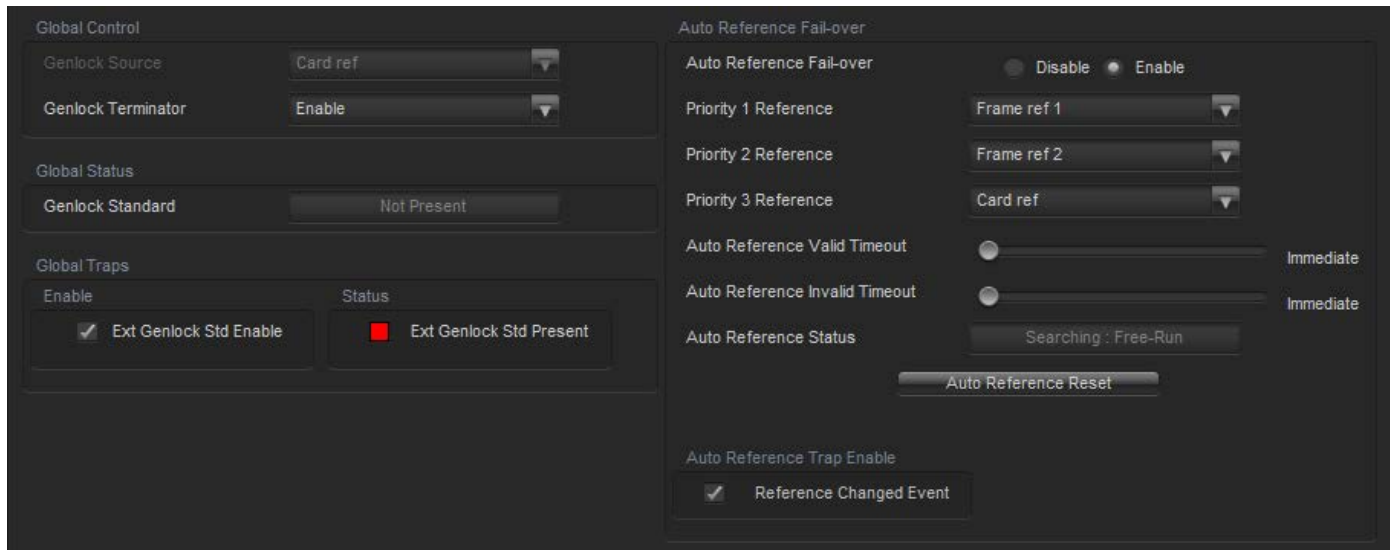


Figure 6-2: Misc Faults Tab

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.

6.2. REFERENCE CONTROL TAB

The *Genlock* control tab is used to configure which reference input connector is configured as an input (for Genlock) and to define the source of Genlock for the module. There is also the ability for the user to select if the input reference is 75 ohm or Hi-Z. Auto Reference fail-over can also be configured on the Tab.



6.2.1. Genlock Control

6.2.1.1. Genlock Source

The VLPRO interface for the **Genlock Source** control appears as follows:

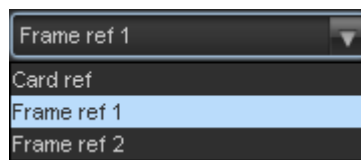


Figure 6-3: Genlock Source Control

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

Card Ref	When <i>Card Ref</i> is selected, the module will lock to the external reference signal applied to the module's rear panel.
Frame 1	When <i>Frame 1</i> is selected, the module will lock to the external reference applied to the 7800 frame REF 1 input.
Frame 2	When <i>Frame 2</i> is selected, the module will lock to the external reference applied to the 7800 frame REF 2 input.



Note that if the selected genlock reference disappears or is not valid, the card will lock to incoming video or free-run. (See Section 7.28.1.2)

6.2.1.2. Genlock Terminator

The genlock terminator control allows for software selectable 75 Ohm or HI-Z termination on the reference input. When this control is set to disable, the module will setup the reference termination to Hi-Z. When this is set to enable, the module will setup the reference termination for 75 Ohm.

6.2.2. Global Status

6.2.2.1. Genlock Standard Status

The *Genlock Standard* reports if a valid video reference has been supplied to the selected reference input and indicates the standard that is detected when a valid reference is applied.

6.2.3. Global Genlock Traps

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.

6.2.4. Auto Reference Fail-over

6.2.4.1. Auto Reference Fail-Over Enable Parameter

The *Auto Reference Fail Over Enable* is used to set a Priority Genlock sequence. When enabled the module will automatically fail-over to the next priority reference input selected in the reference priority controls.

When *Prioritized Reference Fail Over* is Enabled, the following controls are enabled.

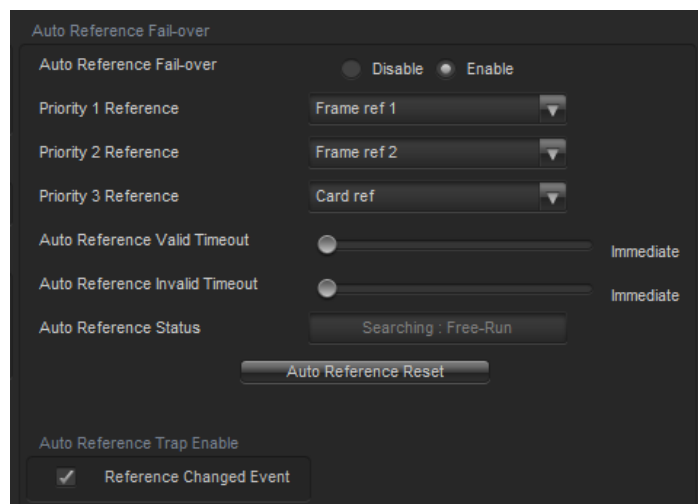
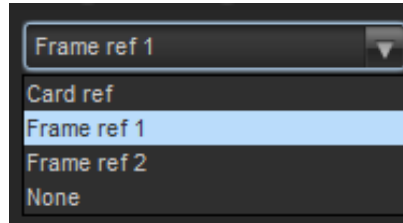


Figure 6-4: Prioritized Reference Fail Over Options

6.2.4.2. Priority 1 Reference Select

This control is used to set the desired first priority reference point

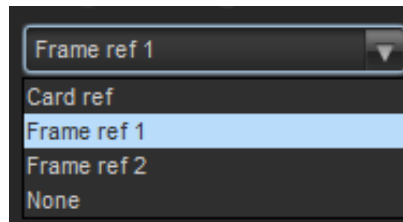
- To select locking to the incoming video, select Video (none).
- To select the REF IN BNC, choose External genlock.
- To select Frame Ref 1 on the 7700FR-G or the 7800FR, choose Frame reference 1
- To select Frame Ref 2 on the 7700FR-G or the 7800FR, choose Frame reference 2
- To select No reference input select None



6.2.4.3. Priority 2 Reference Select

This control is used to set the desired second priority reference point

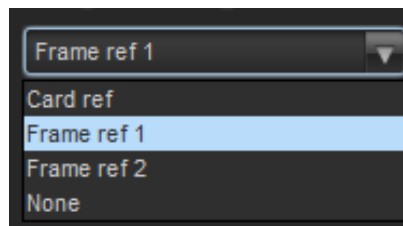
- To select locking to the incoming video, select Video (none).
- To select the REF IN BNC, choose External genlock.
- To select Frame Ref 1 on the 7700FR-G or the 7800FR, choose Frame reference 1
- To select Frame Ref 2 on the 7700FR-G or the 7800FR, choose Frame reference 2
- To select No reference input select None



6.2.4.4. Priority 3 Reference Select

This control is used to set the desired second priority reference point

- To select locking to the incoming video, select Video (none).
- To select the REF IN BNC, choose External genlock.
- To select Frame Ref 1 on the 7700FR-G or the 7800FR, choose Frame reference 1
- To select Frame Ref 2 on the 7700FR-G or the 7800FR, choose Frame reference 2
- To select No reference input select None



6.2.4.5. Auto Reference Valid Timeout

The *Reference Valid Timeout* sets a user specified time that the reference input will return to the Priority 1 Reference when a valid genlock signal is re-asserted.

6.2.4.6. Auto Reference Invalid Timeout

This control allows the user to set a timeout length when a reference signal is lost on the Priority 1 Reference input. Once the module confirms that, the genlock input is no longer valid

6.2.4.7. Auto Reference Status Monitor

The Auto reference Status Monitor is used to see what the current Priority the module is under. It will report either Priority 1 or Priority 2 and the source of the current genlock input.

6.2.4.8. Auto Reference Reset Button

The Reference Reset Button allows the user to reset the *Prioritized Reference Fail Over* back to original settings

6.2.4.9. Reference Changed Event

The *Reference Changed Event* trap will send a monitoring trap back to VLPro in the event the module losses input reference and changes over to the next priority reference input. 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.

6.3. IP CONTROL TAB

6.3.1. IP Configuration through VLPro

All 7814 series modules have a dedicated Ethernet port for controlling module functions as a 7814 mini-agent.

Setting the IP address of the 7814 series dedicated Ethernet port is done through VLPRO using the IP control tab. To set the IP address, type the desired network settings into the IP ADDRESS, SUBNET MASK and DEFAULT GATEWAY fields and then press APPLY.



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

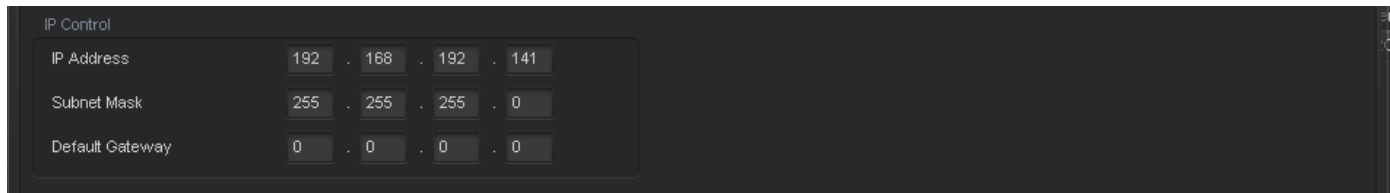


Figure 6-5: IP Control

6.3.2. IP Configuration through serial com port (Not Implemented at time of writing)

Alternatively, the IP address can be set through the card edge serial connector. To configure the IP address through the serial port. Before inserting the front card, connect the Evertz serial ribbon cable to the supplied header J3 on the module processor board and connect 9-pin d-type end of the cable to a serial port on your computer. Open a Terminal session and configure the port for the following configuration:

Bits per second	115200
Data Bits	8
Parity	None
Stop Bits	2
Flow Control	None

Once a terminal connection is established, you can log into the module using the following criteria.

Username:	customer
Password:	customer

This will bring you to the user IP configuration menu, which will allow you to configure the IP address, Gateway and netmask for the dedicated Ethernet port on the rear-plate.

6.4. CHANGE PRODUCT TAB

Some options can be purchased from sales and added to the 7814 without hardware upgrades. This tab allows for module upgrades that are purchased from sales.

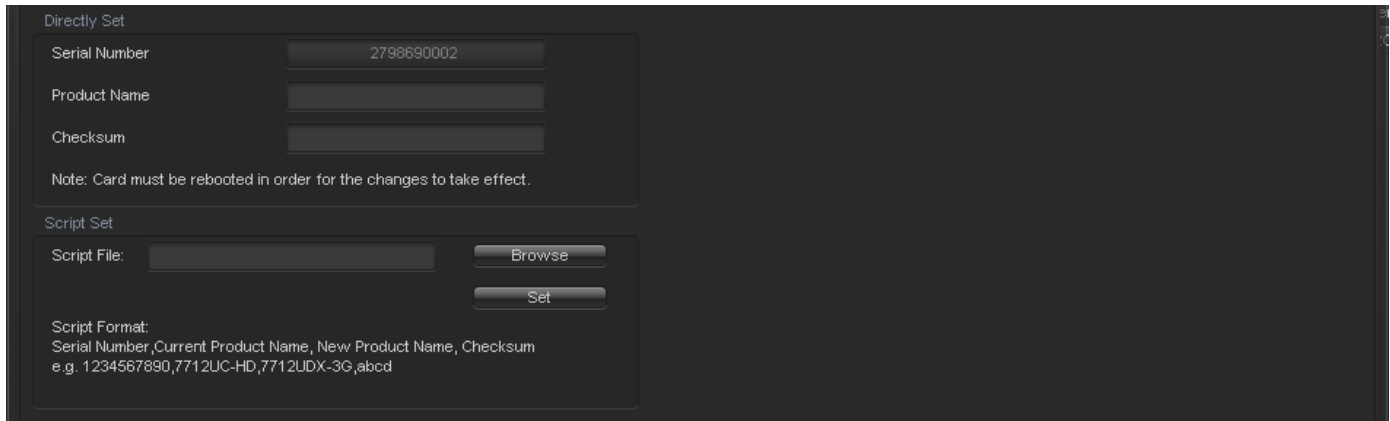


Figure 6-6: Change Product Tab

6.4.1. Directly Set

6.4.1.1. Serial Number

The serial number is loaded by the manufacturer and will be displayed in this location. When contacting sales for an option upgrade you will need to quote this number.

6.4.1.2. Product Name

The *product name* entry area is used to enter in the name of the product that the module will be upgrade to. Please ask your sales rep for the proper product name when upgrading your module.

6.4.1.3. Checksum

The check sum location will contain the verification code that the Evertz sales department will provide when the options have been purchased.



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

6.4.2. Script Set

6.4.2.1. Script File

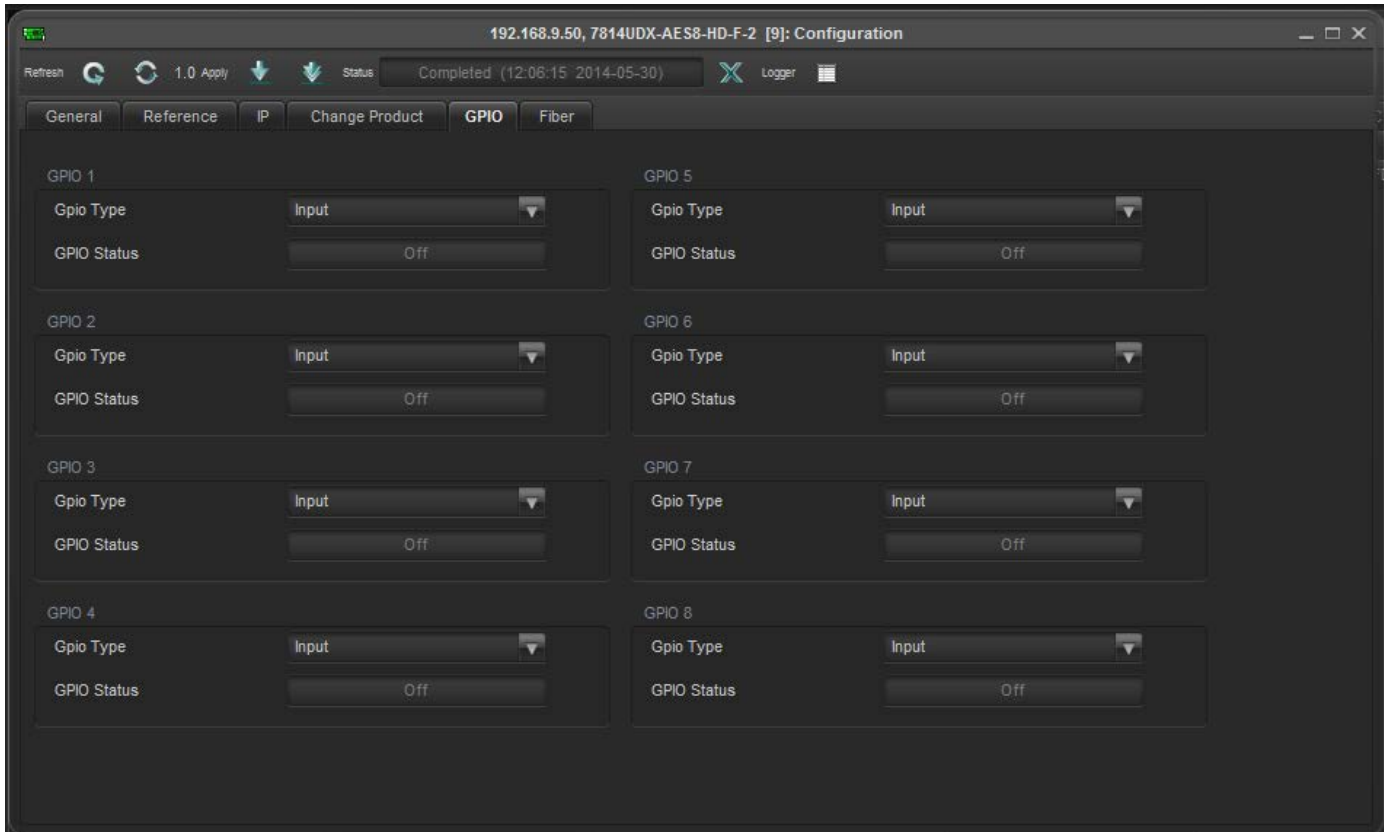
When upgrading the 7814 cards a script file could be sent to the module to make the upgrade process easier.

If using a script file for upgrading follow these steps:

1. Browse to the location of the file on your computer.
2. Press set to send the script file to the card
3. Once done restart the card for the settings to take effect.

6.5. GPIO CONTROL TAB

The GPIO control Tab in the Global configuration window is used to configure the direction of the external GPIO's located on the rear-plate. There are 8 external GPIO located on the rearplate. All GPIO controls operate in the same fashion. For sake of beifity only controls for GPIO one will be described in the manual.



6.5.1. GPIO 1

6.5.1.1. GPIO Type control

The GPIO Type control is used to configure the direction on the specified GPIO. To set the GPIO as an input select Input for the drop down menu. To configure the GPIO as an output select output from the drop Down menu.

6.5.1.2. GPIO Status

The GPIO status monitor allows for quick reference to determine if the GPIO has been enabled.

6.6. FIBER CONTROL TAB (-F OPTION ONLY)

The Fiber control Tab shows various monitoring status' and overall health of the SFP modules inserted into the rear-plate. These include Part Name, Firmware, Laser receive power and Laser transmit wavelength. Various SFP health traps can also be configured on this tab. The following section describes these monitors in more detail.

6.6.1. Fiber Rx

6.6.1.1. Part Number

This parameter reports full part name of SFP fiber Rx module

6.6.1.2. Firmware

This parameter reports SFP fiber Rx module firmware version information

6.6.1.3. Version

This parameter reports SFP fiber Rx module firmware identifier

6.6.1.4. Laser Receive Power

This parameter reports fiber Rx receive power status

6.6.1.5. Low Power Fault Threshold

This parameter selects the threshold in dBm to trigger a fiber Rx low power fault

6.6.2. Fiber Tx

6.6.2.1. Part Number

This parameter reports full part name of SFP fiber Tx module

6.6.2.2. Firmware

This parameter reports SFP fiber Tx module firmware identifier

6.6.2.3. Version

This parameter reports SFP fiber Tx module firmware version information

6.6.2.4. Laser Wavelength

This parameter reports SFP fiber Tx laser wavelength in nanometres (nm)

6.6.3. Trap Status

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.

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7. CONFIGURING THE VIDEO PATH CONTROLS

The *Video Path* controls are used to configure the main conversion controls for both video and audio. Each path is listed in the tree and can be seen when the card is expanded in VLPro. Once the card has been expanded both conversion paths can be selected for further configuring. Figure 7-1 shows the control tabs available for each conversion path. For sake of brevity only the controls for video path one will be described in the manual as the controls for video Path 2 are identical.

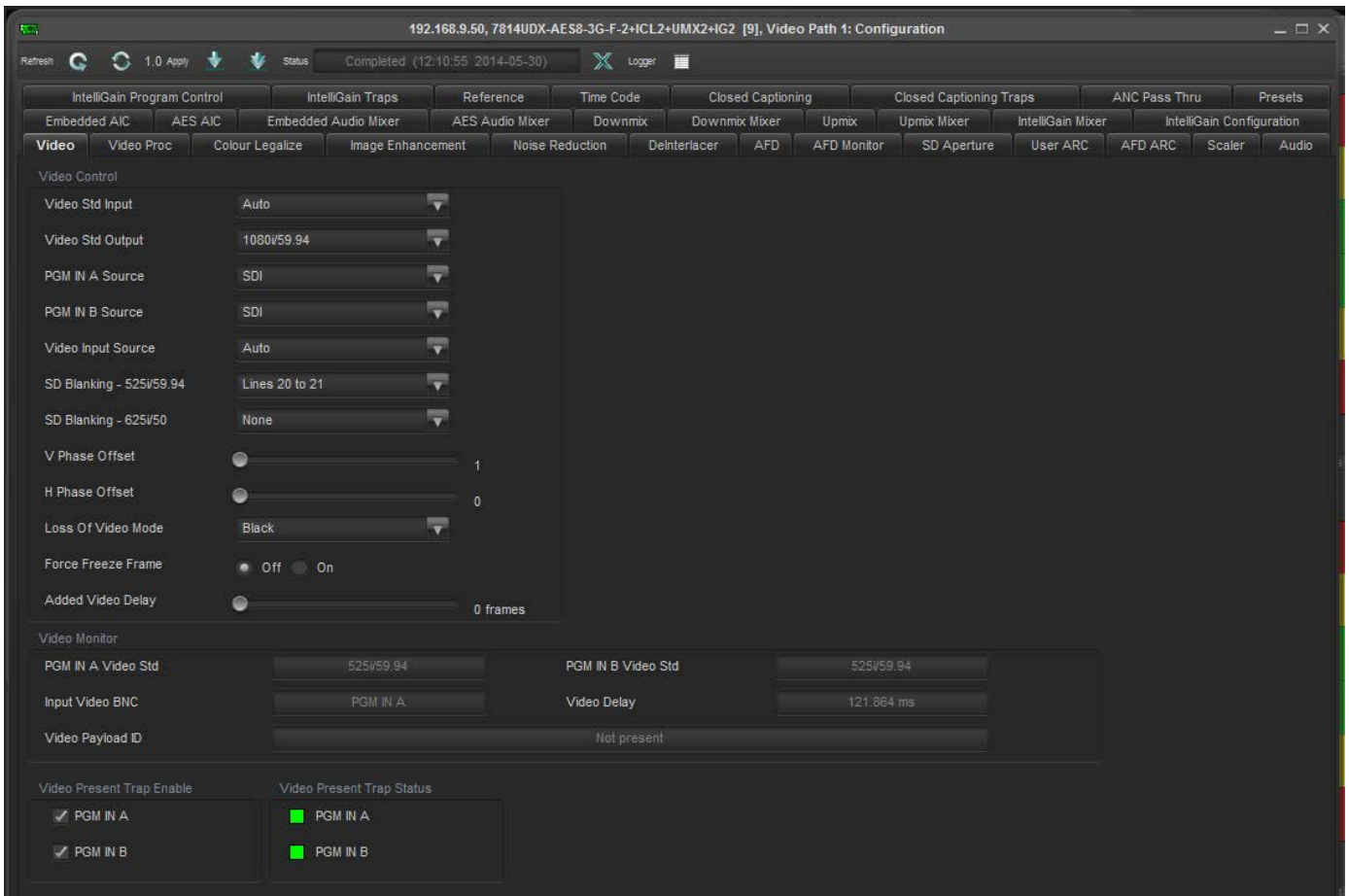


Figure 7-1: Video Tab

7.1. VIDEO CONTROL TAB

The video control tab contains the main controls used for configuring the conversion path including source of video, the input and output video standards, and frame sync output timing. In addition, the loss of video mode, user added video delay and Force Freeze frame controls can also be found on this tab. The status of several monitored video and traps parameters are also reported in this control tab.

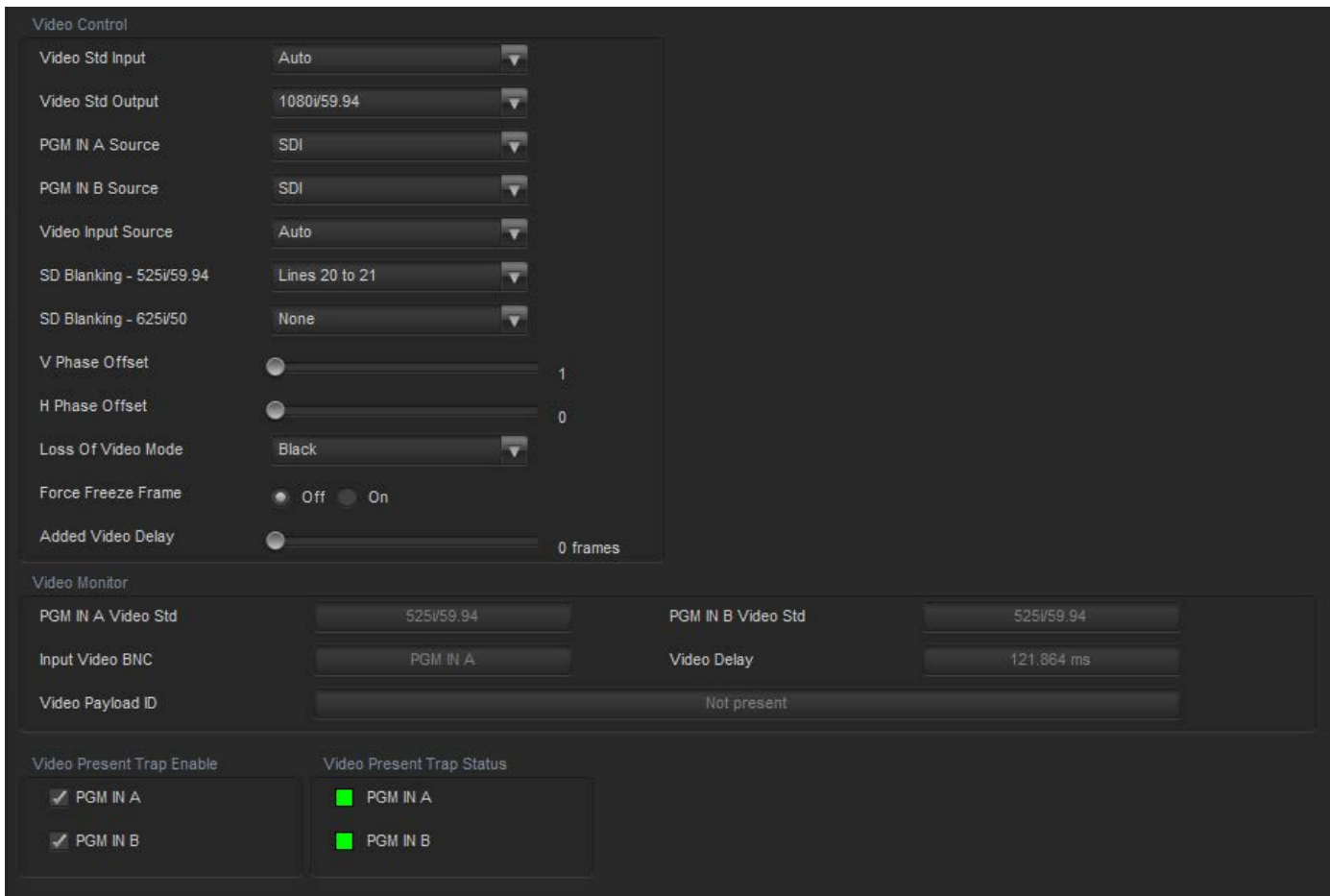
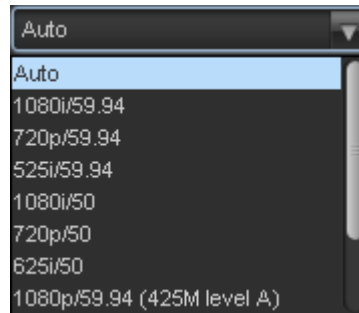


Figure 7-2: Video Tab

7.1.1. Video Control

7.1.1.1. Video Standard 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 drop down menu for **Video Std Input** appears as follows:



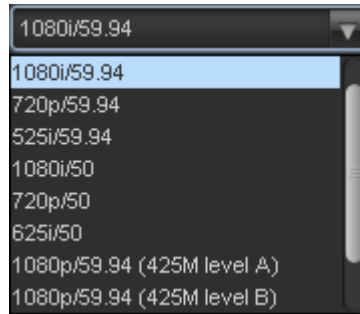
When the input standard is set to *Auto*, the module will auto detect the video standard. The full set of available input video standards includes:

* For -3G versions only.

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

7.1.1.2. Video Standard Output

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



The full set of available output video standards includes:

* For -3G versions only

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

7.1.1.3. PGM IN A Source (-F Option Only)

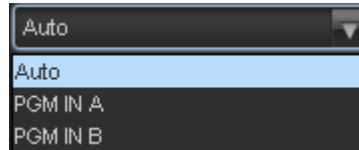
The PGM IN A source control is used to select whether the Input video for PGM IN A is to be source by the SDI input of the Fiber input. To source this input with the DIN connector on the rear-plate select SDI. To source this input with the Fiber input select Fiber in the drop-down menu.

7.1.1.4. PGM IN B Source (-F Option Only)

The PGM IN B source control is used to select whether the Input video for PGM IN B is to be source by the SDI input of the Fiber input. To source this input with the DIN connector on the rear-plate select SDI. To source this input with the Fiber input select Fiber in the drop-down menu.

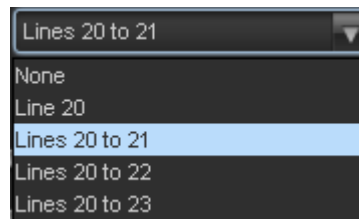
7.1.1.5. Video Input Source

The **Video Input Source** control selects whether the source of input video will be the PGM IN A or the PGM IN B DIN connector. In this control, select PGM IN A to process video supplied on PGM IN A through the main up/down/cross conversion path. Select PGM IN B to process video supplied on PGM IN B through the main up/down/cross conversion path. Select *Auto* to enable the card to automatically fail-over to the alternative input DIN should video on the DIN in active use become invalid for any reason. The drop down for **Video Input Source** appears as follows:



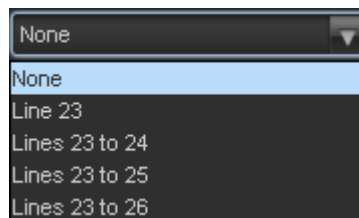
7.1.1.6. SD Blanking – 525i/59.94

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



7.1.1.7. SD Blanking – 625/50

With this control, you can adjust which standard definition lines will be blanked prior to processing SD input signals. It is customary to blank line 23 where closed caption information may be present. Note that the caption translation process will still occur as expected even when line 23 is blanked. This control simply prevents caption waveforms from being processed as video. The drop down for **SD Blanking** appears as follows:



7.1.1.8. Vertical Phase Offset

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

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



Note: The slider is available for selecting *H* and *V Phase Offsets*. To increment, 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.

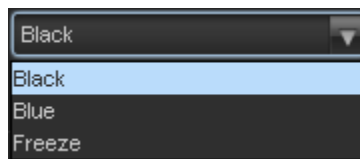
7.1.1.9. Horizontal Phase Offset

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

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

7.1.1.10. 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 *Loss of Video Mode* drop down menu appears as follows:



7.1.1.11. Force Freeze Frame

This control Enables or Disables *Force Freeze Frame*. It is a manual user control to freeze the output of the card. When off the module will run as expected. When enabled the output picture will freeze

7.1.1.12. User Added Video Delay

This slider control is used to add additional user delay to the video. To add additional frames of video delay slide the slider to the right. Up to an additional 12 frames of delay can be added.

7.1.2. Video Monitor

The *Video Monitor* section enables the user to view the status of video related parameters. The following sections describe the monitoring in detail.

7.1.2.1. PGM IN A Video Standard

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

7.1.2.2. PGM IN B Video Standard

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

7.1.2.3. Input Video BNC

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

7.1.2.4. Video Delay

Video Delay reports video delay through the card in ms.

7.1.2.5. Video Payload ID

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

7.1.3. Video Traps

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.

7.2. VIDEO PROCESSING TAB

The *Video Proc* control menu as shown in Figure 7-3 is used to configure parameters associated with the video processing functions of the converter. Sections 7.2.1 to 7.2.1.8 provide detailed information about each of the menu items.



Figure 7-3: Video Proc Tab



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

7.2.1. Video Proc

7.2.1.1. RGB Clipper

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

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

7.2.1.2. Gain Levels

Eight controls set the gain of the video. With these controls, the user can adjust the gain of the three components in either the Y Cr Cb domain or the R G B domain over a range of -50% to 100% in 0.1% steps. Gain adjustments in the Y, Cb, and Cr domain are made first, and then gain adjustments in the RGB domain are made second. 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.

7.2.1.3. DC Offsets

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

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

7.2.1.4. Hue

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

- Hue:** Ranges from -180 to 180 degrees in 0.1-degree increments.

7.2.1.5. Gamma Adjust

The *Gamma Adjust* control enables and disables the gamma adjustment functionality of 7814 series modules. When enabled, the module will allow the user to adjust the gamma level. If disabled, then the gamma level is set to 0.

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

7.2.1.6. Gamma Level

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

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

7.2.1.7. Red, Green, Blue Gamma Levels

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

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

7.2.1.8. Reset Button

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

7.3. COLOUR LEGALIZE TAB (+ICL2)

The *Colour Legalize* control menu as shown in Figure 7-4 is used to configure parameters associated with the video processing functions of the converter. Sections 7.2.1 to 7.2.1.8 provide detailed information about each of the menu items.

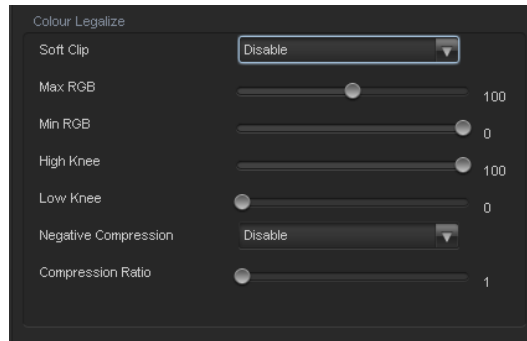


Figure 7-4: Colour Legalize Tab

7.3.1. Colour Legalize

7.3.1.1. Soft Clip

Soft Clip control will enable/disable the colour compander controls

7.3.1.2. Max RGB

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

7.3.1.3. Min RGB

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

7.3.1.4. High Knee

This control will set the point at which companding occurs at the upper range. The value range for the high knee adjustments is 90% to 110% of the maximum legal value. high knee is adjusted in 1% increments. The default value is 90%.

7.3.1.5. Low Knee

This control will set the point at which companding occurs at the lower range. The value range for the low knee adjustments is from 0% to -10% of the minimum legal value. low knee is adjusted in 1% increments. The default value is 0%.

7.3.1.6. Negative Compression

This control will enable/disable negative colour legalizer compression to be applied. When Enabled the amount of compression can be adjusted with the compression ratio control

7.3.1.7. Compression Ratio

This control will set the gamut range compression ratio. The value range for the compression adjustments is from 5% to 1% of the minimum legal value. The compression ratio is adjusted in 1% increments. The default value is 5%.

7.4. IMAGE ENHANCEMENT TAB

The *Image Enhancement* control menu as shown in Figure 7-5, is used to configure parameters associated with the video processing functions of the converter. Sections 7.2.1 to 7.2.1.8 provide detailed information about each of the menu items.

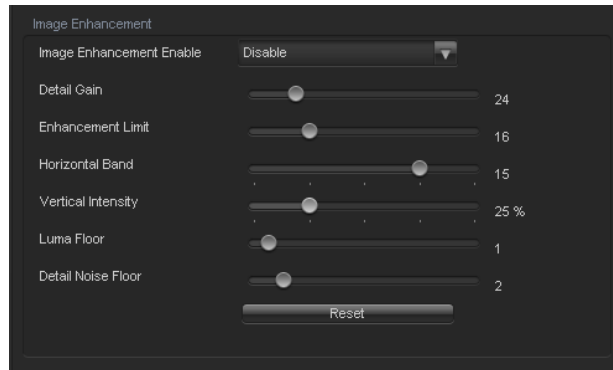


Figure 7-5: Image Enhancement Tab

7.4.1. Image Enhancement

7.4.1.1. Image Enhancement Enable

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

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

7.4.1.2. Detail Gain

This control selects the level of the detail gain with a range of 0 to 127, where 0 refers to no increase in detail gain. A typical range for this control is 0 to 50. Higher values will normally distort the image beyond the range that is normally considered acceptable.

7.4.1.3. Enhancement Limit

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

7.4.1.4. Horizontal Band

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

7.4.1.5. Vertical Intensity

This control selects the intensity of the vertical enhancement process, as a ratio of the Horizontal enhancement. The range is 0 to 100% in increments of 25% where 0% refers to no Vertical enhancement and 100% provides a Vertical intensity that is equivalent to the Horizontal.

7.4.1.6. Luma Floor

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

7.4.1.7. Detail Noise Floor

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



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

7.5. NOISE REDUCTION TAB

The *Noise Reduction* tab is used to configure parameters associated with the video noise reduction processing. The *General Noise Reduction* section is a motion adaptive spatial-temporal and recursive noise filter.

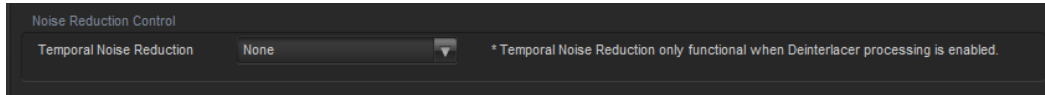
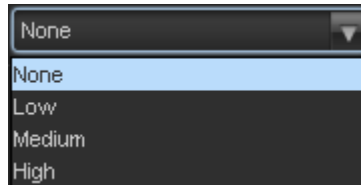


Figure 7-6: Noise Control Tab

7.5.1. Temporal Noise Reduction Levels

The Temporal Noise Reducer (*TNR*) *Level* controls the strength of the applied *Temporal Noise Reduction* filter. Select the level of noise reduction to be applied by selecting the appropriate value from the drop down menu as shown below.



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



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



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

7.6. DEINTERLACER CONTROL TAB

The *Deinterlacer* controls as shown in Figure 7-7 are used to configure parameters associated with the video de-interlacer. Video de-interlacing is performed so that the scaling/aspect ratio conversion can occur in the progressive video domain. Scaling/aspect ratio conversion in the progressive domain is the highest quality way to perform up/down/cross conversion. Sections 7.6.1.1 to 7.6.2.1 provide detailed information about each of the menu items.

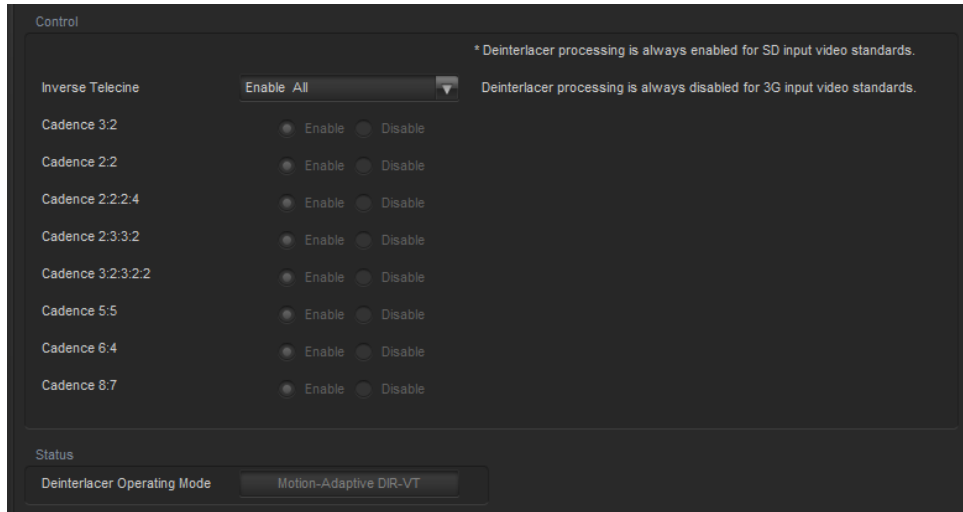
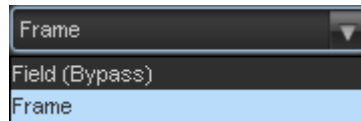


Figure 7-7: Deinterlacer Control Tab

7.6.1. De-Interlacer Control

7.6.1.1. Deinterlacer Mode

With this control, you can set whether the module will perform field or frame based de-interlacing conversion. The user can select Field or Frame based processing using the drop down menu that appears as follows:



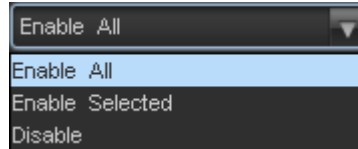
Field	In <i>Field</i> mode, the de-interlacer works on a field-by-field basis.
Frame	In <i>Frame</i> mode, the de-interlacer works on a complete frame basis.



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

7.6.1.2. Inverse Telecine

The 7814 series modules have the ability to automatically detect embedded 3:2 and 2:2 sequences. When such sequences are present inverse 3:2 and 2:2 is performed so that mathematically lossless conversion back to progressive may be achieved. For optimal performance, the *Auto* mode of operation is highly recommended. The **Inverse Telecine** drop down menu enables the user to set the operating mode as shown below:



Enable All	The card will automatically detect video sequences including embedded 3:2 and embedded 2:2 sequences and more as listed in the Cadence List. Processing will be automatically adapted to match the detect content. If no film mode sequence is detected, the de-interlacer will automatically revert to video mode processing. This is the recommended setting for this control.
Enable Selected	The module will only initialize the de-interlacer when the selected Cadence(s) are detected. For a full list of available cadences, see section 7.6.1.3.
Disable	The video de-interlacer will operate in <i>video only</i> mode and will utilize its internal motion adaptive and edge interpolation process for de-interlacing the input signal.

7.6.1.3. List of Cadences

Cadence 3:2	When enabled, the video de-interlacer will search for and lock onto embedded 3:2 sequences and perform inverse 3:2 pull-down to de-interlace the input signal.
Cadence 2:2	When enabled, the video de-interlacer will search for and lock onto embedded 2:2 sequences and perform inverse 2:2 pull-down to de-interlace the input signal.
Cadence 2:2:2:4	When enabled, the video de-interlacer will search for and lock onto embedded 2:2:2:4 sequences and perform inverse 2:2:2:4 pull-down to de-interlace the input signal.
Cadence 2:3:3:2	When enabled, the video de-interlacer will search for and lock onto embedded 2:3:3:2 sequences and perform inverse 2:3:3:2 pull-down to de-interlace the input signal.
Cadence 3:2:3:2:2	When enabled, the video de-interlacer will search for and lock onto embedded 3:2:3:2:2 sequences and perform inverse 3:2:3:2:2 pull-down to de-interlace the input signal.
Cadence 5:5	When enabled, the video de-interlacer will search for and lock onto embedded 5:5 sequences and perform inverse 5:5 pull-down to de-interlace the input signal.
Cadence 6:4	When enabled, the video de-interlacer will search for and lock onto embedded 6:4 sequences and perform inverse 6:4 pull-down to de-interlace the input signal.
Cadence 8:7	When enabled, the video de-interlacer will search for and lock onto embedded 8:7 sequences and perform inverse 8:7 pull-down to de-interlace the input signal.

7.6.2. Deinterlacer Status

7.6.2.1. Deinterlacer Operating Mode

The *De-Interlacer Operating Mode* is used to notify the current operating mode of the De-interlacer. This will inform if the de-interlacer is operating in Motion-Adaptive DIR-VT or Bypassed.

7.7. AFD TAB

The 7814 series of converters are fully AFD enabled and offer frame accurate and glitch free steering of aspect ratio conversions based on AFD signals decoded from incoming video signals. This applies for all variations of the 7814 series product line including down-converters, up-converters, cross converters as well as up/down/cross converters.

Within the 7814 series of products, AFD values are monitored and read from the incoming video signal every frame. These inbound AFD codes are then used to index a user programmable ARC/Scaler response. Each incoming AFD code can have its own unique ARC/Scaler response. AFD codes are then re-stamped on the outbound video signal so that down-stream devices may further take advantage of the embedded AFD codes.

There are four main control tabs for AFD. These are the AFD Control, AFD Monitor, User AFD and the AFD ARC control tabs.

The following diagram depicts the AFD Control tab.

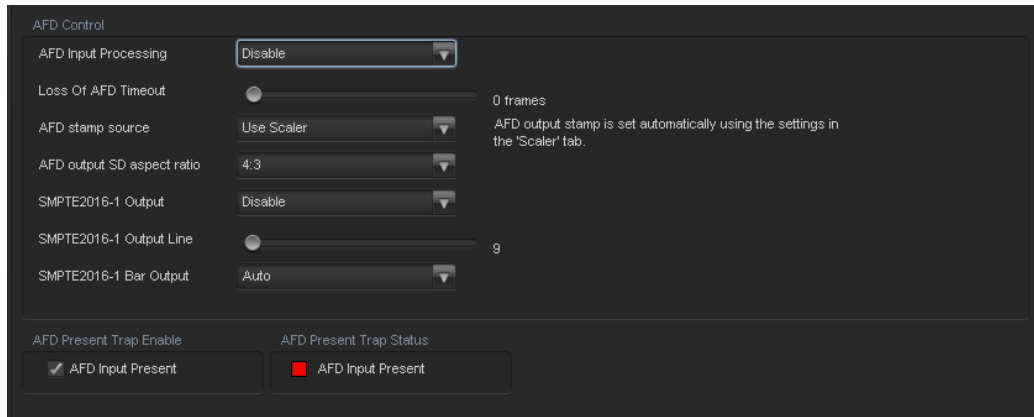


Figure 7-8: AFD Control Tab

7.7.1. AFD Control

7.7.1.1. AFD Input Processing Enable Control

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

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

7.7.1.2. Loss of AFD Timeout

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

0 Frames (Use Default)	When incoming AFD values are absent, ARC processing will revert to default ARC processing as defined in the <i>Scaler</i> control tab.
Infinite	When incoming AFD values are absent, ARC processing will use the last valid AFD code received to automatically steer ARC processing.
1 – 300 frames	When incoming AFD values are absent, ARC processing will use the last valid AFD code for x amount of frames. If a valid AFD signal does not return for the selected amount of frames the AFD will revert to default.

7.7.1.3. AFD Stamp Source

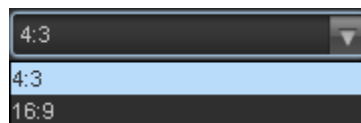
This control enables the user to set the source for output AFD stamping. The user may configure the card to use the AFD value automatically generated by the scaler and its setting or to stamp a user defined AFD value.



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

7.7.1.4. AFD Output SD Aspect Ratio

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



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.

7.7.1.5. SMPTE2016-1 Output Enable Control

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

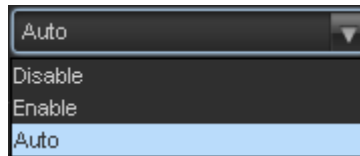
Disable	AFD codes will NOT be inserted into the outgoing video signal.
Enable	AFD codes will be inserted into the outgoing video signal.

7.7.1.6. SMPTE2016-1 Output Line

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

7.7.1.7. SMPTE2016-1 Bar Output Enable

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



Disable	When set to disable, Bar Data will not be inserted in to the output video
Enable	When set to Enable, Bar data will accompany the AFD information in the output picture.
Auto	When set to Auto, the card will automatically respond to the current card configuration and insert bar data as needed.

7.7.2. AFD Present Traps

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.

7.8. AFD MONITOR TAB

The AFD monitoring tab contains AFD monitoring of input and output codes used in the 7814 product line.

7.8.1. SMPTE2016-1 Monitor

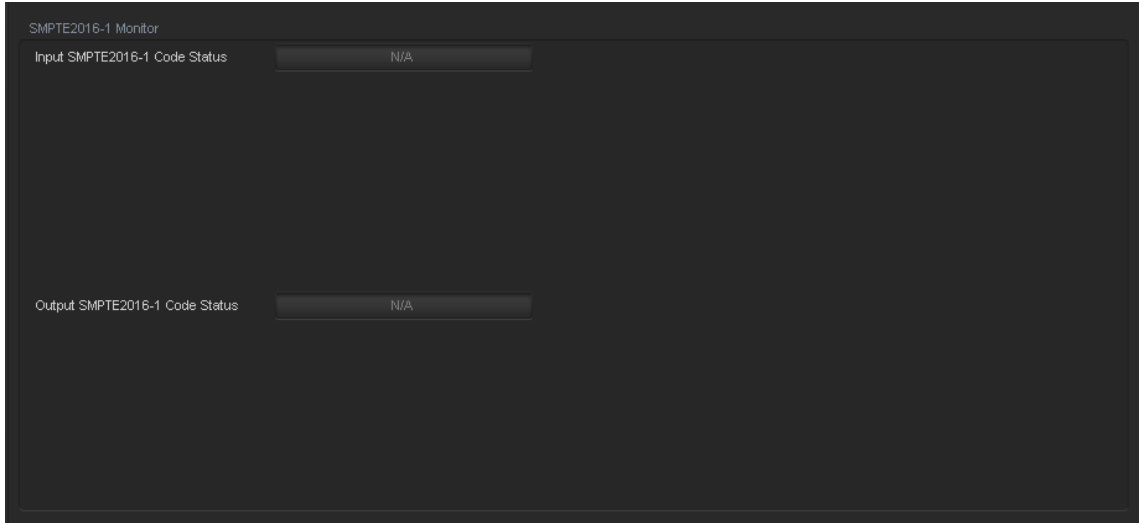


Figure 7-9: SMPTE2016-1 Monitor Tab

7.8.1.1. Input SMPTE2016-1 Code Status

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

7.8.1.2. Output SMPTE2016-1 Code Status

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

7.9. SD APERTURE CONTROL TAB

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

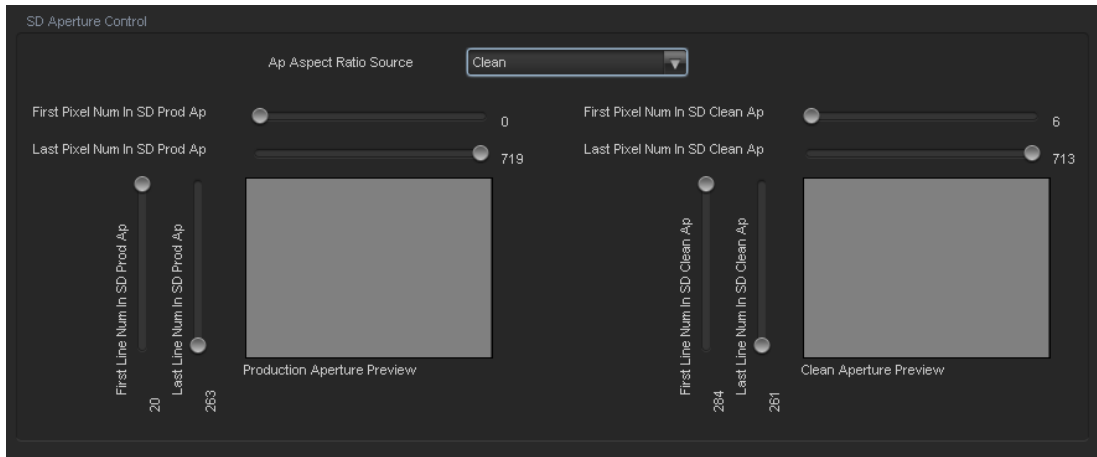
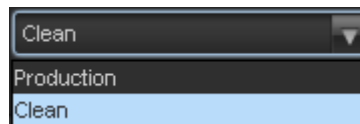


Figure 7-10: SD Aperture Control Tab

7.9.1. SD Aperture Control

7.9.1.1. AP Aspect Ratio Source

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



Production	Selects the <i>Production Aperture</i> to be used when converting input signals.
Clean	Selects the <i>Clean Aperture</i> to be used when converting input signals.

7.9.1.2. AP Aspect Ratio Settings

These controls allow the user to define the exact pixels and exact lines that are used to define the *SD Clean Aperture* and the *SD Production Aperture*. As this process is done, a pictorial representation of the defined region is depicted (as shown in Figure 7-11).

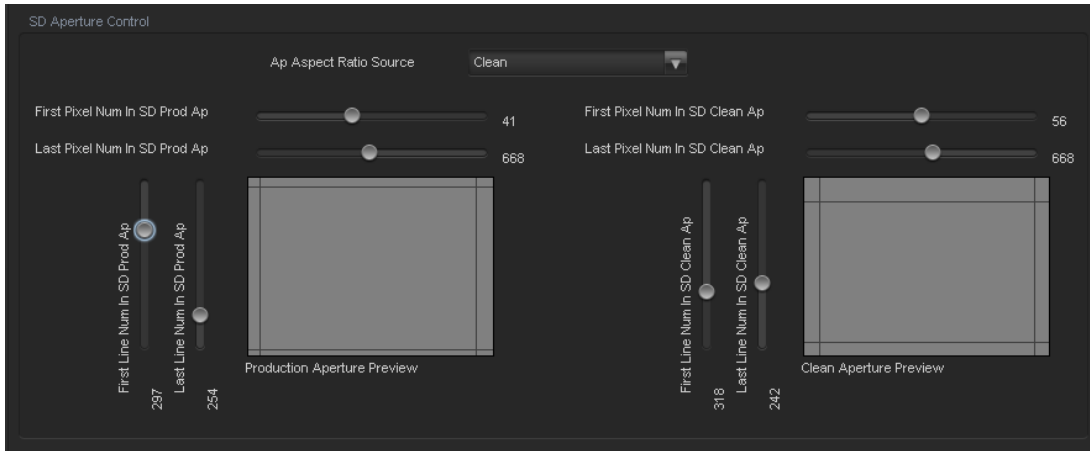


Figure 7-11: SD Aperture Control

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.

7.10. USER ARC

The *USER ARC* tab is used to create custom user defined aspect ratios. Custom user aspect ratios can be easily defined with user-defined names for easy recall of custom aspect ratios. There is the capability to define up to 10 user-defined aspect ratios. Figure 7-12 below shows the USER ARC tab.

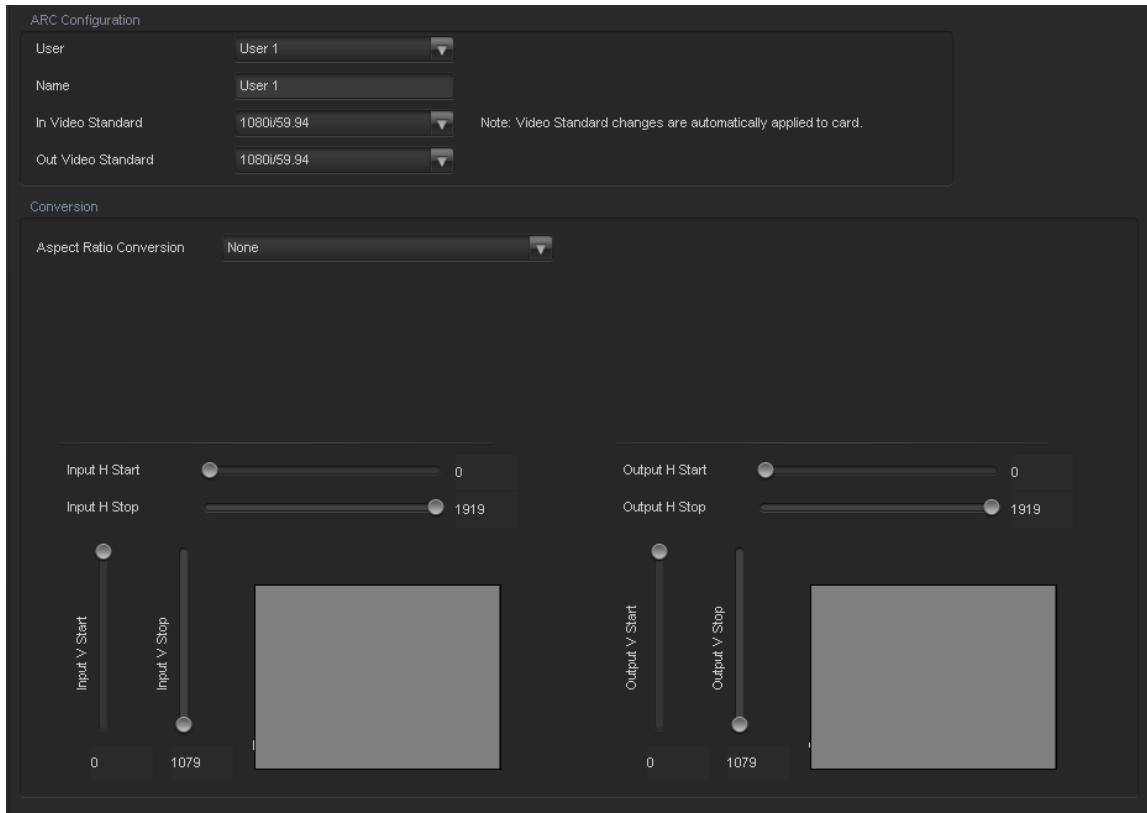


Figure 7-12: User AFD Tab

7.10.1. ARC Configuration

7.10.1.1. User Control

The user control selects the slot that the custom user defined aspect ratio will be stored. There are 10 slots available for user defined custom ARC settings.

7.10.1.2. Name Control

The *Name Control* allows the user to apply custom names to new aspect ratios for easy recall. Simply assign a meaningful name to the user ARC and these can be pulled up in the Scaler and AFD ARC tabs.

7.10.1.3. In Video Standard

The In Video Standard Control is used to specify what the incoming video standard is to be when the custom ARC is to be used. This control will update the higher limit for the sliders associated to the input ARC conversion controls.

7.10.1.4. Out Video Standard

The Out Video Standard Control is used to specify what the outgoing video standard is to be when the custom ARC is to be used. This control will update the higher limit for the sliders associated to the output ARC conversion controls.

7.10.2. Conversion Controls

7.10.2.1. Aspect Ratio Conversion

The *Aspect Ratio Conversion* menu selects the aspect ratio conversion that the module will perform for the custom AFD. There are numerous pre-defined aspect ratio conversions as well as the ability to define custom aspect ratio conversions. When *None* is selected, the user can set input image cropping and output image size on a pixel-by-pixel and line-by-line basis.

None	Converts the region of the input raster defined by the <i>Input H & V Start</i> and <i>Stop</i> values to the region of the output raster defined by the <i>Output H & V Start</i> and <i>Stop</i> values with coloured side panels.
Full Raster	Converts the full input raster to full output raster. If the input and output aspect ratios are not equivalent, there will be aspect distortion.
4:3 Side Panel to 16:9 TB Cut 13:9 Letter Box to 16:9 TB Cut 14:9 Letter Box to 16:9 TB Cut 13:9 Stretch to 16:9 TB Cut 14:9 Stretch to 16:9 TB Cut 16:9 Stretch to 16:9 TB Cut	These settings convert the input picture to 16:9 top and bottom cuts. Note: For 1080i/1035i inputs, these functions only work in field mode.
13:9 Stretch to 4:3 Side Panel 14:9 Stretch to 4:3 Side Panel 16:9 Stretch to 4:3 Side Panel	These settings squeeze common stretched input video back to 4:3 side panel images on a 16:9 aspect raster.
4:3 to 4:3 Side Panel on 16:9 4:3 to 13:9 Stretch on 16:9 4:3 to 14:9 Stretch on 16:9 4:3 to 16:9 Stretch on 16:9 4:3 to 13:9 Crop on 16:9 4:3 to 14:9 Crop on 16:9 4:3 to 16:9 Crop on 16:9	These settings are common up converter settings for converting 4:3 aspect ratio images to common 16:9 formats. These settings are not appropriate for cross or down conversion.
16:9 to 16:9 Letter Box on 4:3 16:9 to 14:9 Letter Box on 4:3 16:9 to 13:9 Letter Box on 4:3 16:9 to 4:3 Side Cut on 4:3 16:9 to 4:3 Squeeze on 4:3	These settings are common down converter settings for converting 16:9 aspect ratio images to common 4:3 formats. These settings are not appropriate for cross or up conversion.
16:9 Top Letter Box on 4:3 to 16:9 14:9 Top Letter Box on 4:3 to 16:9 TB Cut 14:9 Top Letter Box on 4:3 to 14.9 Side Panel 14:9 Top Letter Box on 4:3 to 16:9 Stretch on 16.9 16:9 Top Letter Box on 4:3 to 16:9	
14.9 Letter Box on 4:3 to 16:9 TB Cut	

14:9 Letterbox on 4:3 to 14.9 Side Panel 14.9 Letterbox on 4.3 to 16.9 Stretch on 16.9	
4.3 Side Panel on 16.9 to 4:3 14.9 Side Panel to 14.9 Letter Box on 4:3 14.9 Side Panel to 4:3 Side Cut on 4:3 14.9 Side Panel to 4.3 Squeeze on 4.3	

7.10.2.2. User Aspect Ratio Setting

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

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

There are four registers for each output video standard that define the size of the output image and how to place the resulting image on the output video raster.

Output H Start/ Output H Stop:	The <i>Output H Start</i> and <i>Output H Stop</i> 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 <i>Output V Start</i> and <i>Output V Stop</i> define how to scale the cropped input image vertically and where to place it vertically on the output raster. The image will be stretched to fill the height. (E.g. For 1080i, the range of values are 0 to 539. The range of values for 720p output is 0 to 719).

A pictorial representation of the input image cropping and output image size is shown to the user right below the slider bars for the custom aspect ratios as shown in Figure 7-13.

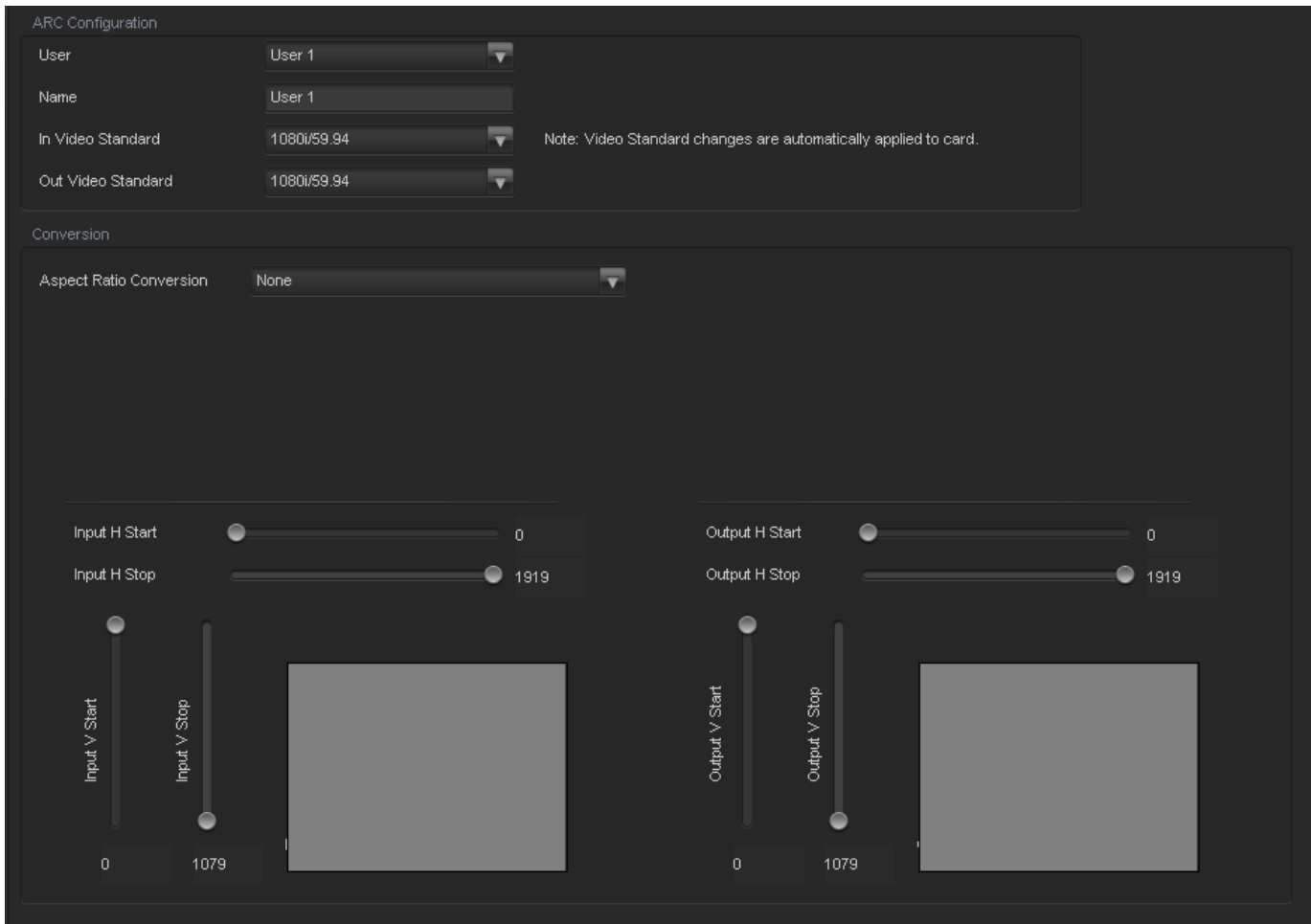


Figure 7-13: Image Cropping and Output Image Size

7.11. AFD ARC CONTROLS

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

To properly configure the 7814 series cards for AFD, proceed to the *AFD ARC* control tab. Select an AFD code using the *AFD Select* drop down menu. This corresponds to the inbound AFD value for which you will define a specific ARC/Scaler response. In the *Conversion* section, select the specific ARC processing that you would like to occur every time that specified input side AFD code is received. Furthermore, specify the outbound AFD code in the *AFD stamp* section. Note that the AFD Stamp control is enabled only when the AFD Stamp Source is set to *User AFD Stamp*. Once all settings are selected, press the *Apply* button on the top of the control tab. Perform this process for each incoming AFD value.

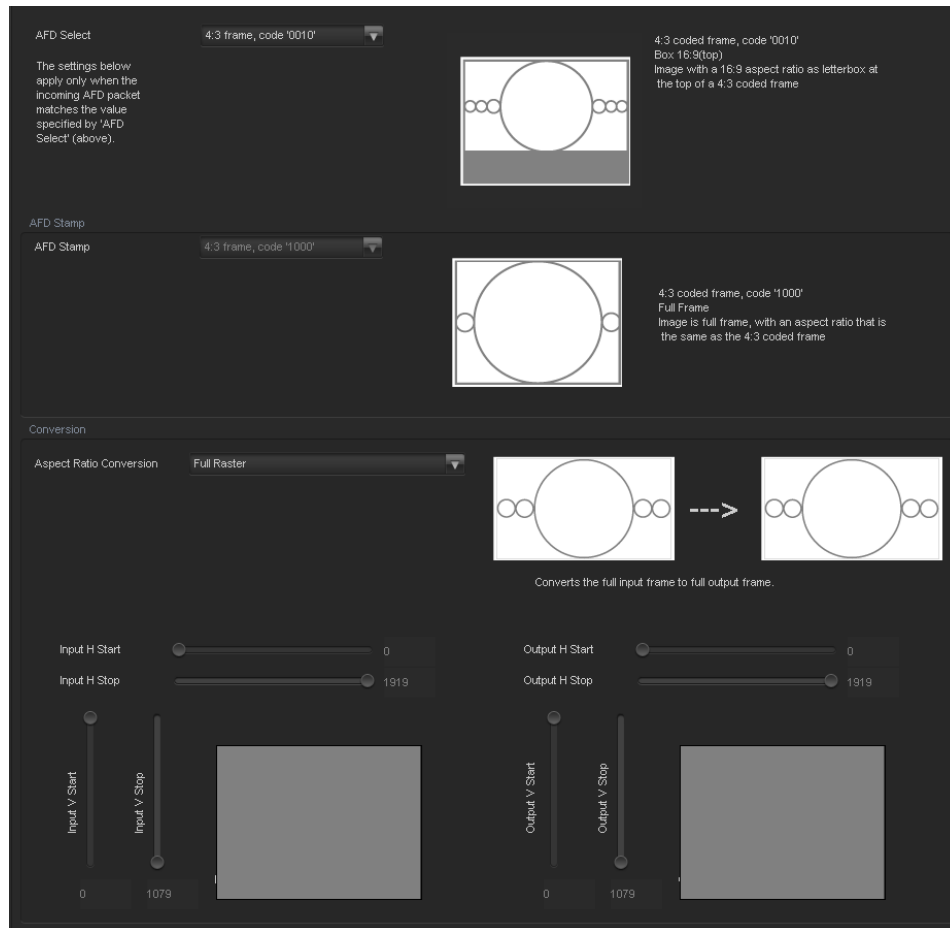


Figure 7-14: AFD ARC Tab

7.11.1. AFD Select

This control enables the user to select the incoming AFD code to which a scaler response will be defined. Use the drop down menu as shown below (in Figure 7-15) to select an AFD code. As each menu item is selected, a pictorial representation of the actual aspect ratio being selected is shown on the right hand side of the screen beside the drop down selection.

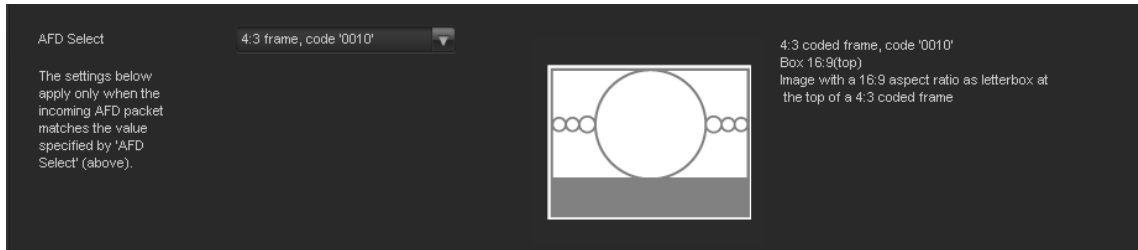


Figure 7-15: AFD Select

The following AFD codes may be selected.

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

7.11.2. AFD Stamp

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

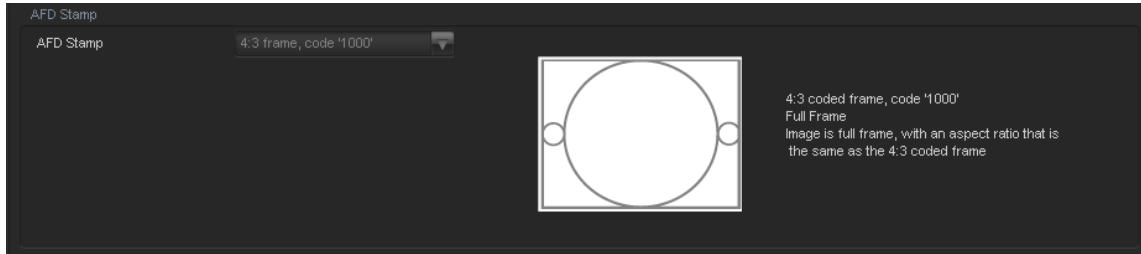


Figure 7-16: AFD Code Description

7.11.3. AFD Stamp Settings

7.11.3.1. AFD Stamp

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

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

When each AFD code is selected, a pictorial representation of what the code is intended to mean (see Figure 7-20)

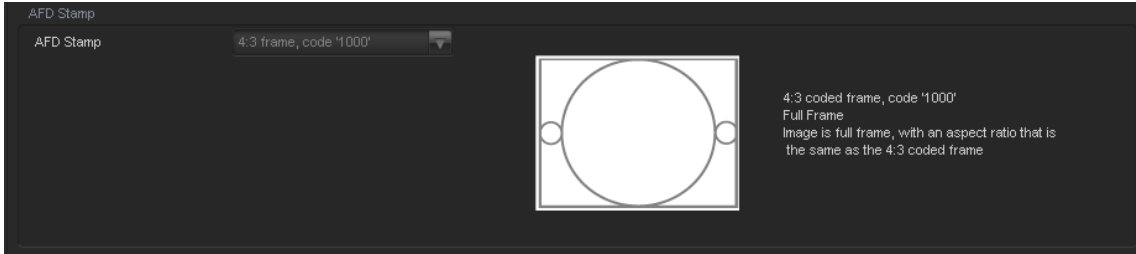


Figure 7-17: Pictorial Representation

7.11.4. Conversion Settings

7.11.4.1. Aspect Ratio Conversion

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

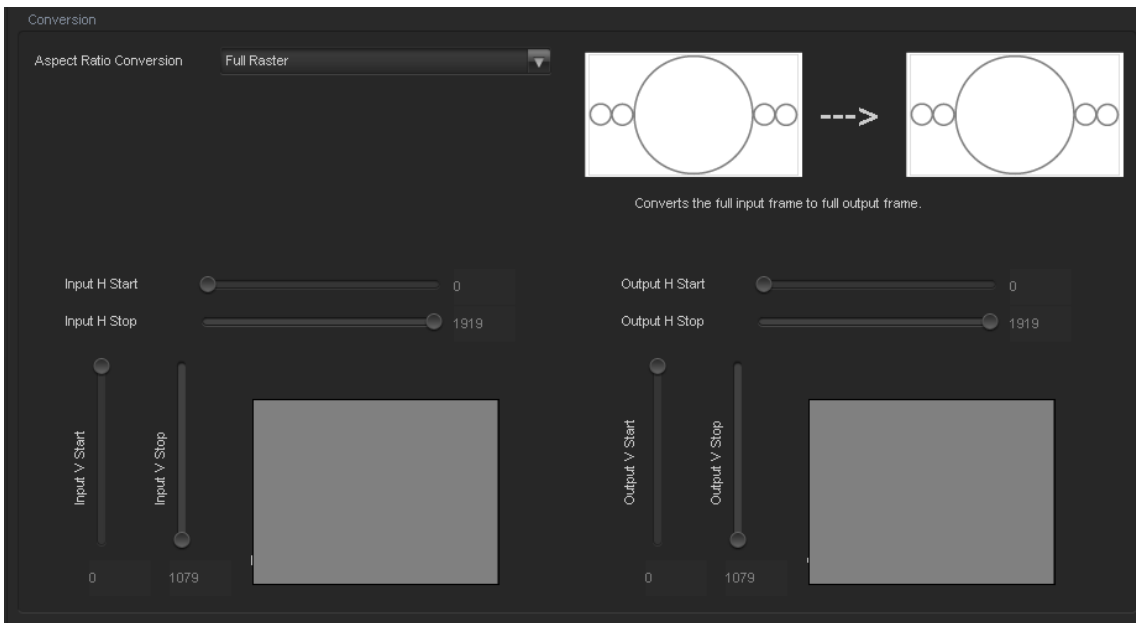


Figure 7-18: Conversion Screen

There are numerous pre-defined aspect ratio conversions available, as well as the ability to define custom aspect ratio conversions. When the *User Aspect* mode is selected, the user can set input image cropping and output image size on a pixel-by-pixel and line-by-line basis. There are 10 user definable custom aspect ratios available. See Section 7.10 for details on configuring custom user aspect ratios.

<p>Full Raster</p>	<p>Converts the full input raster to full output raster. If the input and output aspect ratios are not equivalent, there will be aspect distortion.</p>
<p>User 1 to User 10</p>	<p>There are 10 custom user slots available for custom aspect ratios (See Section 7.10). Converts the region of the input raster defined by the <i>Input H & V Start</i> and <i>Stop</i> values to the region of the output raster defined by the <i>Output H & V Start</i> and <i>Stop</i> values with coloured side panels.</p>
<p>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</p>	<p>These settings convert the input picture to 16:9 top and bottom cuts. Note: For 1080i/1035i inputs, these functions only work in field mode.</p>
<p>13:9 Stretch to 4:3 Side Panel 14:9 Stretch to 4:3 Side Panel 16:9 Stretch to 4:3 Side Panel</p>	<p>These settings squeeze common stretched input video back to 4:3 side panel images on a 16:9 aspect raster.</p>
<p>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</p>	<p>These settings are common up-converter settings for converting 4:3 aspect ratio images to common 16:9 formats. These settings are not appropriate for cross or down conversion.</p>
<p>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</p>	<p>These settings are common down converter settings for converting 16:9 aspect ratio images to common 4:3 formats. These settings are not appropriate for cross or up conversion.</p>
<p>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</p>	
<p>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</p>	
<p>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</p>	

7.12. SCALER TAB

The 7814 series of converters utilize high performance multi-tap polyphase filters to perform scaling and aspect ratio conversion on the input signal. The *Scaler* control menus are used to configure the cut-off frequencies of the polyphase filters and to define the aspect ratio conversion. In addition, the *Scaler* tab contains specific controls for managing sharp vertical and horizontal edge transitions so that edge ringing is minimized. Static side panel colours and output AFD stamping values are also adjusted within this tab. Sections 7.12.1 to 7.12.5 provide detailed information about each menu item.

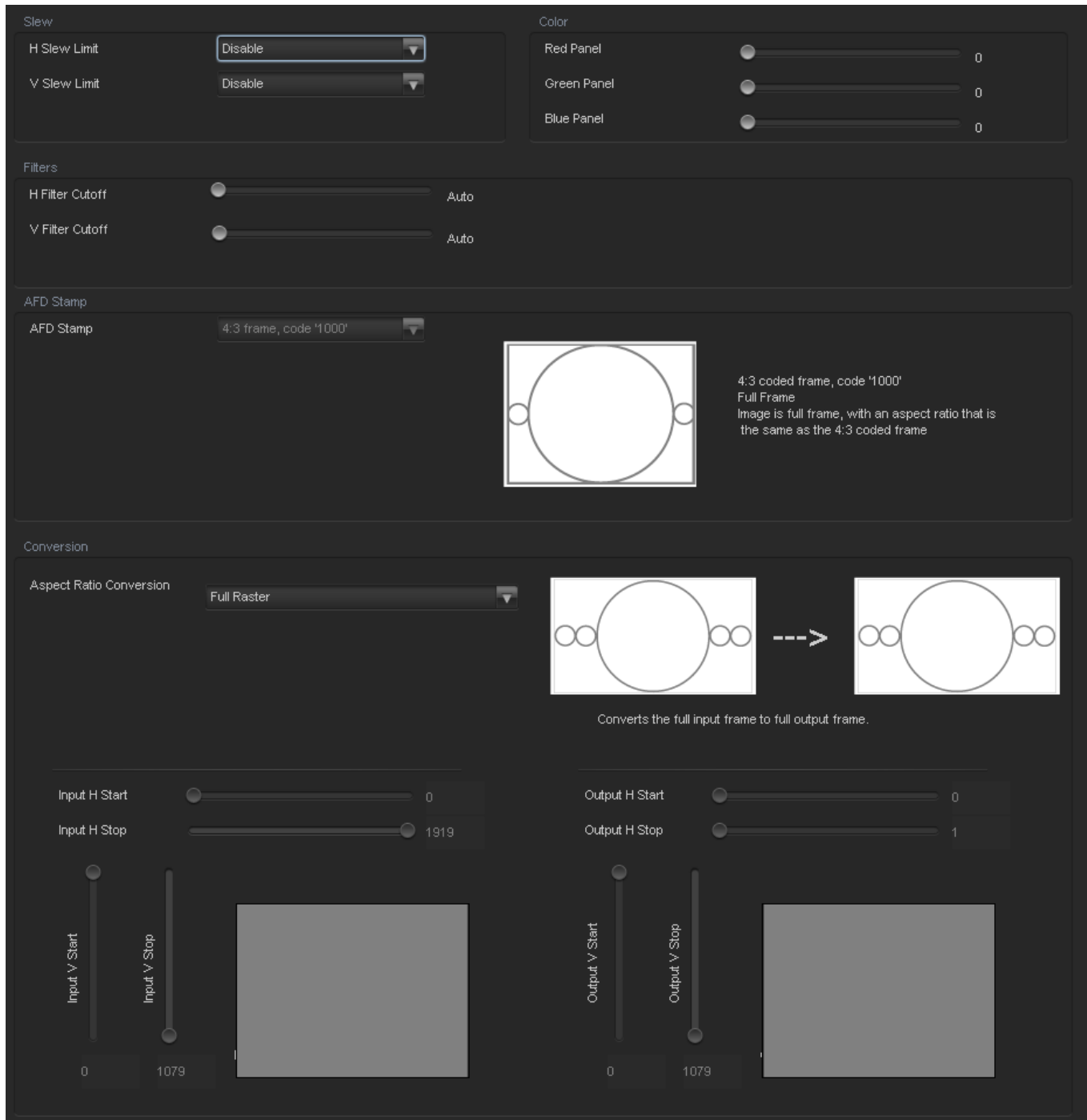


Figure 7-19: Scaler Tab

7.12.1. Slew Settings

7.12.1.1. Slew Limits

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

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

Enable	Enables the H Slew Rate Limiting so that ringing around sharp horizontal edge transitions is minimized.
Disable	H Slew Rate Limiting is disabled.

The *V Slew limit* control manages sharp vertical edge transitions.

Enable	Enables the V Slew Rate Limiting so that ringing around sharp vertical edge transitions is minimized.
Disable	V Slew Rate Limiting is disabled.

7.12.2. Colour Controls

7.12.2.1. Letterbox Panel Colours

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

- R:** Sets the value for the R component of the default side panel colour with a range of 0 to 255.
G: Sets the value for the G component of the default side panel colour with a range of 0 to 255.
B: Sets the value for the B component of the default side panel colour with a range of 0 to 255.



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

7.12.3. Filter Settings

7.12.3.1. Scaler Filter Sharpness

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

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

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

Auto	The optimal horizontal filter is automatically selected to match the scaling and aspect ratio conversion process being performed.
Enhance HF 1 dB	High frequencies within the image are enhanced by 1 dB
Enhance HF 2 dB	High frequencies within the image are enhanced by 2 dB
Mid Band Boost 1 dB	Mid band frequencies within the image are enhanced by 1 dB
Mid Band Boost 2 dB	Mid band frequencies within the image are enhanced by 2 dB
Levels 5....64	Selects the horizontal filter bandwidth such that each value 5 thru 64 corresponds to 1/64 th the bandwidth of the input signal.

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

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

7.12.4. AFD Stamp Settings

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

7.12.4.1. AFD Stamp

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

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

When each AFD code is selected, a pictorial representation of what the code is intended to mean (see Figure 7-20)

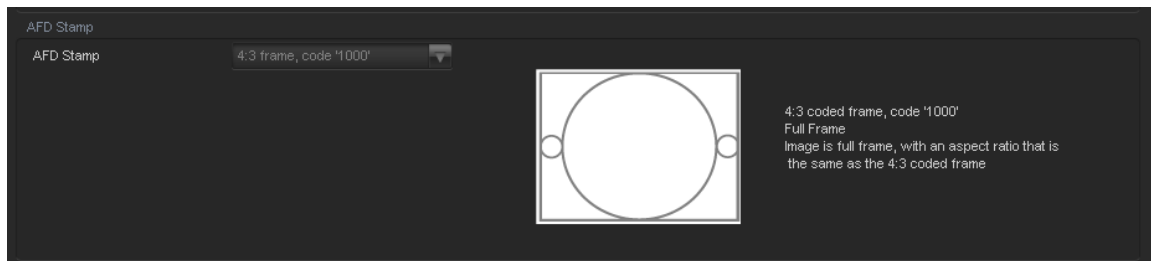


Figure 7-20: Pictorial Representation

7.12.5. Conversion Settings

7.12.5.1. Aspect Ratio Conversion

The *Aspect Ratio Conversion* menu selects the aspect ratio conversion that the module will perform. There are numerous pre-defined aspect ratio conversions as well as the ability to define custom aspect ratio conversions. When the *User Aspect* mode is selected, the user can set input image cropping and output image size on a pixel-by-pixel and line-by-line basis. There are 10 user definable custom aspect ratios available. See Section 7.10 for details on configuring custom user aspect ratios.

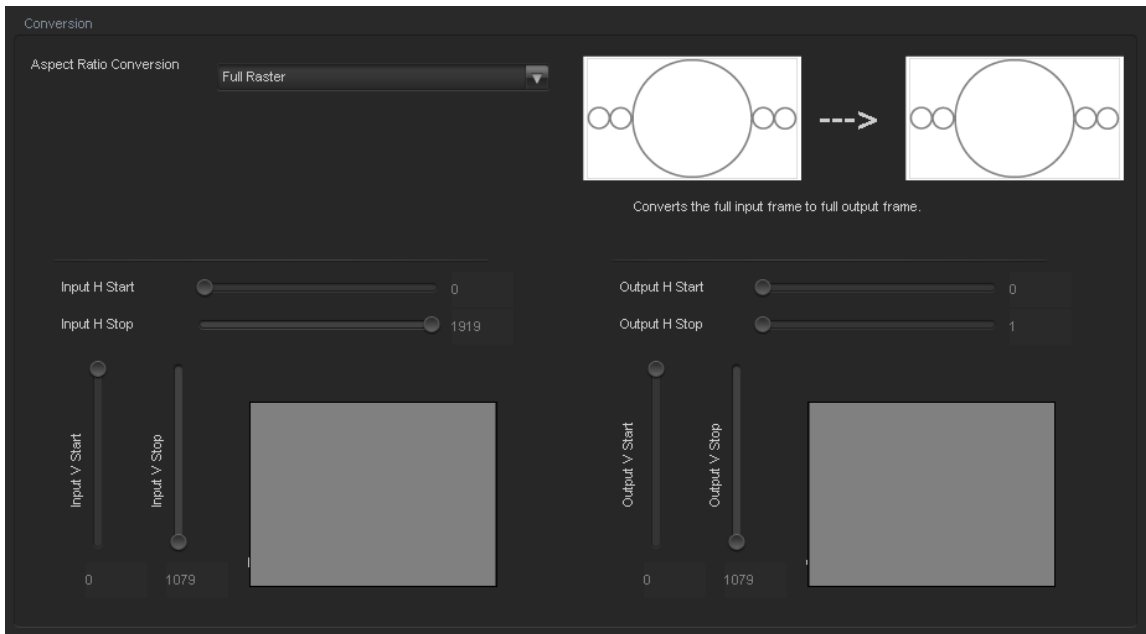


Figure 7-21: Aspect Ratio Conversion

Full Raster	Converts the full input raster to full output raster. If the input and output aspect ratios are not equivalent, there will be aspect distortion.
User 1 to User 10	There are 10 custom user slots available for custom aspect ratios (See Section 7.10). Converts the region of the input raster defined by the <i>Input H & V Start and Stop</i> values to the region of the output raster defined by the <i>Output H & V Start and Stop</i> values with coloured side panels.
4:3 Side Panel to 16:9 TB Cut 13:9 Letter Box to 16:9 TB Cut 14:9 Letter Box to 16:9 TB Cut 13:9 Stretch to 16:9 TB Cut 14:9 Stretch to 16:9 TB Cut 16:9 Stretch to 16:9 TB Cut	These settings convert the input picture to 16:9 top and bottom cuts. Note: For 1080i/1035i inputs, these functions only work in field mode.
13:9 Stretch to 4:3 Side Panel 14:9 Stretch to 4:3 Side Panel 16:9 Stretch to 4:3 Side Panel	These settings squeeze common stretched input video back to 4:3 side panel images on a 16:9 aspect raster.
4:3 to 4:3 Side Panel on 16:9 4:3 to 13:9 Stretch on 16:9 4:3 to 14:9 Stretch on 16:9 4:3 to 16:9 Stretch on 16:9 4:3 to 13:9 Crop on 16:9 4:3 to 14:9 Crop on 16:9 4:3 to 16:9 Crop on 16:9	These settings are common up-converter settings for converting 4:3 aspect ratio images to common 16:9 formats. These settings are not appropriate for cross or down conversion.
16:9 to 16:9 Letter Box on 4:3 16:9 to 14:9 Letter Box on 4:3 16:9 to 13:9 Letter Box on 4:3 16:9 to 4:3 Side Cut on 4:3 16:9 to 4:3 Squeeze on 4:3	These settings are common down converter settings for converting 16:9 aspect ratio images to common 4:3 formats. These settings are not appropriate for cross or up conversion.
16:9 Top Letter Box on 4:3 to 16:9 14:9 Top Letter Box on 4:3 to 16:9 TB Cut 14:9 Top Letter Box on 4:3 to 14.9 Side Panel 14:9 Top Letter Box on 4:3 to 16:9 Stretch on 16.9 16:9 Top Letter Box on 4:3 to 16:9	
14.9 Letter Box on 4:3 to 16:9 TB Cut 14:9 Letterbox on 4:3 to 14.9 Side Panel 14.9 Letterbox on 4.3 to 16.9 Stretch on 16.9	
4.3 Side Panel on 16.9 to 4:3 14.9 Side Panel to 14.9 Letter Box on 4:3 14.9 Side Panel to 4:3 Side Cut on 4:3 14.9 Side Panel to 4.3 Squeeze on 4.3	



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

As each of the above settings is selected, a pictorial representation of the selected conversion is shown to the immediate right of the drop down menu as shown in Figure 7-21.

7.13. 7814 AUDIO ARCHITECTURE

All 7814 series modules incorporate a similar audio architecture. Figure 7-22 depicts this architecture. Internally, 16 channels of audio are processed within the module. Once input audio channels are selected, auto-sensing audio sample rate conversion and adjustable audio delay is applied. All advanced audio processing steps, such as audio up-mixing, 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 output audio. 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 for each channel of output audio. AES audio outputs and embedded audio outputs can carry different audio.

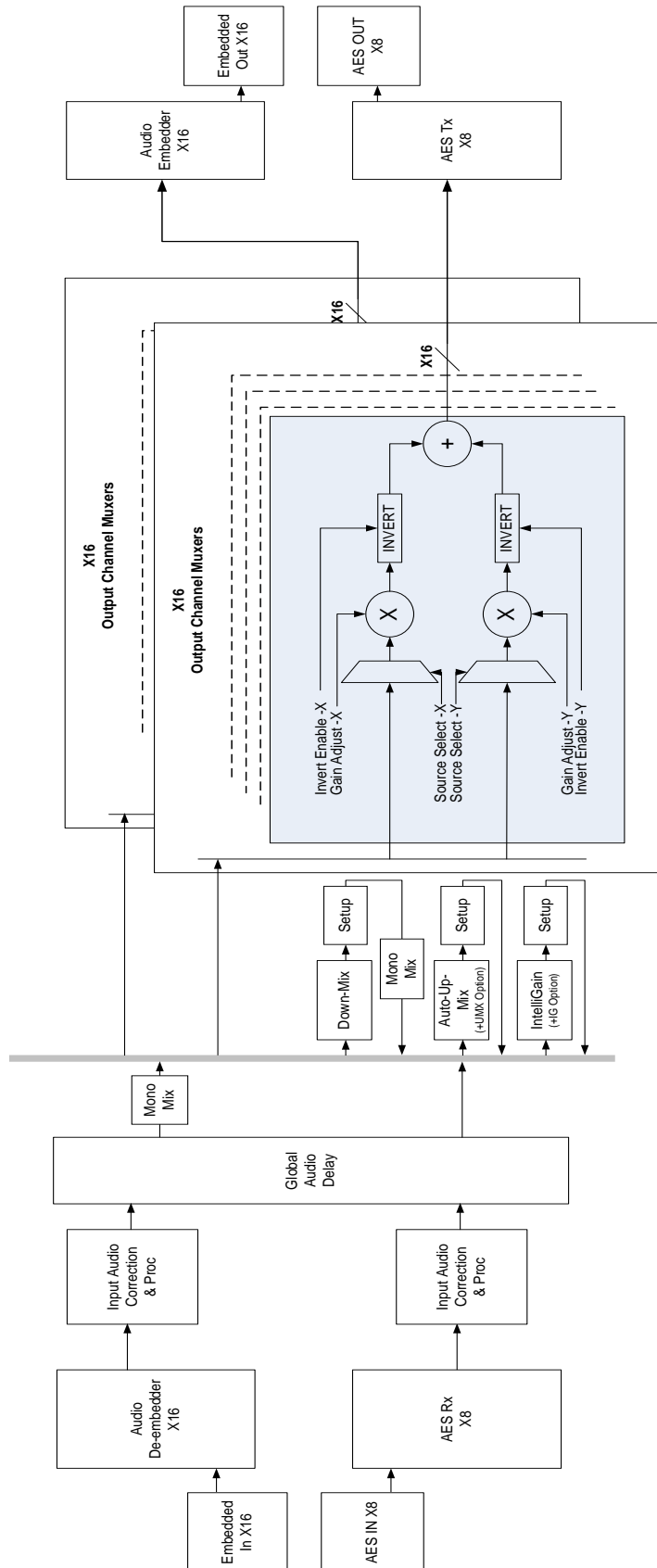


Figure 7-22: Internal 7814 Series Audio Architecture

7.14. AUDIO TAB

The *Audio* control menu 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, Video Delay are also monitored and reported in the *Audio* menu. Sections 7.14.1 to 7.14.2 give detailed information about each of the menu items.

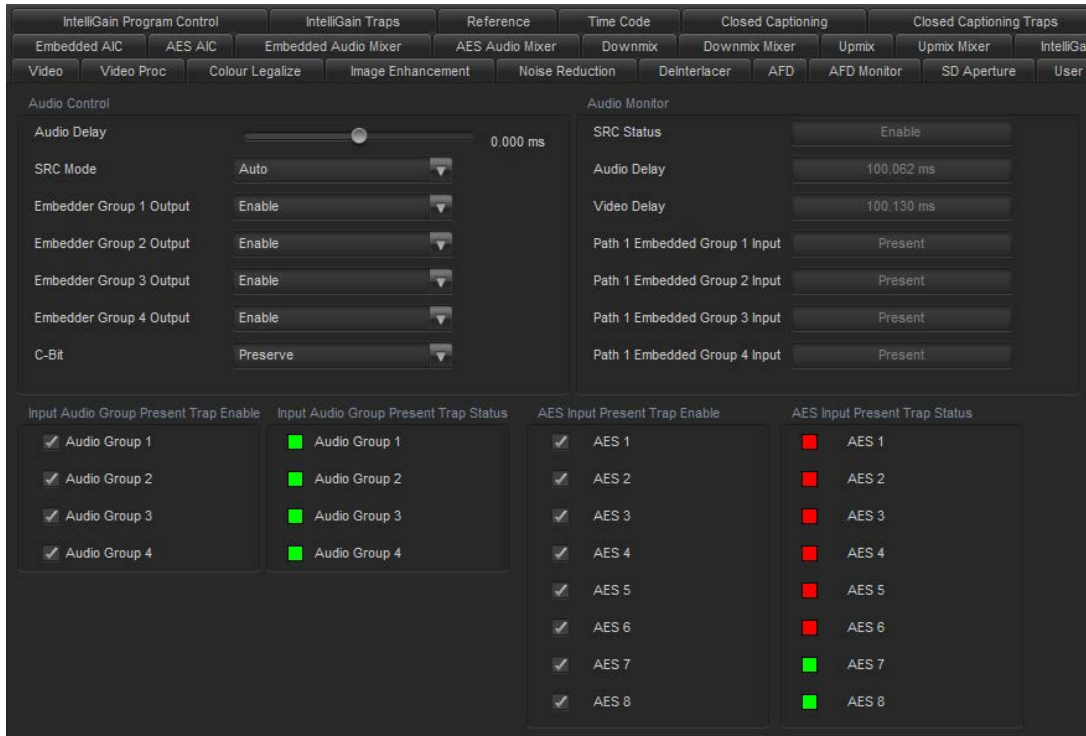


Figure 7-23: Audio Tab



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

7.14.1. Audio Control

7.14.1.1. Audio Delay

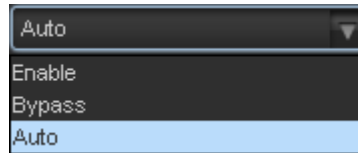
This control adjusts the audio delay +/- 350.00 ms. This delay is relative to the delay that the module automatically inserts to match audio path and video path delays.



Note: Negative values are limited to the amount of video delay; the card does not have negative delay ability. Video delay can be added in the Video Tab in order to achieve a greater negative audio delay. See Section 7.1.1.10 for details on how to add additional Video delay

7.14.1.2. SRC Mode Configuration

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



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

7.14.1.3. Embedded Audio Groups

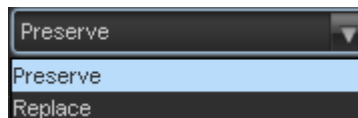
The module has four audio embedders that each inserts one group of audio into the outgoing serial digital video. For the sake of brevity, only the control for Audio Embedder 1 is discussed in further detail. Each embedder has an enable and disable function as shown below.



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

7.14.1.4. C-Bit Control

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



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

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

7.14.2. Audio Monitor Settings

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

7.14.2.1. SRC Status

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

7.14.2.2. Audio Delay

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

7.14.2.3. Video Delay

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

7.14.2.4. Embedded Group 1 Input

The **Embedded Group 1 Input** parameter displays the presence of audio in group one.

7.14.2.5. Embedded Group 2 Input

The **Embedded Group 2 Input** parameter displays the presence of audio in group two.

7.14.2.6. Embedded Group 3 Input

The **Embedded Group 3 Input** parameter displays the presence of audio in group three.

7.14.2.7. Embedded Group 4 Input

The **Embedded Group 4 Input** parameter displays the presence of audio in group four.

7.14.3. Audio Present Traps

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.

7.15. EMBEDDED AUDIO INPUT CORRECTION TAB

The *Embedded Audio Input Correction* controls as shown in Figure 7-24 is used to configure parameters associated with the embedded audio inputs. Audio input Correction is used to adjust the Gain, Inversion of the individual audio input channels. Channels 1 to 8 can be configured by selecting the *Channels 1-8* radial button and channels 9 to 16 can be configured by selecting the *Channels 9-16* radial button. The controls for Channel 1 will be described in detail, as the controls for Channels 1 - 16 operate in an identical fashion. Sections 7.15.1 to 7.15.1.2 provide detailed information about each of the menu items.

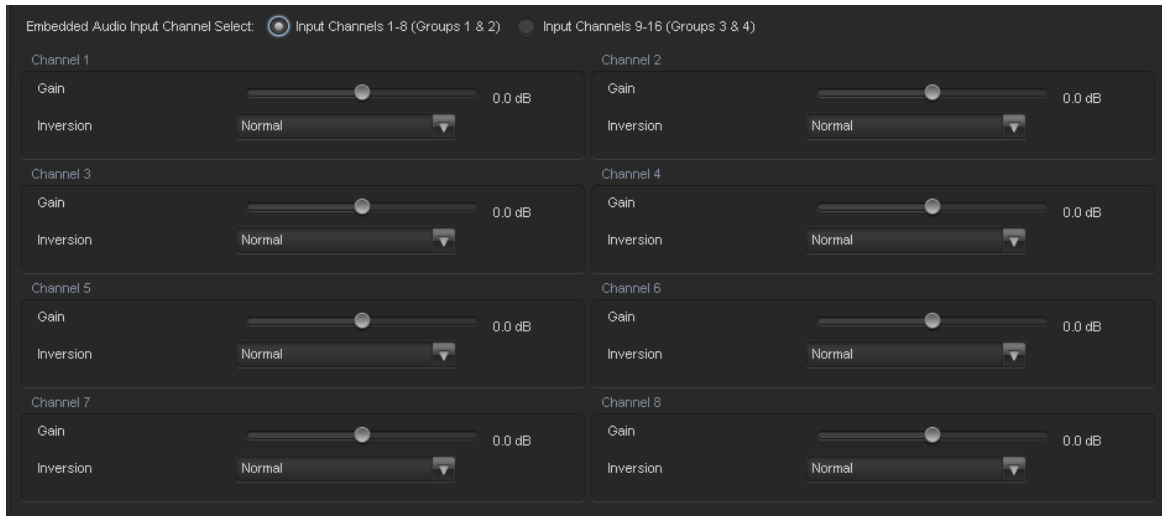


Figure 7-24: Audio Input Correction Tab

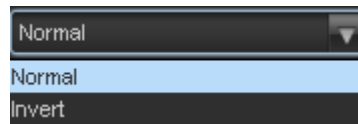
7.15.1. Channel X

7.15.1.1. Input Gain Controls

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

7.15.1.2. Inversion Control

The *Inversion* control is used to invert the incoming audio channel.



7.16. AES AUDIO INPUT CORRECTION TAB

The *AES Audio Input Correction* controls as shown in Figure 7-24 is used to configure parameters associated with the AES audio inputs. Audio input Correction is used to adjust the Gain, Inversion of the individual audio input channels. Channels 1 to 8 can be configured by selecting the *Channels 1-8* radial button and channels 9 to 16 can be configured by selecting the *Channels 9-16* radial button. The controls for Channel 1 will be described in detail, as the controls for Channels 1 - 16 operate in an identical fashion. Sections 7.16.1 to 7.16.1.2 provide detailed information about each of the menu items.

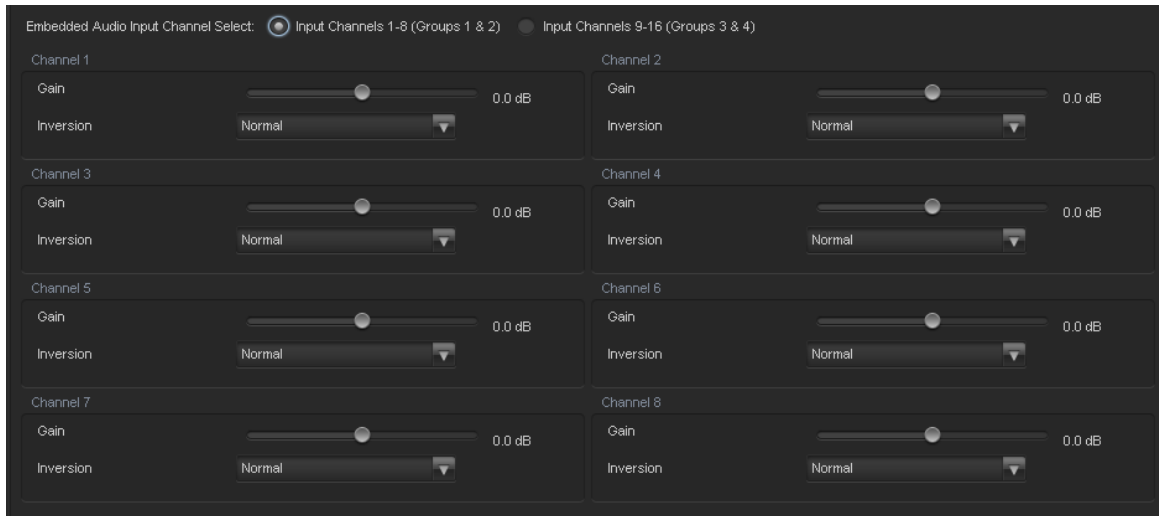


Figure 7-25: Audio Input Correction Tab

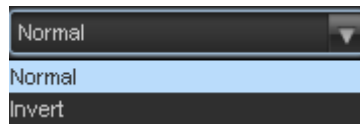
7.16.1. Channel X

7.16.1.1. Input Gain Controls

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

7.16.1.2. Inversion Control

The *Inversion* control is used to invert the incoming audio channel.



7.17. EMBEDDED AUDIO MIXER TAB

As shown in Figure 7-26, there are sixteen individual Output Channel Mixers in the 7814 series modules. These Output Channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 16 output audio channels. Using the X and Y inputs of each Output Channel Mixer an additional level of mono mixing is also available for each channel of output audio.

For the sake of brevity, only the *Audio Proc Ch1-Ch4* control tab will be discussed in this manual. Control radial buttons for Channel 5-8, Channel 9-12, and Channel 13-16 are identical in their operation. The controls for Channel 1 will be described in detail, as the controls for Channel 2, Channel 3 and Channel 4 operate in an identical fashion.



Note: Each group of controls contained in each one of the radial buttons is refreshed every time a new radial button is selected. Once all the controls have been configured, the controls must be applied in VLPro before continuing to a new radial tab or changes will be lost.

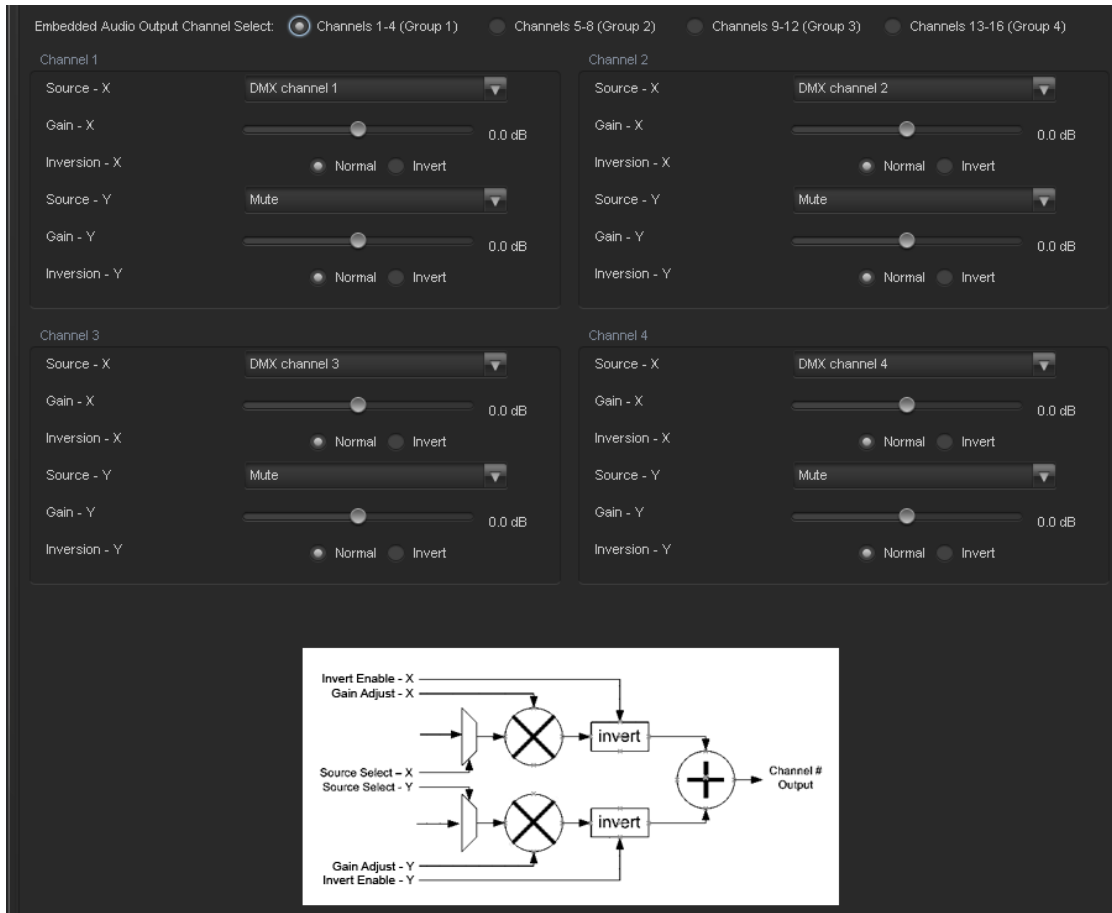
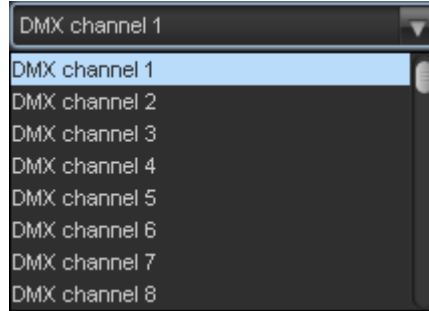


Figure 7-26: Audio Proc Ch1-Ch4 Tab

7.17.1. Channel 1

7.17.1.1. Source X

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



The full set of available channel options is listed below.

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

7.17.1.2. Gain Adjust X

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

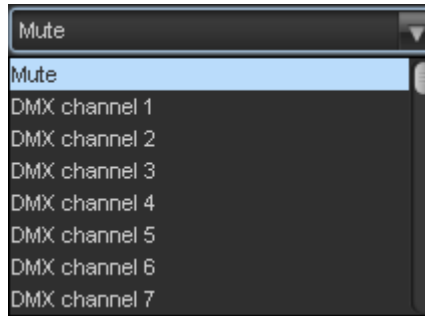
7.17.1.3. Invert Enable X

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

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

7.17.1.4. Source Y

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



The full set of available channels is listed below.

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

7.17.1.5. Gain Adjust Y

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

7.17.1.6. Invert Enable Y

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

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

7.18. AES AUDIO MIXER TAB

As shown in Figure 7-27, there are sixteen individual AES Output Channel Mixers in the 7814 series modules. These Output Channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 16 output audio channels. Using the X and Y inputs of each Output Channel Mixer an additional level of mono mixing is also available for each channel of output audio.

For the sake of brevity, only the *Audio Proc Ch1-Ch4* control tab will be discussed in this manual. Control radial buttons for Channel 5-8, Channel 9-12, and Channel 13-16 are identical in their operation. The controls for Channel 1 will be described in detail, as the controls for Channel 2, Channel 3 and Channel 4 operate in an identical fashion.

Note: Each group of controls contained in each one of the radial buttons is refreshed every time a new radial button is selected. Once all the controls have been configured, the controls must be applied in VLPro before continuing to a new radial tab or changes will be lost.

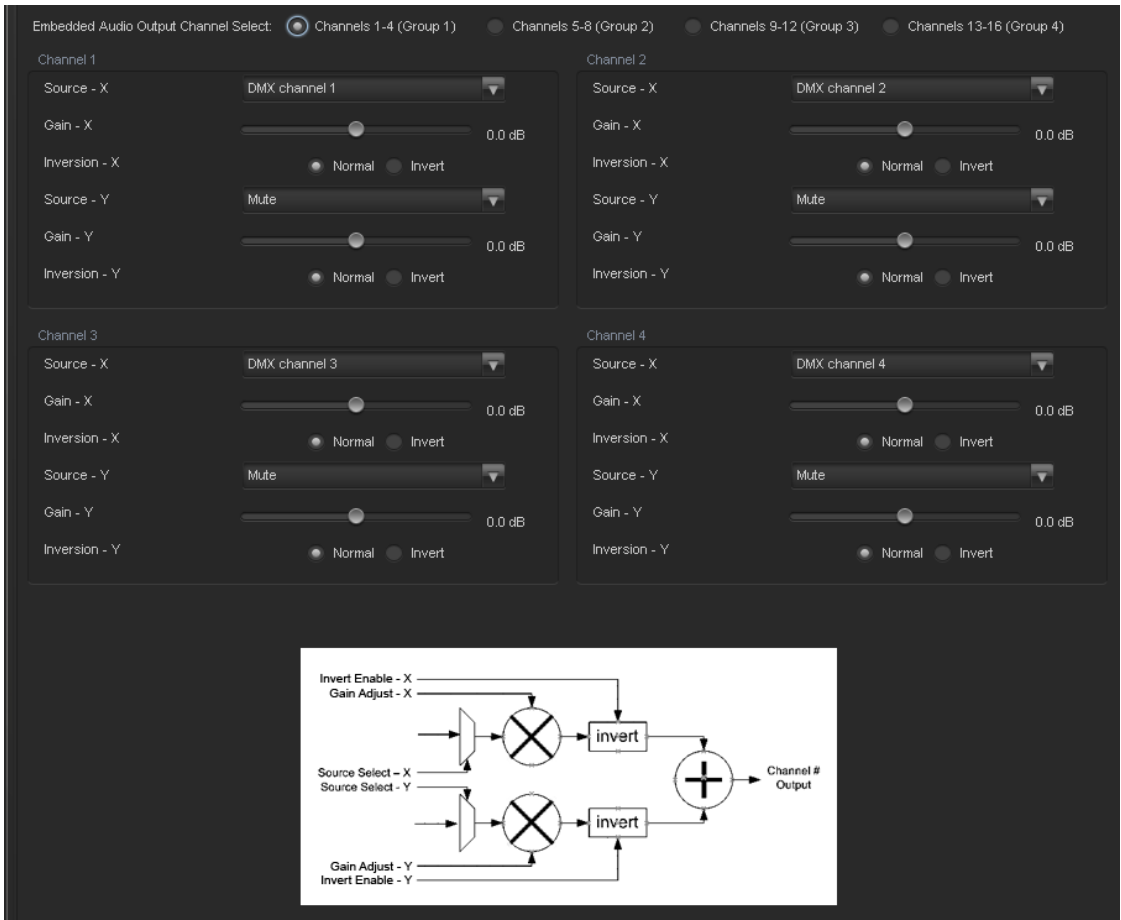
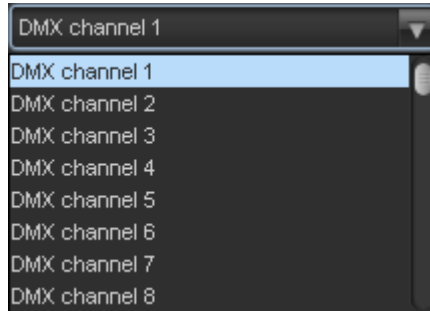


Figure 7-27: Audio Proc Ch1-Ch4 Tab

7.18.1. Channel 1

7.18.1.1. Source X

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



The full set of available channel options is listed below.

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

7.18.1.2. Gain Adjust X

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

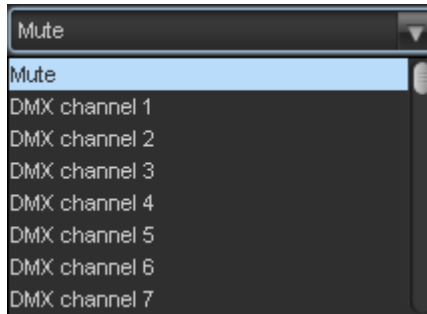
7.18.1.3. Invert Enable X

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

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

7.18.1.4. Source Y

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



The full set of available channels is listed below.

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

7.18.1.5. Gain Adjust Y

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

7.18.1.6. Invert Enable Y

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

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

7.19. DOWN MIX CONTROL TAB

The 7814 series of modules can perform 5.1 PCM to stereo (LtRt or LoRo) down mixing. This is a standard feature in all variations of the module.

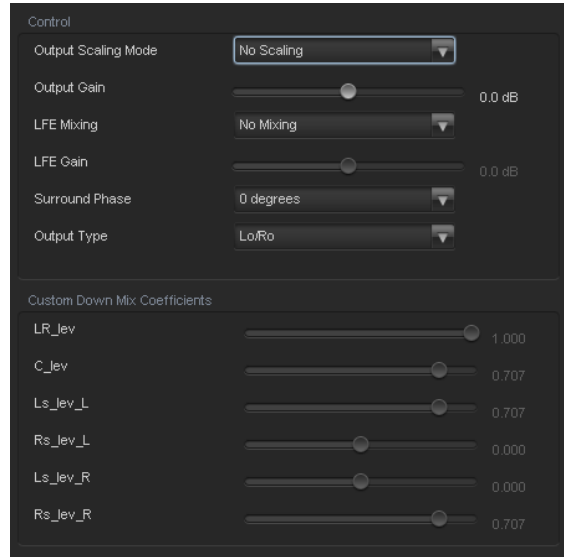
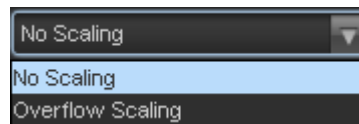


Figure 7-28: Audio 5.1 Down Mix Tab

7.19.1. Control

7.19.1.1. 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:



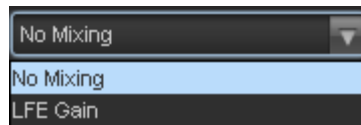
No Scaling	If no normalization is applied, the stereo down-mix usually sounds at the similar levels as the 5.1 audio input, but clipping may occur when input sound level is close to 0dB FS.
Overflow Scaling	Select <i>Overflow Scaling</i> to normalize the matrix coefficients. Normalization of matrix coefficients will avoid any possibility of overflow, but it tends to lower the loudness level when compared against the original 5.1 input.

7.19.1.2. 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.

7.19.1.3. LFE Mixing Control

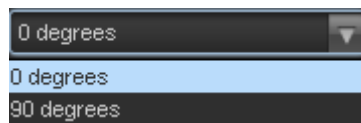
This control enables the user to control whether the LFE channel is included or not in the audio down mixing. Note that the LFE Gain control is in effect only when LFE Gain is selected. The *LFE Mixing Control* drop down menu provides the following options:



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.

7.19.1.4. Surround Phase Control

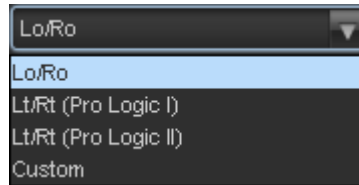
This control manages whether no phase shift (0 degrees) or a 90-degree phase shift is applied to the surround channels before being passed to the down-mix matrix. Select 0 degree if no 90-degree phase shift is needed. It is required that surround channels are 90-degree phase shifted for Dolby Prologic 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.

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

7.19.1.6. 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.

$$L = (LR_{lev} \times L + C_{lev} \times C + LS_{levL} \times Ls\{0^\circ / 90^\circ\} + RS_{levL} \times Rs\{0^\circ / 90^\circ\} + lfe_{gain} \times LFE) \times gain \div norm$$

$$R = (LR_{lev} \times R + C_{lev} \times C + LS_{levR} \times Ls\{0^\circ / 90^\circ\} + RS_{levR} \times Rs\{0^\circ / 90^\circ\} + lfe_{gain} \times LFE) \times gain \div norm$$

Where lfe_{gain} is controlled by LFE Mixing and LFE Gain, $gain$ is controlled by Output Gain and $norm$ is controlled by Output Scaling Mode and where LR_{lev} , C_{lev} , LS_{levL} , RS_{levL} , LS_{levR} and RS_{levR} are custom specified user coefficients. These custom down-mixing coefficients are controlled using the appropriate slider bars in the *Down Mix Type* control section as shown below.



- LR_{lev} : Ranges from 1.000 to -1.000 in increments of .001 increments.
- C_{lev} : Ranges from 1.000 to -1.000 in increments of .001 increments.
- LS_{levL} : Ranges from 1.000 to -1.000 in increments of .001 increments.
- RS_{levL} : Ranges from 1.000 to -1.000 in increments of .001 increments.
- LS_{levR} : Ranges from 1.000 to -1.000 in increments of .001 increments.
- RS_{levR} : Ranges from 1.000 to -1.000 in increments of .001 increments.

7.20. DOWNMIX MIXER TAB

As shown in Figure 7-26, there are six individual Downmix Channel Mixers in the 7814 series modules. These downmix channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 6 downmix channels. Using the X and Y inputs of each downmix Channel Mixer, an additional level of mono mixing is also available for each channel of downmix audio.

For the sake of brevity, only the Downmix Channel Mixers *L*, *R*, *C* control tab will be discussed in this manual. Control radial button for Channels LFE, Ls, Rs are identical in their operation. The controls for Channel L will be described in detail, as the controls for Channel R and Channel C operate in an identical fashion.

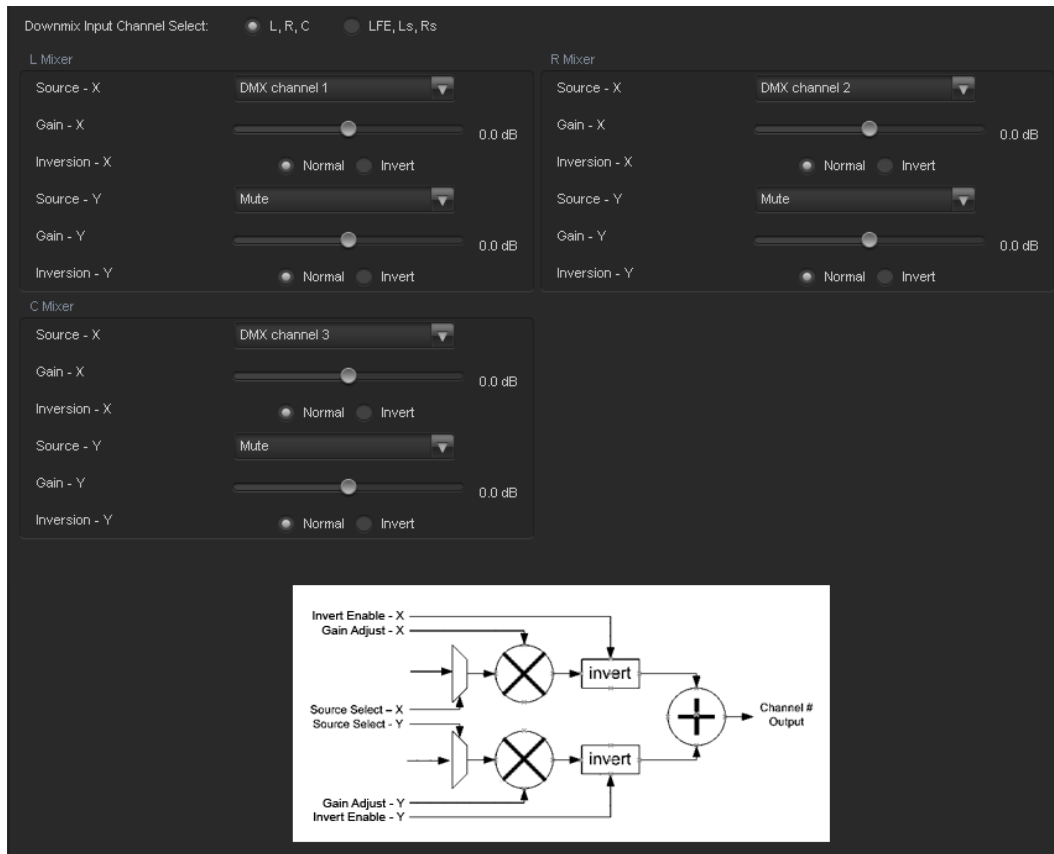


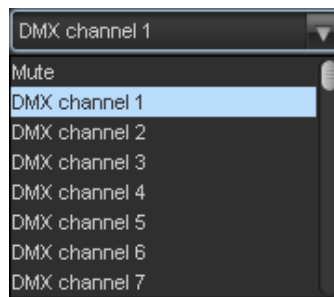
Figure 7-29: Down Mix Mixer Tab

7.20.1. 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. There are six sources of audio that feeds the down-mixing process: L Source, R Source, C Source, LFE Source, Ls Source, and Rs Source. Each of these sources can be assigned a specific channel of audio using the appropriate drop down menu. For sake of brevity, only the L Source selection process is shown.

7.20.1.1. Source X

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



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

7.20.1.2. Gain Adjust X

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

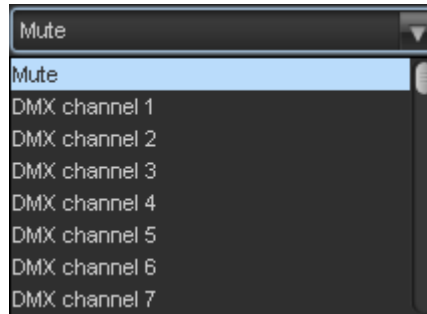
7.20.1.3. Invert Enable X

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

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

7.20.1.4. Source Y

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



The full set of available channels is listed below.

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

7.20.1.5. Gain Adjust Y

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

7.20.1.6. Invert Enable Y

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

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

7.21. AUTO UP MIX CONTROL TAB (+UMX2)

With the +UMX2 option, the 7814 series of converters can up mix stereo audio to 5.1 surround sound audio. The Up-mixing block also has the capability to auto detect the incoming source to see if it is a stereo pair or 5.1 signal being supplied and automatically up-mix the incoming stereo pair or pass the incoming 5.1.

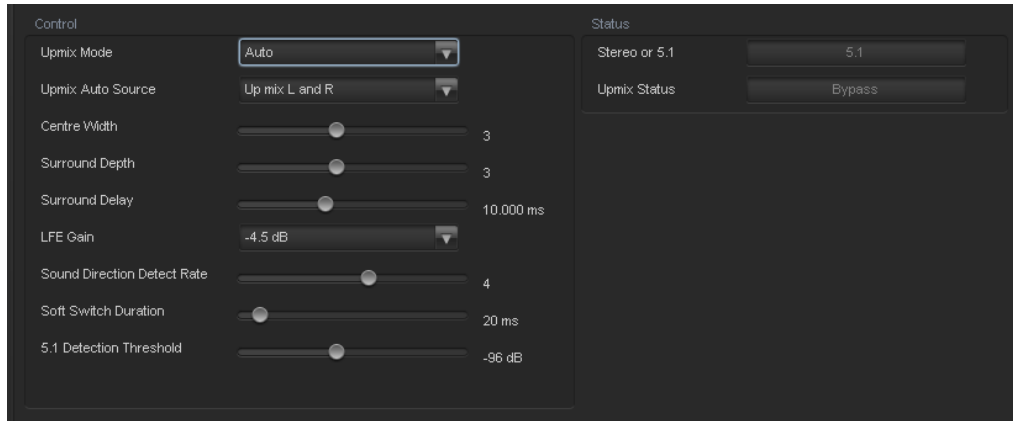
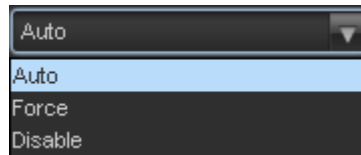


Figure 7-30: Up Mix Control Tab

7.21.1. UpMix Control

7.21.1.1. UpMix Mode

The Up-mixer can automatically determine if the audio needs to be up-mixed. It will detect whether 5.1 or a stereo pair is seen on its inputs.



Auto	When set to Auto the up-mixer will determine if 5.1 or stereo is present. If stereo is present it will up-mix the audio to 5.1, and pass if 5.1 is seen.
Force	When set to force the up-mixer will always up-mix the incoming audio.
Disable	When set to disable the up-mixer will not up-mix the audio and just pass it through.

7.21.1.2. UpMix Auto Source

The Up-mix Auto Source control selects where to listen for audio in order to perform the Auto up-mix process.

Up mix L and R	When set to Up mix L and R, if audio is detected on the L and R channels and audio is not detected on the remaining channels the audio on L and R will be up-mixed.
Up mix passthru L and R	When set to Up mix passthru L and R, when audio is detected on these channels they will be up-mixed.

7.21.1.3. Centre Width

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

7.21.1.4. Surround Depth

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

7.21.1.5. Up Mix Surround Delay

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

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

7.21.1.6. LFE Gain

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

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

7.21.1.7. Sound Direction Detect Rate

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

The value range is 0 to 7 in increments of 1. The default is level 4.

7.21.1.8. Soft Switch Duration

The Soft Switch Duration controls the transition time when the up-mix module switches modes from 5.1 bypass to up-mix and vice versa. The duration can range from 5 ms to 200 ms.

7.21.1.9. 5.1 Detection Threshold

The 5.1 Detection threshold control allow control of what level of audio is declared as silence. When audio on channels C, LFE, Ls, and Rs are all below this value the audio on channels L and R will be up-mixed.

7.21.1.10. Stereo or 5.1 Monitor

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

7.21.1.11. Upmix Status Monitor

The up-mix status monitor gives a visual representation of what mode the UMX block is currently running in.

7.22. UPMIX MIXER TAB

As shown in Figure 7-26, there are eight individual UpMix Channel Mixers in the 7814 series modules. These UpMix channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 8 UpMix channels. Using the X and Y inputs of each UpMix Channel Mixer an additional level of mono mixing is also available for each channel of UpMix audio.

For the sake of brevity, only the UpMix Channel Mixers *L*, *R*, *C* and *LFE* control tab will be discussed in this manual. Control radial button for Channels *Ls*, *Rs* Pass *L*, Pass *R* are identical in their operation. The controls for Channel *L* will be described in detail, as the controls for Channel *R*, Channel *C* and *LFE* operate in an identical fashion.



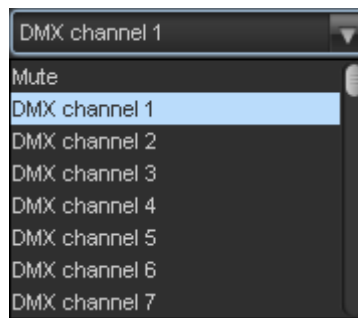
Figure 7-31: Up Mix Mixer Tab

7.22.1. 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 up mix. There are six sources of audio that feeds the up-mixing process: L Source, R Source, C Source, LFE Source, Ls Source, Rs Source Pass L and Pass R. Each of these sources can be assigned a specific channel of audio using the appropriate drop down menu. For sake of brevity, only the L Source selection process is shown.

7.22.1.1. Source X

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



L Source X	Mute	AES 7.B
	Channel 1	AES 8.A
	Channel 2	AES 8.B
	Channel 3	Mono mix channels 1 and 2
	Channel 4	Mono mix channels 3 and 4
	Channel 5	Mono mix channels 5 and 6
	Channel 6	Mono mix channels 7 and 8
	Channel 7	Mono mix channels 9 and 10
	Channel 8	Mono mix channels 11 and 12
	Channel 9	Mono mix channels 13 and 14
	Channel 10	Mono mix channels 15 and 16
	Channel 11	Down mix L
	Channel 12	Down mix R
	Channel 13	Down mix Mono
	Channel 14	IntelliGain 1 Channel 1
	Channel 15	IntelliGain 1 Channel 2
	Channel 16	IntelliGain 1 Channel 3
	AES 1.A	IntelliGain 1 Channel 4
	AES 1.B	IntelliGain 1 Channel 5
	AES 2.A	IntelliGain 1 Channel 6
	AES 2.B	IntelliGain 1 Channel 7
	AES 3.A	IntelliGain 1 Channel 8
	AES 3.B	IntelliGain 2 Channel 1
	AES 4.A	IntelliGain 2 Channel 2
	AES 4.B	IntelliGain 2 Channel 3
	AES 5.A	IntelliGain 2 Channel 4
	AES 5.B	IntelliGain 2 Channel 5
	AES 6.A	IntelliGain 2 Channel 6
	AES 6.B	IntelliGain 2 Channel 7
	AES 7.A	IntelliGain 2 Channel 8

7.22.1.2. Gain Adjust X

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

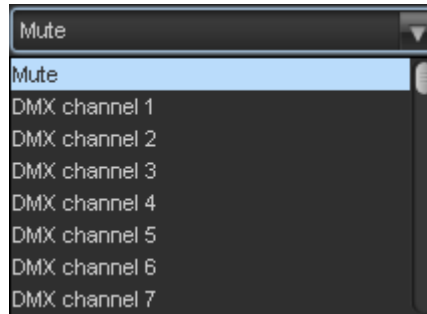
7.22.1.3. Invert Enable X

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

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

7.22.1.4. Source Y

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



The full set of available channels is listed below.

L Source Y		
	Mute	AES 7.B
	Channel 1	AES 8.A
	Channel 2	AES 8.B
	Channel 3	Mono mix channels 1 and 2
	Channel 4	Mono mix channels 3 and 4
	Channel 5	Mono mix channels 5 and 6
	Channel 6	Mono mix channels 7 and 8
	Channel 7	Mono mix channels 9 and 10
	Channel 8	Mono mix channels 11 and 12
	Channel 9	Mono mix channels 13 and 14
	Channel 10	Mono mix channels 15 and 16
	Channel 11	Down mix L
	Channel 12	Down mix R
	Channel 13	Down mix Mono
	Channel 14	IntelliGain 1 Channel 1
	Channel 15	IntelliGain 1 Channel 2
	Channel 16	IntelliGain 1 Channel 3
	AES 1.A	IntelliGain 1 Channel 4
	AES 1.B	IntelliGain 1 Channel 5
	AES 2.A	IntelliGain 1 Channel 6
	AES 2.B	IntelliGain 1 Channel 7
	AES 3.A	IntelliGain 1 Channel 8
	AES 3.B	IntelliGain 2 Channel 1
	AES 4.A	IntelliGain 2 Channel 2
	AES 4.B	IntelliGain 2 Channel 3
	AES 5.A	IntelliGain 2 Channel 4
	AES 5.B	IntelliGain 2 Channel 5
	AES 6.A	IntelliGain 2 Channel 6
	AES 6.B	IntelliGain 2 Channel 7
	AES 7.A	IntelliGain 2 Channel 8

7.22.1.5. Gain Adjust Y

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

7.22.1.6. Invert Enable Y

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

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

7.23. INTELLIGAIN OVERVIEW

IntelliGain™ is a technology developed by Evertz to control the loudness of audio programs on the fly. More specifically, it calculates the perceived loudness of the input audio and modifies the audio to ensure that the long-term average loudness level is at the target level. IntelliGain™ works with mono, stereo and multi-channel audio per program and can handle up to 16 programs simultaneously. The objective loudness calculation is based on ITU Recommendation (ITU-R BS.1770), “Algorithms to measure audio program loudness and true-peak audio level”. This recommendation provides equations for calculating loudness over mono, stereo and multi-channel audio programs. IntelliGain™ constantly calculates audio program loudness. When the loudness is over the target level, it reduces the gain; and when the loudness is below the target level, it increases the gain. The gain adjustment smoothness is user-controllable by setting attack and release times.

Features:

- Normalize loudness of audio programs to a target level
- Supports up to 16 programs and 16 channels
- Relatively constant gain within a program interval to preserve audio dynamic range
- Simultaneously process multiple multi-channel programs
- User adjustable attack and release times
- Applied loudness algorithm ITU-R BS. 1770
- Peak limiting
- LKFS calculations
- Momentary, short term and integrated loudness measurements

7.24. INTELLIGAIN MIXER TAB

As shown in Figure 7-26, there are sixteen individual Intelligain Channel Mixers in the 7814 series modules. These Intelligain channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 16 Intelligain channels. Using the X and Y inputs of each Intelligain Channel Mixer an additional level of mono mixing is also available for each channel of Intelligain audio.

For the sake of brevity, only the Intelligain Module 1 will be discussed in the manual, as controls for module 2 are identical. Only Channel Mixers 1 - 4 control tab will be discussed in this manual. Control radial button for Channels 5 - 8 are identical in their operation. The controls for Channel 1 will be described in detail, as the controls for Channel 2, Channel 3 and 4 operate in an identical fashion.

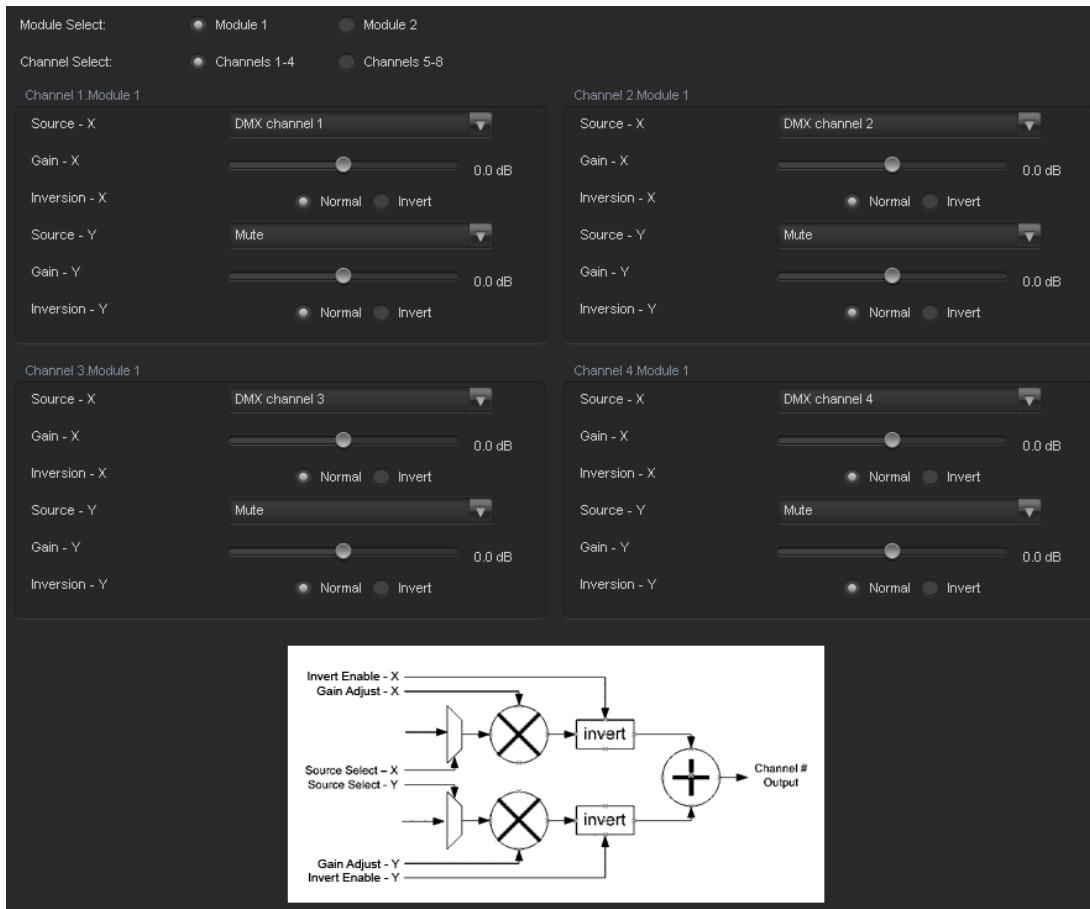


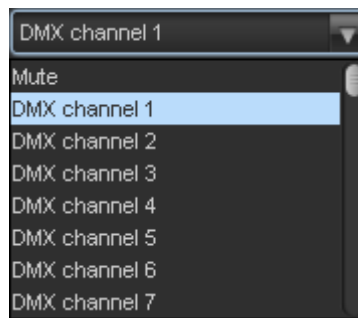
Figure 7-32: Intelligain Mix Mixer Tab

7.24.1. 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 IntelliGain. There are sixteen sources of audio that feeds the IntelliGain process: Module 1, channel 1 - 4, module 1, channel 5 – 8, Module 2 channel 1 – 4 and module 2 channel 5 – 8. Each of these sources can be assigned a specific channel of audio using the appropriate drop down menu. For sake of brevity, only Module 1 channel 1 selection process is shown.

7.24.1.1. Source X

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



L Source X	Mute	AES 5.B
	Channel 1	AES 6.A
	Channel 2	AES 6.B
	Channel 3	AES 7.A
	Channel 4	AES 7.B
	Channel 5	AES 8.A
	Channel 6	AES 8.B
	Channel 7	Mono mix channels 1 and 2
	Channel 8	Mono mix channels 3 and 4
	Channel 9	Mono mix channels 5 and 6
	Channel 10	Mono mix channels 7 and 8
	Channel 11	Mono mix channels 9 and 10
	Channel 12	Mono mix channels 11 and 12
	Channel 13	Mono mix channels 13 and 14
	Channel 14	Mono mix channels 15 and 16
	Channel 15	Down mix L
	Channel 16	Down mix R
	AES 1.A	Down mix Mono
	AES 1.B	Up mix L
	AES 2.A	Up mix R
	AES 2.B	Up mix C
	AES 3.A	Up mix LFE
	AES 3.B	Up mix Ls
	AES 4.A	Up mix Rs
	AES 4.B	Up mix Pass L
	AES 5.A	Up Mix Pass R

7.24.1.2. Gain Adjust X

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

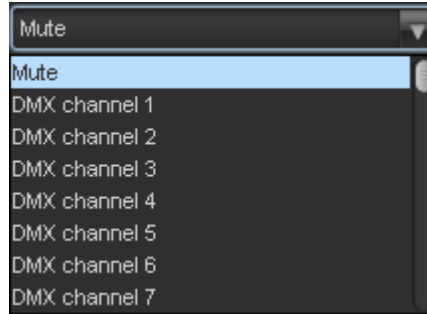
7.24.1.3. Invert Enable X

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

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

7.24.1.4. Source Y

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



The full set of available channels is listed below.

L Source X	Mute	AES 5.B
	Channel 1	AES 6.A
	Channel 2	AES 6.B
	Channel 3	AES 7.A
	Channel 4	AES 7.B
	Channel 5	AES 8.A
	Channel 6	AES 8.B
	Channel 7	Mono mix channels 1 and 2
	Channel 8	Mono mix channels 3 and 4
	Channel 9	Mono mix channels 5 and 6
	Channel 10	Mono mix channels 7 and 8
	Channel 11	Mono mix channels 9 and 10
	Channel 12	Mono mix channels 11 and 12
	Channel 13	Mono mix channels 13 and 14
	Channel 14	Mono mix channels 15 and 16
	Channel 15	Down mix L
	Channel 16	Down mix R
	AES 1.A	Down mix Mono
	AES 1.B	Up mix L
	AES 2.A	Up mix R
	AES 2.B	Up mix C
	AES 3.A	Up mix LFE
	AES 3.B	Up mix Ls
	AES 4.A	Up mix Rs
	AES 4.B	Up mix Pass L
	AES 5.A	Up Mix Pass R

7.24.1.5. Gain Adjust Y

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

7.24.1.6. Invert Enable Y

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

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

7.25. INTELLIGAIN™ CONFIGURATION TAB

The IntelliGain™ Configuration tab displays the top-level IntelliGain™ control interface. There are a number of parameters that control both the intelligent leveler and the on-board dynamic processor (compressor, expander, and limiter). Figure 7-33 shows the IntelliGain™ Configuration view from the VistaLINK® NMS.

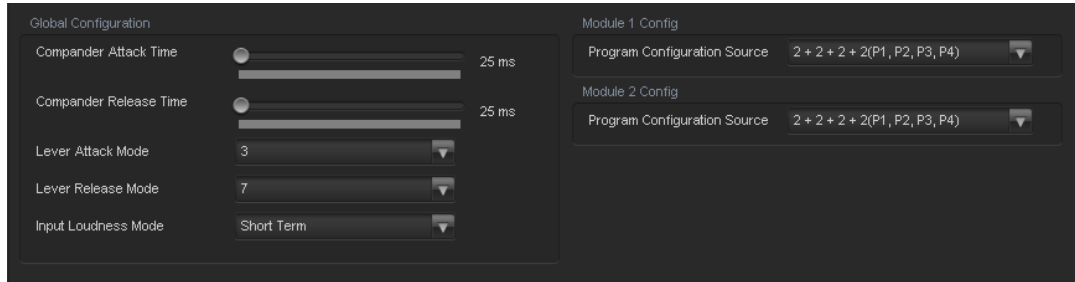


Figure 7-33: IntelliGain™ Configuration Tab

Table 7-1 provides a brief overview of the top level of the IntelliGain™ Configuration menu tree. The details of each of the menu items are described in sections 7.25.1 to 7.25.1.6.

Program Configuration Source	Defines how the audio channels are grouped together.
Compander Attack Time	Defines how quickly the compander reacts to an increase in the input loudness.
Compander Release Time	Defines how quickly the compander reacts to a decrease in the input loudness.
Leveler Attack Mode	Defines the maximum integration time that is applied when loudness increases during a program period.
Leveler Release Mode	Defines the maximum integration time that is applied when loudness decreases during a program period.
Input Loudness Mode	Defines the window that will be used to produce the <i>Input Loudness</i>

Table 7-1: IntelliGain™ Configuration Options

7.25.1. Configuration

7.25.1.1. Program Configuration Source

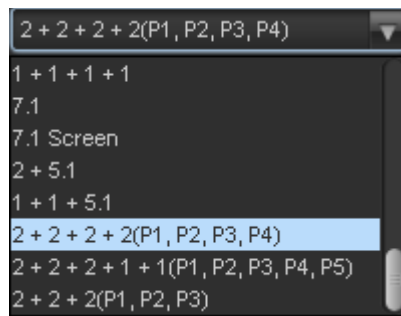
This parameter defines how the audio channels are grouped together. Up to eight channels can be grouped together in individual programs, where each program contains its own metadata. IntelliGain™ uses this parameter to configure multiple internal settings.

This control must be set to define the audio program provided as the input to IntelliGain™.



Note: It is important to follow the program to channel mapping guidelines, which are provided in Table 7-3. For example, Program Configuration Source 2 + 2 + 2 + 2 defines audio program 1 mapped to AES 1, audio program 2 mapped to AES 4, audio program 3 mapped to AES 2 and audio program 4 mapped to AES 3. Program Configuration Source 2 + 2 + 2 + 2 (p1, p2, p3, p4) has the audio program mapped sequentially.

If the audio program configuration is defined to be of this type, it is recommended to use this Program Configuration Source.



The following table (Table 2-2) Table 7-3 provides a list of programs to channel mapping guidelines. For example, configuration 5.1+2, program 1 (P1) is mapped to channel CH1 to CH6 and program 2 (P2) is mapped to channel CH7 to CH8. Table 7-2 provides a list of abbreviations used:

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

Table 7-2: Abbreviations

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

Table 7-3: Relationship between Audio Programs and Audio Channels

7.25.1.2. Comander Attack Time

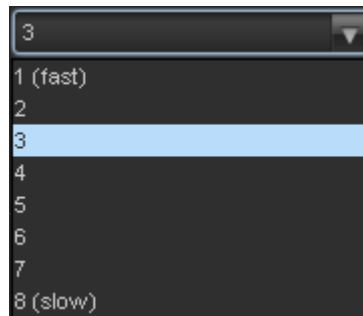
The *Comander Attack Time* control defines how quickly the compander reacts to an increase in the input loudness. The compander Attack time can be set to a value from 10 ms to 2000ms (2 sec.).

7.25.1.3. Comander Release Time

The *Comander Release Time* control defines how quickly the compander reacts to a decrease in the input loudness. The compander release time should be larger than or equal to the *Comander Attack Time*. The compander Release time can be set to any value from 10 ms to 2000ms (2 sec.).

7.25.1.4. Leveler Attack Mode

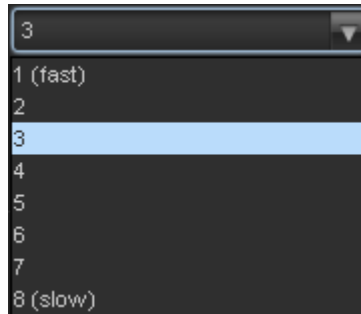
The Leveler Attack Mode defines the maximum integration time that is applied when loudness increases during a commercial period. The actual integration time is content dependent. For more responsive results set the attack time to a smaller value.



1	< 1 sec. maximum integration time will be applied when loudness increases
2	< 2 sec. maximum integration time will be applied when loudness increases
3	< 3 sec. maximum integration time will be applied when loudness increases
4	< 6 sec. maximum integration time will be applied when loudness increases
5	11 sec. maximum integration time will be applied when loudness increases
6	22 sec. maximum integration time will be applied when loudness increases
7	44 sec. maximum integration time will be applied when loudness increases
8	88 sec. maximum integration time will be applied when loudness increases
9	3 min. maximum integration time will be applied when loudness increases
10	6 min. maximum integration time will be applied when loudness increases
11	12 min. maximum integration time will be applied when loudness increases
12	24 min. maximum integration time will be applied when loudness increases

7.25.1.5. Leveler Release Mode

The *Leveler Release Mode* defines the maximum integration time that is applied when loudness decreases during a commercial period. The actual integration time is content dependent. For more responsive results set the release time to a smaller value.



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

7.25.1.6. Input Loudness mode

The *Input Loudness Mode* control defines the window that will be used to produce the *Input Loudness* values in section.

A *Momentary* selection defines a moving window of 400 ms. A *Short Term* selection defines a moving window of 3 s.

7.26. INTELLIGAIN™ PROGRAM CONTROL TAB

IntelliGain™ can individually process up to eight audio programs independently. An audio program defines how the audio is grouped together.

For example, a 5.1+2 program configuration mode is defined to have 2 audio programs. The first audio program is 5.1 and the second is 2.

Table 7-4 outlines the relationship between the program configuration mode and the number of audio programs.

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

Table 7-4: Relationship between Program Configuration Mode and Audio Programs

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

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

Figure 7-34 identifies up to eight program configuration tabs that are accessible via the VistaLINK® NMS.

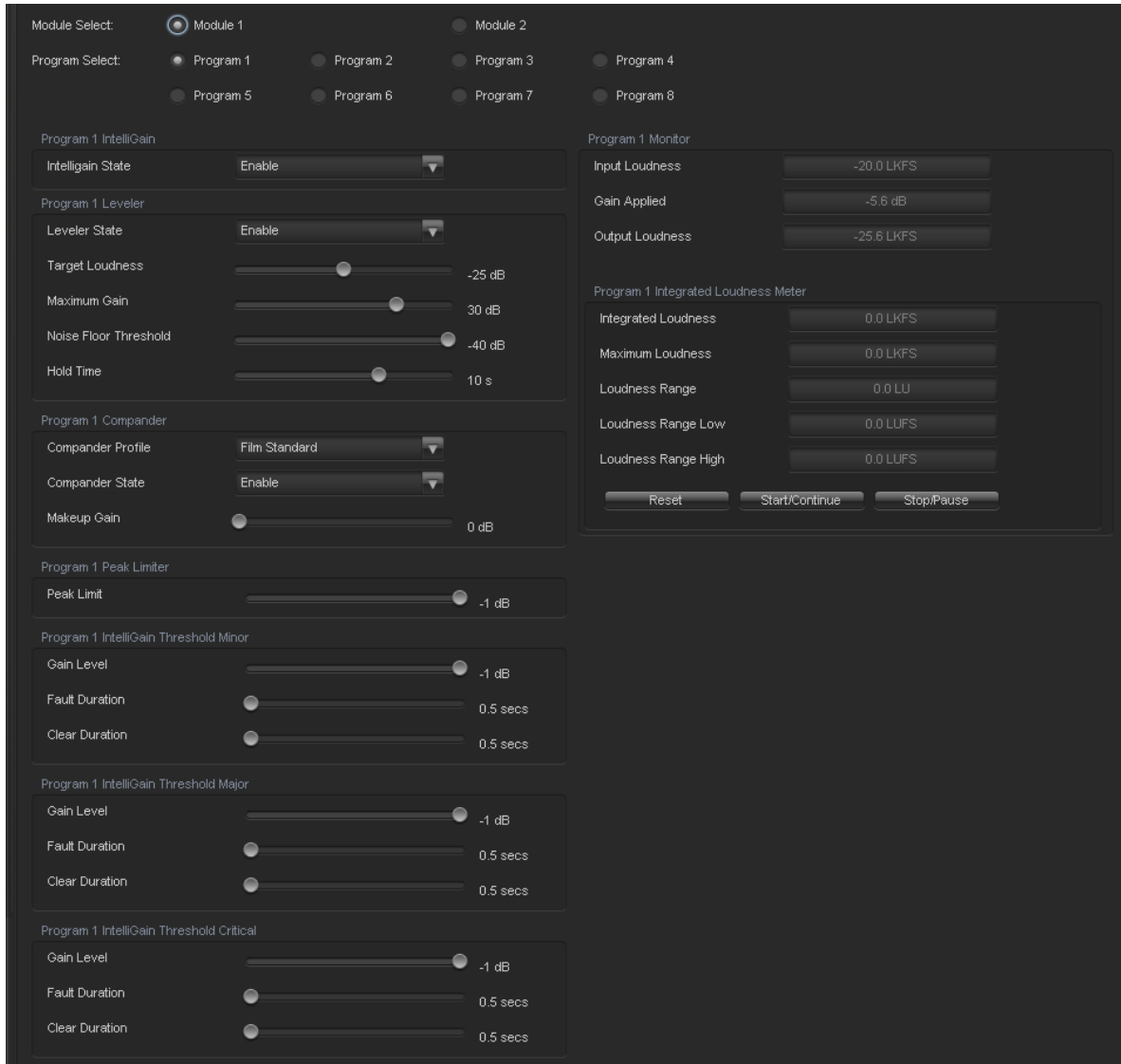


Figure 7-34: Program 1 Configuration View

7.26.1. Program Configuration Control

As IntelliGain™ detects valid audio programs, the VistaLINK® program configuration tabs will become activated. The user interface and program configuration tabs are identical.

Sections 7.26.2 to 7.26.7.3 provide detailed explanations for each control available in the Program Configuration tab. Since each program configuration interface is identical, only Program 1 will be described.

7.26.2. Intelligain

7.26.2.1. IntelliGain™ State

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

Enable	Set this control to <i>Enable</i> to initiate IntelliGain™ processing.
Disable	Set this control to <i>Disable</i> to deactivate IntelliGain™ processing.

7.26.3. Intelligain Leveler

7.26.3.1. Leveler State

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

Enable	Set this control to <i>Enable</i> to activate the IntelliGain™ audio leveler.
Disable	Set this control to <i>Disable</i> to de-activate the IntelliGain™ audio leveler.

7.26.3.2. Target Loudness

This control is used to set the target loudness level for the given audio program. The IntelliGain™ processor will level the audio to this value. Note that if the compander is enabled, it is desirable to set the target loudness parameter to the range (-31 dB to -26 dB) and use *Makeup Gain* control to reach the final desired target loudness level. The *Target Loudness* control has a full range from -35 dBFS to -15dBFS.

7.26.3.3. Maximum Gain Control

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

7.26.3.4. Noise Floor Threshold

The *Noise Floor Threshold* control is used to set the threshold level for IntelliGain™ processing. Levels below this value will not have IntelliGain™ processing applied. The *Target Loudness* control has a full range from -70 dB to -40 dB.

7.26.3.5. Hold Time Control

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

Immediate	Immediately processes the incoming audio.
1 – 14 seconds	Allows the user to select a defined amount of time before applying processing.
Adaptive	The adaptive setting will vary the hold time depending on the content for optimal sound quality.

7.26.4. Comander

7.26.4.1. Comander Profile

The comander profiles are used to define the dynamic range control of the comander. There are 5 default profiles.

<i>Film Standard</i>	The <i>Film Standard</i> profile is used to compress/expand sporting events, and movies with a large dynamic range. Max Boost: 6 dB (below -43 dB) Boost Range: -43 to -31 dB (2:1 ratio) Null Band Width: 5 dB (-31 to -26 dB) Early Cut Range: -26 to -16 dB (2:1 ratio) Cut Range: -16 to +4 dB (20:1 ratio)
<i>Film Light</i>	The <i>Film Light</i> profile is used to compress/expand light movies or program content such as dramas or content with less dynamic range. Max Boost: 6 dB (below -53 dB) Boost Range: -53 to -41 dB (2:1 ratio) Null Band Width: 20 dB (-41 to -21 dB) Early Cut Range: -26 to -11 dB (2:1 ratio) Cut Range: -11 to +4 dB (20:1 ratio)
<i>Speech</i>	The <i>Speech</i> profile is used to compress/expand content such as news, documentaries or “talking head” type content. Max Boost: 15 dB (below -50 dB) Boost Range: -50 to -31 dB (5:1 ratio) Null Band Width: 5 dB (-31 to -26 dB) Early Cut Range: -26 to -16 dB (2:1 ratio) Cut Range: -16 to +4 dB (20:1 ratio)
<i>Music Standard</i>	The <i>Music Standard</i> profile is used in most typical music environments such as concerts, music videos and music content with a wide dynamic range. Max Boost: 12 dB (below -55 dB) Boost Range: -55 to -31 dB (2:1 ratio) Null Band Width: 5 dB (-31 to -26 dB) Early Cut Range: -26 to -16 dB (2:1 ratio) Cut Range: -16 to +4 dB (20:1 ratio)
<i>Music Light</i>	The <i>Music Light</i> profile is used to compress/expand music content with a narrow dynamic range. Max Boost: 12 dB (below -65 dB) Boost Range: -65 to -41 dB (2:1 ratio) Null Band Width: 20 dB (-41 to -21 dB) Cut Range: -21 to +9 dB (2:1 ratio).

7.26.4.2. Compander State

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

7.26.4.3. Makeup Gain

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

7.26.5. Peak Limiter

7.26.5.1. Peak Limit

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

7.26.6. Intelligain Program Monitor

7.26.6.1. Input Loudness Monitor

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

7.26.6.2. Gain Applied Monitor

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

7.26.6.3. Output Loudness Monitor

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

7.26.6.4. Integrated Loudness Meter

7.26.6.4.1. Integrated Loudness

The *Integrated Loudness* control will provide a real time value of the calculated integrated loudness value. This control is used for monitoring purposes only.

The period of the integrated loudness measurement is defined by the *Start/Continue* and *Stop/Pause* buttons. Once the *Stop/Pause* button is activated, the loudness of the segment(s) defined by all active periods is calculated.

The integrated loudness measurement is performed using the gating function specified in ITU-R BS.1770-2 summarized as follows:

- an absolute gating threshold at -70 LKFS is used to compute the absolute-gated loudness level
 - a relative gating threshold that is 10 LU below the absolute-gated loudness level is applied
- the measurement input to which the gating threshold is applied is the loudness of 400 ms blocks with a constant overlap between consecutive gating blocks of 75%

7.26.6.4.2. Maximum Loudness

The *Maximum Loudness* control will provide a real time value of the calculated maximum loudness value within the duration of the *Integrated Loudness* calculation. This control is used for monitoring purposes only.

7.26.6.4.3. Loudness Range

The *Loudness Range* control will provide a real time value of the calculated loudness range value within the duration of the *Integrated Loudness* calculation. This control is used for monitoring purposes only.

The *Loudness Range* describes the distribution of loudness within a program and is defined as the difference between the highest and lowest loudness values within the *Integrated Loudness* period. This range excludes all loudness values in the top 5% and bottom 10% of the loudness distribution after applying a relative gating threshold of 20 LU below the absolute-gated loudness level.

7.26.6.4.4. Loudness Range Low

The *Loudness Range Low* control will provide a real time value of the lowest calculated loudness value within the duration of the *Integrated Loudness* calculation, given the exclusions and thresholds used as described in the calculation of the *Loudness Range*. This control is used for monitoring purposes only.

7.26.6.4.5. Loudness Range High

The *Loudness Range High* control will provide a real time value of the highest calculated loudness value within the duration of the *Integrated Loudness* calculation, given the exclusions and thresholds used as described in the calculation of the *Loudness Range*. This control is used for monitoring purposes only.

7.26.6.4.6. Reset

The *Reset* control will flush the buffer for the *Integrated Loudness* calculation.

This control should be activated each time a new *Integrated Loudness* value is to be obtained.

7.26.6.4.7. Start/Continue

The *Start/Continue* control will commence or resume the duration in which loudness values are being used to calculate the *Integrated Loudness* measurement.

7.26.6.4.8. Stop/Pause

The *Stop/Pause* control will terminate or pause the duration in which loudness values are being used to calculate the *Integrated Loudness* measurement. Each time this button is activated, a new *Integrated Loudness* value will be produced.

7.26.7. Thresholds

7.26.7.1. Output Level Threshold (1, 2, 3)

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

7.26.7.2. Fault Duration

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

7.26.7.3. Clear Duration Control

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

7.27. INTELLIGAIN™ TRAPS TAB

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

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

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

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

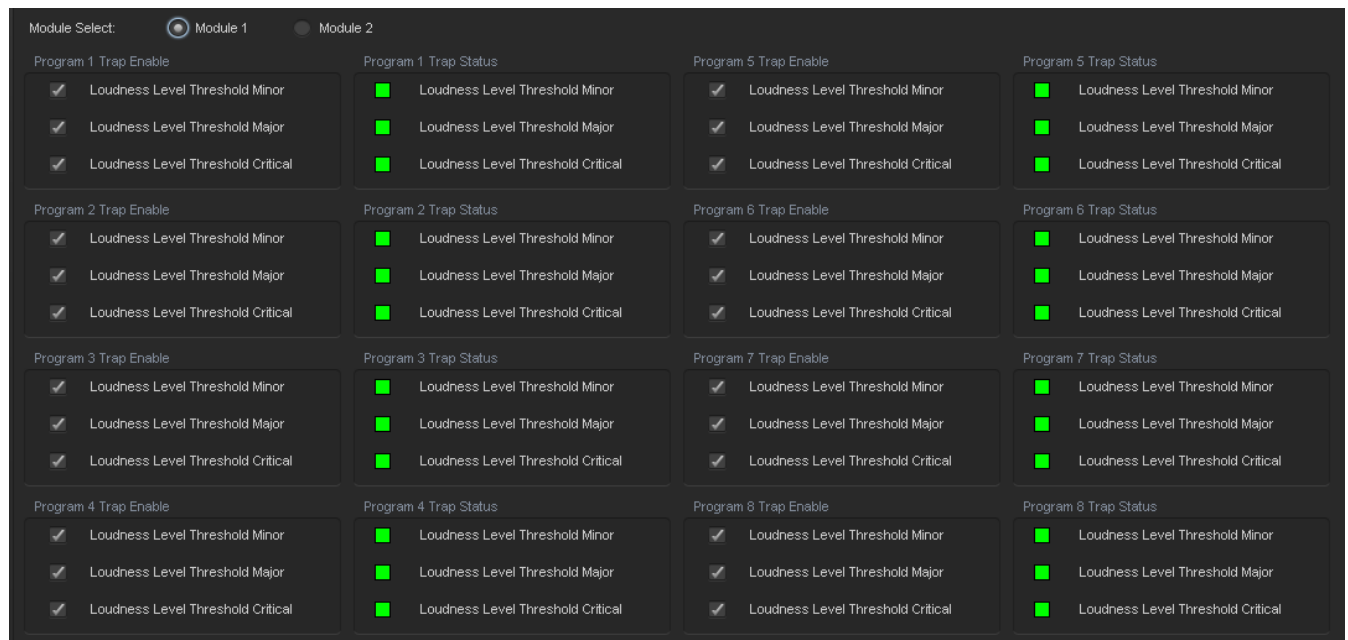


Figure 7-35: IntelliGain™ Traps Tab

7.28. REFERENCE TAB

The 7814 series conversion modules accept standard reference signals including bi-level and tri-level sync signals. The user can select one of the frame reference genlock inputs or the reference DIN on the rear plate. If the reference input is invalid or not present, the module can Fail-Over to either free run or lock to incoming video.

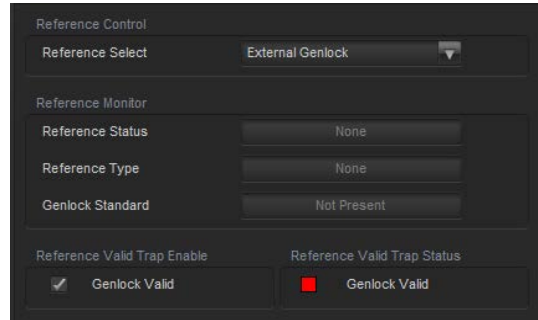


Figure 7-36: Card Reference Tab

7.28.1. Reference Control

7.28.1.1. Reference Select

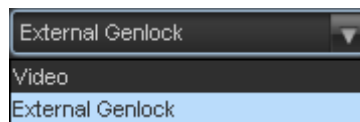
With this control, the source of video reference for the conversion path is selected. When the card is used in the 7700FR-G or the 7800FR Frame Reference inputs may be used.

- When External Genlock is selected the conversion Path will lock to the incoming reference as configured in section 6.2.1.
- When Video is selected, the conversion path will ignore the incoming genlock source and lock to the incoming video stream.



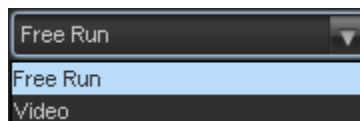
Note: that if the selected genlock reference disappears or is not valid, the card will lock to incoming video.

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



7.28.1.2. Reference Fail-Over

The Reference Fail-Over control allows the configuration of the module to lock to incoming video or free-run when a valid genlock is not present or is invalid.



7.28.2. Reference Monitor

7.28.2.1. Reference Status Monitor

The *Reference Status* Monitor is used to see what the current valid reference standard is being applied to the module. When no reference is detected, the Reference Status window will state None.

7.28.2.2. Reference Type

The *Reference Type* monitor is used to inform the user whether the incoming genlock signal is of bi-level sync or tri-level sync

7.28.2.3. Genlock Standard

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

7.28.3. Reference Traps

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.

7.29. TIME CODE TAB

The 7814 series of converters extracts timecode signals from the input signal and translates it to the output video signal. The time Code control tab contains all the controls associated with the timecode processing and translation.



Figure 7-37: Time Code Control Tab

7.29.1. Time Code Control

7.29.1.1. D-VITC Reader and D-VITC Writer Lines

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

7.29.1.2. Loss of Time Code Control

This control is used to configure the modules response when time code is lost on the input. The 7814 can be configured to Mute the output timecode when the input is lost, continue to run the timecode based on the last timecode received or hold the timecode on that last time code received.

7.29.1.3. D-VITC Source

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

7.29.1.4. ANC-VITC Source

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

7.29.1.5. ANC-LTC Source

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



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

7.30. CLOSED CAPTIONING CONTROL TAB

The 7814 series of converters extracts closed captioning from the input signal and translates it to the output video signal. The *Closed Captioning* menus are used to configure the parameters associated with the closed caption handling. Sections 7.30.1 to 7.30.1.6 provide detailed information about each of the parameters.

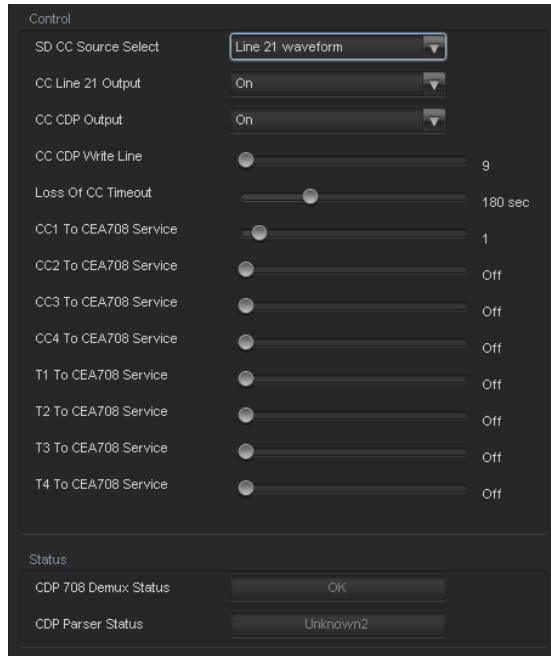


Figure 7-38: CC Control Tab

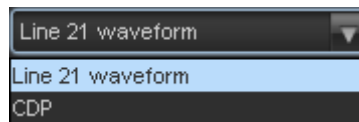


Any changes to the closed captioning settings can cause a momentary interruption.

7.30.1. Closed Captioning Control

7.30.1.1. SD CC Source Select

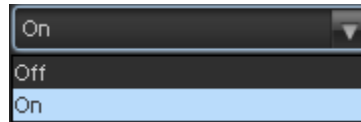
This parameter will select where to get the closed caption information in an SD input signal. Closed caption can be in CDP's or in a line 21 waveform.



Line 21 waveform	When Line 21 waveform is selected, any closed captioning will be extracted from the input signal from the line 21 waveform, and mapped to line 21 if the output video is SD, or to the designated HD write line (see section 7.30.1.4) if the output video is HD and output time code is enabled.
CDP	When CDP is selected, the module will process the incoming CDP timecode signal and embed on the output if the output timecode controls are enabled.

7.30.1.2. CC Line 21 Output

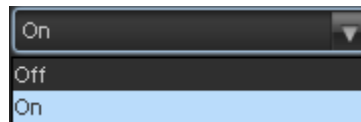
The parameter will enable/disable the line 21 closed caption output if the output is SD.



Off	When turned <i>Off</i> , no closed captioning is encoded in the output video signal on line 21 when the output is SD.
On	When turned <i>On</i> , any closed captioning will be extracted from the input signal, and mapped to line 21 if the output video is SD,

7.30.1.3. CC CDP Output

This parameter will enable closed caption handling for the module.



On	When turned <i>On</i> , any closed captioning will be extracted from the input signal, and mapped to the designated CDP write line (see section 0)
Off	When turned <i>Off</i> , no CDP closed captioning packets are encoded in the output video signal.

7.30.1.4. CC CDP Write Line

The *CC CDP Write Line* parameter will set the closed captioning write line where the VANC captions are inserted on the output video as per SMPTE 334M.

7.30.1.5. 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.

7.30.1.6. Caption Services in CEA708

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

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

7.30.2. CDP Status

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

7.30.2.1. CDP 708 Demux Status

This parameter displays the status of 708 Closed Caption reading.

7.30.2.2. CDP Parser Status

This parameter displays the status of Closed Caption reading.

7.31. 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.

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

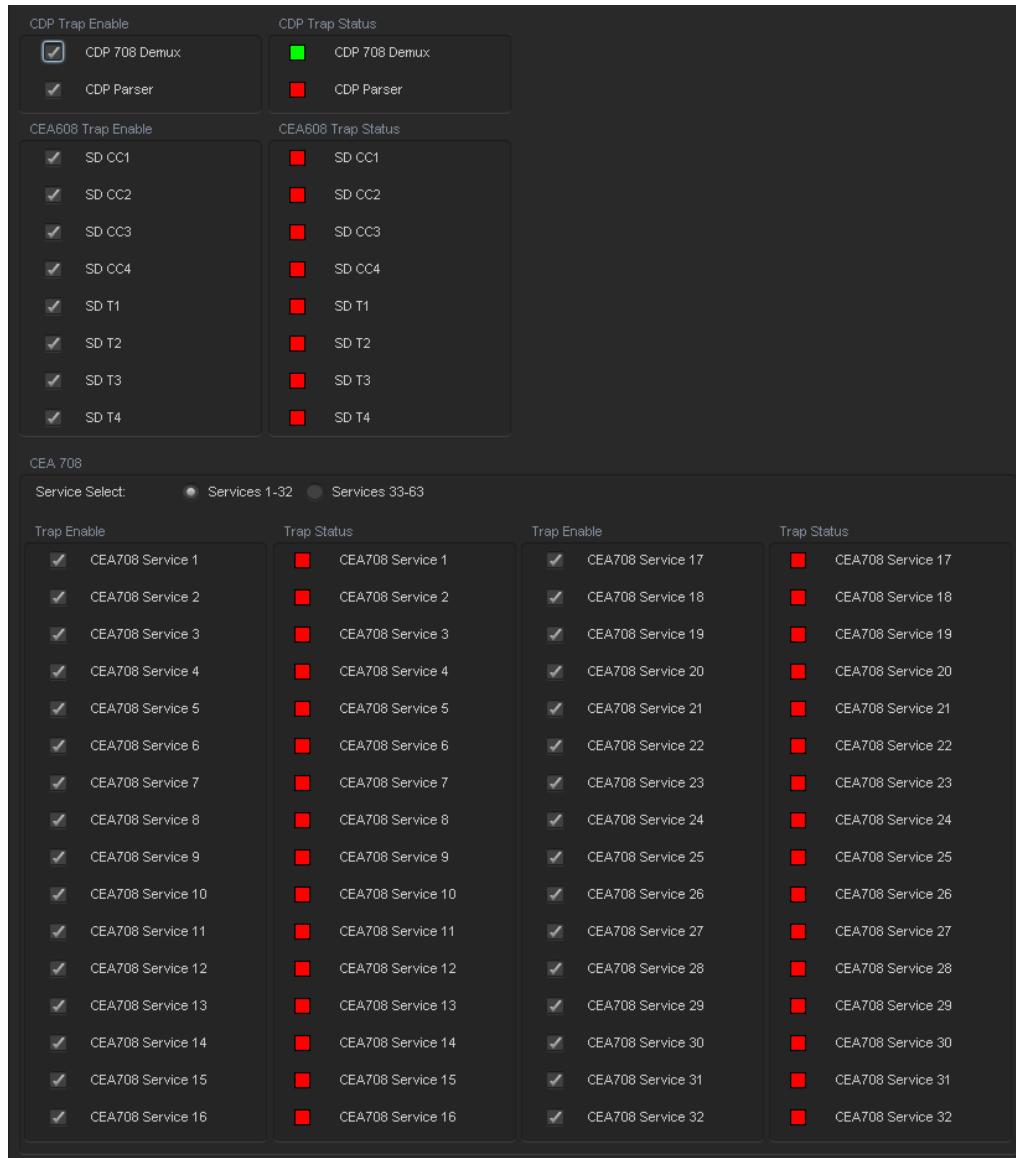


Figure 7-39: CC Fault Traps Tab

7.32. ANC PASSTHRU TAB

The ANC Pass Thru feature allows for user specified ANC data passthru. This allows ANC data that is normally not processed through the module to pass through without getting striped on the output video signal.

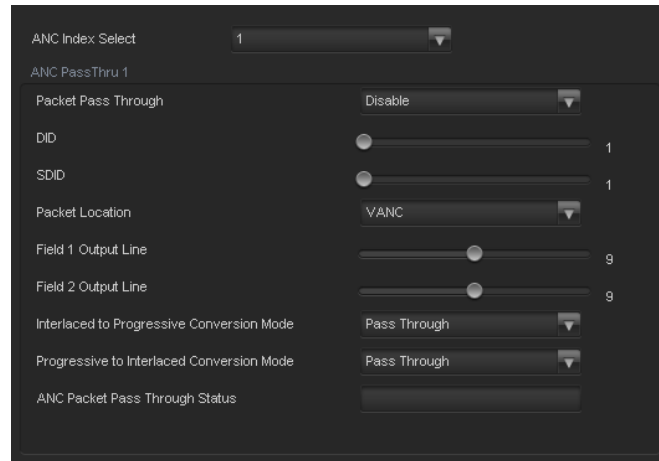


Figure 7-40: ANC PassThru Tab

7.32.1. ANC Index Select

ANC index control allows for selection and configuration of up to 20 ANC data sources to be passed through the module.

7.32.2. ANC PassThru

7.32.2.1. Packet Pass Through

The *ANC Pass Through Enable* is the main control for enabling passing ANC data seen on the input of the 7812 card. When enabled the specified ANC packet is embedded on the output. When disabled no ANC packets will be passed through the 7812 card.

7.32.2.2. DID Control

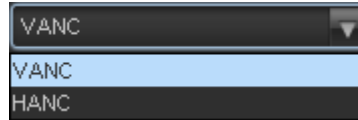
This control will set the DID of the ANC packet to be passed through. The DID has a valid range from 0x1 to 0xFF with a default value of 0x1

7.32.2.3. SDID Control

This control will set the SDID of the ANC packet to be passed through. The SDID has a valid range from 0x1 to 0xFF with a default value of 0x1

7.32.2.4. Packet Location

This control specifies whether the output ANC packet should be located in the HANC or VANC region.



VANC	When set to VANC the incoming ANC packets will be inserted on the VANC region of the output video.
HANC	When set to HANC the incoming ANC packets will be inserted on the HANC region of the output video.

7.32.2.5. Field 1 Output Line

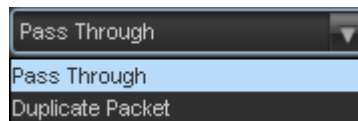
This control will set the field 1 output line of the ANC packet to be passed through. The valid range for the Field 1 Output Line is from line 7 to line 24. The default value is 10.

7.32.2.6. Field 2 Output Line

This control will set the field 1 output line of the ANC packet to be passed through. The valid range for the Field 1 Output Line is from line 7 to line 24. The default value is 10.

7.32.2.7. Interlaced to Progressive Conversion Mode

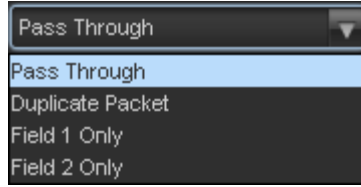
This control will determine the method of outputting the ANC packets on an interlaced to progressive conversion.



Pass Through	When set to <i>Pass Through</i> the module will take ANC packet from field 1 and insert onto frame 1 and data on field 2 will be inserted onto frame 2.
Duplicate Packet	When set to <i>Duplicate Packet</i> , the module will embed data from field 1 on to both frame one and two on the output.

7.32.2.8. Progressive to Interlaced Conversion Mode

This control will determines the method of outputting the ANC packets on a progressive to interlaced conversion



Pass Through	When set to <i>Pass Through</i> the module will take ANC packet from frame 1 and insert onto field 1 and data on frame 2 will be inserted onto field 2.
Duplicate Packet	When set to <i>Duplicate Packet</i> , the module will embed data from frame 1 on to both field one and two on the output.
Field 1 Only	When set to <i>Field 1 Only</i> , the module will only embed the incoming packets onto Field 1 on the output.
Field 2 Only	When set to <i>Field 2 Only</i> , the module will only embed the incoming packets onto Field 1 on the output.

7.32.2.9. ANC Packet Pass Through Status

This monitoring window returns the current state of the ANC Packet Pass Through module. This will display if the control is disabled or passing the incoming ANC data. If there is no ANC data present on the input this control will indicate Not Detected.

7.33. PRESETS CONTROL TAB

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

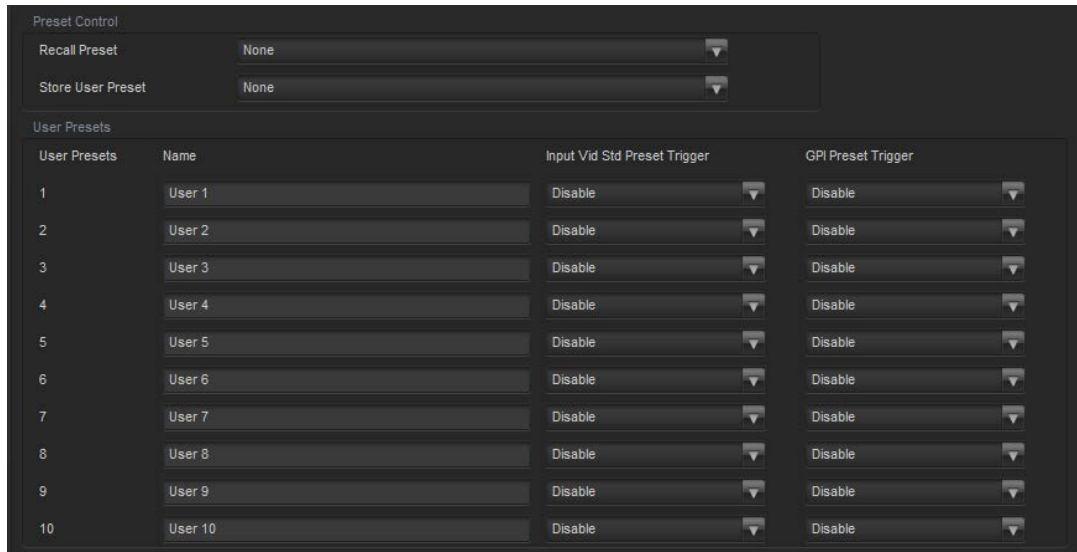


Figure 7-41: Utilities Control Tab

7.33.1. Preset Control

The 7814 series of converters can manage 10 user presets. These 10 presets can store the complete set of card controls.



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

7.33.1.1. Recalling Configurations from the User Presets

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

There are 10 user presets to recall.

None	No Presets will be recalled
Default	All controls for the card will revert to defaults
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

7.33.1.2. Storing Configurations from the User Presets

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

None	No Presets will be stored
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

7.33.1.3. Auto Recall Presets for Specific Video Input Standard

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

- 1) Enable the *Presets* functionality in the *Utilities* control tab by selecting the dropdown beside the desired user preset.
- 2) Set the input standard for which you wish to define the card preset.
- 3) Proceed to configure as desired ensuring that you press **APPLY** each time a parameter is changed.
- 4) Repeat steps 2-3 for each input video standard

NOTE:

The Auto Recall Presets functionality should be used with care.



All card parameters are recalled when a input standard is detected. When a new input standard is detected, a new value for that particular card parameter may be recalled. Parameters must be specifically set for each the video input standards if you desire the same parameter value to be recalled all the time.

Disable	<i>Auto Recall Presets</i> functionality is disabled.
1080i/59.94	Each time 1080i/59.94 video is detected on the input the module will automatically recall the defined preset for the input video standard.
720p/59.94	Each time 720p/59.94 video is detected on the input the module will automatically recall the defined preset for the input video standard.
525i/59.94	Each time 525i/59.94 video is detected on the input the module will automatically recall the defined preset for the input video standard.
1080i/50	Each time 1080i/50 video is detected on the input the module will automatically recall the defined preset for the input video standard.
720p/50	Each time 720p/50 video is detected on the input the module will automatically recall the defined preset for the input video standard.
625i/50	Each time 625i/50 video is detected on the input the module will automatically recall the defined preset for the input video standard.
1080p/59.94A	Each time 1080p/59.94A video is detected on the input the module will automatically recall the defined preset for the input video standard.
1080p/59.94B	Each time 1080p/59.94B video is detected on the input the module will automatically recall the defined preset for the input video standard.
1080p/50A	Each time 1080p/50A video is detected on the input the module will automatically recall the defined preset for the input video standard.
1080p/50B	Each time 1080p/50B video is detected on the input the module will automatically recall the defined preset for the input video standard.

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8. JUMPERS

Figure 8-1 and Figure 8-2 provide the locations of the jumpers and LEDs on the 7814 series boards.

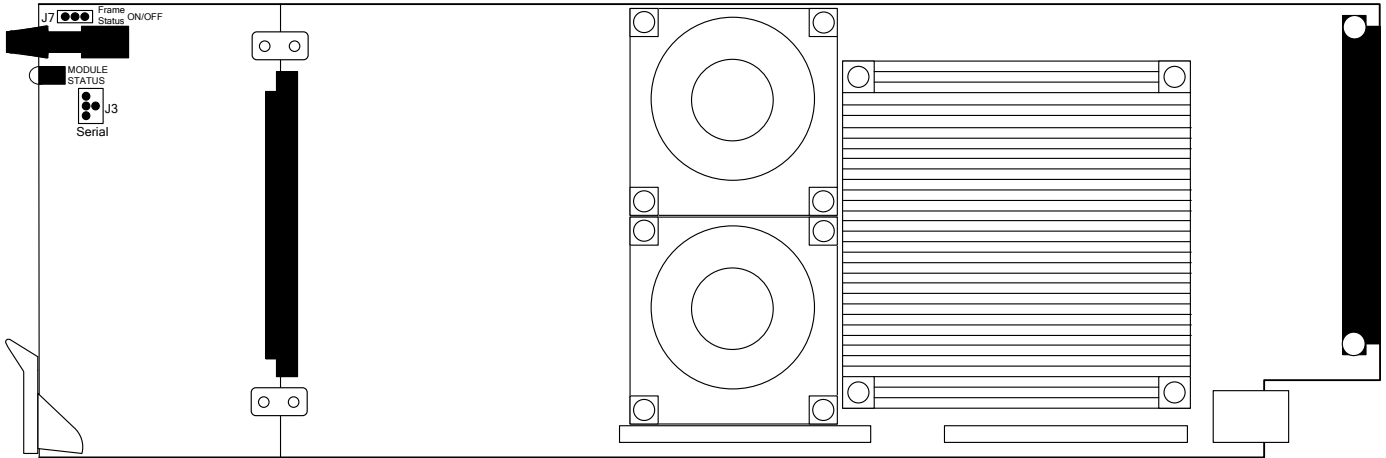


Figure 8-1: Location of Jumpers – Top View Main Module

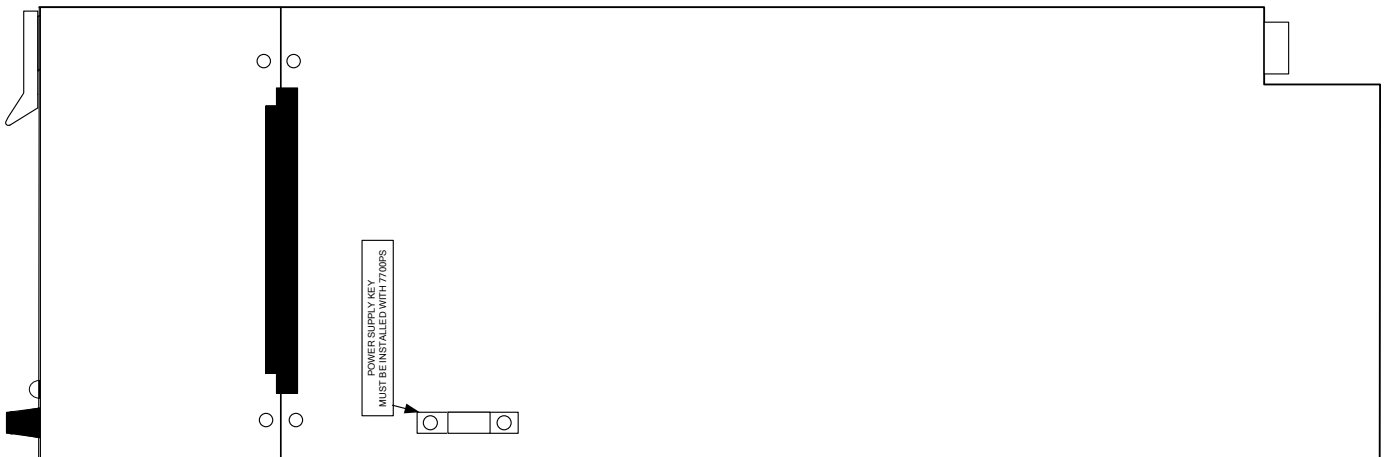


Figure 8-2: Location of Jumpers – Bottom View Main Module

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

FRAME STATUS: The FRAME STATUS jumper J7 is located near the front of the board and close to the encoder knob. The FRAME STATUS jumper determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR-C or 7800FR frame's global status bus.

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

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

8.2. 7814 Series “Slot Blocker”

The 7814 series of modules can be installed in either the 7700FR-C or the 7800FR frames. These modules are designed to take two slots in the Evertz 7800FR frame and three slots in the 7700FR-C.

Modules can fit into two slots in a 7800FR frame because the 7800FR allows modules to consume more power on a per slot basis than the Evertz 7700FR-C. When a 7814 series module is installed in the 7700FR-C, the module must occupy 3 slots to ensure that the frame power is managed properly. This is accomplished by installing a “Slot Blocker” on the bottom side of the board. If the “Slot Blocker” is not installed on the card and the card is inserted into the 7700FR, the card will not power-up. When installing the card in a 7800FR, the “Slot Blocker” may be removed and it will power-up and operate normally. If the “Slot Blocker” remains installed and the card is inserted into the 7800FR, the card will also power-up and operate normally.

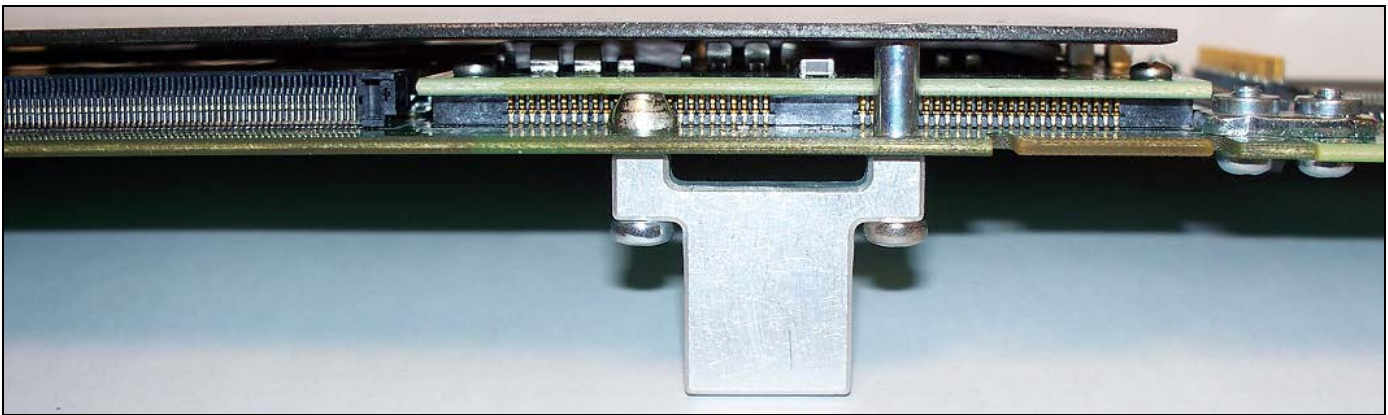


Figure 8-3: Slot Blocker

9. VISTALINK[®] REMOTE MONITORING/CONTROL

9.1. WHAT IS VISTALINK[®]?

VistaLINK[®] 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. *VistaLINK[®]* provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through *VistaLINK[®]* PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, *VistaLINK[®]* enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz VL-Fiber demo Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz *VistaLINK[®]* enabled fiber optic products.
2. Managed devices, (such as 7707EO and 7707OE cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz *VistaLINK[®]* enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC/7800FC *VistaLINK[®]* frame controller module, which serves as the Agent.
3. A virtual database, known as the Management information Base (MIB), lists all the variables being monitored, which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the *VistaLINK[®]* network, see the 7700FC/7800FC Frame Controller chapter.

9.2. VISTALINK® MONITORED PARAMETERS

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

Parameter	Description	Pg.
Audio Delay	Displays the delay of the audio in <i>ms</i> .	80
CDP 708 Demux Parser	Displays the status of CDP 708 Demux Closed Caption reading.	134
CDP Parser	Displays the status of Closed Caption reading.	134
De-Interlacer Operating Mode	Reports the current operating mode of the deinterlacer.	54
Embedder Group 1 Input	Displays is audio is detected in Audio Group 1	80
Embedder Group 2 Input	Displays is audio is detected in Audio Group 2	80
Embedder Group 3 Input	Displays is audio is detected in Audio Group 3	80
Embedder Group 4 Input	Displays is audio is detected in Audio Group 4	80
Gain Applied	Reports a real time value indicating the amount of gain being applied by the IntelliGain™ system. Values	124
Genlock Standard	Reports if a valid video reference has been supplied to the REF IN DIN and indicates the standard that is detected when a valid reference is applied.	129
Global Status: Genlock Standard	Reports if a valid video reference has been supplied to the selected reference input	29
Input Loudness	Reports a real time value of the calculated input loudness value.	124
Input SMPTE2016-1 Code Status	Reports any detected AFD values on the incoming video signal.	58
Input Video Source	Reports what input source has been selected to pass through the main up/down/cross conversion path.	43
Integrated Loudness	Reports a real time value of the calculated integrated loudness value.	125
Loudness Range	Reports a real time value of the calculated loudness range value within the duration of the <i>Integrated Loudness</i> calculation.	125
Loudness Range High	Reports a real time value of the highest calculated loudness value within the duration of the <i>Integrated Loudness</i> calculation.	125
Loudness Range Low	Reports a real time value of the lowest calculated loudness value within the duration of the <i>Integrated Loudness</i> calculation,	125
Maximum Loudness	Reports a real time value of the calculated maximum loudness value within the duration of the <i>Integrated Loudness</i> calculation	125

Output Loudness	Reports a real time value of the calculated output loudness value. This control is used for monitoring purposes only.	124
Output SMPTE2016-1 Code Status	Presents the AFD code being stamped on the output of the card (if applicable).	58
PGM IN A Video Standard	Reports if a valid video signal is presented to the SDI input and what standard has been detected when it is present.	43
PGM IN B Video Standard	Reports if a valid video signal is presented to Fiber input and what standard has been detected when it is present.	43
Reference Status	Reports what the current valid reference standard is being applied to the module	129
Reference Type	Reports whether the incoming genlock signal is of bi-level sync or tri-level sync	129
Serial Number	Reports the serial number that is loaded by the manufacturer.	33
SRC Status	Displays the status of the Sample Rate Converters.	80
Stereo or 5.1	Displays the audio detected on the input of the up-mix block	103
UpMix Status	Displays the up-mix status (UpMix or Bypass)	103
Video Delay	Reports video delay through the card in ms.	43
Video Delay	Displays the delay of the associated video in ms.	80
Video Payload ID	Reports if a valid Video Payload ID ANC packet has been detected and indicates the format that the video is being sent to the card.	43

Table 9-1: VistaLINK[®] Monitored Parameters

9.3. VISTALINK® CONTROLLED PARAMETERS

Parameter	Description	Pg.
5.1 Detection Threshold	Sets the audio level below which the 5.1 source is considered absent.	103
AES AIC Gain	Used to correct audio levels of the AES audio input.	82
AES AIC Inversion	Used to correct the inversion of the AES audio input	82
AES Gain Adjust X	Sets the value of the gain from the selected source.	90
AES Gain Adjust Y	Sets the value of the gain from the selected source.	92
AES Invert Enable X	Inverts the phase or passes the selected audio channels.	90
AES Invert Enable Y	Inverts the phase or passes the selected audio channels.	92
AES Source X	Routes one of the 16 input audio channels to the X input of the Channel 1 mixer.	89
AES Source Y	Routes one of the 16 input audio channels to the Y input of the Channel 1 mixer.	91
AFD Input Processing Enable Control	Enables the input side AFD processing.	55
AFD 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.	56
AFD Select	Selects the incoming AFD code.	66
AFD Stamp	Selects the AFD signal that will be stamped on the output signal.	73
AFD Stamp Settings	Specifies the outgoing AFD code.	67
AFD Stamp Source	Sets the source for output AFD stamping.	56
ANC-LTC Source	This control selects the source of Timecode for the ANC-LTC timecode to be embedded on the output	131
ANC-VITC Source	This control selects the source of Timecode for the ANC-VITC timecode to be embedded on the output.	130
AP Aspect Ratio Source	Selects whether the Production Aperture or the Clean Aperture is used when converting input signals.	59
Aspect Ratio Conversion	Selects the ARC processing that the card will perform.	68
Aspect Ratio Conversion	Selects the aspect ratio conversion that the module will perform.	74
Audio Delay	Adjusts the audio delay from the card nominal.	78
Auto Recall Presets	Enables automatic preset recall when input or output changes.	141
B Gain	Varies the Gain in RGB Domain.	45
Blue Gamma Level	Adjusts the Blue Gamma levels.	46
Blue Panel	Sets the value for the B component of the background side panels.	71
C_lev	Sets the C_lev level.	95
Cb Gain	Varies the Source Cb.	45

Cb Offset	Varies the Source Cb.	45
C-Bit Control	Enables the user to set the C-Bit Control.	79
CC CDP Output	Enables CDP packet processing on the output.	133
CC CDP Write Line	Selects the output line number to insert CDP packets	133
CC Line 21 Output Enable	Enables closed caption handling for SD outputs.	133
CC1 To CEA708 Service	Maps closed caption and text channels into CEA708 caption services.	134
CC2 To CEA708 Service	Maps closed caption and text channels into CEA708 caption services.	134
CC3 To CEA708 Service	Maps closed caption and text channels into CEA708 caption services.	134
CC4 To CEA708 Service	Maps closed caption and text channels into CEA708 caption services.	134
Centre Width	Controls the width of front centre sound.	102
Clear Duration Control	The <i>Clear Duration</i> defines the amount of time that the IntelliGain™ system must be corrected to before a correction SNMP trap is sent to VistaLINK®.	126
Compander Attack Time	The <i>Compander Attack Time</i> control defines how quickly the compander reacts to an increase in the input loudness	118
Compander Profile	The compander profiles are used to define the dynamic range control of the compander	123
Compander Release Time	The <i>Compander Release Time</i> control defines how quickly the compander reacts to a decrease in the input loudness	118
Compander State	This control is used to activate the on-board compressor/expander, otherwise known as the compander.	124
Compression Ratio	This control will set the gamut range compression ratio.	48
Cr Gain	Varies the Source Cr.	45
Cr Offset	Varies the Source Cr.	45
Deinterlacer Mode	Sets whether the module will perform field or frame based de-interlacing conversion.	52
Detail Gain	Selects the level of the detail gain.	49
Detail Noise Floor	Sets the minimum level of detail required before the enhancer is enabled.	50
Down Mix Type	Sets the type of audio down mixing that will be performed.	95
Downmix Gain Adjust X	Sets the value of the gain from the selected source.	98
Downmix Gain Adjust Y	Sets the value of the gain from the selected source.	100
Downmix Invert Enable X	Inverts the phase or passes the selected audio channels.	98

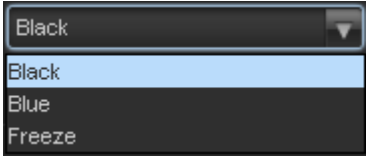
Downmix Invert Enable Y	Inverts the phase or passes the selected audio channels.	100
Downmix Source X	Routes one of the 16 input audio channels to the X input of the Channel 1 mixer.	97
Downmix Source Y	Routes one of the 16 input audio channels to the Y input of the Channel 1 mixer.	99
D-VITC Source	This control selects the source of Timecode for the D-VITC timecode to be embedded on the output.	130
Embedded AIC Gain	Used to correct audio gains of the embedded audio input.	81
Embedded AIC Inversion	Used to correct the inversion of the embedded audio input	81
Embedded Gain Adjust X	Sets the value of the gain from the selected source.	85
Embedded Gain Adjust Y	Sets the value of the gain from the selected source.	87
Embedded Invert Enable X	Inverts the phase or passes the selected audio channels.	85
Embedded Invert Enable Y	Inverts the phase or passes the selected audio channels.	87
Embedded Source X	Routes one of the 16 input audio channels to the X input of the Channel 1 mixer.	84
Embedded Source Y	Routes one of the 16 input audio channels to the Y input of the Channel 1 mixer.	86
Embedder Group 1 Enable	Enables or disables the Embedder Group.	79
Embedder Group 2 Enable	Enables or disables the Embedder Group.	79
Embedder Group 3 Enable	Enables or disables the Embedder Group.	79
Embedder Group 4 Enable	Enables or disables the Embedder Group.	79
Enhancement Limit	Sets the maximum enhancement allowed.	49
Fault Duration	The <i>Fault Duration</i> control defines the amount of time that the IntelliGain™ system detects the output level has been exceeded.	126
First Line Num in SD Clean Ap	Defines the first active line for the SD Clean Aperture.	60
First Line Num in SD Prod Ap	Defines the first active line for the SD Production Aperture.	60
First Pixel Num in SD Clean Ap	Defines the first active horizontal pixel for the SD Clean Aperture.	60
First Pixel Num in SD Prod Ap	Defines the first active horizontal pixel for the SD Production Aperture.	60
Force Freeze Frame		
G Gain	Varies the Gain in RGB Domain.	45
Gamma Adjust	Enables gamma adjust.	46

Gamma Level	Sets the gamma correction level.	46
Green Gamma Level	Adjusts the Green Gamma levels.	46
Green Panel	Sets the value for the G component of the background side panels.	71
H Filter Cutoff	Sets the type of the horizontal filter in the scaler.	72
H Slew Limit	Controls sharp horizontal edge transitions.	71
High Knee	This control will set the point at which companding occurs at the upper range.	47
Hold Time Control	This control is used to set the hold time for the given audio program.	123
Horizontal Band	Sets the horizontal frequency band.	49
Horizontal Phase Offset	Sets the horizontal phase.	42
Hue	Adjusts the hue of the video signal. +/- 180 degrees in 0.1 degree increments.	45
Image Enhancement Enable	Enables the Image Enhancement control settings.	49
In Video Standard	Sets the input video standard to use when designing a user defined ARC.	61
Input Loudness mode	The <i>Input Loudness Mode</i> control defines the window that will be used to produce the <i>Input Loudness</i> values in section.	119
Intelligain Gain Adjust X	Sets the value of the gain from the selected source.	112
Intelligain Gain Adjust Y	Sets the value of the gain from the selected source.	114
Intelligain Invert Enable X	Inverts the phase or passes the selected audio channels.	112
Intelligain Invert Enable Y	Inverts the phase or passes the selected audio channels.	114
Intelligain Source X	Routes one of the 16 input audio channels to the X input of the Channel 1 mixer.	111
Intelligain Source Y	Routes one of the 16 input audio channels to the Y input of the Channel 1 mixer.	113
IntelliGain™ State	This control is the master switch for the IntelliGain™ processor	122
Inverse Telecine	Sets the base type of de-interlacing that the module will perform.	53
Last Line Num in SD Clean Ap	Defines the last active line for the SD Clean Aperture.	60
Last Line Num in SD Prod Ap	Defines the last active line for the SD Production Aperture.	60
Last Pixel Num in SD Clean AP	Defines the last active horizontal pixel for the SD Clean Aperture.	60
Last Pixel Num in SD Prod Ap	Defines the last active horizontal pixel for the SD Production Aperture.	60
Leveler Attack Mode	The Leveler Attack Mode defines the maximum integration time that is applied when loudness increases during a commercial period.	118

Leveler Release Mode	The <i>Leveler Release Mode</i> defines the maximum integration time that is applied when loudness decreases during a commercial period.	119
Leveler State	This control is used to activate the IntelliGain™ audio leveler	122
LFE Gain	Controls the LFE channel gain after audio is up-mixed.	102
LFE Mixing	Controls whether the LFE channel is included or not in the audio down-mixing.	94
Loss of AFD Timeout	Configures the action that the converter will take when incoming AFD signals are lost.	56
Loss of CC Timeout	When video is lost, this control sets the amount of time (in seconds) before the Closed Captioning timeouts.	133
Loss of Time Code Control	Set the operation when input timecode is lost.	130
Loss of Video Mode	Selects the action to take when the input video is missing.	42
Low Knee	This control will set the point at which companding occurs at the lower range.	47
LR_lev	Sets the LR_lev level.	95
Ls_lev_L	Sets the Ls_lev_L level.	95
Ls_lev_R	Sets the Ls_lev_R level.	95
Makeup Gain	The <i>Makeup Gain</i> is used to add additional gain to the audio program.	124
Max RGB	This control will set the maximum value for the RGB compander.	47
Maximum Gain Control	The <i>Maximum Gain</i> control is the total amount of gain that the IntelliGain™ engine will apply.	122
Min RGB	This control will set the minimum value for the RGB compander.	47
Name Control	Sets the name of the user defined aspect ratio conversion.	61
Negative Compression	This control will enable/disable negative colour legalizer compression to be applied.	48
Noise Floor Threshold	The <i>Noise Floor Threshold</i> control is used to set the threshold level for IntelliGain™ processing.	122
Out Video Standard	Sets the output video standard to use when designing a user defined ARC.	62
Output Gain	Configures the output gain.	94
Output Scaling Mode	Controls whether the down mix matrixing is normalized or not.	93
Peak Limit	The <i>Peak Limit</i> is used within the audio program chain to provide an upper limit to peak program levels.	124
Program Configuration Source	This parameter defines how the audio channels are grouped together.	116
R Gain	Varies the Gain in RGB Domain.	45

Recall Preset	Used to recall a current card configuration from one of the user presets.	132
Red Gamma Level	Adjusts the Red Gamma levels.	46
Red Panel	Sets the value for the R component of the background side panels.	71
Reference Fail-Over	Set video or free run if valid genlock not present.	128
Reference Select	Set video or external genlock for card locking.	128
RGB Clipper	Enables RGB clipper.	45
Rs_lev_L	Sets the Rs_lev_L level.	95
Rs_lev_R	Sets the Rs_lev_R level.	95
Saturation Gain	Sets the saturation gain level.	45
SD Blanking – 525i/59.94	Last line of blanking in SD for 525/59.94. SD input only.	41
SD Blanking – 625/50	Last line of blanking in SD for 625/50. SD input only.	41
SD CC Source Slecet	Selects which CC shouce to use with SD inputs	132
SMPTE2016-1 Bar Output Enable	Enables AFD bar output	57
SMPTE2016-1 Output Enable Control	Enables the insertion of AFD packets in the outgoing video signal.	57
SMPTE2016-1 Output Line	Sets the AFD Output Line level.	57
Soft Clip	Soft Clip control will enable/disable the colour compander controls	47
Soft Switch Duration	Sets the upmix soft switch step.	103
Sound Direction Detect Rate	Controls the detection rate of sound direction.	103
SRC Mode Configuration	Sets mode of sample rate converter.	79
Store User Preset	Used to store the current card configuration.	140
Surround Depth	Controls the depth of surround sound.	102
Surround Phase	Controls whether a 90-degree phase shift is applied to the surround channels before being passed to the down-mix matrix.	94
T1 To CEA708 Service	Maps closed caption and text channels into CEA708 caption services.	134
T2 To CEA708 Service	Maps closed caption and text channels into CEA708 caption services.	134
T3 To CEA708 Service	Maps closed caption and text channels into CEA708 caption services.	134
T4 To CEA708 Service	Maps closed caption and text channels into CEA708 caption services.	134
Target Loudness	This control is used to set the target loudness level for the given audio program.	122

Temporal Noise Reduction Levels	Controls the strength of the applied Temporal Noise Reducer filter.	51
Up Mix Surround Delay	Controls the amount of time that the surround sound will be delayed against other channels.	102
Upmix Audio Source	Selects which audio channels to monitor for the upmix process.	101
Upmix Gain Adjust X	Sets the value of the gain from the selected source.	106
Upmix Gain Adjust Y	Sets the value of the gain from the selected source.	108
Upmix Invert Enable X	Inverts the phase or passes the selected audio channels.	106
Upmix Invert Enable Y	Inverts the phase or passes the selected audio channels.	108
UpMix Mode	Enable/Disable the auto upmix functionality	101
Upmix Source X	Routes one of the 16 input audio channels to the X input of the Channel 1 mixer.	105
Upmix Source Y	Routes one of the 16 input audio channels to the Y input of the Channel 1 mixer.	107

<p>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 <i>Loss of Video Mode</i> drop down menu appears as follows:</p>  <p>9.3.1.1. Force Freeze Frame This control Enables or Disables <i>Force Freeze Frame</i>. It is a manual user control to freeze the output of the card. When off the module will run as expected. When enabled the output picture will freeze</p> <p>User Added Video Delay</p>	<p>Adds Additional user video delay</p>	<p>42</p>
<p>User Control</p>	<p>Sets the location where to store the user defined aspect ratio (10 available spots)</p>	<p>61</p>
<p>V Filter Cutoff</p>	<p>Sets the type of the vertical filter in the scaler.</p>	<p>72</p>
<p>V Slew Limit</p>	<p>Controls sharp vertical edge transitions.</p>	<p>71</p>
<p>Vertical Intensity</p>	<p>Sets the intensity of vertical enhancement.</p>	<p>49</p>
<p>Vertical Phase Offset</p>	<p>Sets the vertical phase.</p>	<p>42</p>
<p>Video Gain</p>	<p>Sets the video gain level.</p>	<p>45</p>

<p>PGM IN A Source (-F Option Only) The PGM IN A source control is used to select whether the Input video for PGM IN A is to be source by the SDI input of the Fiber input. To source this input with the DIN connector on the rear-plate select SDI. To source this input with the Fiber input select Fiber in the drop-down menu.</p> <p>9.3.1.2. PGM IN B Source (-F Option Only) The PGM IN B source control is used to select whether the Input video for PGM IN B is to be source by the SDI input of the Fiber input. To source this input with the DIN connector on the rear-plate select SDI. To source this input with the Fiber input select Fiber in the drop-down menu.</p> <p>Video Input Source</p>	<p>Selects source of video input.</p>	<p>40</p>
<p>Video Standard Input</p>	<p>Selects the video input standard.</p>	<p>39</p>
<p>Video Standard Output</p>	<p>Selects the video output standard.</p>	<p>40</p>
<p>VITC Read</p>	<p>Select decode line for VITC. SD input only.</p>	<p>130</p>
<p>VITC Write</p>	<p>Select line for VITC insert. SD output only.</p>	<p>130</p>
<p>Y Gain</p>	<p>Varies the Source Y.</p>	<p>45</p>
<p>Y Offset (Black Level)</p>	<p>Varies the Source Y.</p>	<p>45</p>

Table 9-2: VistaLINK® Controlled Parameters

9.4. VISTA LINK[®] TRAPS

The 7814UDX-HD-2 modules will raise a VistaLINK[®] trap if the temperature of the main or sub cards rises above > 78 °F.

Parameter	Description	Page
AFD Loss	Displays the status of the AFD loss trap.	57
Audio Group 1	Displays the status of audio group 1 presence	80
Audio Group 2	Displays the status of audio group 2 presence	80
Audio Group 3	Displays the status of audio group 3 presence	80
Audio Group 4	Displays the status of audio group 4 presence	80
CEA708 Service 1 to CEA708 Service 16 Not Present	Displays the trap status of CEA708 Service 1 to 16.	132
Cooling Fan Module 1	Displays the status of the top on-board cooling fan	27
Cooling Fan Module 2	Displays the status of the bottom on-board cooling fan	27
External Genlock Std Enable	Displays the status of the external Genlock Standard	29
Genlock Valid	Displays the validity of the genlock input	43
IG Loudness Level Threshold Critical	Displays the status of the critical threshold limit	127
IG Loudness Level Threshold Major	Displays the status of the major threshold limit	127
IG Loudness Level Threshold Minor	Displays the status of the minor threshold limit	127
PGM IN A	Displays the status of input video to PGM IN A DIN	43
PGM IN B	Displays the status of input video to PGM IN B DIN	43
SD CC1 to SD CC3 Not Present	Displays the trap status of Standard Definition Closed Captioning for captions 1 to 3.	132
Temperature	Displays the status of the temperature trap.	27

Table 9-3: VistaLINK[®] Trap Parameters

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