7814UDX-4K Series

HD/3G/UHD Up/Down/Cross Converters

User Manual

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IMPORTANT SAFETY INSTRUCTIONS

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

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

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

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

WARNING
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE
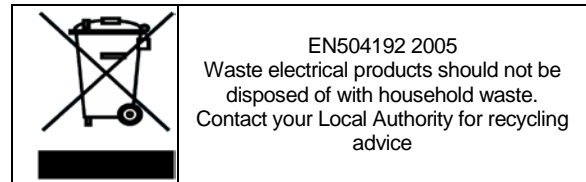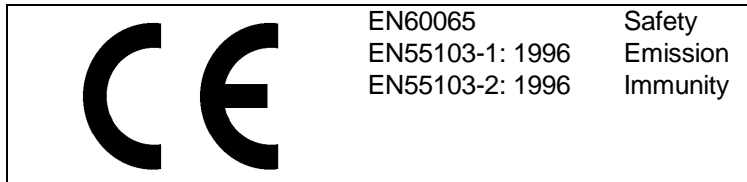
WARNING
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

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

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

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

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

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

WARNING

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

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

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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	June 2016
1.1	Error Fixing	Dec 2016
1.2	Added HDR and 12G Options/Updates Throughout	Aug 2018

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1. OVERVIEW

Addressing the needs of content procedures and distributors to be able to supply UHD, 3G and HD content in parallel, the 7814UDX-4K, 7814UC-4K, 7814XC-4K and 7814HDC-4K are a series of broadcast quality up/down converters that convert between common HD/SMPTE 292M and 3G/SMPTE 424M video signals and UHD. Models are available to support upconversion, downconversion, crossconversion or a combination:

7814UC-4K   : 3G/HD to UHD upconverter
7814HDC-4K : UHD to 3G/HD downconverter
7814UDX-4K : UHD to/from 3G/HD up and downconverter
7814XC-4K   : UHD cross-converter (also supports 2SI to Quadrant based UHD conversions)

The 7814UDX/UC/XC/HDC-4K Series supports broadcast quality video conversion. Advanced motion adaptive spatial-temporal (3D) noise reduction and next generation de-interlacing techniques ensure superior resolution and artifact reduction, generating the highest quality video suitable for broadcast and other professional media applications. Optionally available video processing features (+VPROC option) include full broadcast quality color correction and detail enhancement processors along with RGB based color legalization.

The 7814UDX-4K series products are HDR capable (with +VPROC and +HDR options) and can up/down/cross convert SDR and a range of HDR formats, including SMPTE ST 2084 (PQ), HLG and S-Log3. It also performs all colour space conversion including BT.709, BT.2020 and S.Gamut3. Rather than using fixed LUTs, the Evertz HDR conversion uses high-precision 32 bit mathematical modelling to allow for very low-latency, high accuracy transforms while allowing on-the-fly changes to colour correction or HDR transfer function parameters.

The 7814UDX-4K Series transparently supports 16 channels of embedded audio with audio delay automatically matching video delay. Optional audio processing features (+APROC option) include audio channel shuffling, gain, inversion and mono-mixing. With "-AES8" variants, 8 discrete AES inputs and 8 discrete AES outputs are provided, allowing for discrete AES input and output. Full audio routing capability allows outgoing embedded and discrete AES audio (-AES8 versions) to be sourced from any combination of embedded audio, discrete AES inputs (-AES8 versions) or processed audio.

The -12G option adds support for SMPTE ST 2082 and enables up to 2x 12G SFPs (ordered separately) to be added to allow transport over a single coax or Fiber. The -12G-HDBNC-R option includes an HDBNC module that supports coaxial 12G-SDI signals.

These modules are SNMP capable for remote monitoring, control and configuration capabilities using WebEASY®, VistaLINK® PRO, CP-2116E or CP-2232E Control Panels. SNMP control is available when modules are used with the 3RU 7800FR series or 1RU 7801 frames and a 7700/7800/7801FC Frame Controller module is installed. Each card occupies two slots in the frame and the card does not support direct SNMP configuration.

	HD to HD (SF)	HD to HD (DF)	HD to 3G	HD to 4K	3G to HD	3G to 3G (SF)	3G to 3G (DF)	3G to 4K	4K to HD	4K to 3G	4K to 4K (SF)	4K to 4K (DF)
7814UDX-4K	●	●	●	●	●	●	●	●	●	●	●	●
7814HDC-4K	●	OB	OB	OB	●	●	OB	OB	●	●	●	OB
7814UC-4K	●	OB	●	●	OB	●	OB	●	OB	OB	●	OB
7814XC-4K	●	●	OB	OB	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 : Differences Between 7814UDX-4K Series Converters (Ordering Options)

This manual will serve to cover the 7814UDX-4K, the 7814UC-4K, the 7814-XC and the 7814HDC-4K base products as well as the –AES8 versions.

Features & Benefits

- Broadcast quality up/downconversion between common HD/SMPTE 292M and 3G/SMPTE 424M video signals to/from UHD.
- Integrated frame synchronizers (quad input frame synchronizers on 7814UDX-4K and 7814HDC-4K to time quad-lane SDI inputs)
- Support for card reference connection and two sources of 7800FR frame reference (software selectable from the three sources)
- Advanced 3D noise reduction and next generation de-interlacing technologies ensure the highest quality video without compromise for broadcast and professional media applications
- Broadcast quality color corrector and detail enhancement engines optional (+VPROC option)
- 16 channel embedded audio support
- Audio delay automatically tracks video delay
- Full audio proc and channel swapping plus 5.1 surround sound to stereo (Lt/Rt and Lo/Ro) down-mixing provided with +APROC option
- Supports 8 external AES inputs and 8 AES outputs (-AES8 versions only)
- SNMP capable for remote monitoring, control and configuration capabilities using WebEASY®, VistaLINK® PRO, CP-2116E or CP-2232E Control panels
- VistaLINK® is available when modules are used with the 3RU 7800FR frame and a 7700FC VistaLINK® Frame Controller module in slot 1 of the frame
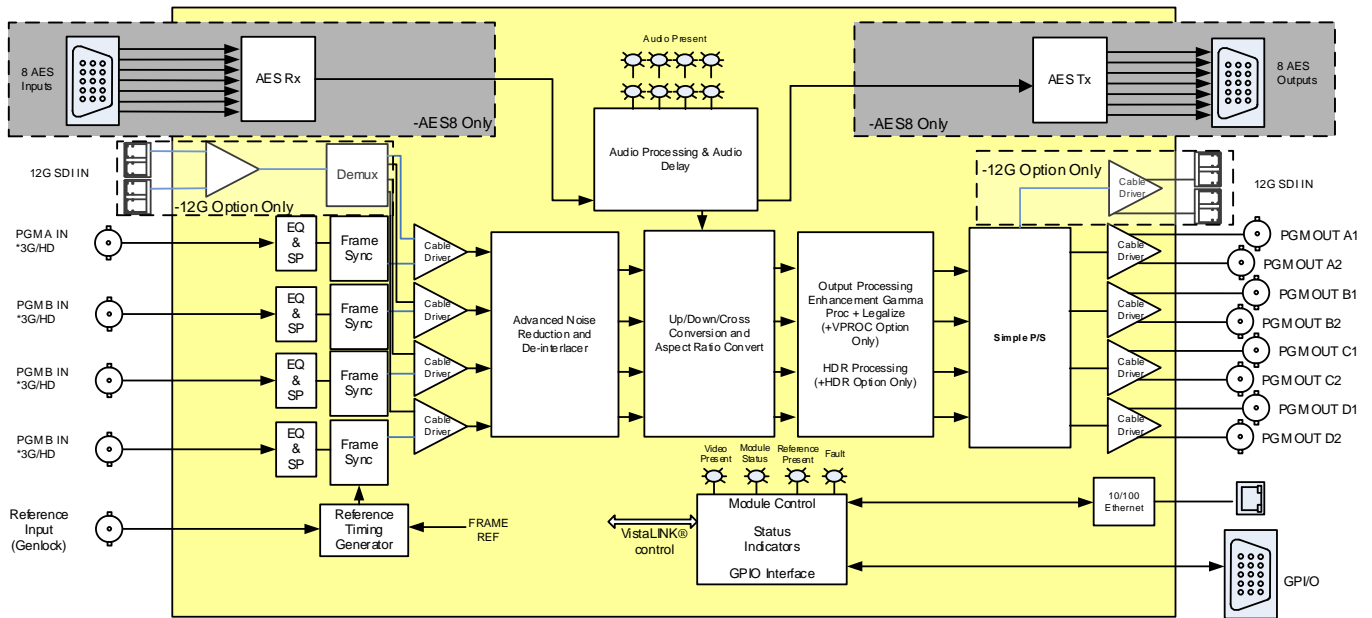
Figure 1-1 : 7814UDX-4K Series Block Diagram

1.1. PRODUCT OPTIONS

This manual covers all variations and ordering options for the 7814UDX-4K Series platform. The majority of card controls are common across all products variations (7814UDX-4K, 7814UC-4K, 7814XC-4K and 7814HDC-4K) 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	Adds 8 AES inputs and outputs to the audio mixing controls.
+VPROC	Video proc/color correction support including RGB, YCbCr.
+APROC	Audio processing support including 5.1 to stereo down-mixing (LoRo to LtRt), global audio delay, audio channel shuffling, gain, inversion and mono-mix capabilities on 16 channels of embedded audio (Note: included as standard on –AES8 versions, optional on non-AES8 versions)
+HDR	Translates a range of HDR formats, including SMPTE2084 (PQ), HLG and S-Log3. Performs all colour space conversion including BT.709, BT.2020 and S.gamut3. Uses high-precision mathematical modelling rather than fixed LUTs.

Table 1-2 : Description of product options for 7814UDX-4K Series Converters

The following can assist in the customization and ordering options:
7814 {UDX/UC/XC/HDC} [-AES8] -4k [+APROC] [+VPROC] [HDR]

Explanation of notation: / = or, { } = mandatory, [ ] = optional

1.2.   ENCLOSURES

7800FR	3RU Multiframe which holds up to 15 single slot modules
7800FR-QT	3RU Multiframe which holds up to 15 single slot modules, low noise
7801FR	1RU Multiframe which holds up to 4 single slot modules or two dual slot modules

2.   INSTALLATION

All 7814UDX-4K 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 7814UDX-4K 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 6.2 of this manual for more information on the 7814UDX-4K series slot blocker. Refer to Figure 2-1 for 7814UDX-4K 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.
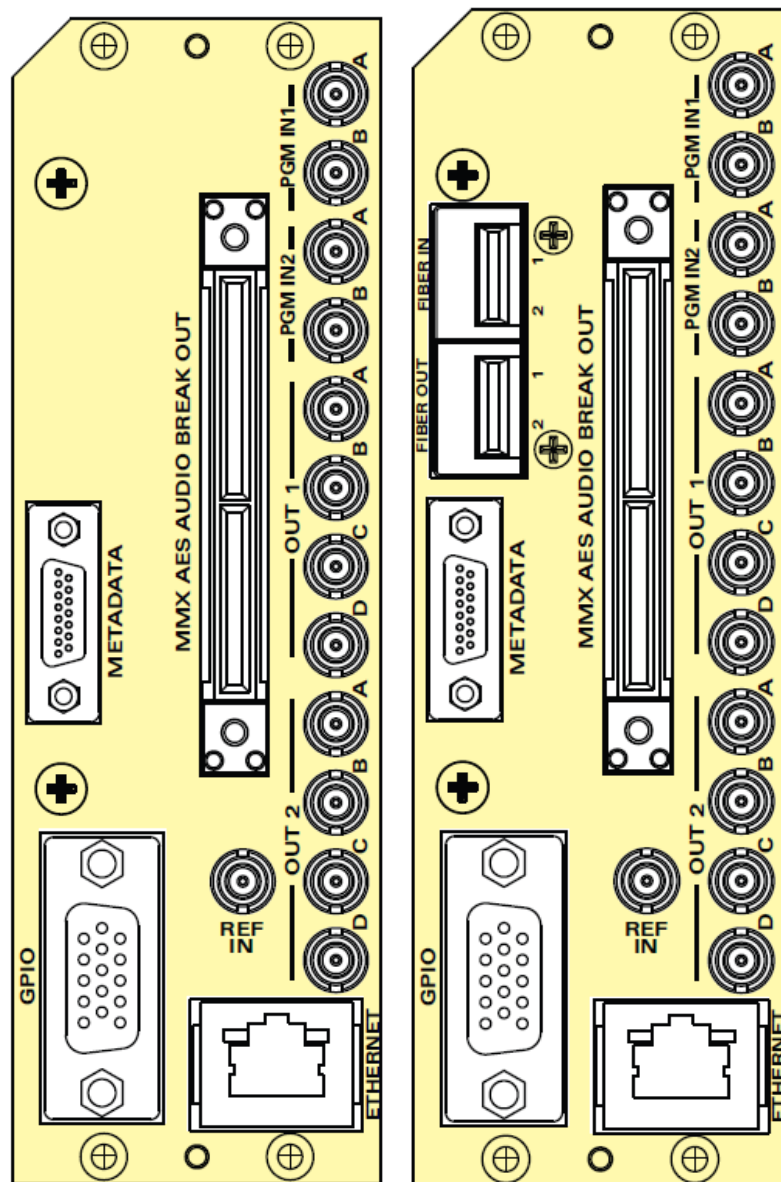
Figure 2-1 : 7814UDX-AES8-4K and 7814UDX-AES8-4K-12G Rear Plates

2.1. INPUT/OUTPUT CONNECTIONS

PGM IN A/B/C/D: Accepts a 10-bit serial digital video signal. All inputs are compatible with SMPTE 292M, SMPTE 372M and SMPTE 425M standards. The module can be set to receive a specific video standard or set to automatically detect the supplied input video standard.
Note: Non-4K inputs must be plugged in to PGM IN A.

PGM OUTPUT A1/A2/B1/B2/C1/C2/D1/D2:

These DIN connectors are used to output video as serial component video. All outputs are compatible with SMPTE 292M, SMPTE 259M or SMPTE 372M standard.

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-QT, 7801FR and 7800FR FRAME REFERENCE inputs. User Control is used to select either the card's external reference or the FRAME REFERENCE inputs.

The 7814UDX-4K series conversion modules accept standard reference signals including bi-phase (525i59 or 625i50) and tri-level sync signals (1080i59 or 1080i50).

2.2. ETHERNET CONNECTIONS

All 7814UDX-4K 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 7814UDX-4K modules and the other end into a port of the supporting hub. If you are connecting the 7814UDX-4K series modules 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 2-2. A color code-wiring table is provided in Table 2-1 for the current RJ-45 standards (AT&T 258A or EIA/TIA 258B color coding shown). Also, refer to the notes following the table for additional wiring guide information.
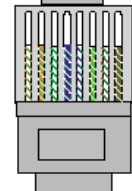
	Pin #	Signal	EIA/TIA 568A	AT&T 258A or EIA/TIA 568B	10BaseT or 100BaseT
Pin 1	1	Transmit +	White/Green	White/Orange	X
	2	Transmit –	Green/White or White	Orange/White or Orange	X
	3	Receive +	White/Orange	White/Green	X
	4	N/A	Blue/White or Blue	Blue/White or Blue	Not used (required)
	5	N/A	White/Blue	White/Blue	Not used (required)
	6	Receive –	Orange/White or Orange	Green/White or Green	X
	7	N/A	White/Brown	White/Brown	Not used (required)
	8	N/A	Brown/White or Brown	Brown/White or Brown	Not used (required)

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

Note the following cabling information for this wiring guide:

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

The maximum cable run between the 7814UDX-4K series modules and the supporting hub is 300 ft (90 m).

2.3. GPIO CONNECTOR

There are 8 General Purpose Inputs/Outputs (GPIOs) on the 7814UDX-4K 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 2-2 shows the Pin-out of this connector as follows:

DB-15 Pin	Name	Description
1	GPIO1	General Purpose Input / Output #1
2	LTC OUT	External LTC out
3	GPIO2	General Purpose Input / Output #2
4	GPIO4	General Purpose Input / Output #4
5	6 HZ IN	6 Hz In
6	LTC IN 1	External LTC In 1
7	SERIAL-A TX-	Serial Port A Transmit Negative
8	GPIO3	General Purpose Input / Output #3
9	GPIO8	General Purpose Input / Output #8
10	SERIAL-A RX+	Serial Port A Receive Positive
11	GPIO5	General Purpose Input / Output #5
12	GPIO6	General Purpose Input / Output #6
13	SERIAL-A TX+	Serial Port A Transmit Positive
14	GPIO7	General Purpose Input / Output #7
15	SERIAL-A RX-	Serial Port A Receive Negative
Shell	GND	Ground
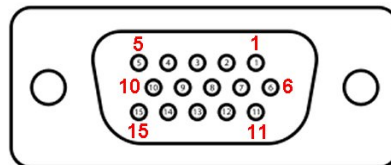
Table 2-2 : GPIO Connector Pin out

NOTE: LTC, 6 Hz and Metadata inputs and outputs are not supported in the current Firmware version (2.24 B 324).

When a particular GPIO is configured to be a GPI, the following interface shall apply (Figure 2-2):
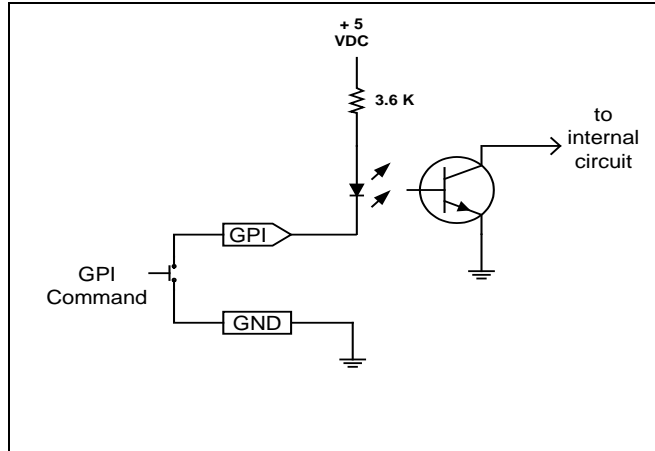
Figure 2-2 : GPI Input Circuitry

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 2-3 shows the circuit for the general-purpose output.
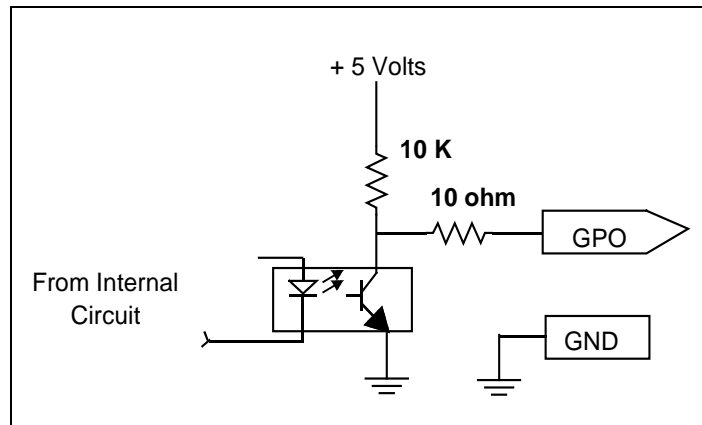
Figure 2-3 : GPO Output Circuitry

2.4. AES OUTPUTS

The –AES8 versions of 7814UDX-4K 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 the MMX connector is shown in Table 2-4.

	PIN #	Name	Description
Pin 1 Pin 2 **Female MMX Audio Breakout**	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	Not Connected	
	28	Not Connected	
	31	GND	Ground
	32	GND	Ground
	33	Not Connected	
	34	Not Connected	
	37	GND	Ground
	38	GND	Ground
	39	Not Connected	
	40	Not Connected	
	43	GND	Ground
	44	GND	Ground
	45	Not Connected	
	46	Not Connected	

Table 2-4 : AES Output Audio Connector Pin out

2.5. AES INPUTS

The –AES8 versions of 7814UDX-4K 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 MMX connector is shown in Table 2-5.

	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
Pin 1 **Pin 2**	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	Not Connected	
	76	Not Connected	
Female	79	GND	Ground
MMX Audio	80	GND	Ground
Breakout	81	Not Connected	
	82	Not Connected	
	85	GND	Ground
	86	GND	Ground
	87	Not Connected	
	88	Not Connected	
	91	GND	Ground
	92	GND	Ground
	93	Not Connected	
	94	Not Connected	

Table 2-5 : AES Input Audio Connector Pin out

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3. SPECIFICATIONS

3.1. SERIAL DIGITAL VIDEO INPUT

Standard   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 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   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
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
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)
7801FR Frame	2

4. STATUS LEDS

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

Figure 4-1 depicts status LEDs for the 7814UDX-4K series module. LEDs are in the same position and perform the same function for all variations of the 7814UDX-4K series including UDX, UC, XC, HDC and (-AES) versions.
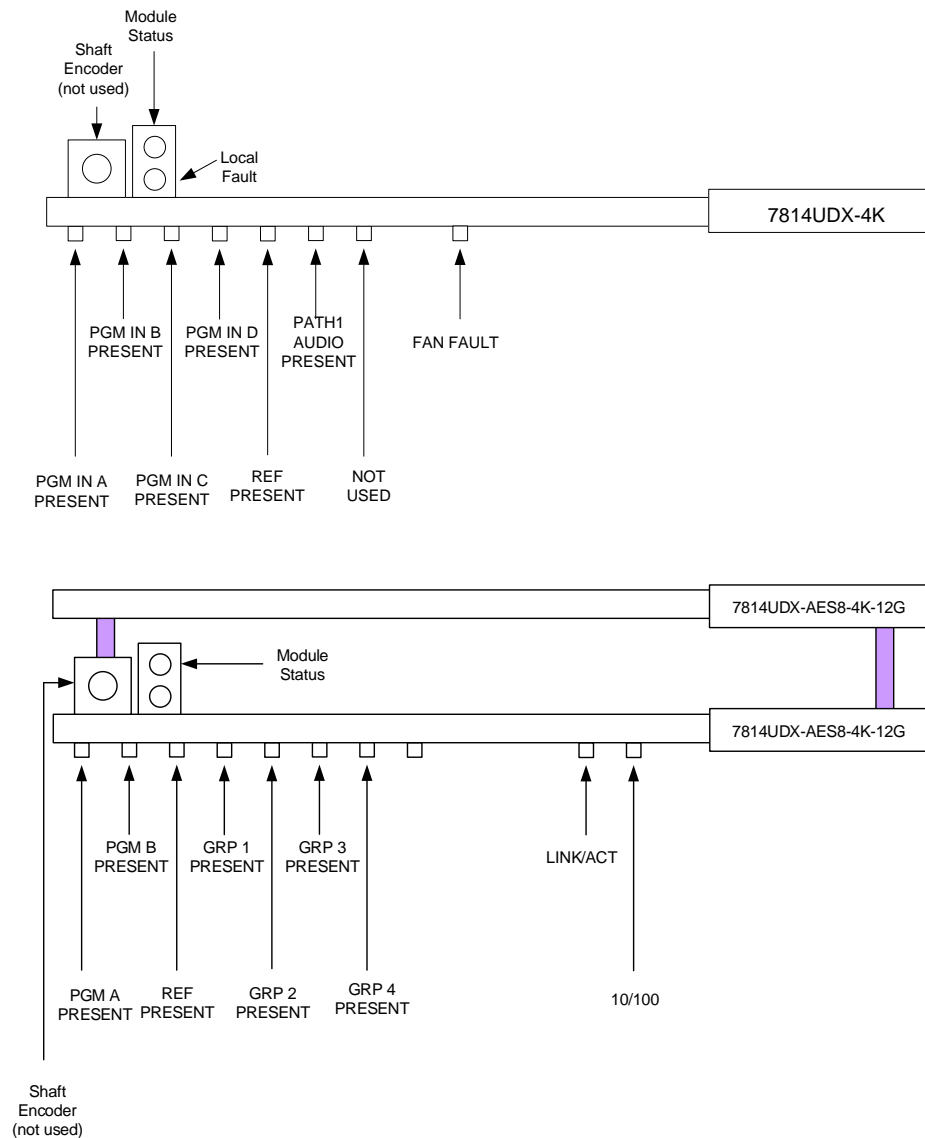
Figure 4-1 : Status LEDs

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.

PGM IN A PRESENT: The **PGM IN A PRESENT** LED will be green when a valid input signal is present on the **PGM IN A**. It will be off when missing an input signal.

PGM IN B PRESENT: The **PGM IN B PRESENT** LED will be green when a valid input signal is present on the **PGM IN B**. It will be off when missing an input signal.

PGM IN C PRESENT: The **PGM IN C PRESENT** LED will be green when a valid input signal is present on the **PGM IN C**. It will be off when missing an input signal.

PGM IN D PRESENT: The **PGM IN D PRESENT** LED will be green when a valid input signal is present on the **PGM IN D**. 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.

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.

5. WEB INTERFACE

The 7814UDX-4K series of products are controlled using Web Interface. WebEASY® operates using Ethernet and SNMP control protocols. The 7814UDX-4K series modules DO NOT HAVE card edge controls. As a result, 7700FC/7800FC modules must be installed in all frames that house 7814UDX-4K series modules. Refer to the Evertz website for the most recent firmware for the 7700FC/7800FC.

For the sake of brevity, the following sections describe module controls in terms of the parameters found within the Web Interface screens for the 7814UDX-AES8-4K+APROC+VPROC. The vast majority of controls are the same for the XC, UC and HDC versions of 7814UDX-4K series modules. Exceptions to this are outlined in section 1.1 of this manual. As additional features and options are released, additional sections will be appended to this manual to show those control screens.

Login

After the card has been **installed** and configured with the required network addresses for the control port, it can be completely configured using the web interface. For doing this, simply type the IP address of the control port of the 7814UDX-4K Series module in the web browser.

> **NOTE:** The Web interface can only be supported if the 7800FC or 7801FC are being used.
> (WebEASY® doesn't work with 7700FC)

Note: Computer must be on the same Subnet in order to have communication with the module.
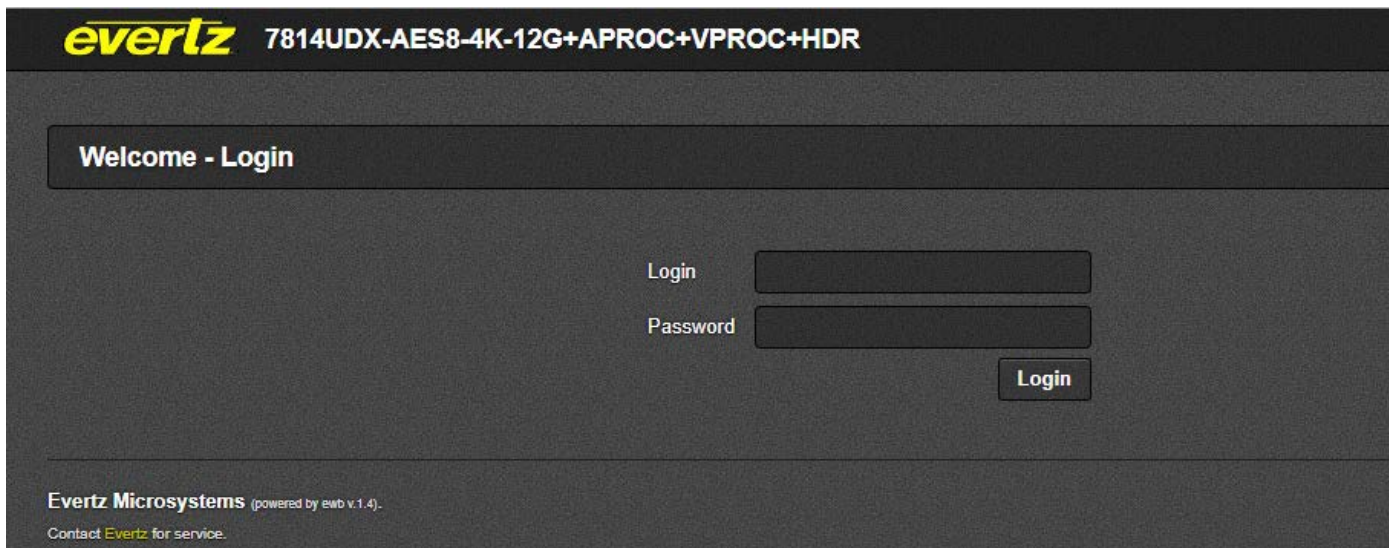

Figure 5-1 : WebEASY® - Login Menu

Login and Password is "customer".

On the web interface there are 15 different types of menus as is shown in Figure 5-2.
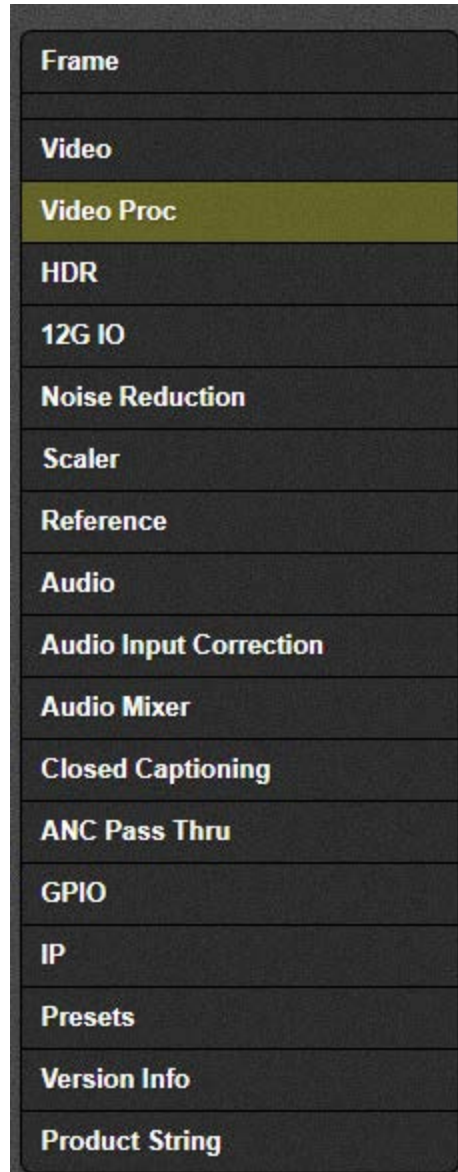
Frame
Video
Video Proc
HDR
12G IO
Noise Reduction
Scaler
Reference
Audio
Audio Input Correction
Audio Mixer
Closed Captioning
ANC Pass Thru
GPIO
IP
Presets
Version Info
Product String

Figure 5-2 : WebEASY® - 7814-AES8-4K-12G Menu

5.1. VIDEO

Figure 5-3 : WebEASY® - Video Panel

5.1.1. Video Control

Input Video Standard: This option selects the input video standard being used. Interlaced video formats are shown with the number of fields per second. Progressive formats are shown with the number of frames per second. The module is not capable of converting between 59.94/60 Hz and 50 Hz related frame rates. The drop down menu for **Input Video Standard** appears as follows:

```
Auto
1080i/59.94
720p/59.94
1080i/50
720p/50
1080p/59.94 (425M level A)
1080p/59.94 (425M level B)
1080p/50 (425M level A)
1080p/50 (425M level B)
2160p/59.94 (425M level A Sq)
2160p/59.94 (425M level B Sq)
2160p/50 (425M level A Sq)
2160p/50 (425M level B Sq)
2160p/59.94 (425M level A 2SI)
2160p/59.94 (425M level B 2SI)
2160p/50 (425M level A 2SI)
2160p/50 (425M level B 2SI)
```
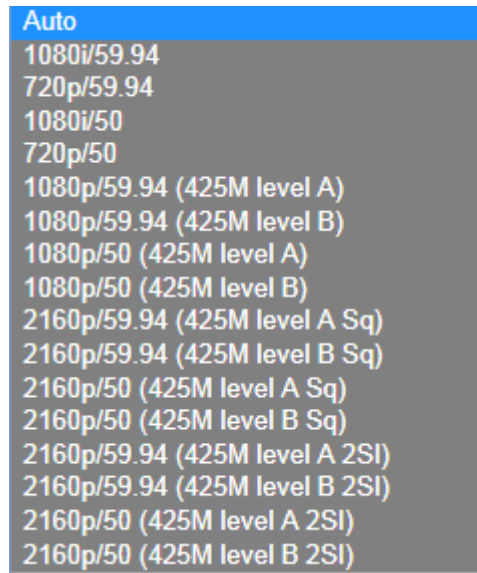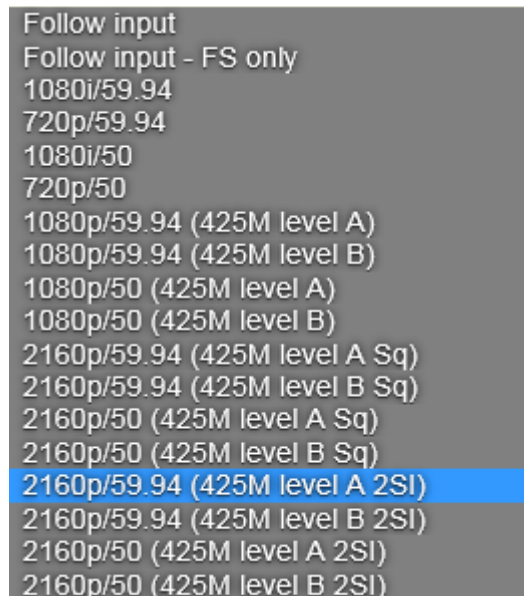
When the input standard is set to *Auto*, the module will auto detect the video standard.

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

```
Follow input
Follow input - FS only
1080i/59.94
720p/59.94
1080i/50
720p/50
1080p/59.94 (425M level A)
1080p/59.94 (425M level B)
1080p/50 (425M level A)
1080p/50 (425M level B)
2160p/59.94 (425M level A Sq)
2160p/59.94 (425M level B Sq)
2160p/50 (425M level A Sq)
2160p/50 (425M level B Sq)
2160p/59.94 (425M level A 2SI)
2160p/59.94 (425M level B 2SI)
2160p/50 (425M level A 2SI)
2160p/50 (425M level B 2SI)
```

Note: "**Follow input-FS only**" can be used when the input and output standards are the same. It results in lower delay.

Horizontal Phase Offset: With this control, the user 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 the user 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.)

Vertical Phase Offset: With this control, the user 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.

5.1.2. Video Monitor

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

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

The functionality for **PGM IN B**, **PGM IN C** and **PGM IN D** is the same.

Video Playload ID: This field reports if a valid Video Playload ID ANC packet has been detected and will display video format information.

5.1.3. 4K Inputs

4K Input Detected: This field indicates whether or not a 4K input has been detected based on the input detected on PGM IN A, B, C and D. If a 4K input has been detected, it displays the video format.

Additional video Delay: These fields allow the user to set the additional video delay in addition to the processing delay for PGM IN A-D. Up to 30 frames of addition video delay can be added to each of the 4 links.

Total Video Delay: These fields indicate total video delay for PGM IN A-D in ms.

5.1.4. Non-4K Inputs

Video Delay: This field indicates the video delay through the card in ms when non 4K signals are detected on the input.

5.1.5. Audio Inputs

Audio Delay: This field indicates the audio delay through the card in ms.

5.2. VIDEO PROC [+VPROC]

The *Video Proc* control menu as shown in Figure 5-4 is used to configure parameters associated with the video processing functions of the converter.
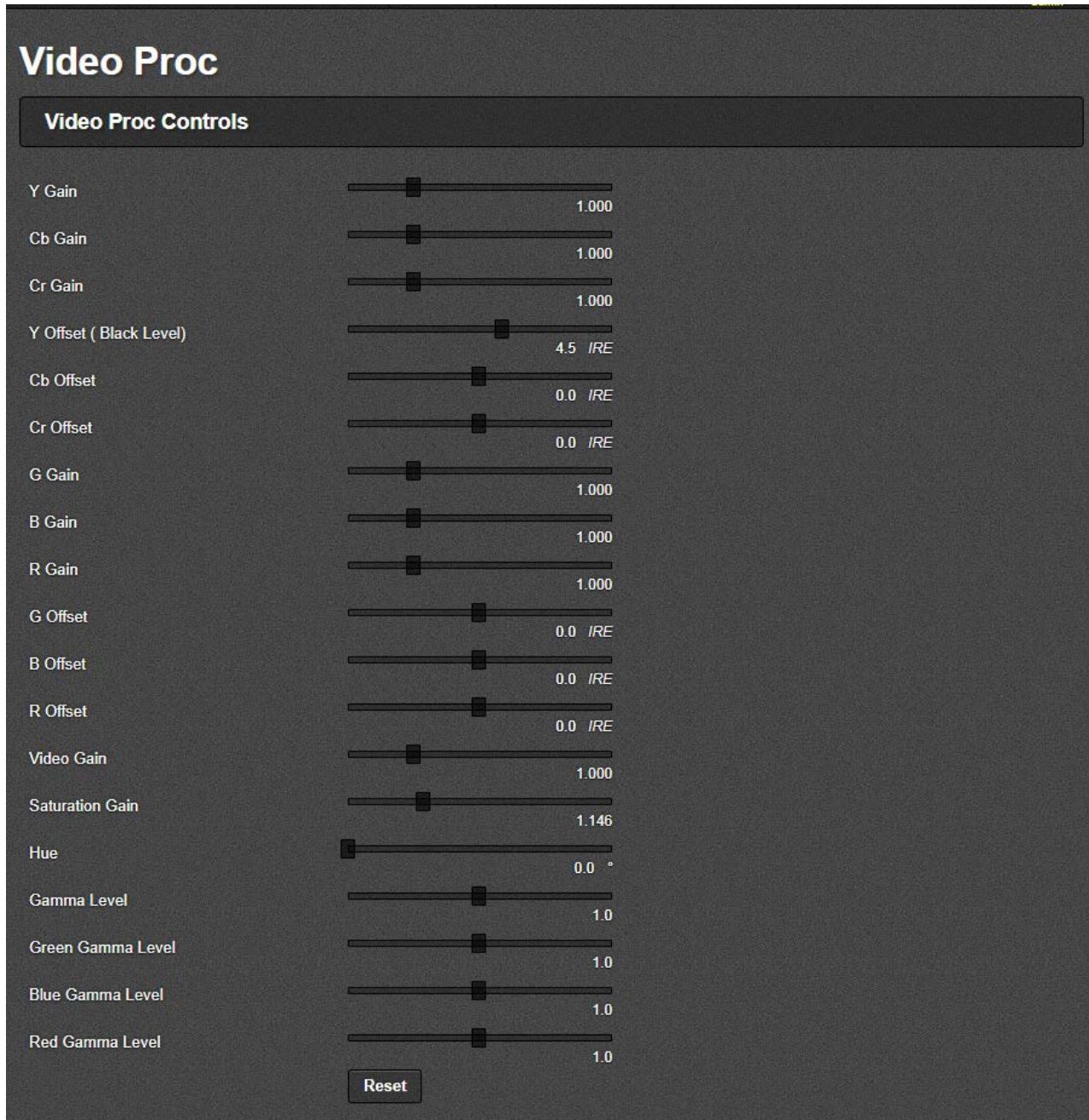

Figure 5-4 : WebEASY® - Video Proc Panel

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

Video Proc Controls

5.2.1. 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.

5.2.2. 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.

5.2.3. 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 (HD, 3G or 4K).

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

5.2.4. Gamma Level

With this control, the user can adjust the overall Gamma correction factor from 0.0 to 2.0 in increments of 0.1.

5.2.4.1. Red/Green/Blue Gamma Levels

With these controls, the user can individually adjust the Red, Green, and Blue Gamma levels from 0.0 to 2.0 in increments of 0.1.

Red Gamma Level:	Ranges from 0 to 2.0 in 0.1 level increments.
Green Gamma Level:	Ranges from 0 to 2.0 in 0.1 level increments.
Blue Gamma Level:	Ranges from 0 to 2.0 in 0.1 level increments

5.3. HDR [+HDR]

The 7814UDX-4K series products are HDR capable (with +VPROC and +HDR options) and can translate SDR and a range of HDR formats, including SMPTE2084 (PQ), HLG and S-Log3. It also performs all colour space conversion including BT.709, BT.2020 and S.gamut3. Rather than using fixed LUTs, the Evertz HDR conversion uses high-precision mathematical modelling to allow for very low-latency, high accuracy transforms while allowing on-the-fly changes to colour correction or HDR transfer function parameters.

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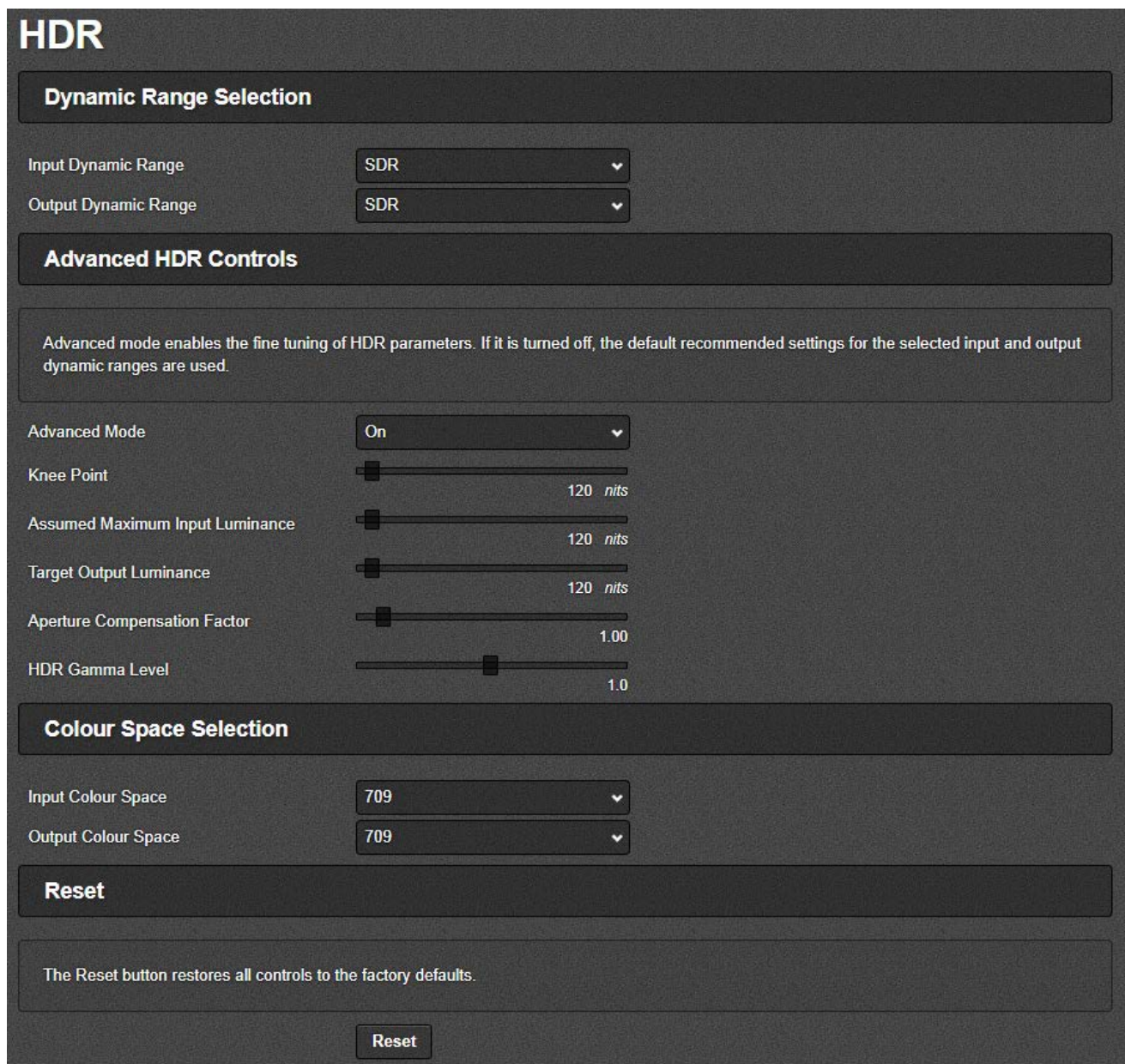

Figure 5-5 : WebEASY® - HDR

5.3.1. Dynamic Range Selection

Input Dynamic Range: The input dynamic range control specifies the expected SDR/HDR input format. Available options are SDR, HDR-2084 legal, HDR-2084 Full, HDR-SLOG3, HDR-HLG as shown below.

```
SDR
HDR-2084 Legal
HDR-2084 Full
HDR-SLOG3
HDR-HLG
```
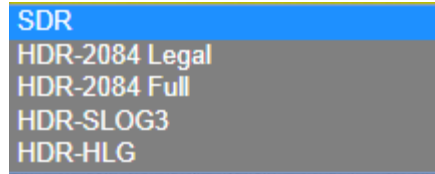
Output Dynamic Range: The output dynamic range control specifies the desired HDR output format. Available options are SDR, HDR-2084 legal, HDR-2084 Full, HDR-SLOG3, HDR-HLG as shown below.

```
SDR
HDR-2084 Legal
HDR-2084 Full
HDR-SLOG3
HDR-HLG
```
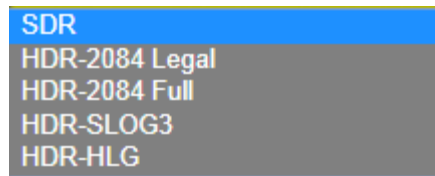
5.3.2. Advanced HDR Controls

Advanced Mode: Advanced Mode enables the advanced HDR controls to custom modify the HDR conversion process. When it is on, the advanced HDR controls will become available. When it is turned off, the controls will be set to the default baseline depending on input and output HDR types.

Knee Point: This control sets the point to where highlights are to be expanded / companded to the output target luminance. This control has a range of 0 to 2000 nits with a default value of 120 nits.

Assumed Maximum Input Luminance: This control defines the expected luminance level of the input video. For 709 color space usually set to 100-120 nits and around 1000 to 2000 for HDR inputs depending on monitor capabilities.

Target Output Luminance: This control is used to set the desired output luminance. For 709 color space usually set to 100-120 and around 1000 to 2000 for HDR outputs depending on monitor capabilities. The range is 0-2000 nits.

Aperture Compensation Factor: The aperture compensation control is used to adjust the curve above the knee point. For best results for an HDR output, it is recommended to set this control between 3 and 5.

HDR Gamma Level: This control is used to adjust the overall gamma correction factor above the knee point from 0.0 to 2.0 with a default value of 1.0.

5.3.3. Colour Space Selection

Input Colour Space: This dropdown allows the user to set the input color space.

Output Colour Space: This dropdown allows the user to set the output color space.

Reset: The Reset button restores all controls to the factory defaults.

HDR Conversion

SDR to HDR conversions:

The input SDR is first scaled by the aperture compensation then the highlights are expanded to the output target from the knee and above.

For SDR->HDR it is recommended that the aperture compensation be set between 3 and 5 for best results for an HDR output of 300-500 nits. It is also recommended not to expand the highlights too much as the results will become quite banded due to lack of dynamic range of the input.

Note: For all the HDR standards such as HLG, HDR1092084) or SLOG3, the operation is the same.
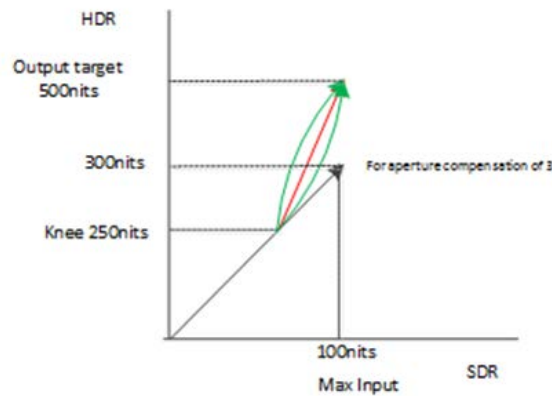
Figure 5-6 : HDR to SDR Conversion Diagram

HDR to SDR Conversions:

The input HDR is first scaled by 1/aperture compensation then the highlights are compressed to the output target from the knee and above.

Note: All levels above the maximum input will be compressed to the target output.
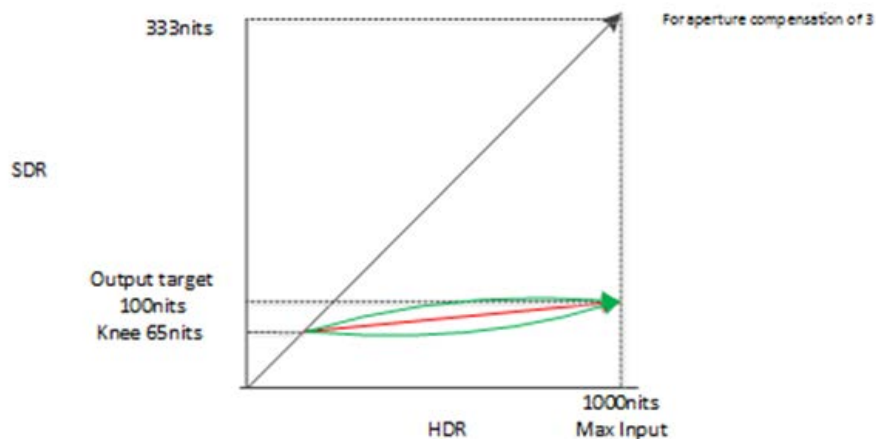

Figure 5-7 : HDR to SDR Conversion Diagram

5.4. 12G IO (-12G OPTION ONLY)

The –12G option adds support for SMPTE ST 2082 and enables up to 2x 12G SFP's (ordered separately) to be added to allow transport over a single coax or Fiber. The –12G–HDBNC–R option includes an HDBNC module that supports 12G-SDI signals.
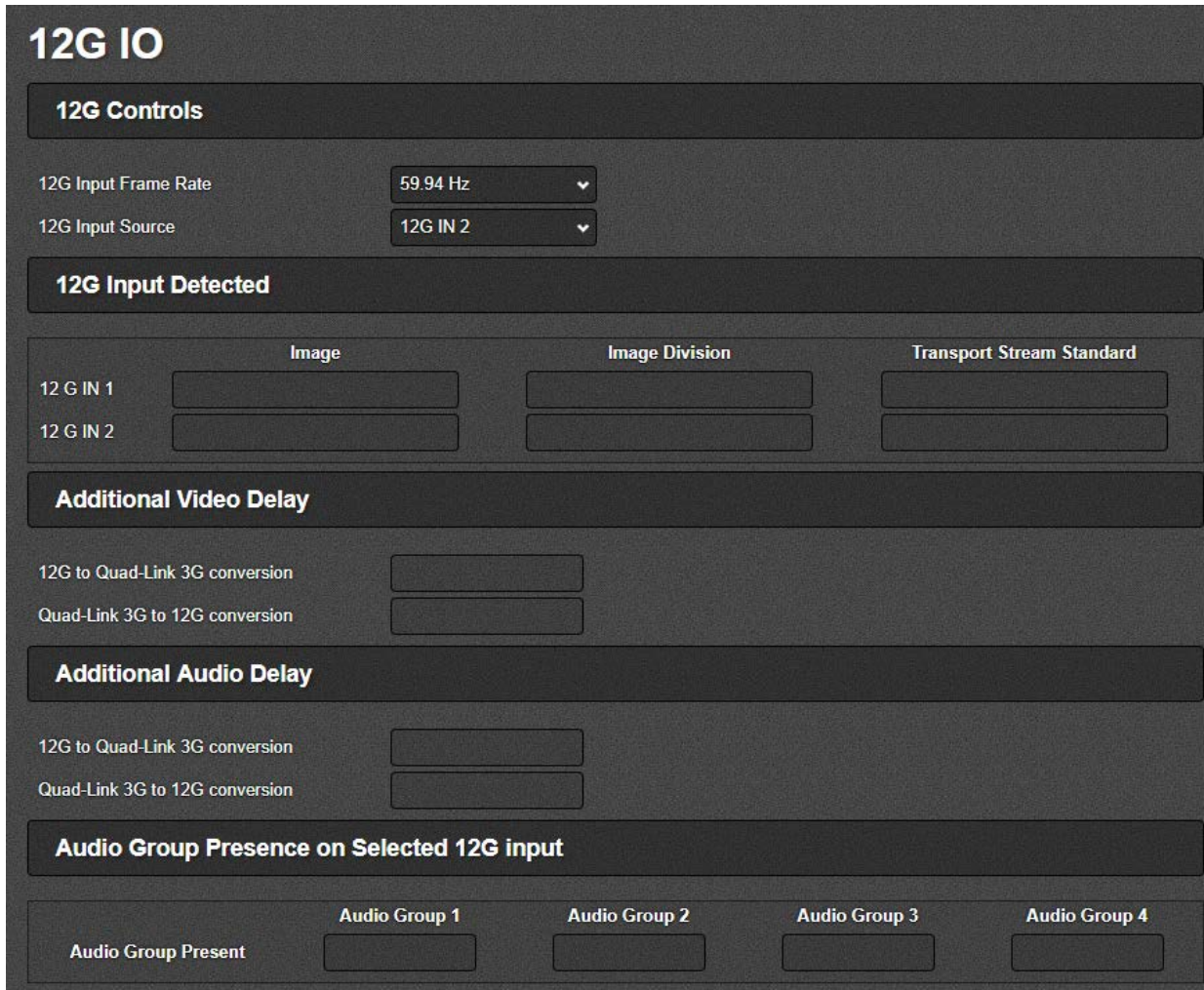

Figure 5-8 : WebEASY® - 12G IO

5.4.1. 12G Controls

12G Input Frame Rate: This control allows the user to select the 12G input frame rate. Possible options are 59.94 and 50 Hz.

12G Input Source: The 7814UDX-4K-12G has the capability to house up to two 12G SFP modules. This control allows the user to select the 12G input source.

5.4.2. 12G Input Detected

Image: This field displays the image pixel size which is detected through the 12G input.

Image Division: This field indicates the image division which has been detected through 12G input. Possible options are 2Si or Square Division.

Transport Stream Standard: This field indicates the transport stream standard that is detected through 12G input.

5.4.3. Additional Video Delay

12G to Quad-Link 3G Conversion: This field displays the additional video delay for the 12G to 3G translation. This delay is on top of the processing delay found in the Video Tab.

Quad-Link 3G to 12G Conversion: This field displays the additional video delay for the 3G to 12G translation. This delay is on top of the processing delay found in the Video Tab.

5.4.4. Additional Audio Delay

12G to Quad-Link 3G Conversion: This field displays the additional audio delay for the 12G to 3G translation. This delay is on top of the processing delay found in the Audio Tab.

Quad-Link 3G to 12G Conversion: This field displays the additional audio delay for the 3G to 12G translation. This delay is on top of the processing delay found in the Audio Tab.

5.4.5. Audio Input Presence on Selected 12G Input

Audio Group 1-4: This field indicates the audio group presence for audio group 1-4.

5.5. NOISE REDUCTION

The *Noise Reduction* panel is used to configure parameters associated with the video noise reduction processing.
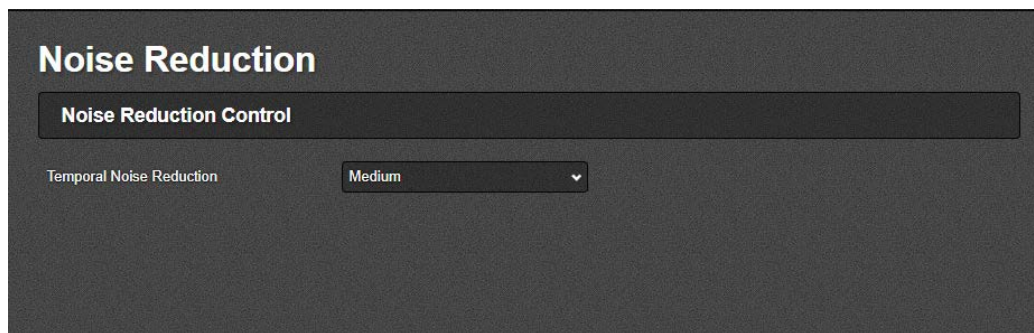

Figure 5-9 : WebEASY® - Noise Reduction Panel

Temporal Noise Reduction: 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.

None	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.

5.6.   SCALER

The Scaler control menu is used to configure the cut-off frequencies of the polyphase filters.
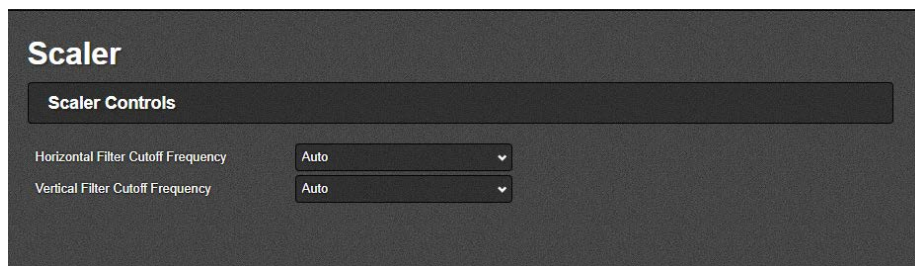
Figure 5-10 : WebEASY® **- Scaler Panel**

<u>Scaler Controls</u>

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 the output. The larger the value is, the wider the corresponding filter bandwidth will be.

Horizontal Filter Cutoff Frequency: It 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 1/64th the bandwidth of the input signal.

Vertical Filter Cutoff Frequency: It 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 1/64th the bandwidth of the input signal.

5.7. REFERENCE

The 7814UDX-4K series conversion modules accept standard reference signals including bi-phase (525i59 or 625i50) and tri-level sync signals (1080i59 or 1080i50). 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 5-11 : WebEASY® - Reference Panel
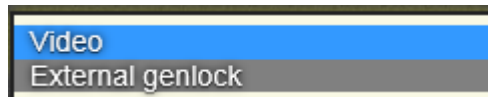
5.7.1. Reference Controls

Reference Select: With this control, the source of video reference for the conversion path is detected. When the card is used in the 7700FR-G, 7801FR or the 7800FR Frame Reference inputs may be used.

When *External Genlock* is selected, the conversion Path will lock to the incoming reference.
When *Video* is selected, the conversion path will ignore the incoming Genlock source and lock to the incoming video stream.
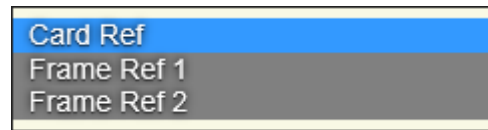
✍	**NOTE:** If the selected Genlock reference disappears or is not valid, the card will lock to incoming video.

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

Video
External genlock

Genlock Source: Possible options for Genlock Source are as follows:

Card Ref
Frame Ref 1
Frame Ref 2

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

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

✍	**NOTE:** If the selected Genlock reference disappears or is not valid, the card will lock to incoming video or free-run.

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.

Genlock VITC Read Line: This control specifies the line number where VITC time code will be extracted from the input reference signal.
The range of the Genlock VITC control is line 6 to line 22 for 50Hz field rates (PAL) and from line 10 to line 20 for 59.94 field rates (NTSC).

5.7.2. Reference Monitor

Reference Status: The *Reference Status* reports the current source of reference for the video path. If the video path is currently locked to a reference signal, it will report the source of the reference signal as *Card ref*, *Frame ref 1*, or *Frame ref 2*. If the card is actively locked to input video, it will report *Video*. If the video path is currently free-running, it will report *None.*

Reference Type: The *Reference Type* reports the type of reference for the video path. If the video path is currently locked to a reference signal, it will report the type of the reference signal as either *Bi-phase* or *Tri-level.* If the card is actively locked to input video, it will report *Video*. If the video path is currently free-running, it will report None.

Genlock Standard: *External Genlock Standard* reports the video standard of the detected reference signal. If a signal has been detected, but the module determines the video standard, it will report *Unknown*. If no reference signal is present on the selected reference input, it will report *Not present*.

5.7.3. Auto Reference Fail-over

Auto Reference Fail-over: 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.

Priority Reference Select: This section allows the user to set the desired first, second and third 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
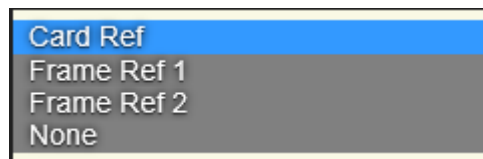
Auto Reference Valid Timeout: This control sets a user specified time that the reference input return to the Priority 1 reference when a valid genlock signal is re-asserted.

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.

Auto Reference Status: 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.

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

5.8. AUDIO

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 specify C bit processing modes. SRC status, Audio Delay, Video Delay are also monitored and reported in the *Audio* menu.
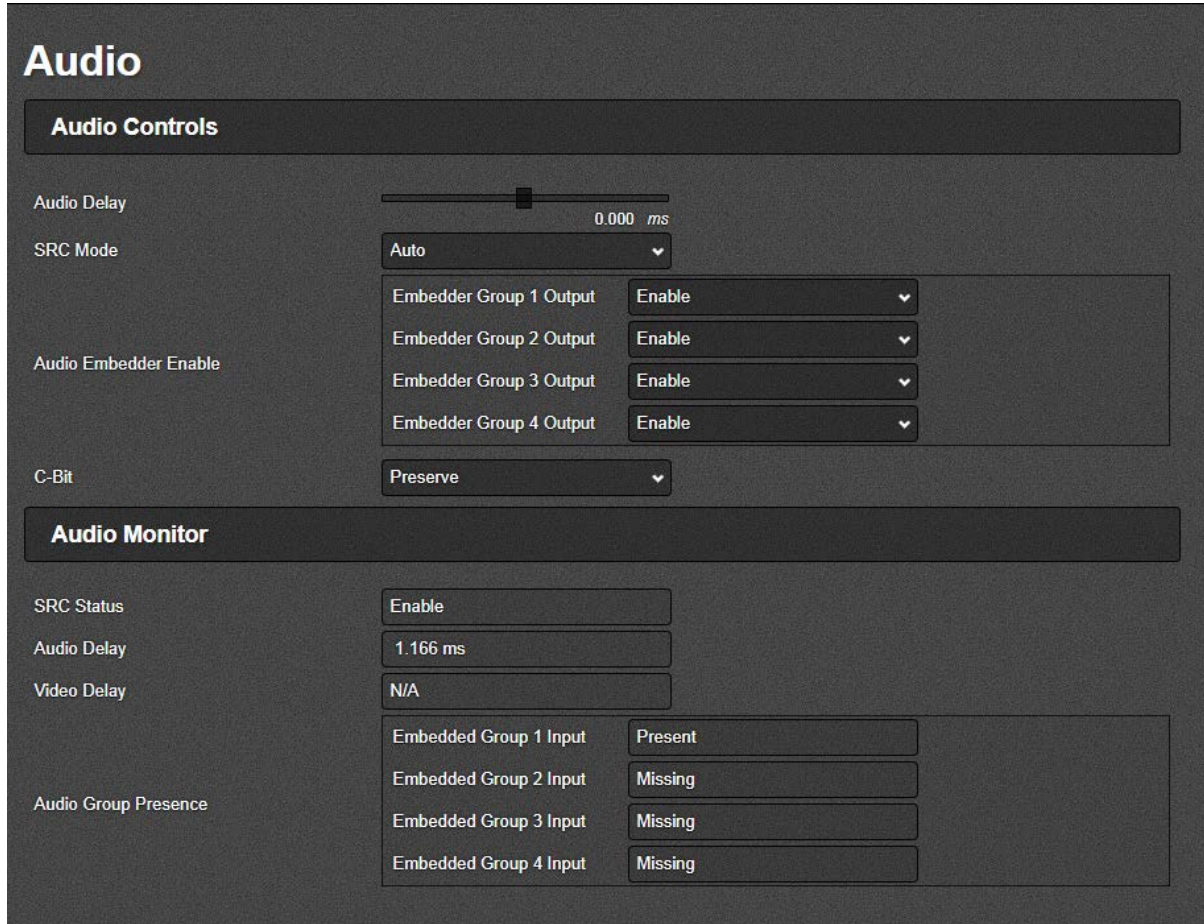

Figure 5-12 : WebEASY® - Audio Panel

Audio Controls [+APROC]

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. The audio delay can be adjusted with single sample precision.

> **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.

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

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

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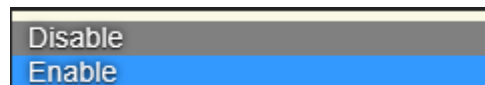
Disable	Audio embedding for group 1 will be disabled.
Enable	Audio embedding for group 1 will be enabled.

C-Bit: This control allows the user to set the C-Bit Control. Using the *C-Bit Control* drop down menu, the user can select from the following options:
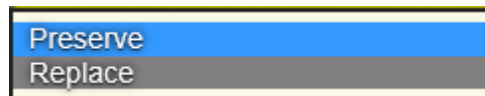
Preserve	This option preserves/passes the C-Bit settings from audio inputs to audio outputs.
Replace	This option replaces the C-Bit settings to the default values by the module.

Audio Monitor

The Audio Monitor section allows 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.

SRC Status: This parameter displays the status of the Sample Rate Converters (SRC). The SRC status will display either E*nable* or *Bypass.*

Audio Delay: The *Audio Delay* parameter displays the current delay/latency through the audio processing path in milliseconds (*ms).*

Video Delay: The *Video Delay* reports the current video processing delay/latency through the module in milliseconds (ms).

Audio Group Presence: The *Embedded Group 1* Input parameter displays the presence of audio in Group 1.

Group 2, 3 and 4 have the same functionality.

5.9.   AUDIO INPUT CORRECTION [+APROC]

The Audio Input Correction Controls as shown in Figure 5-13 are 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 and the delay of audio inputs.
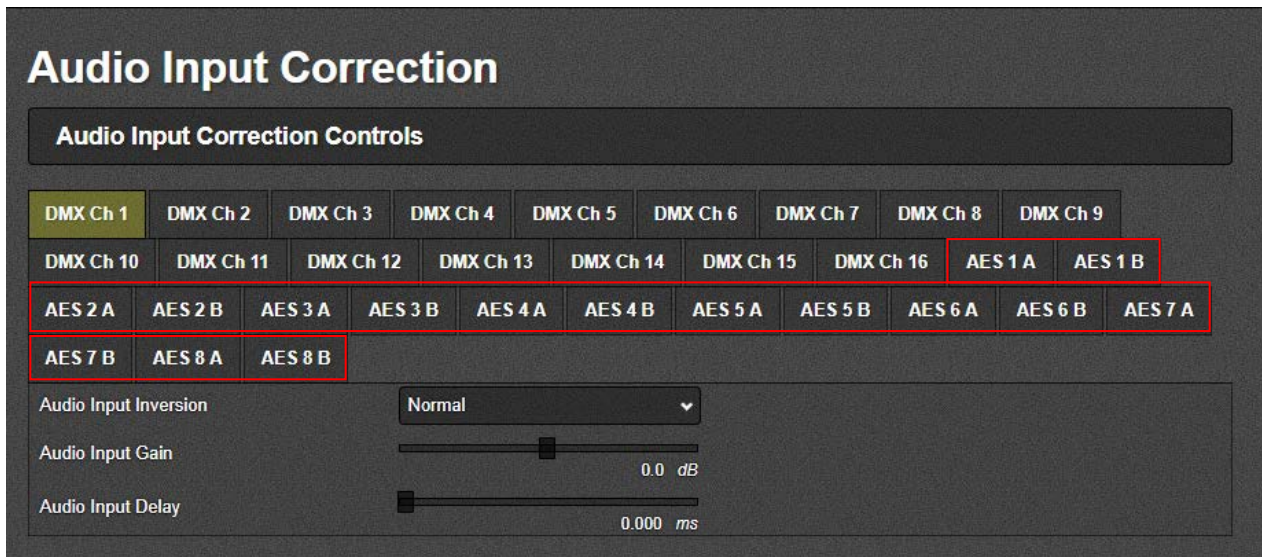

Figure 5-13 : WebEASY® - Audio Input Correction Panel

Audio Input Correction Controls

Audio Input Inversion: This control is used to invert the incoming audio channel.

Audio Input Gain: This control allows 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 moving to the 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.

Audio Input Delay: This control allows the user to set the Audio Input Delay. The range is -82.562 ms to +1195.250 ms.

NOTE: The AES tabs are only available with the [-AES8] product option.

5.10. AUDIO MIXER

Each audio output has a 2-channel mixer as is shown in Figure 5-14.
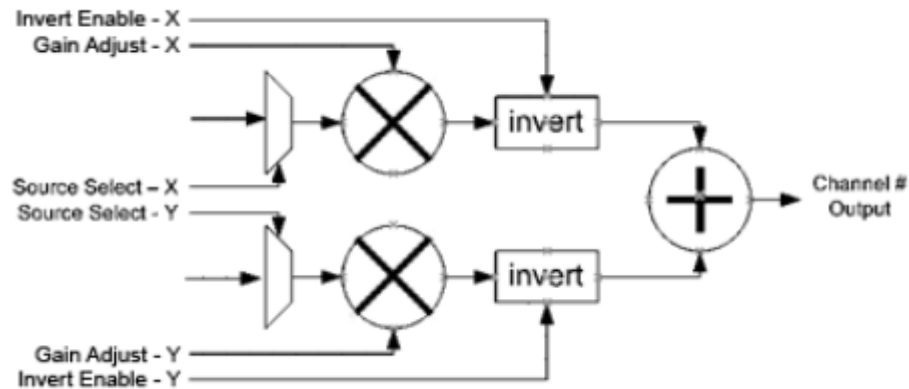
Figure 5-14 : Audio Mixer Diagram for each Audio Channel

<u>Audio Mixer Controls</u>

There are 16 embedded channels (1-16 and 17-32) and 16 AES channels (33-48 and 49-64, [-AES8] product option). These Output Channel mixers perform audio inversion, audio gain adjustment and audio channel swapping for each of the 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 video.
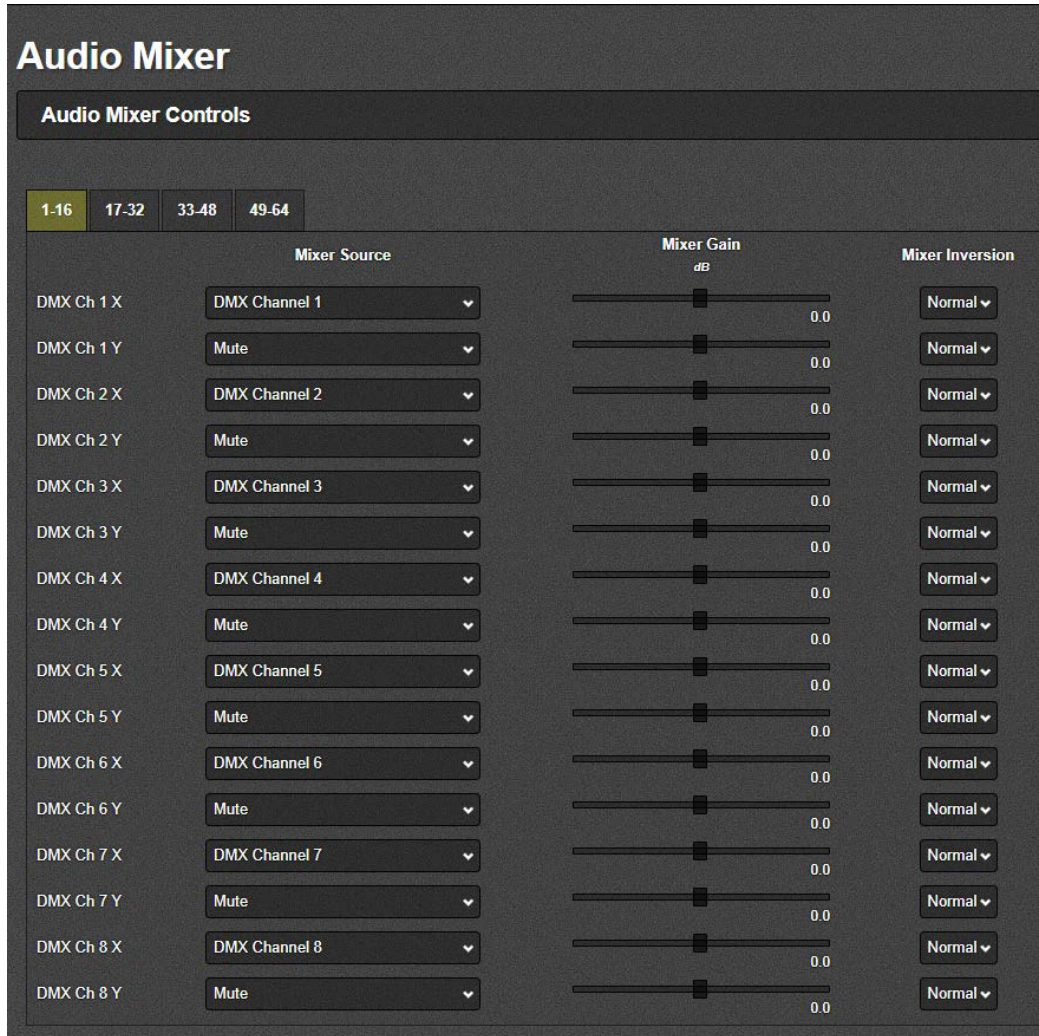
Figure 5-15 : WebEASY® - Audio Mixer Panel

Mixer Source: This control enables the user to route one of the 16 internally processed input audio channels to the X input of the Mixer Source. The user can select the channel source by selecting the desired channels from the Mixer Source drop down menu as below. For the sake of brevity, only the 1-16 section will be discussed in this manual.
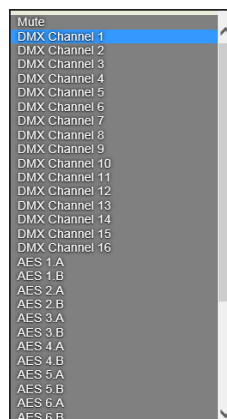

The full set of available channel options are listed below.

	Mute	AES 3.A [-AES8]
	DMX Channel 1	AES 3.B [-AES8]
	DMX Channel 2	AES 4.A [-AES8]
	DMX Channel 3	AES 4.B [-AES8]
	DMX Channel 4	AES 5.A [-AES8]
	DMX Channel 5	AES 5.B [-AES8]
	DMX Channel 6	AES 6.A [-AES8]
	DMX Channel 7	AES 6.B [-AES8]
	DMX Channel 8	AES 7.A [-AES8]
	DMX Channel 9	AES 7.B [-AES8]
Mixer Source	DMX Channel 10	AES 8.A [-AES8]
	DMX Channel 11	AES 8.B [-AES8]
	DMX Channel 12	Mono mix DMX channels 1 and 2
	DMX Channel 13	Mono mix DMX channels 3 and 4
	DMX Channel 14	Mono mix DMX channels 5 and 6
	DMX Channel 15	Mono mix DMX channels 7 and 8
	DMX Channel 16	Mono mix DMX channels 9 and 10
	AES 1.A [-AES8]	Mono mix DMX channels 11 and 12
	AES 1.B [-AES8]	Mono mix DMX channels 13 and 14
	AES 2.A [-AES8]	Mono mix DMX channels 15 and 16
	AES 2.B [-AES8]	

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

Mixer Inversion: This control enables the user to invert the phase or pass the selected audio channel. The Mixer Inversion drop down menu appears as follow:
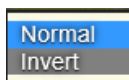
Normal	Pass the audio channel through with no processing.
Invert	Invert the phase of the audio channel.

5.11.   CLOSED CAPTIONING

The 7814UDX-4K 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.
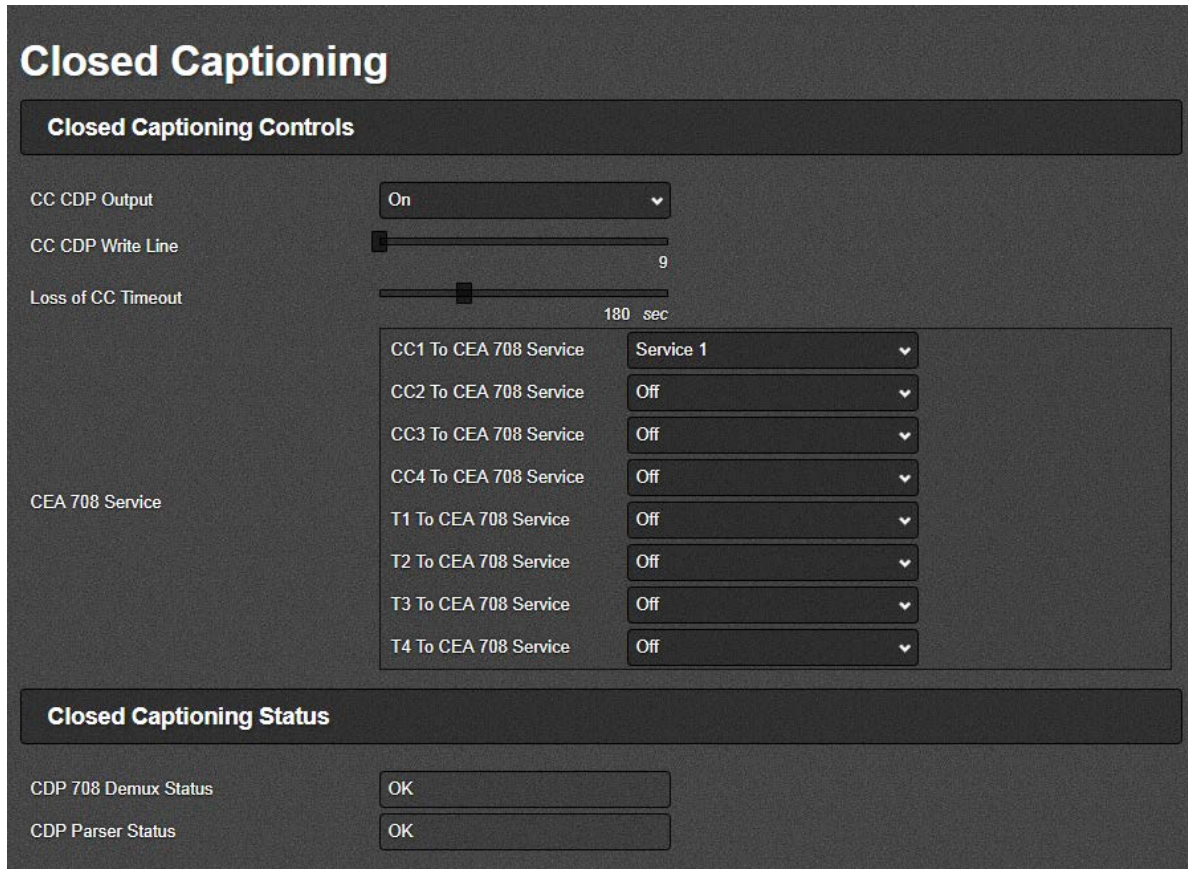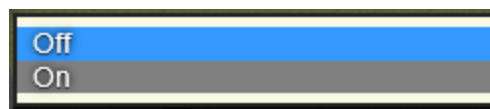

Figure 5-16 : WebEASY® - Closed Captioning Panel

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

5.11.1. Closed Captioning Controls

CC CDP Output: This parameter will enable closed caption handling for module.

On	When turned *On*, any closed captioning will be extracted from the input signal, and mapped to the designated CDP write line.
Off	When turned *Off*, no CDP closed captioning packets are encoded in the output video signal.

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.

Loss of CC Timeout: This parameter allows 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.

CEA 708 Service: 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

5.11.2. Closed Captioning 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 can't be modified.

CDP 708 Demux Status: This parameter displays the status of 708 Closed Caption reading.

CDP Parser Status: This parameter displays the status of Closed Caption reading.

5.12.   ANC PASS THRU

The ANC Pass Thru feature allows the user to define specific rules for passing ANC data from input to output. This allows ANC data that is normally not processed through the module to pass through without getting striped on the output video signal.

There are two modes of operation for ANC Pass Thru, **Mapped ANC Pass Thru** and **Direct ANC Pass Thru.**
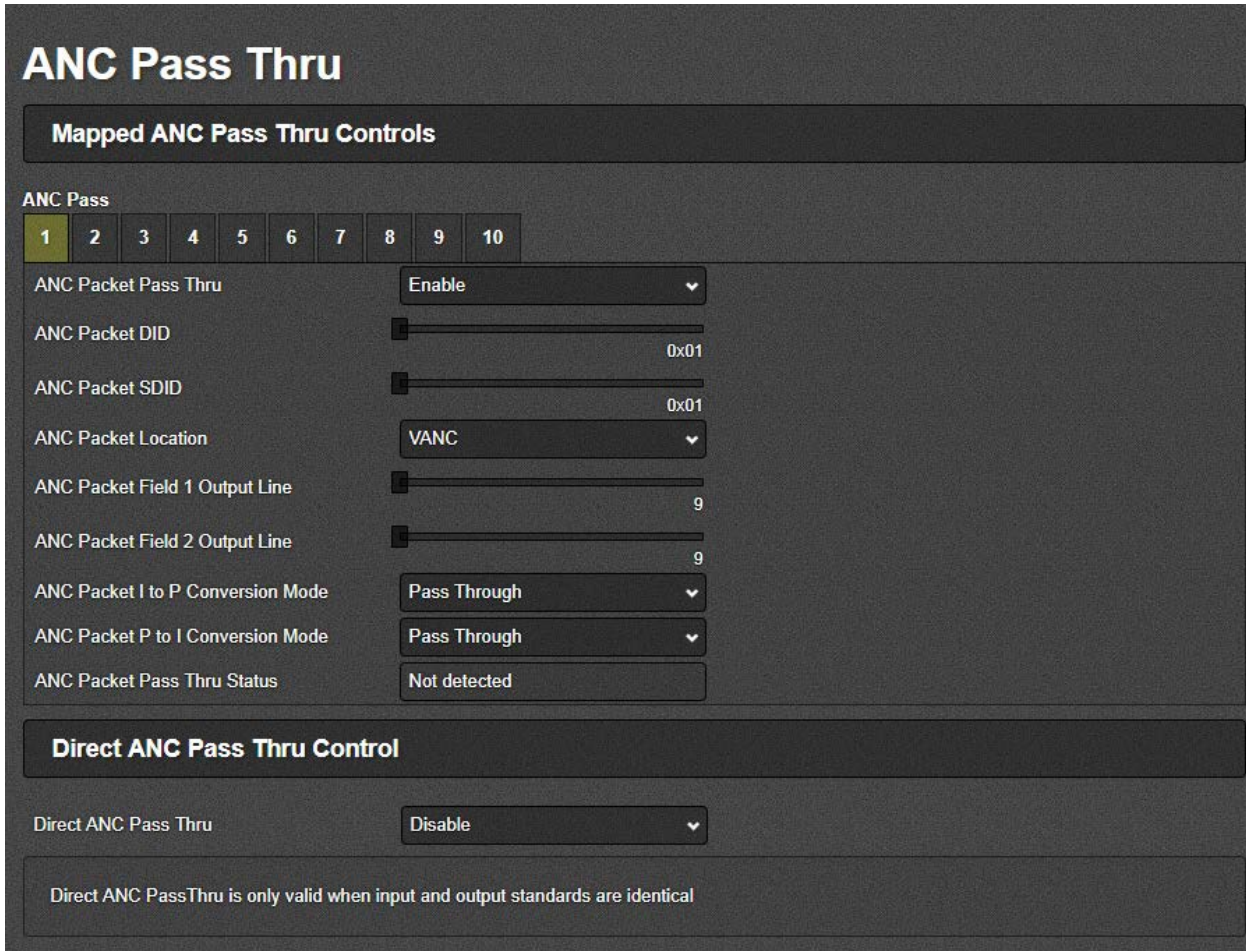
Figure 5-17 : WebEASY® - ANC Pass Thru Panel

5.12.1. Mapped ANC Pass Thru Controls

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

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

Key Functional Notes of Mapped ANC PassThru:

- Supported for all valid input and output video standard combinations.

- When enabled and valid, *Direct ANC PassThru* overrides *Mapped ANC PassThru*.

- ANC packets processed by the system (*For example: Source ID*) will be blocked from passing through using *Mapped ANC PassThru* to avoid duplicate entries on the output video.

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

ANC Packet Pass Thru: The *ANC Packet Pass Through* Enable is the main control for enabling passing ANC data seen on the input of the 7814UDX-4K card. When enabled the specified ANC packet is embedded on the output. When disabled no ANC packets will be passed through the 7814UDX-4K card.

ANC Packet DID: 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.

ANC Packet SDID: 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.

ANC 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.

ANC Packet 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 ANC Packet Field 1 Output Line is from line 9 to line 41. The default value is 10.

ANC Packet Field 2 Output Line: This control will set the Field 2 output line of the ANC packet to be passed through. The valid range for the ANC Packet Field 2 Output Line is from line 9 to line 41. The default value is 10.

ANC Packet I to P Conversion Mode: This control will determine the method of outputting the ANC packets on an interlaced to progressive conversion.
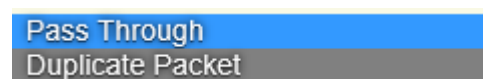
Pass Through	When set to *Pass Through* the module will take ANC packet from field 1 and insert onto frame 1 and data on field 2 will be inserted onto frame 2.
Duplicate Packet	When set to *Duplicate Packet,* the module will embed data from field 1 on to both frame one and two on the output.

ANC Packet P to I Conversion Mode: This control will determines the method of outputting the ANC packets on a progressive to interlaced conversion.

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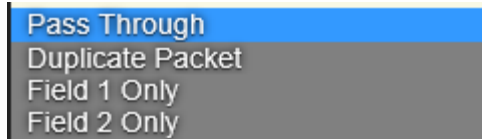
Pass Through	When set to *Pass Through* the module will take ANC packet from frame 1 and insert onto field 1 and data on frame 2 will be inserted onto field 2.
Duplicate Packet	When set to *Duplicate Packet,* the module will embed data from frame 1 on to both field one and two on the output.
Field 1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

ANC Packet Pass Thru Status: This monitoring window returns the current state of the ANC Packet Pass Thru 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.

5.12.2. Direct ANC Pass Thru Control

The Direct ANC Pass Thru mode of operation routes all ancillary data in both HANC and VANC frame accurately from input to output. This mode of operation is designed for the use case when the input video standard and output video standard are identical. Additionally, Direct ANC Pass Thru will also support passing SD-VBI waveforms from input to output.

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

Key Functional Notes of Direct ANC Pass Thru:

- Only supported when Input Video Standard is identical to the Output Video Standard.

- Direct ANC Pass Thru overrides Mapped ANC Pass Thru when it is enabled and Input Video Standard is identical to the Output Video Standard.

- When Direct ANC Pass Thru is disabled or invalid, Mapped ANC Pass Thru rules are applied.

- Supports SD-VBI wave pass through for SD video.

- ANC packets processed by the system (For example: Source ID) will be blocked from passing through to avoid duplicate entries on the output video.

Direct ANC pass Thru: This control allows the user to enable or disable Direct ANC Pass Thru for ANC data that is not processed through the module to pass through without getting striped on the output video signal.

> **NOTE:** Direct ANC PassThru is only functional when input and output video standards are identical.
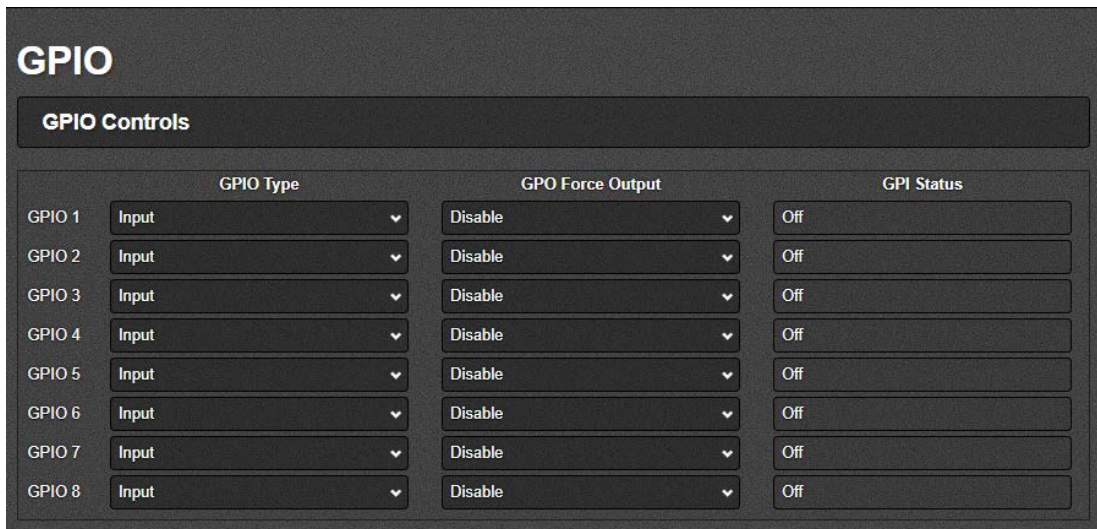
5.13. GPIO

Figure 5-18 : WebEASY® - GPIO Panel

<u>GPIO Controls</u>

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

GPO Force Output: The GPO Force Output control is used to force the GPO pin output. It can be enabled (set to ON) when the GPIO type is set to output. When it is set to ON, this parameter value will override all other logic that can drive the GPO pins.

GPI Status: The GPI Status monitor allows for quick reference to determine if the GPIO has been enabled.

5.14. IP
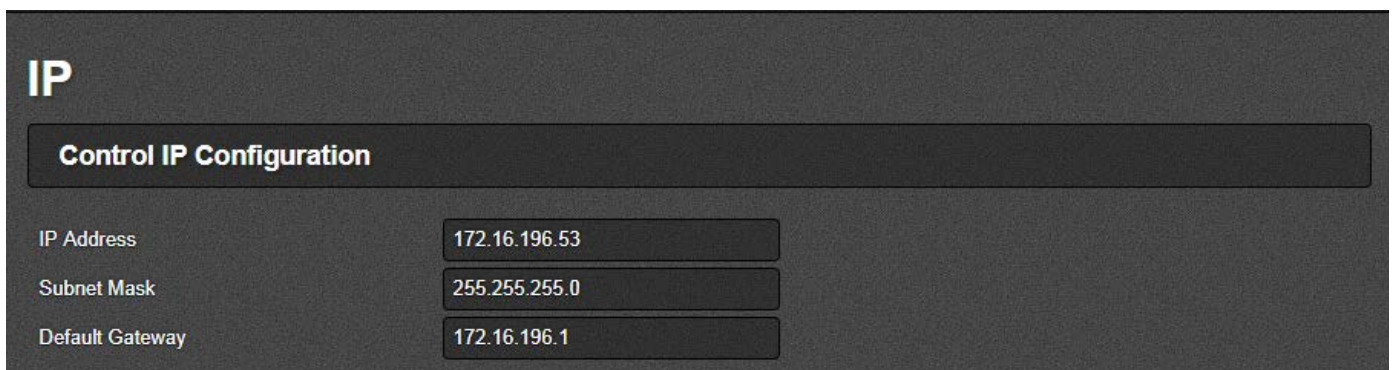
Figure 5-19 : WebEASY® - IP Panel

5.14.1. Control IP Configuration

To set the IP address of the 7814UDX-4K series, type the desired network settings into the IP Address, Subnet Mask and Default Gateway fields and then press Apply.

5.15. PRESETS

The Presets 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 5-20 : WebEASY® - Presets Panel

5.15.1. Preset Control

The 7814UDX-4K series of converters can manage 10 user presets. These 10 presets can store the complete set of card controls.

> ✎ **NOTE:** There may be a slight disturbance in the operation of the card while the new preset is being recalled.

Recall Preset: This control is used to initiate 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

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

5.15.2. User Presets

Name: This control allows the user to provide a meaningful name to each user preset. For example, rather than simply using User 1, the user preset can take on a name such as *1080i/59.94 In to 525i/59.94 Out*.

Input Video Standard Trigger: This control allows the user to automatically trigger the loading of a video path user preset based on detected input video standard. For each video path user preset, the following are the selectable options:
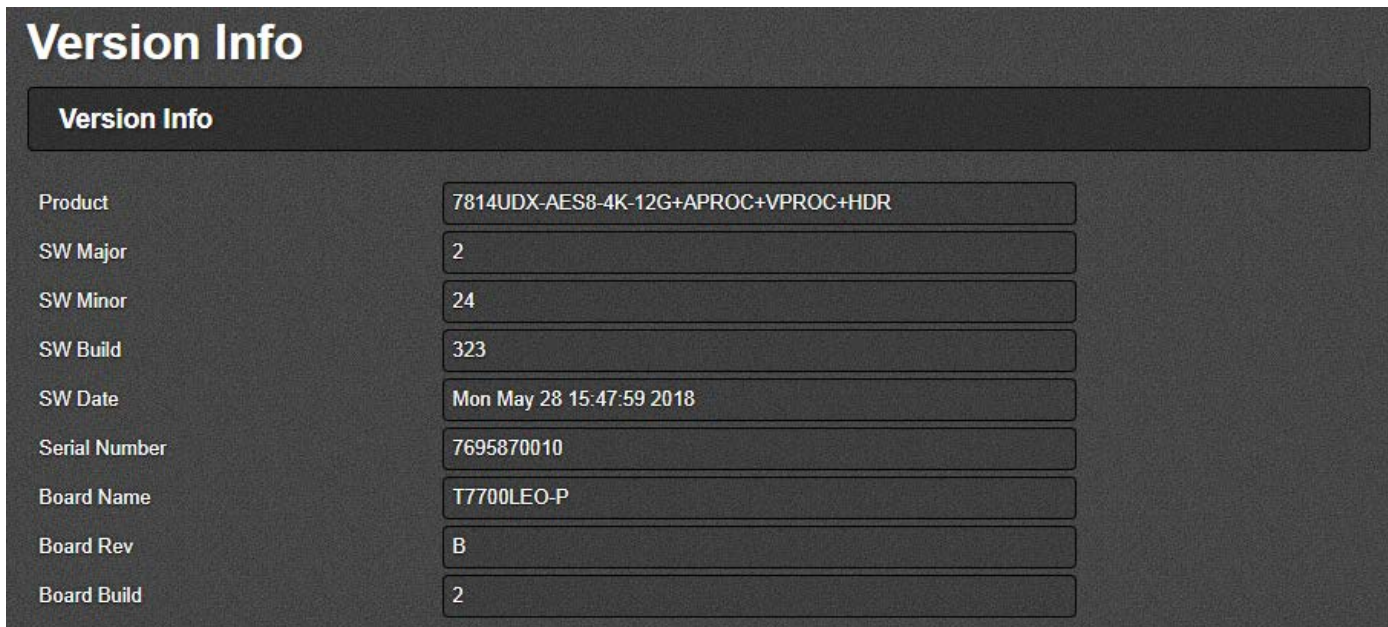
Disable	Input video standard preset triggering is **disabled**.
1080i/59.94	When **1080i/59.94** input video is detected, recall the user preset.
720p/59.94	When **720p/59.94** input video is detected, recall the user preset.
1080i/50	When **1080i/50** input video is detected, recall the user preset.
720p/50	When **720p/50** input video is detected, recall the user preset.
1080p/59.94 (425M Level A)	When **1080p/59.94 (425M Level A)** input video is detected, recall the user preset.
1080p/59.94 (425M Level B)	When **1080p/59.94 (425M Level B)** input video is detected, recall the user preset.
1080p/50 (425M Level A)	When **1080p/50 (425M Level A)** input video is detected, recall the user preset.
1080p/50 (425M Level B)	When **1080p/50 (425M Level B)** input video is detected, recall the user preset.

Table 5-1 : Presets – Input Video Standard Preset Triggers

GPI Preset Trigger: This control allows the user to set the GPI that would trigger a preset.

5.16. VERSION INFO

This section gives the user general information about 7814UDX-4K series modules such as major and minor revisions of Firmware, build number, serial number, board name, revision and build number.

Figure 5-21 : WebEASY® - Version Info Panel

5.17.   PRODUCT STRING

This section allows the user to change the product string. In order to change the product string, enter the new product string followed by a space, followed by the 4-digit checksum and then click Apply.

Figure 5-22 : WebEASY® - Product String Panel

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6. JUMPERS

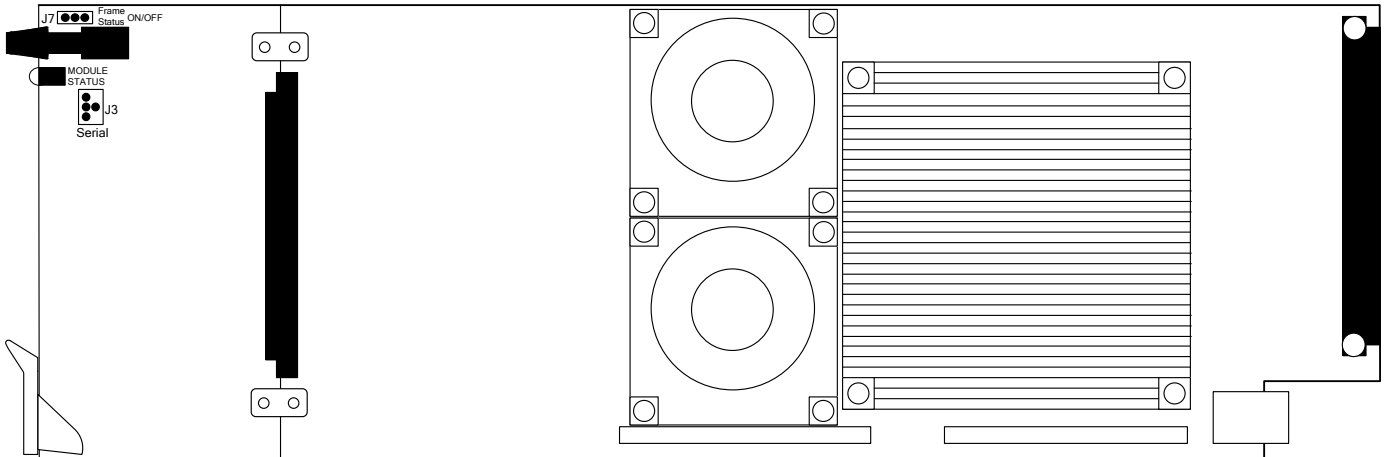Figure 6-1 and Figure 6-2 provide the locations of the jumpers and LEDs on the 7814UDX-4K series boards.
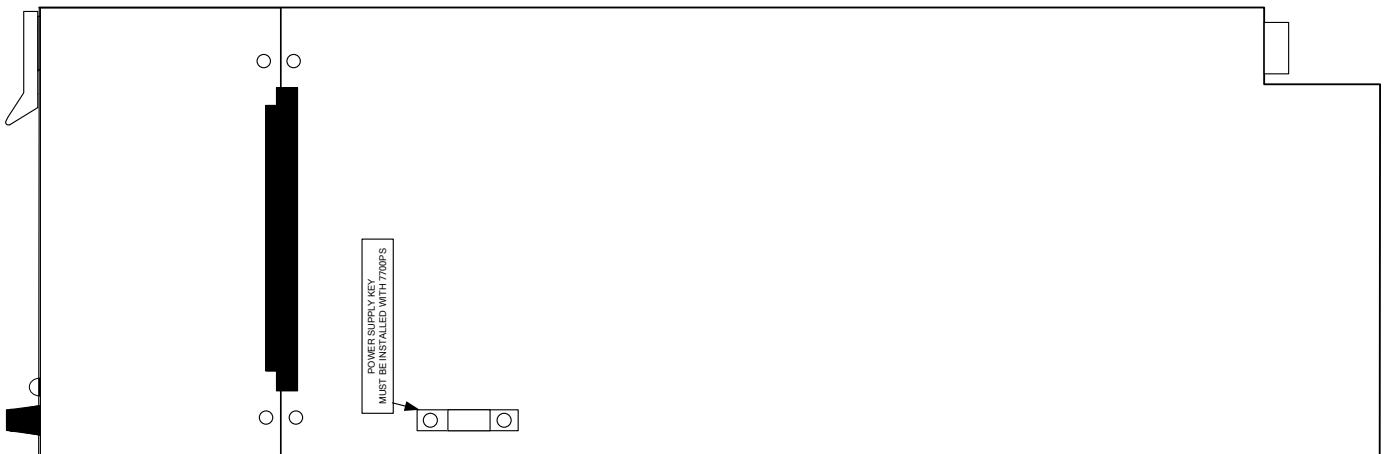

Figure 6-1 : Location of Jumpers – Top View Main Module

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

6.1. MONITORING LOCAL FAULTS 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.

6.2. 7814UDX-4K Series "Slot Blocker"

The 7814UDX-4K 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 7814UDX-4K 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.
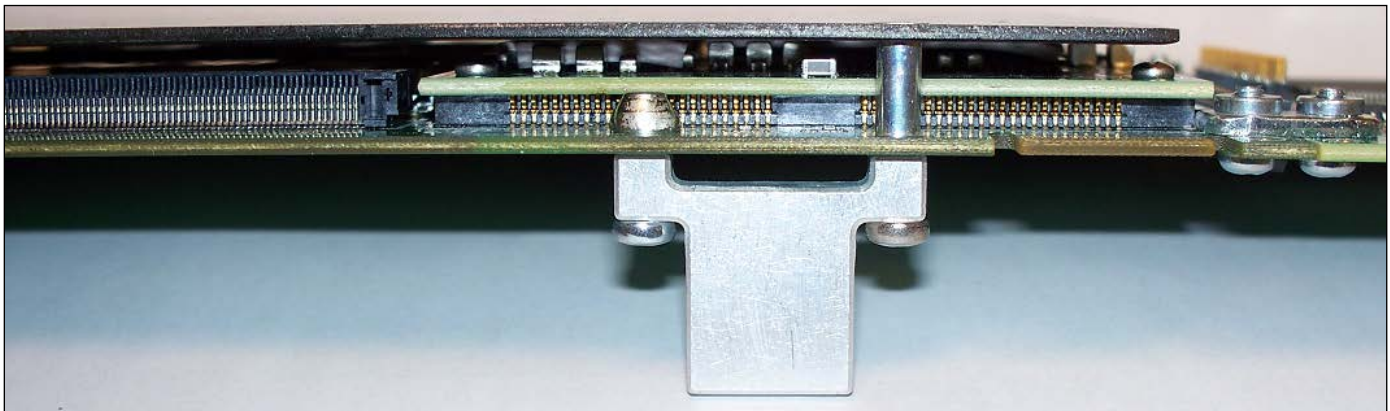

Figure 6-3 : Slot Blocker

7. UPGRADE PROCEDURES

7.1. FIRMWARE UPGRADE

Using the WebEASY® on a web interface is the fastest and recommended way to load the firmware onto the 7814UDX-4K series modules.

On the top of the web page for the 7814UDX-4K series modules, there is a button labelled Upgrade. The Upgrade tab is used to check current firmware version and upload the latest firmware.
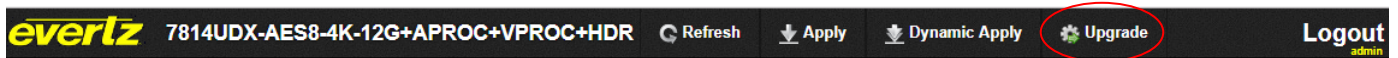

Figure 7-1 : WebEASY® - Upgrade Button on Top Menu Bar

Selecting the Upgrade tab, will take the user to Figure 7-2 where the current firmware version is shown. Should the firmware version be outdated, the user needs to download the firmware image file.

Figure 7-2 : WebEASY® - Firmware Upgrade Menu

Click choose file and browse to locate image file. Once selected, click open to advance to next step. Click upgrade and watch progress bar for status. Once completed, the device will automatically restart.
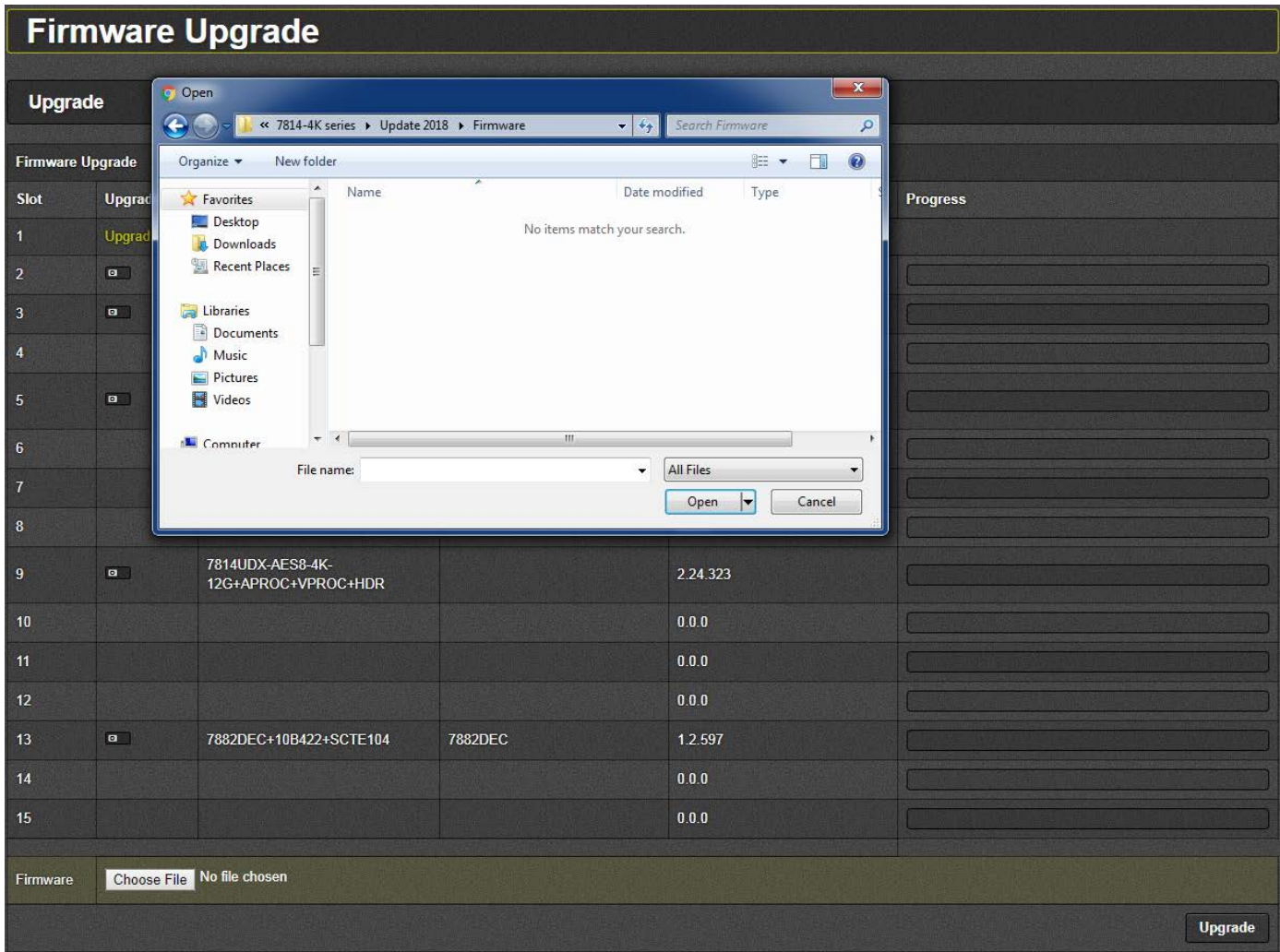

Figure 7-3 : WebEASY® - Firmware Upgrade Menu