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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Initial version	May 06
1.0	Updated to include +F option, modified proc ranges amongst other features	May 08
1.1	Updated VistaLINK® section, updated menus and AFD information	Jul 08
1.2	Added FS Only Mode Description	Dec 08
1.3	Added AFD Code table to Custom AFD Format and Code section.	Jan 09

1. OVERVIEW

The 7711UC-HD series of High Definition Format Up Converters perform high quality up-conversion of SDTV signals to HDTV signals. These modules incorporate a 10 bit signal path and integrate Evertz® proprietary detail enhancement and 3D pixel adaptive noise reduction technologies. Wide range RGB/YCbCr gain and offset controls and RGB color limiting/legalization functions are also available.

The 771UC-HD and the 7711UC-AES4-HD support multi-format SD/HD serial digital inputs and can generate up to three HD or SD serial digital outputs (PGM OUT, OSD and PGM OUT/IN). The OSD output has the ability to perform overlays on the program output for card configuration. The PGM OUT/IN BNC is a configurable BNC that can act as a secondary program input or one of three program outputs.

Inputs are auto-sensing and the card's output will "glitchlessly" transition through black when inputs are changed from SD to HD. HD signals can be frame synced and passed through to the card's output with HDVANC being preserved in the process. Video proc adjustments can also be made on HD inputs signals but without HDVANC being preserved.

With +F option, the PGM OUT/IN BNC can be used as an input BNC for HD FILL signals. When up-converting SD to HD, signals supplied as HD FILL inputs can be keyed into the unused portion of the output image raster (i.e. side panels typically generated when converting 4:3 to 16:9) using the internal HD keyer. The internal keyer is not enabled when operating with SD IN and SD OUT. FILL input signal must be the same format as the target output video format and must be advanced relative to output video timing (< than 1 line).

These modules can accept 2 groups of SMPTE 272M embedded audio on the input and re-embed them into the serial video output (audio delay tracks video delay). The 7711UC-HD and the 7711UC-AES4-HD transports closed caption and time code information from input to output with all necessary SD to HD translations and time code recalculations taking place. The -AES4 version also accepts 4 external discrete unbalanced AES inputs and provides 4 AES outputs with the same audio that is being embedded. The 7711UC-AES4-HD has a separate audio processor for the 4 AES outputs.

The 7711UC-HD and 771UC-AES4-HD support reading AFD values from the incoming video signals and stamping AFD values on the outgoing video. Automatic steering of aspect ratio conversions can be accomplished in conjunction with VLPRO AutoResponse (ARC changes not frame accurate). The 7711UC-AES4-HD has the additional ability to stamp Dolby™ metadata on the outgoing video (type A and type B).

The 7711UC-HD and 7711UC-AES4-HD can also be configured to output an SD video as well (SD ⇒ SD ARC mode). In this mode, frame syncing, aspect ratio conversion, video proc and video noise reduction can be performed on the signal as well.

The versions available are shown in the table below:

Model	Input	Outputs Pgm	OSD	Conversion	Audio Processing	
					Embedded	AES
7711UC-HD	SD	2 HD	1 HD	525/625 ⇒ 1080/720	2 groups	-
		2 SD	1 SD	525/625 ⇔ 525/625 (ARC)	2 groups	-
7711UC-AES4-HD	SD	2 HD	1 HD	525/625 ⇒ 1080/720	2 groups	4
		2 SD	1 SD	525/625 ⇔ 525/625 (ARC)	2 groups	4
7711UC-HD	HD	2 HD	HD	1080/720 ⇒ 1080/720 Frame Sync or Frame Sync + Video Proc*	2 groups	
7711UC-AES4-HD	HD	2 HD	HD	1080/720 ⇒ 1080/720 Frame Sync or Frame Sync + Video Proc*	2 groups	4

Table 1-1: Product Versions

* HDVANC preserved when in HD in ⇒ HD out Frame Sync only mode. HDVANC not preserved when HD video proc enabled. Card does not cross convert between 720p and 1080i.

The 7711UC-HD module occupies two card slots in the 7700FR-C or 7700FR-D 3RU frames, which will hold up to 15 modules. The module has card edge LEDs to indicate signal presence, genlock presence and audio group presence.

Features:

- High quality SD to HD up conversion
- Evertz® proprietary noise reduction and image enhancement
- Supports standard and user defined aspect ratio conversions
- Auto-sensing SD/HD inputs with glitch-free output switching (transitions done through black)
- Supports HD in and HD out with frame syncing and preservation of HDVANC data
- Supports HD in and HD out with frame syncing and video proc (HDVANC not preserved)
- Optional FILL input signal for keying into unused portions of output image raster (+F option)
- Supports all required colour space conversions (rec. 601 to 709)
- Full video proc functions for RGB gain, YCrCb gain/offset/hue
- RGB color limiter/legalizer
- Reference input allows for phasing of output video
- Min. delay or variable delay for video output without reference
- Stamping of AFD codes on outgoing video signals and reading of AFD codes from incoming video
- Full adaptive AFD processing using VLPRO Auto Response
- Dolby™ Metadata authoring (-AES4 version only)
- Supports external 4 AES inputs and outputs (-AES4 version only)
- Output On Screen Display (OSD) can be used to configure the operating modes
- De-embeds 2 groups of audio from video input and embeds into video output with audio delay tracking video delay

- Moves VITC time code and Line 21 captions from the SD video into the HD video ancillary data
- *Vista*LINK® capable for remote monitoring, control and configuration capabilities via SNMP; using *Vista*LINK® PRO, CP-2200E, CP-3216PROC, 9000NCP or 9000NCP2 Network Control Panels
- *Vista*LINK® is available when modules are used with the 3RU 7700FR-C or 7700FR-D frame and a 7700FC *Vista*LINK® Frame Controller module in slot 1 of the frame

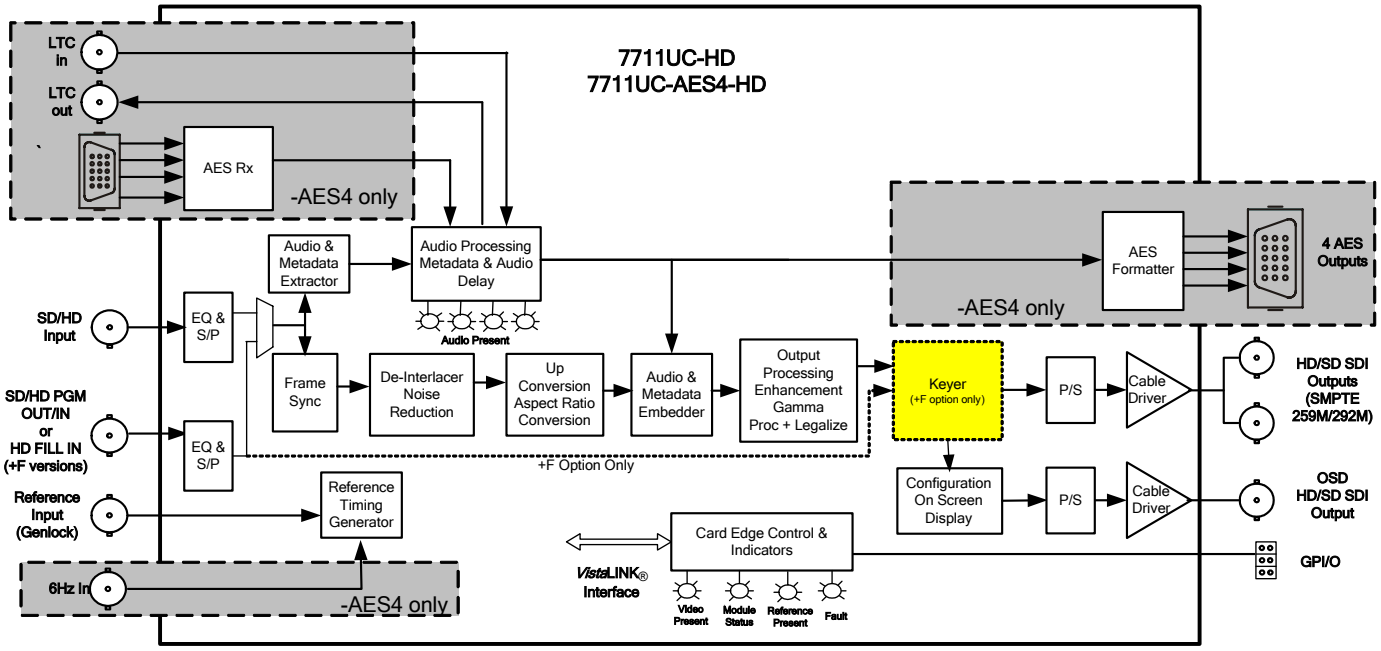


Figure 1-1: 7711UC-HD and 7711UC-AES4-HD Block Diagram

2. INSTALLATION

The 7711UC-HD modules come with a companion rear plate that occupies two slots in the frame. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

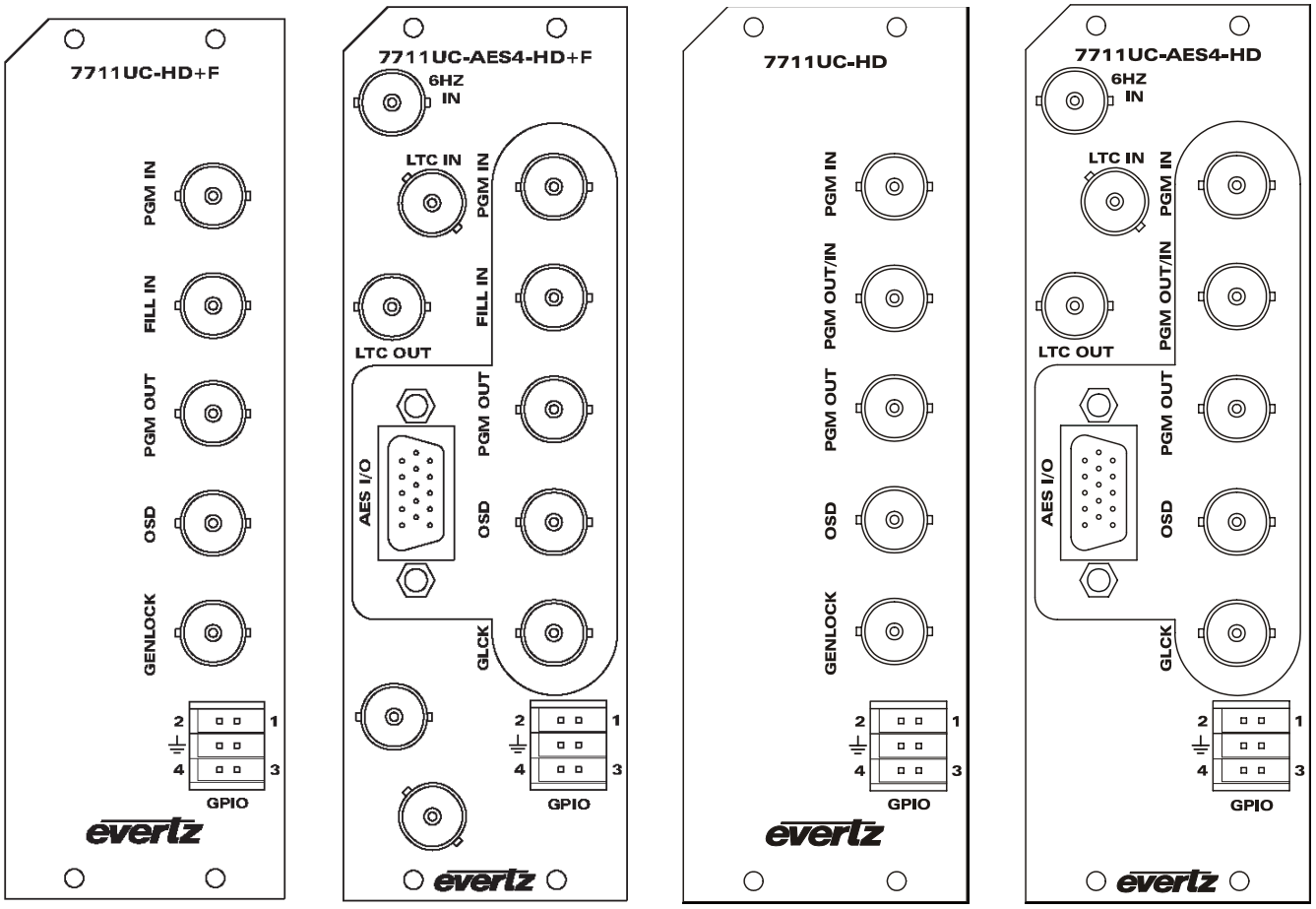


Figure 2-1: Rear Panels

2.1. VIDEO CONNECTIONS

PGM IN: Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE292M/SMPTE 259M standard. The module can be set to a specific video standard or set to auto-detect the video standard. SMPTE 292M signals can be fame synced and passed through the module with HD VANC being preserved (HD video proc controls not enabled).

PGM OUT/IN or **FILL IN** (+F option): This BNC connector is used to output the converted input video as serial digital video, compatible with SMPTE 292M or SMPTE 259M . It can also be configured as an alternate video input compatible with SMPTE 292M/SMPTE 259M standard. With the +F option, this input is used to supply an HD FILL input signal to the module.

PGM OUT: This BNC connector is used to output the converted input video as serial component video, compatible with the SMPTE 292M or SMPTE 259M standard.

OSD: This BNC connector is used to output the converted input video as serial digital video compatible with SMPTE 292M or SMPTE 259M and has on screen display menus (OSD) superimposed over the video.

2.2. GENLOCK REFERENCE

GENLOCK: This BNC is used to connect a bi-level or tri-level sync reference and is auto-detected by the module. Jumper J21 selects whether the reference input is terminated to 75 ohms or high impedance (default). (See section 7.3). The output video can be timed with respect to the genlock using the *H Phase Offset* and *V Phase Offset* menu items. (See section 6.3.17) When no Genlock is provided, the output video is timed with respect to the input video. Cards with hardware revision 7711FT(A) or later will also support a genlock input from the FRAME REFERENCE.

6Hz IN: This BNC connector is used to input a 6Hz reference for the A-frame controller used for 3:2 pulldown. This BNC connector only appears on the "-AES4" versions.

2.3. TIME CODE (7711UC-AES4-HD ONLY)

LTC IN: This BNC connector is used to input Time Code.

LTC OUT: This BNC connector is used to output Time Code.

2.4. AES INPUT AND OUTPUT AUDIO CONNECTIONS ("-AES4" VERSIONS ONLY)

Four unbalanced AES inputs and outputs are provided on 8 BNC connectors on the high density DB-15 connector labeled **AES I/O** on the 7711UC-AES4-HD. These inputs and outputs are for unbalanced AES signals conforming to SMPTE 276M. The user can select whether audio from the four AES input pairs, or from 2 groups of embedded audio is re-embedded on the output video. Table 2-1 shows the DB15 connector pinout.

Name	Description	DB-15 Pin
GPI2	Reserved for Future Use	1
	Reserved for Future Use	2
GPO1	Reserved for Future Use	3
	Reserved for Future Use	4
	Reserved for Future Use	5
	Reserved for Future Use	6
AES In 2	AES Input 2 - Unbalanced	7
GPI1	Reserved for Future Use	8
AES Out 2	AES Output 2 – Unbalanced	9
AES Out 1	AES Output 1 – Unbalanced	10
AES In 1	AES Input 1 - Unbalanced	11
AES Out 4	AES Output 4 – Unbalanced	12
AES Out 3	AES Output 3 – Unbalanced	13
AES In 4	AES Input 4- Unbalanced	14
AES In 3	AES Input 3- Unbalanced	15
GND	Ground	Shell

Table 2-1: AES Audio Connector Pinout

The 7711UC-AES4-HD is shipped with a breakout cable for the 15 pin D connector (Evertz Part # WA-1XY-R or WPAES8-BNCM-6F) which can be used to facilitate wiring the audio and GPI connections. The pinout of the cables are shown in Table 2-2 and Table 2-3.

High Density DB-15 PIN (male)	Wire	Ground/Shield Connection	Labeled Name	Connector Type	7711UC-AES4-HD Connection Map
1	Black		GPI 2	WIRE	GPI 1
2	Black		Tx	WIRE	
3	Black		GPO 1	WIRE	GPO 1
4	Black		(not used)		
5	Black		(not used)		
6	Black		Rx	WIRE	
7	Black	Soldered to DB15 Shell	AES A2	BNC MALE	AES In 2
8	Black		GPI 1	WIRE	GPI 1
9	Black	Soldered to DB15 Shell	AES B2	BNC MALE	AES Out 2
10	Black		AES B1	BNC MALE	AES Out 1
11	Coax	Soldered to DB15 Shell	AES A1	BNC MALE	AES In 1
12	Coax	Soldered to DB15 Shell	AES B4	BNC MALE	AES Out 4
13	Coax	Soldered to DB15 Shell	AES B3	BNC MALE	AES Out 3
14	Coax	Soldered to DB15 Shell	AES A4	BNC MALE	AES In 4
15	Coax	Soldered to DB15 Shell	AES A3	BNC MALE	AES In 3
Shell	Black		GND	WIRE	GND

Table 2-2: AES Audio Breakout Cable (Evertz Part # WA-1XY-R)

High Density DB-15 PIN (male)	Wire	Ground/Shield Connection	Labeled Name	Connector Type	7711UC-AES4-HD Connection Map
1	Red		W1 RED	WIRE	GPI 1
2	Green		W2 GREEN	WIRE	
3	Blue		W3 BLUE	WIRE	GPO 1
4	(not used)		(not used)		
5	(not used)		(not used)		
6	White		W4 WHITE	WIRE	
7	Black	Soldered to DB15 Shell	AES A2	BNC MALE	AES In 2
8	Yellow		W5 YELLOW	WIRE	GPI 1
9	Coax	Soldered to DB15 Shell	AES B2	BNC MALE	AES Out 2
10	Coax	Soldered to DB15 Shell	AES B1	BNC MALE	AES Out 1
11	Coax	Soldered to DB15 Shell	AES A1	BNC MALE	AES In 1
12	Coax	Soldered to DB15 Shell	AES B4	BNC MALE	AES Out 4
13	Coax	Soldered to DB15 Shell	AES B3	BNC MALE	AES Out 3
14	Coax	Soldered to DB15 Shell	AES A4	BNC MALE	AES In 4
15	Coax	Soldered to DB15 Shell	AES A3	BNC MALE	AES In 3
Shell	Black		GND	WIRE	GND

Table 2-3: AES Audio Breakout Cable (Evertz Part # WPAES8-BNCM-6F)

2.5. GENERAL PURPOSE INPUTS AND OUTPUTS

On all versions of the module, a 6-pin connector labeled **GPIO** contains 4 GPI/O inputs.

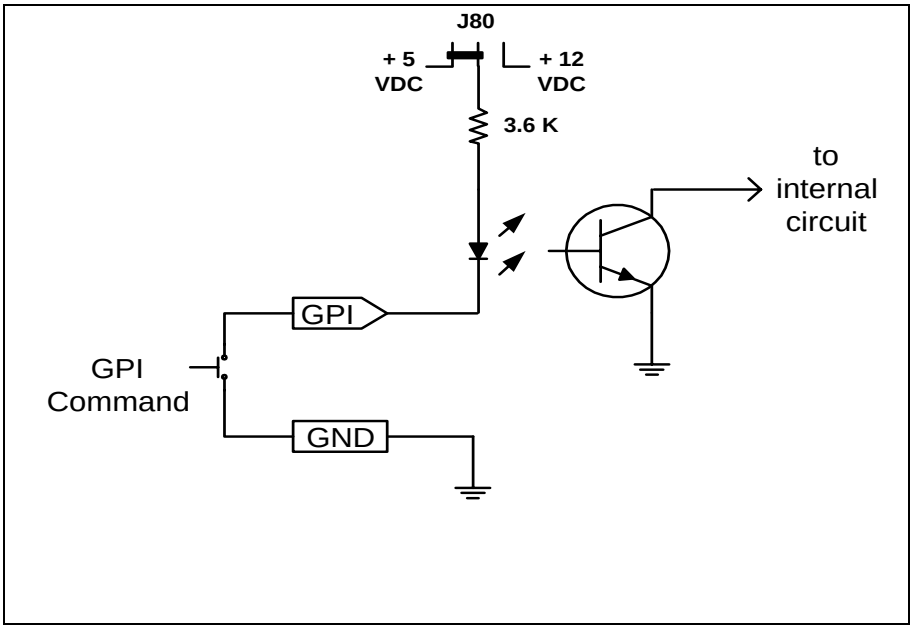


Figure 2-2: GPI Input Circuitry

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. The GPO output is not used at this time.

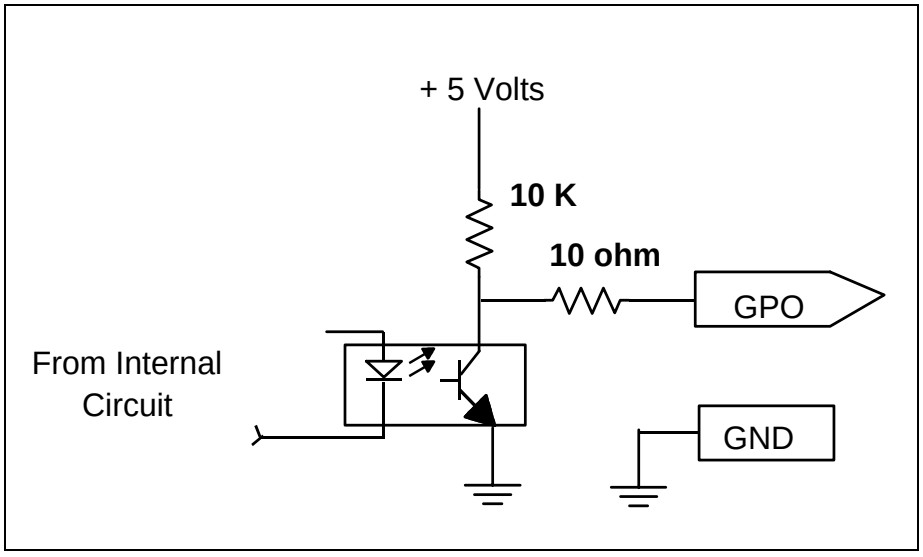


Figure 2-3: GPO Output Circuitry

3. SPECIFICATIONS

3.1. SERIAL DIGITAL VIDEO INPUTS

Standards: 270Mb/sec SMPTE 259M, 1.485 Gb/s SMPTE 292M

Number of Inputs: 1 or 2 (optional based on PGM OUT/IN configuration)
Connector: BNC per IEC 61169-8 Annex A
Input Equalization: Automatic to 300m @ 270 Mb/s with Belden 1694 or equivalent cable.
Return Loss:
SD Standards: >15 dB up to 270 Mhz

3.2. SERIAL DIGITAL VIDEO OUTPUTS

Standard: 270Mb/s SMPTE 259M or 1.485 Gb/s SMPTE 292M.
Number of Outputs: 3 Per Card (or 2 based on PGM IN/OUT configuration)
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time:
SD Standards: 740ps nominal
HD Standards: 200ps nominal
Overshoot: <10% of amplitude
Return Loss:
HD Standards: > 10 dB at 1.5 GHz

3.3. GENLOCK INPUT

Type: HD Tri-Level sync, NTSC or PAL Colour Black 1 V p-p
Connector: BNC per IEC 61169-8 Annex A
FRAME REFERENCE input supported in revision 7711FT Rev A and later
Termination: 75 ohm/high impedance (jumper selectable)

3.4. 6HZ INPUT

Standard: 6Hz TTL Pulse
Number of Inputs: 1 (7711UC-AES4-HD only)
Connector: BNC per IEC 61169-8 Annex A
Termination: 75 ohm (jumper selectable)

3.5. LTC INPUT

Standard: SMPTE 12M
Number of Inputs: 1 (7711UC-AES4-HD only)
Connector: BNC per IEC 61169-8 Annex A
Termination: 75 ohm (jumper selectable)

3.6. LTC OUTPUT

Standard: SMPTE 12M
Number of Inputs: 1 (7711UC-AES4-HD only)
Connector: BNC per IEC 61169-8 Annex A
Termination: 75 ohm (jumper selectable)

3.7. AES AUDIO INPUTS

Number of Inputs: 4 (only on "-AES4" version)
Standard: SMPTE 276M, single ended synchronous or asynchronous AES
Connectors: DB15
Resolution: 24 bits
Sampling Rate: 48 kHz
Impedance: 75 Ω
Signal Level: 1 V p-p nominal

3.8. AES AUDIO OUTPUTS

Number of Outputs: 4 (only on "-AES4" version)
Standard: SMPTE 276M, single ended synchronous AES
Connectors: DB15
Resolution: 24 bits
Sampling Rate: 48 kHz
Impedance: 75 Ω
Signal Level: 1 V p-p nominal

3.9. GENERAL PURPOSE INPUTS AND OUTPUTS

Number: 4 (configurable as inputs or outputs)
Type: Opto-isolated, active low with internal pull-ups to +5 or +12V (jumper settable)
Connector: 6 pin removable terminal block
Signal Level: closure to ground
Function:
Inputs: User Preset select
Outputs: None

3.10. ELECTRICAL

Voltage: +12VDC
Power: 25 Watts (7711UC-HD and 7711UC-AES4-HD)
EMI/RFI: Complies with FCC regulations for class A devices
Complies with EU EMC directive

3.11. PHYSICAL

Number of slots:
7700 frame mounting: 2 (7711UC-HD and 7711UC-AES4-HD)
7701 frame mounting: 1 (7711UC-HD and 7711UC-AES4-HD)

4. STATUS INDICATORS

The 7711UC-HD modules have a number of LED Status indicators on the card edge of the main and sub board modules to show operational status of the card at a glance. Figure 4-1 and Figure 4-2 show the locations of the LEDs and card edge controls.

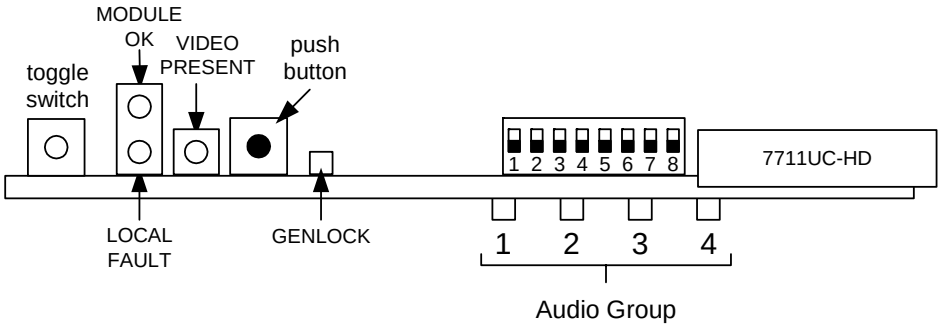


Figure 4-1: LED Status Indicators: 7711UC-HD

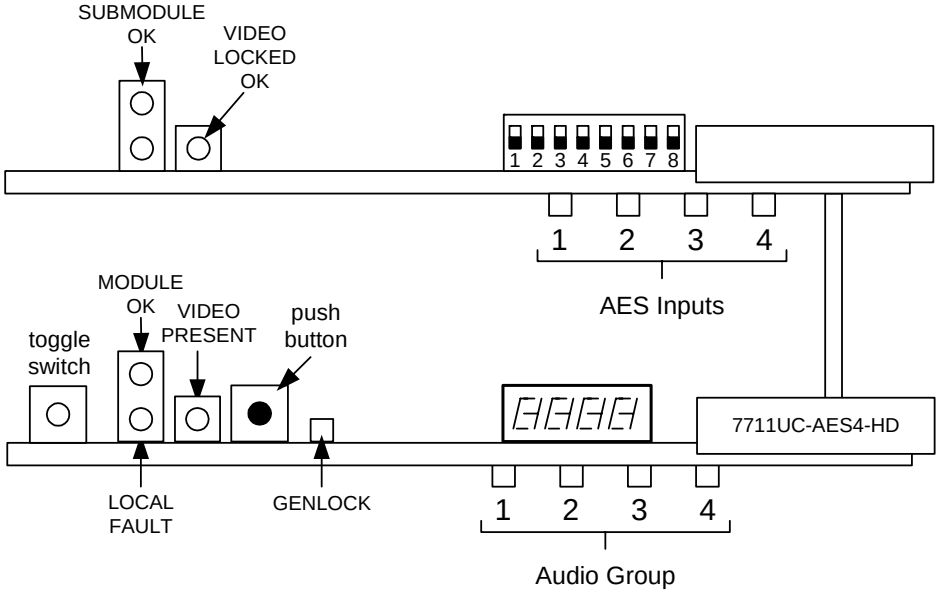


Figure 4-2: LED Status Indicators: 7711UC-AES4-HD

Two large LEDS on the front of the main board indicate the general health of the module.

LOCAL FAULT: This Red LED indicates poor module health and will be ON during the absence of a valid input signal or if a local input power fault exists (i.e. a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

MODULE OK: This Green LED indicates good module health. It will be ON when a valid input signal is present, and the board power is good.

VIDEO PRESENT: This Green LED will be ON when there is a valid video signal present at the module input depending on the module configuration. For example, if the video input source is Main PGM, then the LED will indicate a signal presence on that input. The same applies if PGM OUT/IN is configured as the video input source.

GENLOCK: This Green LED will be ON when there is a signal present at the module genlock input. This LED will blink to indicate that an incorrect signal appropriate for the current video format is present.

The large LEDs on the sub-board of the module (only on "-AES4" versions) indicate the following:

SUB-MODULE OK: This Green LED indicates good module health. It will be ON when a valid input signal is present on the sub-board, and the board power is good.

VIDEO LOCKED: This Green LED will be ON when the video signal on the sub-board is locked to output video.

4.1. AUDIO STATUS LEDS

Four LEDs located on the main board on the lower end of the module (near the card extractor) indicate which audio groups are present in the input video. Audio group LED 1 is located closest to the center of the module.

Audio Group LED	Colour	Audio Group Status
1	Off	No group 1 present on input video.
	Green	Group 1 present on input video.
2	Off	No group 2 present on input video.
	Green	Group 2 present on input video.
3	Off	No group 3 present on input video.
	Green	Group 3 present on input video.
4	Off	No group 4 present on input video.
	Green	Group 4 present on input video.

Table 4-1: Audio Group Status LEDs

On the sub-board, the four LEDs located on the lower end of the module (near the card extractor) indicate which discrete AES channels are present in the input video. Audio group LED 1 is located closest to the center of the module.

Audio Group LED	Colour	AES Input Status
1	Off	No signal on AES 1 input.
	Green	Audio signal present on AES 1 input.
2	Off	No signal on AES 2 input.
	Green	Audio signal present on AES 2 input.
3	Off	No signal on AES 3 input.
	Green	Audio signal present on AES 3 input.
4	Off	No signal on AES 4 input.
	Green	Audio signal present on AES 4 input.

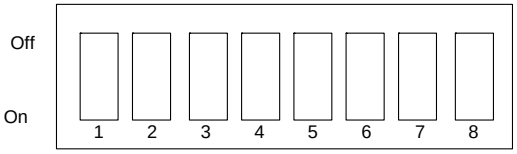
Table 4-2: AES Input Status LEDs

5. CARD EDGE CONTROLS

The 7711UC-HD modules are equipped with an 8 position DIP switch to allow the user to select various functions. Figure 4-1 and Figure 4-2 show the locations of the DIP switch on the modules.

On the "-AES4" version, there is a second set of DIP switches that are on the main board. These switches have no functionality and should be left in factory settings.

All positions are assigned sequentially such that the DIP switch 1 is located at the top of the DIP switch (farthest from the card ejector). Table 5-1 gives an overview of the DIP switch functions. Sections 5.1 to 5.2 describe the DIP switch functions. The On (closed) position is down, or closest to the printed circuit board. The Off (open) position is up, or farthest from the printed circuit board. There is also a toggle switch and pushbutton which are used to navigate the on screen menu. (See section 6)



DIP Switch	Function
1	Output Video Standard
2	
3	
4	
5	
6	Frame Rate Divisor Selection
7	
8	Unused

Table 5-1: Overview of DIP Switch Functions

5.1. SETTING THE OUTPUT VIDEO FRAME RATE

DIP switches 6 and 7 are used to set the frame rate frequency of operation.

DIP 6	DIP 7	FRAME RATES
Off	Off	Set by Menu or *Vista*LINK®
On	Off	59.94/29.97/23.98
Off	On	50/25

Table 5-2: Frame Rate Divisor DIP Switch Settings

When DIP switches 6 and 7 are both OFF, the frame rate and video standard can be set by either the menu system or *Vista*LINK® only. The other two settings of DIP switches 6 and 7 allow setting of the frame rate and video standard manually using the DIP switches. When in these states frame rate and video standard cannot be set by the menu system or *Vista*LINK®.

5.2. SETTING THE OUTPUT VIDEO STANDARD

DIP switches 1 to 5 set the output video standard. DIP switches 6 and 7 set the exact frame rate divisor. For example to select 1080i/59.94 as the output format set switches 6 and 7 to the On and Off position (select 59.94) and sets switches 1 to 5 to the Off position. Interlaced video formats are shown with the number of fields per second. Progressive formats are shown with the number of frames per second.

#	DIP 1	DIP 2	DIP 3	DIP 4	DIP 5	OUTPUT VIDEO FORMAT
0	Off	Off	Off	Off	Off	1080i/59.94
1	On	Off	Off	Off	Off	1080p/29.97 or 1080p/30
2	Off	On	Off	Off	Off	1080p/29.97 or 1080p/30sF
3	On	On	Off	Off	Off	1080p/23.98 or 1080p/24
4	Off	Off	On	Off	Off	1080p/23.98 or 1080p/24sF
5	On	Off	On	Off	Off	1035i/59.94
6	Off	On	On	Off	Off	720p/59.94
7	On	On	On	Off	Off	720p/29.97
8	Off	Off	Off	On	Off	Future Use
9	On	Off	Off	On	Off	525i/59.94
10	Off	On	Off	On	Off	1080p/25
11	On	On	Off	On	Off	1080p/25sF
12	Off	Off	On	On	Off	1080i/50
13	On	Off	On	On	Off	720p/50
14	Off	On	On	On	Off	625i/50

Table 5-3: Output Video Switch Settings

Other DIP -switch combinations are reserved for future use.

6. ON SCREEN MENUS

6.1. NAVIGATING THE ON SCREEN MENU SYSTEM

A toggle switch and pushbutton allow card edge navigation of a set of on-screen menus used to configure the card. To enter the on-screen menu system, hold the toggle switch in the up or down position and then press and hold the pushbutton for 3 seconds. This will bring you to the main Setup menu where you can use the toggle switch to move up and down the list of available sub-menus. An arrow (➔) moves up and down the left hand side of the menu items to indicate which item you are currently choosing. Once the arrow is on the desired item, press the pushbutton to select the next menu level.

On all menus, there are two extra selectable items: *Back* and *Exit*. Selecting *Back* will take you to the previous menu (the one that was used to get into the current menu) while *Exit* will return the display to its normal operating mode. On the main menu, BACK and EXIT will both take you to the normal operating mode.

Once in a sub-menu, there may be another menu layer, or there may be a list of parameters to adjust. If there is another set of menu choices, use the toggle switch to select the desired menu item and press the pushbutton.

To adjust any parameter, use the toggle switch to move up or down to the desired parameter and press the pushbutton. The arrow will move to the right hand side of the line (➔) indicating that you can now adjust the parameter. Using the toggle switch, adjust the parameter to its desired value. If the parameter is a numerical value, the number will increase if you lift the toggle switch and decrease if you push down on the toggle switch.

When you have stopped at the desired value, depress the pushbutton. This will update the parameter to the selected value and move the arrow back to the left side of the parameter list (➔). Continue selecting and adjusting other parameters or use the BACK or EXIT commands.

6.2. ON SCREEN DISPLAY – MAIN MENU

The OSD menu is arranged in a layered structure that groups similar configuration items together. The following section provides a brief description of the first level of menus that appear when you enter the OSD screens. Selecting one of these items will take you to the next menu level. Sections 6.3 to 6.12 provide detailed descriptions of each of the sub-menus. The tables in sections 6.3 to 6.12 are arranged in an indented structure to indicate the path taken to reach the control. Menu items or parameters that are underlined indicate the factory default values.

Note: Some menu items do not appear on all models.

Video	Sets the frame rate, input and output video standards, pull down references, caption blanking, action on loss of input, timing reference select and timing offset for the video output.
Scaler	Configuration of the main output picture aspect ratio presets. Configuration of the main scaler filter sharpness, panel colours, user cropping and output picture window size.
Deinterlacer	Configuration of the deinterlacer frame or field mode, image enhancement motion detect thresholds.
Proc Func	Control the main video proc amp functions.
Noise Reducer	Control application of the noise reducer.
Audio	Sets the main audio groups and delay.
Audio Process Embedded	Controls main audio processing.
Audio Process External	Controls the external AES audio processing. (-AES4 version only)
Closed Captioning	Controls the closed captioning of the HD or SD signal.
AFD Setup	Controls the process of reading incoming AFD values and stamping outgoing AFD values.
Utilities	Card preset management and various debug and maintenance features.

6.3. CONFIGURING THE VIDEO CONTROLS

The *Video* menus are used to configure parameters associated with the input and output video standards and output video timing. The chart below shows the items available in the *Video* menu. Sections 6.3.1 to 6.3.17 give detailed information about each of the menu items.

Video Input	Selects the video input standard.
Video Output	Selects the video output standard.
Video Input Source	Selects video input from PGM IN or PGM OUT/IN BNC.
Pgm OUT/IN Mode	Sets the input or output mode of the PGM OUT/IN BNC.
FILL Input	Enables the PGM OUT/IN BNC as HD FILL input (+F option only).
FILL Timing Error	Controls Keyer response to FILL input timing misalignment (+F option).
Pulldown Reference	Selects the reference source when 3:2 pulldown is being added on the output.
A Frame Offset	Sets the offset of the A Frame from the Pulldown Reference when 3:2 pulldown is being added on the output.
SD Blanking	Selects upper lines as video or blank. SD input only.
VITC Read Select	Select line for VITC reader. SD input formats only.
VITC Write Select	Select line for VITC generator. SD output formats only.
Time Code Source	Selects the source of Time Code.
Loss of Video	Selects the action to take when the input video is missing.
No Glitch Mode	Enables and disables no glitch mode upon changes of input standard.
Force Minimum Delay	Sets the H and V phase such that the path delay in minimized.
Reference Select	Selects internal or video and locking reference.
V Phase Offset	Sets the vertical phase of the output signal to the genlock reference input.
H Phase Offset	Sets the horizontal phase of the output signal to the genlock reference input.

6.3.1. Setting the Input Video Standard

Video
Input Standard
525i59.94
625i50

This control selects the input video standard/frame rate being used. The options of the output standards available are dependent upon the Input Standard menu setting. For example, to select 1080i/59.94 as the output format set the Input Standard menu to 525i/*59.94*. Interlaced video formats are shown with the number of fields per second. Progressive formats are shown with the number of framers per second.

NOTE: The module is not capable of frame rate conversions between the 59.94/60 Hz the 50 Hz frame rate families.

6.3.2. Setting the Output Video Standard

Video
Output Standard
1080i59.94
1080p/29.97
1080p/29.97 sF
1080p/23.98
1080p/23.98sF
1035i/59.94
720p/59.94
720p/29.97
525i/59.94
1080i/50
720p/50
1080p/25 sF
1080p/25
625i/50

This control selects the output standard desired. The choice of output standards available is dependent upon the Input Standard menu setting.

NOTE: The module is not capable of frame rate conversions between the 59.94/60 Hz the 50 Hz frame rate families.

6.3.3. Selecting the Video Input Source

Video
Video Input Source
Auto
PGM IN
PGM OUT/IN

This control selects whether the source of input video will be the **PGM IN** BNC or the **PGM OUT/IN** BNC. When set to Auto, the card will automatically revert to the PGM OUT/IN upon loss of video on the main PGM input.

6.3.4. Select the Video Mode on PGM OUT/IN

Video
PGM OUT/IN Mode
Video Out
Video In

This option controls the whether the **PGM OUT/IN** BNC will be used as an input or output.

When it is set to *Video Out* the **PGM OUT/IN** BNC is used as a second output with the same content as is available on the **PGM OUT** BNC.

When it is set to *Video In the* **PGM OUT/IN** BNC can be used to supply a backup PGM input signal or a HD FILL input signal (+F option only)

6.3.5. Enable and Disable FILL Input (+F option only)

Video
FILL Input
Disable
Enable

This option controls whether the PGM OUT/IN is used as a FILL source for the internal side panel keyer. When Enabled, this HD fill input will be keyed into the side panels of the upconverted output. When disabled, the content supplied to the PGM OUT/IN BNC will not be keyed into the up-converted image side panels.

6.3.6. Define Card Action When FILL Input Timing Errors Exist

Video
Fill Timing Error
Pass
Panels

When set to PASS the content on the PGM OUT/IN BNC will be keyed into the upconverted image side panels even if the card determines that there is a timing misalignment between the HD input and the card output timing.

NOTE: The HD FILL signals applied to the PGM OUT/IN BNC should be advanced <1 line relative to the card's output timing.

When set to Panels, the card will revert to internally generated panels (user defined RGB colours).

6.3.7. 3:2 Pulldown Processing

When using a 525i/59.94 input video feed containing 3:2 pulldown, the 7711UC-HD must be operated in *Field Mode* in order to minimize motion artifacts. In *Field mode* each field of the incoming image will be converted to one field of the output image, so there will be no pulldown related de-interlacing artifacts on film originated material with 3:2 pulldown, or video originated material acquired at a nominal 24 frames per second.

When using a 1080i/59.94 input video feed containing 3:2 pulldown, the 7711UC-HD must be operated in *Field Mode* in order to minimize motion artifacts. In *Field mode,* each field of the incoming image will be converted to one field of the output image, so there will be no pulldown-related de-interlacing artifacts on film-originated material with 3:2 pulldown, or video-originated material acquired at a nominal 24 frames per second.

When using a 720p/59.94 input video feed, the 7711UC-HD will operate in *Frame Mode,* where each frame of the incoming image will be converted to one field of the output image, so there will be no pulldown-related artifacts on film-originated material with 3:2 pulldown, or video-originated material acquired at a nominal 24 frames per second.

When using a 1080p/23.98sF input video feed, the 7711UC-HD operates in *Frame Mode,* where each segment of the incoming image is combined back to a progressive frame before conversion. After conversion, extra fields are inserted to create a 3:2 pulldown at the output. The *Pulldown Reference* menu is used to determine the cadence of the 3:2 output.

6.3.8. Selecting the 3:2 Pulldown Reference with 1080p/23.98sF Input Video

This menu setting is ***only*** used when converting from a 23.98 Hz frame rate to a 59.94 Hz field or frame rate, or when converting from a 59.94 Hz field or frame rate to a 23.98 Hz frame rate. **It is not applicable in any other input to output combination.**

Video
- *Pulldown Reference*
  - *Auto*
  - *RP 188*
  - *6 Hz Input*
  - *Free Run*

When performing a 24 to 60 Hz, or a 60 to 24 Hz conversion, the *Pulldown Reference* menu is used to identify the input frame that will become an A frame at the output. This frame is called the *A frame candidate* (see Figure 6-1). The output of the *A frame candidate* frame will consist of two video fields, and will normally be in time with the Genlock input. The input to output delay of the A frame candidate frame is variable, and depends on the type of conversion being performed, and the relative timing between when an input frame is received and when an output frame is transmitted. Additionally, an offset can be added to the A Frame reference using the *A Frame Offset* control to accommodate situations where the A frames are not in time with the A Frame reference (see section 6.3.9).

When you select *Auto,* the card will auto-detect the pulldown reference according to the following priority:

- 6 Hz pulse, if present
- RP188 ancillary time code, if present
- Free Run pulldown (when neither 6 Hz pulse nor RP188 is present)

Select *RP 188* when the embedded ancillary time code present on the input video is used to determine the pulldown. The input frames with time code frame numbers that are divisible evenly by four (24 to 60 Hz conversion) or by five (60 to 24 Hz conversion) will normally identify the input A frame candidates.

Select *6 Hz Input* when a 6 Hz pulse connected to the 6Hz source card input (see IO Control section) and is used to determine the pulldown. The 6 Hz pulse should be a 1/30th second wide, TTL level, active high pulse, occurring six times per second, and must be coincident with the start of an input frame. The 6 Hz pulse will normally identify the A frame candidates.

Select *Free Run* when you want a continuous 3:2 pulldown on the output, but do not care if it matches the specific frames of the input video.

6.3.9. Accommodating Non-Standard 3:2 Sequences

This menu setting is ***only*** used when converting from a 23.98 Hz frame rate to a 59.94 Hz field or frame rate, or when converting from a 59.94 Hz field or frame rate to a 23.98 Hz frame rate. **It is not applicable in any other input to output combination.**

Video
A Frame Offset
0
1
2
3

This control allows the user to select other frames as the A Frame.

Figure 6-2 shows how this control defines the A frame candidate when the 6 Hz pulse is present. Figure 6-3 shows how this control defines the A frame when RP188 Ancillary data is used to control the 3:2 pulldown.

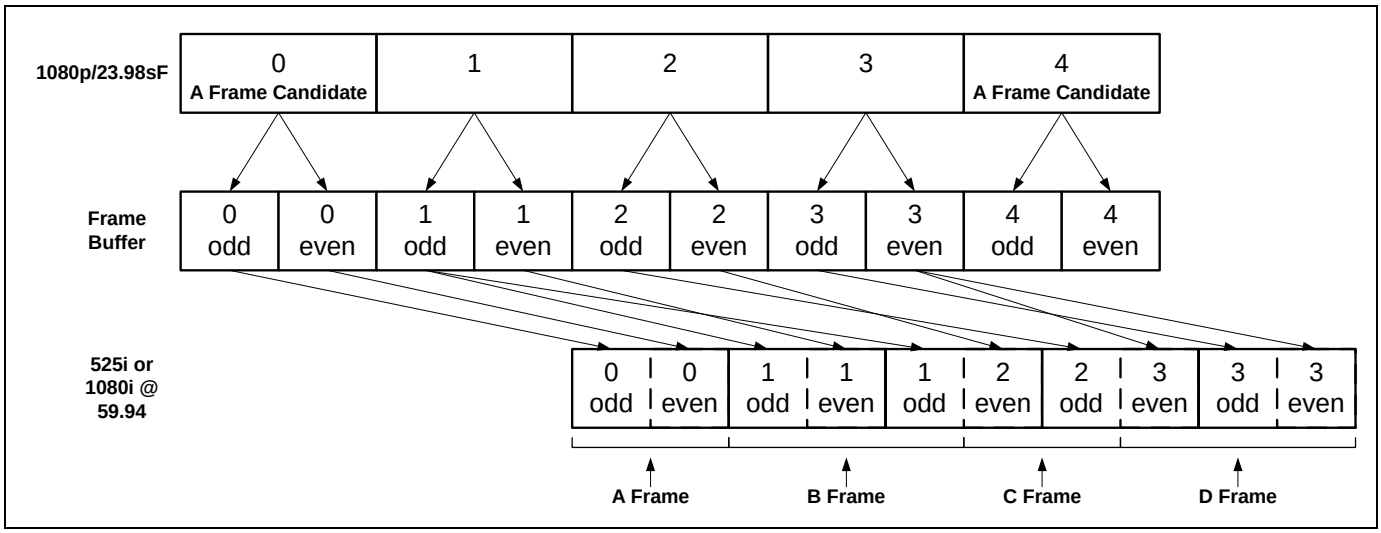


Figure 6-1: 3:2 Pulldown Sequence Insertion – 1080p/23.98sF Input Video

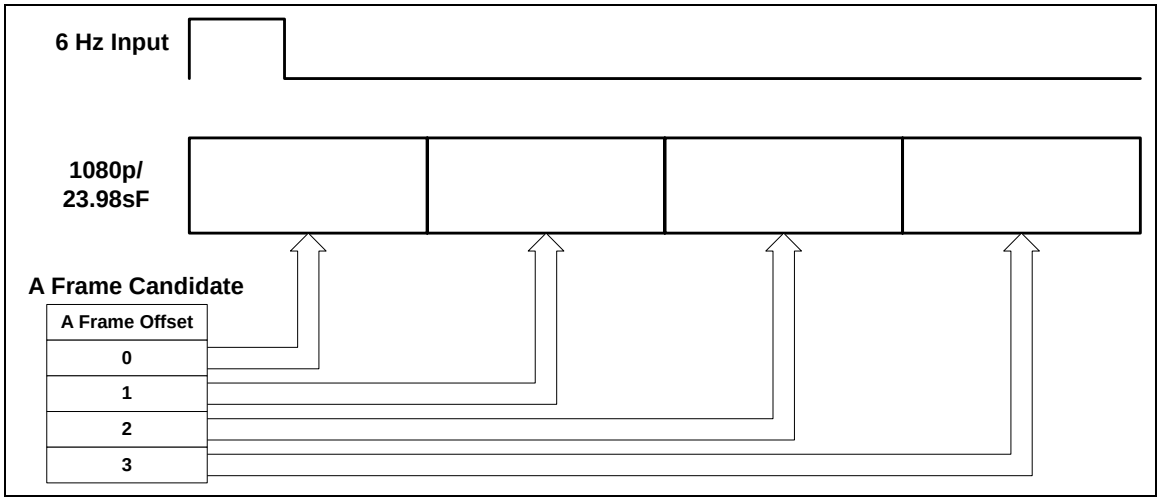


Figure 6-2: 6 Hz Pulldown Sequence A Frame Alignment – 1080p/23.98sF Input Video

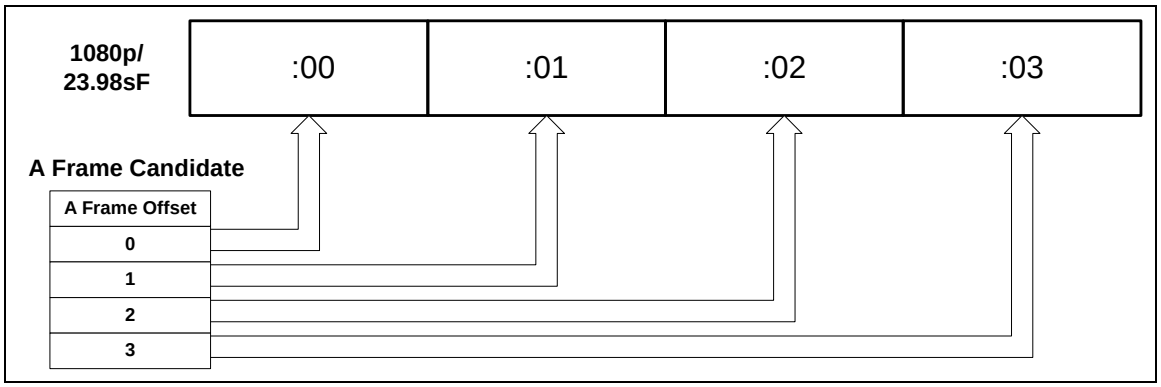


Figure 6-3: RP188 Pulldown Sequence A Frame Alignment – 1080p/23.98sF Input Video

6.3.10. Blanking Line 21 Captions for SD Video Inputs

Video
SD Blanking
21
19-23

With this control, you can adjust which standard definition lines will be blanked prior to up-converting the signal. Normally line 21 where closed caption information may be present is blanked.

Captioning will still be processed normally; this control prevents caption waveforms to be processed as video.

6.3.11. Setting the VITC Reader Line for SD Video Inputs

Video
VITC Read Select
10 for 525
10 for 625

With this control, you can select the line number where VITC will be read on the standard definition input video. The valid range is *10 to 20 for 525i/59.94* inputs*, 6 to 21 for 625i/50* inputs*.*

6.3.12. Setting the VITC Writer Line for SD Video Inputs

Video
VITC Write Select
10 for 525
10 for 625

With this control, you can select the line number where VITC will be written on standard definition output video. The valid range is *10 to 20 for 525i/59.94* inputs*, 6 to 21 for 625i/50* inputs*.*

6.3.13. Setting the Source of Time Code

Video
Time Code Source
Embedded
External LTC
Off

This control selects the source of Timecode. Either Embedded or The external LTC input if available (-AES4 version only).

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 selected as *off*, there will be no timecode on the output video.

Also, note that if no Timecode is detected, it will not be embedded on the output video.

6.3.14. Setting the Action to Take when Input Video Is Missing

Video
Loss of Video
Black
Blue
Pass

The user can set the output to go to black, go to blue or pass the input with this control.

When set to *Pass* the output video will be incoherent when the video input is missing.

6.3.15. Enable and Disable "No Glitch Mode" Processing Upon Input Standard Change

Video
No Glitch Mode
Enable
Disable

The user can select what the card's output will do when an input changes from SD to HD. When set to Enable, the card will output BLACK when transitioning between input formats. When set to DISABLE, the output may show corrupted video.

6.3.16. Enabling FS Only Mode

Video
FS Only Mode
Enable
Disable

The FS Only Mode is used when video input and output are both HD.

Enable: When FS Only Mode is set to ***Enable***, only the frame sync is in the path. All the VANC gets passed to the output and the video proc, scaler, etc, controls are no longer effective.

Disable: When FS Only Mode is set to ***Disable***, only the frame sync and proc controls are in the path. Dolby Metadata and Broadcast Flag are passed and all other VANC data, such as CC, AFD, etc, are controlled by the existing controls.

6.3.17. Setting up the Video Output Timing

The module contains a frame buffer so that the output video can be timed with respect to the reference applied to the **GENLOCK** input when the *Reference Select* menu item is set to *External*. In the absence of a genlock signal, or when the *Reference Select* menu item is set to *Video* the output video will be timed with respect to the incoming Video.

The *V Phase Offset* and *H Phase Offset* adjustments are REAL TIME ADJUSTMENTS and will affect the output video timing immediately. These settings should not be adjusted when the output video is in the broadcast chain.

6.3.17.1. Selecting the Video Reference Source

Video
- *Reference Select*
  - *Video*
  - *External*
  - *Frame Ref. 1*
  - *Frame Ref. 2*

With this control the reference source of video locking is set.

Select *External* to lock the output video to the reference video applied to the **GENLOCK** BNC. If the genlock reference disappears or is not valid, the card will lock to incoming video.

Select *Video* to will lock the output video to the input video. When there is no input video the output video will free run.

Hardware revisions 7711FT Rev A and later will also support reference as supplied to the Frame Reference BNCs (7700FR-G and 7700FR-D only).

If the frame rate of the module is set to 50Hz, only 1080i/50 or 625i/50 will be recognized as valid genlock.

6.3.17.2. Calculating the Delay through the Format Translator/Cross Converter

The delay through the Format Translator/Cross Converter is dependent on the video input format, the converter processing mode and the *V Phase Offset* and *H Phase Offset* settings. For standard conversions that do not involve any 3:2 or 2:2 processing, the latency through the card is approximately 1 frame with the system noise reducer turned off and 2 frames when the system noise reducer is turned on. There are separate settings of *H and V phase* offset for each output video type.

To achieve the minimum delay use the control *Force Minimum Delay*. Otherwise the status screen will report the current true delay of the system.

The delay is counted in the lines and pixels of the output standard and is calculated from input field 0 start to output field 0 start.

6.3.17.3. Force Minimum Delay

Video
Force Minimum Delay
Yes

This control sets the *H Phase Offset* and *V Phase Offset* menu settings such that the card has the minimum possible input to output delay. When YES is selected the card will revert to its minimum delay mode.

6.3.17.4. Setting the Vertical Phase of the Output Video

Video
V Phase Offset
0 to Max Lines
0

With this control, you can set the vertical timing of the output video with respect to the reference input set by the *Reference Select* menu item. There are separate settings of *V phase offset* for each output video type. Setting this control to 0 keeps the output video frame aligned with the Genlock reference or incoming video if genlock is missing.

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

6.3.17.5. Setting the Horizontal Phase of the Output Video

Video
H Phase Offset
0 to Max samples
0

With this control, you can set the horizontal timing of the output video with respect to the reference input set by the *Reference Select* menu item. There are separate settings of V phase offset for each input video type. Setting this control to 0 keeps the output video line aligned with the Genlock reference.

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

6.4. CONFIGURING THE SCALER

This module uses a process of filtering and scaling in order to increase or reduce the resolution during up conversion or down conversion. The *Scaler* menus are used to configure this part of the conversion process. The chart below shows the items available in the *Scaler* menu.

H Filter Cutoff	Sets the type of the horizontal filter in the scaler.
V Filter Cutoff	Sets the type of the vertical filter in the scaler.
H Slew Rate Limit	Sets the type of processing applied to horizontal edges in the picture.
V Slew Rate Limit	Sets the type of processing applied to vertical edges in the picture.
AR	Selects the aspect ratio conversion to be performed.
Panel Colors Red	Sets the colour of the letterbox panels.
Panel Colors Green	Sets the colour of the letterbox panels.
Panel Colors Blue	Sets the colour of the letterbox panels.
Input H Start	Sets the left side crop position for custom aspect ratios.
Input H Stop	Sets the right side crop position for custom aspect ratios.
Input V Start	Sets the top crop position for custom aspect ratios.
Input V Stop	Sets the bottom crop position for custom aspect ratios.
Output H Start	Sets the left side of the output image for custom aspect ratios.
Output H Stop	Sets the right side of the output image for custom aspect ratios.
Output V Start	Sets the top of the output image for custom aspect ratios.
Output V Stop	Sets the bottom of the output image for custom aspect ratios.

6.4.1. Setting the Scaler Filter Sharpness

There are two controls that adjust the horizontal and vertical filters for the scaler.

Scaler
- *H Filter Cutoff*
  - *Auto*
  - *Enhance HF 1 dB*
  - *Enhance HF 2 dB*
  - *Mid Boost 1 dB*
  - *Mid Boost 2 dB5 to 64*

With this control, you can set the cutoff frequency of the horizontal filter.
There are 59 filter bandwidths to choose from (levels 5-64).
These levels generate and output signal with different bandwidths.
Level 5 delivers 5/64th of the input signal's bandwidth.
Level 64 deliver 64/64 (100%) of the input signal's bandwidth.
Levels at the higher end of the range will allow some output aliasing to occur.
If *Auto* is selected, the module will select the appropriate filter for conversion.

Specific filters that apply 1 or 2 dB of boost to the input signal's mid and high frequencies are also available by choosing *Enhance HF 1 dB*
Enhance HF 2 dB, Mid Boost 1 dB or Mid Boost 2 dB

Note: Aliasing will cause diagonal edges to be jagged.

Scaler
- *V Filter Cutoff*
  - *Auto*
  - *1 to 64*

With this control, you can set the cutoff frequency of the vertical filter.
There are 64 filter bandwidths to choose from (levels 1-64).
These levels generate and output signal with different bandwidths.
Level 1 delivers 1/64th of the input signal's bandwidth.
Level 64 deliver 64/64 (100%) of the input signal's bandwidth.
Levels at the higher end of the range will allow some output aliasing to occur.
If *Auto* is selected, the module will select the appropriate filter for conversion.

Note: Aliasing will cause diagonal edges to be jagged.

6.4.2. H/V Slew Rate Limiting

Scaler
- *H Slew Rate Limit Enable*
  - *Enable*
  - *Disable*

This parameter controls the edge processing applied to sharp horizontal edges in the picture. When ENABLED, adaptive processing will be applied to sharp horizontal edges to ensure that they remain complaint to the bandwidths as defined in CCIR-601. This ensures that ringing around sharp edges is minimized. When DISABLED, adaptive edge processing will not be applied.

Scaler
- *V Slew Rate Limit Enable*
  - *Enable*
  - *Disable*

This parameter controls the edge processing applied to sharp vertical edges in the picture. When ENABLED, adaptive processing will be applied to sharp vertical edges to ensure that they remain complaint to the bandwidths as defined in CCIR-601. This ensures that ringing around sharp edges in the image is minimized. When DISABLED, adaptive edge processing will not be applied.

6.4.3. Setting the Aspect Ratio of the Output Picture

The *Aspect Ratio* menu presets the user image conversion parameter to build it presets. Once selected, the user can fine adjust the picture parameters via the input and output H and V start and stop menus.

Note: In order to save any modified state as a preset the *Aspect Ratio* needs to be set to *User Aspect*.

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

6.4.4. Set the Colour of the Letterbox Panels

There are three menu items used to set the panel colour. The menu item for each colour component works in the same way, and so, for simplicity, only the menu item for the *Red* component will be shown in the manual.

Scaler
Panel Colour Red
0 to 255

This control defines one of the component colours for internally generated side panels. Set the R, G or B value for the side panel colour that you want.

Note: You can use a standard colour picker such as is available in Microsoft Paint to determine the colour values that you want to use.

6.4.5. 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.

Scaler
Input H Start
Input H Stop

The *Input H Start* and *Input H Stop* define the horizontal portion of the input image to process to the output.

Scaler
Input V Start
Input V Stop

The *Input V Start* and *Input V Stop* define the vertical portion of the input image to process to the output.

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.

Scaler
Output H Start
Output H Stop

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

Scaler
Output V Start
Output V Stop

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

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

6.5. CONFIGURING THE DEINTERLACER

The *Deinterlacer* menus are used to configure parameters associated with the deinterlacer hardware. The chart below shows the items available in the *Deinterlacer* menu.

Freeze Frame Threshold	Sets number of frames before frozen video is detected.
Motion Detection Threshold	Set Detection threshold for determining when motion occurs for de-interlacing.
Interfield Weighting Factor	Sets the Interfield Weighting factor used by the deinterlacer.

6.5.1. Setting the Freeze Frame Threshold

Deinterlacer
- *Freeze Frame Threshold*
  - *16*
  - *0 to 31*

With this control, you can set a threshold on the detection process between frozen and missing video.

6.5.2. Setting the Motion Detection Controls

Deinterlacer
- Motion Detection Threshold
  - *0 to 15*

With this control, you can change the threshold of what is deemed motion for the deinterlacer.

6.5.3. Setting the Interfield Weighting Factor

Deinterlacer
- *Interfield Weighting Factor*
  - *40*
  - *0 to 255*

With this control, you can set the *Interfield Weighting Factor* control.

6.6. CONFIGURING THE VIDEO PROCESSING FUNCTIONS

The *Proc Func* menus are used to configure parameters associated with the video processing functions of the converter. The chart below shows the items available in the *Proc Func* menu.

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.

RGB Clip	Enables RGB Clipping.
Gamma Adjust	Enables Gamma Adjust.
Y Gain	Sets the Source Y Gain.
Y Offset	Sets the Source Y Offset.
Cr Gain	Sets the Source Cr Gain.
Cr Offset	Sets the Source Cr Offset.
Cb Gain	Sets the Source Cb Gain.
Cb Offset	Sets the Source Cb Offset.
Hue	+/- 180 degrees 0.1 degree steps.
R Offset	Sets the Source R Offset.
R Gain	Sets the Source R Gain.
G Offset	Sets the Source G Offset.
G Gain	Sets the Source G Gain.
B Offset	Sets the Source B Offset.
B Gain	Sets the Source B Gain.
Video Gain (Video Level)	Sets the Source Video Gain.
Saturation Gain	Sets the Source Saturation Gain.
Gamma Level	Sets the gamma correction factor.

R Gamma Level	Sets the gamma correction factor for R component.
G Gamma Level	Sets the gamma correction factor for G component.
B Gamma Level	Sets the gamma correction factor for B component.
Luma Floor	Sets the darkest luma value that will be enhanced.
Detail Noise Floor	Sets the minimum level of detail required before the enhancer is enabled.
Enhancement Limit	Sets the maximum enhancement allowed.
Horizontal Band	Sets the horizontal frequency band.
Vertical Intensity	Sets the intensity of the vertical enhancement process.
Detail Gain	Sets the gain for detail.

6.6.1. Enabling RGB Clipper

Proc Func
- *RGB Clip*
  - *Disable*
  - *Enable*

This enables the RGB clipper. When enabled, the module will clip any illegal levels of R, G, and B (individually) to 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.

6.6.2. Enabling Gamma Adjust

Proc Func
- *Gamma Adjust*
  - *Disable*
  - *Enable*

This enables the Gamma Adjust. When enabled, the module will allow the user to adjust the gamma level. If disabled, then the gamma level is set to 0.

6.6.3. Setting the Gain Levels

There are a total of eight controls that set the gain of the video. The controls are for Y Gain, Cb Gain, Cr Gain, R Gain, G Gain, B Gain, Saturation Gain (Cb+Cr at the same time) and Video Level (Y+Cr+Cb at the same time)

For simplicity, only one control will be shown in the manual. Illegal values are clipped after gain and offset adjustments. All gain controls have the same range of +100/-50 per cent.

Proc Func
Y Gain
+100%/-50%

With these controls the user can adjust the Y gain applied to the input signal over a range of +100/-50% range in 0.1% steps.

6.6.4. Setting the DC Offset

There are six controls that set the DC Offset of the video signal. These are Y offset, Cr Offset, Cb Offset, R Offset, G Offset, B Offset. All offset adjustments have a range of +200/-200. For simplicity, only one control will be shown in the manual.

Proc Func
Y Offset
+/- 200

With these controls the user can adjust the DC offset of the input Y signal with a range of +/- 200 quantization levels.

6.6.5. Setting the Hue

Proc Func
Hue
+/- 180

With this control the user can adjust the Hue or colour of components +/- 180 degrees in 0.1 degree steps.

6.6.6. Setting the Gamma Level

Proc Func
Gamma Level
+/- 128

With this control the user can adjust the Gamma correction factor by +/- 128 in steps of 1.

Proc Func
R Gamma Level
+/- 128

With this control the user can adjust the Gamma correction factor of the Red Channel by +/- 128 in steps of 1. This control is additive to the global gamma level control. Total combined range for R gamma remains +/-128.

Proc Func
G Gamma Level
+/- 128

With this control the user can adjust the Gamma correction factor of the Green Channel by +/- 128 in steps of 1. This control is additive to the global gamma level control. Total combined range for G gamma remains +/-128.

Proc Func
B Gamma Level
+/- 128

With this control the user can adjust the Gamma correction factor of the Blue Channel by +/- 128 in steps of 1. This control is additive to the global gamma level control. Total combined range for B gamma remains +/-128.

6.6.7. Setting the Luma Floor

Proc Func
Luma Floor
0 to 15

Selects the minimum Luma value that will be enhanced. Pixels with a value below this floor will be left untouched.

6.6.8. Setting the Detail Noise Floor

Proc Func
Detail Noise Floor
0 to 15

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.

6.6.9. Setting the Enhancement Limit

Proc Func
Enhancement Limit
0 to 63

Selects the largest detail value to be added back into the signal.
Detail that has a value larger than this value will be clipped.

6.6.10. Setting the Horizontal Band

Proc Func
Horizontal Band
0 to 20

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.

6.6.11. Setting the Vertical Intensity

Proc Func
Vertical Intensity
0-100%

Selects the intensity of the vertical enhancement process, as a ratio of the Horizontal enhancement.

The range is 0 to 100% in steps of 25%.
Where 0% refers to no Vertical enhancement and 100% provides a Vertical intensity that is equivalent to the Horizontal.

6.6.12. Setting the Detail Gain

Proc Func
Detail Gain
0-127

Selects the level of the detail gain.

The range is 0 to 127.
Where 0 refers to no increase in detail gain.

6.7. CONFIGURING THE VIDEO NOISE REDUCER

The *Noise Reducer* menus are used to configure parameters associated with the video noise reduction processing. The noise reduction processing consists of five distinct filters and a complex adaptive algorithm to combine and control the filtered results based on two motion sensors. It is designed to remove random “Gaussian” (or similar band-limited) noise, impulsive “salt & pepper” noise and other temporal varying artifacts like low level “piano-keying”. The motion sensors are used to seamlessly vary between the different filters. Simple user controls allow customization of the amount of expected noise and sensitivity of the motion detectors.

The chart below shows the items available in the *Noise Reducer* menu.

Noise Reduction	Sets the level of noise reduction to apply based on expected noise.
Side-by-side	Turns on side-by-side comparison mode.

Turning the noise reducer Off removes it from the video-processing path. There will be a momentary interruption to the output video signal.

6.7.1. Turning on the Noise Reduction

- *Noise Reducer*
  - *Noise Reduction*
    - *Off*
    - *Light*
    - *Medium*
    - *Heavy*

This option controls the various levels of noise reduction to apply to the video signal. The different levels will set the motion detection threshold and the aggressiveness of the filters to remove noise.

When the control is set to *Off*, then there is noise reduction. The output video is left untouched.

When the control is set to *Light*, the noise reducer will have a lower motion detection threshold and less aggressive filter. This level of noise reduction is used for video that has low random noise, where removal of low-level details is minimized.

When the control is set to *Medium*, the noise reducer will have an average threshold set for the motion detection threshold and aggressive filters. This level of noise reduction is used for video that has typical amounts random noise, where the module will remove random noise and affect low-level details, more so than a *Light* setting.

When the control is set to *Heavy*, the noise reducer will have a high motion detection threshold and very aggressive filter. This level of noise reduction is used for video that has high level of random noise, where the filters will remove the random noise, but will soften the low-level details.

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

6.7.2. Turning on the Side-by-Side Comparison Window

- *Noise Reducer*
  - *Side-by-side*
    - *On*
    - *Off*

This control allows the user to compare the input video before noise reduction (left hand side) and after noise reduction (right hand side).

The separation line for the side-by-side comparison will also appear on the active output video. This setting should be used with care and only during the setup process and not during a live broadcast.

6.8. CONFIGURING THE AUDIO SETTINGS

The SMPTE 272M and 299M standards permit up to 4 groups of 4 audio channels to be embedded into the serial digital video bitstream. This module de-embeds two groups of audio from the serial digital input video that are the source for re-embedding on the serial digital output video. The "-AES4" versions of the card also have 4 discrete AES inputs that can be selected as the source for re-embedding. The *Audio* menu items are used to configure the de-embedder and embedder groups, sample rate converters and to adjust the audio throughput delay. The chart below shows the items available in the *Audio* menu.

De-embedder A	Sets the audio group destined for de-embedder A.
De-embedder B	Sets the audio group destined for de-embedder B.
Embedder A	Sets the audio group destination for embedder A.
Embedder B	Sets the audio group destination for embedder B.
Audio Delay	Adjusts the audio delay from the nominal video delay.
Ch 1&2 Delay Offset	Adjusts the delay offset of input Ch1&2 relative to the global audio delay.
Ch 3&4 Delay Offset	Adjusts the delay offset of input Ch 3&4 relative to the global audio delay.
Ch 5&6 Delay Offset	Adjusts the delay offset of input Ch 5&6 relative to the global audio delay.
Ch 7&8 Delay Offset	Adjusts the delay offset of input Ch 7&8 relative to the global audio delay.
SRC Mode	Adjusts the mode for the audio sample rate converters.
Input Ch 1&2 Source	Sets the source for audio channels 1 and 2 (-AES4 version only).
Input Ch 3&4 Source	Sets the source for audio channels 3 and 4 (-AES4 version only).
Input Ch 5&6 Source	Sets the source for audio channels 5 and 6 (-AES4 version only).
Input Ch 7&8 Source	Sets the source for audio channels 7 and 8 (-AES4 version only).

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

6.8.1. Selecting the Audio Groups Destined for the De-embedders

The module has two de-embedders that will de-embed one group of audio from the serial digital video input. There are one set of controls for each de-embedder. For simplicity, only one control will be shown in the manual.

- *Audio*
  - *De-embedder A*
    - *Group 1*
    - *Group 2*
    - *Group 3*
    - *Group 4*

Under normal conditions the settings for de-embedder A and B should be different otherwise the audio will be repeated from the video input.

The default for both de-embedders is group 1.

6.8.2. Selecting the Audio Groups That Will Be Embedded

The module has two embedders that each inserts one group of audio on the serial digital video outputs. There are two controls that set the audio groups where the embedders will put the audio on the serial digital output. For simplicity, only one control will be shown in the manual.

- *Audio*
  - *Embedder A*
    - *Off*
    - *Group 1*
    - *Group 2*
    - *Group 3*
    - *Group 4*

With these controls, you can set the destination group for Embedder A and B.

When set to *Off*, the embedder will be disabled.

Otherwise the embedder destination can be set to a specific group.

The group for Embedder A must be different from Embedder B. If the user sets them the same then the next higher group number will be used for Embedder B.

6.8.3. Selecting the Audio Delay

- *Audio*
  - *Audio Delay*
    - *+/- 100 ms*

This control adjusts the audio delay +/- 100 ms in 0.021 ms steps from the nominal delay necessary to match the card's video processing delay.

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

6.8.4. Adjusting Additional Audio Delay/Offset on a Per Channel Pair Basis

In addition to the global audio delay control above, the card can implement additional audio delays/offsets on a per channel pair basis. Ch1&2, Ch3&4, Ch5&6 and Ch7&8 are grouped together for this additional audio delay. For simplicity, only Ch1&2 is shown below.

- *Audio*
  - *Ch1&2 Delay Offset*
    - *+/- 100 ms*

This control adjusts the audio delay +/- 100 ms in increments of 0.021 for Ch1&2 relative to the global audio delay.

6.8.5. Configuring the SRC Mode

- *Audio Settings*
  - *SRC Mode*
    - *Enable*
    - *Bypass*
    - *Auto*

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

Enable: Enables the SRC for PCM audio.
Bypass: Bypass the SRC. Should be used for non-PCM audio.
Auto: The module will automatically select enable or bypass on a per stereo pair basis.

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

- *Audio Settings*
  - *Input Channel 1&2 Source*
    - *DMX A1*
    - *AES1*

This control allows the user to configure the source for input channels 1 and 2 of the sample rate converters.

For channels 1 and 2, only the first output pair from De-embedder A or external discrete AES 1 is valid.

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

- *Audio Settings*
  - *Input 3&4 Source*
    - *DMX A2*
    - *AES2*

This control allows the user to configure the source for input channels 3 and 4 of the sample rate converters.

For channels 3 and 4, only the second output pair from De-embedder A or external discrete AES 2 is valid.

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

- *Audio Settings*
  - *Input 5&6 Source*
    - *DMX B1*
    - *AES3*

This control allows the user to configure the source for input channels 5 and 6 of the sample rate converters.

For channels 5 and 6, only the first output pair from De-embedder B or external discrete AES 3 is valid.

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

Audio Settings
Input 7&8Source
DMX B2
AES4

This control allows the user to configure the source for input channels 7and 8 of the sample rate converters.

For channels 7 and 8 only the second output pair from De-embedder B or external discrete AES 4 is valid.

6.9. CONFIGURING THE AUDIO PROCESSING FUNCTIONS

The *Audio Proc Embedded* and *Audio Proc External* menus are used to configure parameters associated with the audio processing functions of the 7711UC-HD modules. The chart below shows the items available in the *Audio Proc* menus. Sections 6.9.1 to 6.9.3 give detailed information about each of the menu items. The 7711UC-AES4-HD has a separate audio processor for the external 4 AES outputs (the *Audio Proc External* menu items). For the sake of simplicity, only the main *Audio Proc* menus will be described.

Output Channel 1	Sets the source of audio that will be output on channel 1.
Output Channel 2	Sets the source of audio that will be output on channel 2.
Output Channel 3	Sets the source of audio that will be output on channel 3.
Output Channel 4	Sets the source of audio that will be output on channel 4.
Output Channel 5	Sets the source of audio that will be output on channel 5.
Output Channel 6	Sets the source of audio that will be output on channel 6.
Output Channel 7	Sets the source of audio that will be output on channel 7.
Output Channel 8	Sets the source of audio that will be output on channel 8.
Input Channel 1 Gain	Sets the gain of input channel 1.
Input Channel 2 Gain	Sets the gain of input channel 2.
Input Channel 3 Gain	Sets the gain of input channel 3.
Input Channel 4 Gain	Sets the gain of input channel 4.
Input Channel 5 Gain	Sets the gain of input channel 5.
Input Channel 6 Gain	Sets the gain of input channel 6.

Input Channel 7 Gain	Sets the gain of input channel 7.
Input Channel 8 Gain	Sets the gain of input channel 8.
Input Channel 1 Invert	Controls audio inversion for input Ch1.
Input Channel 2 Invert	Controls audio inversion for input Ch2.
Input Channel 3 Invert	Controls audio inversion for input Ch3.
Input Channel 4 Invert	Controls audio inversion for input Ch4.
Input Channel 5 Invert	Controls audio inversion for input Ch5.
Input Channel 6 Invert	Controls audio inversion for input Ch6.
Input Channel 7 Invert	Controls audio inversion for input Ch7.
Input Channel 8 Invert	Controls audio inversion for input Ch8.

6.9.1. Configuring the Output Audio Channel Sources

There are eight controls that select the source of the eight audio channels being processed. For simplicity, only the selection control for channel 1 will be shown in the manual.

Audio Process Embedded *Output Ch1* *Input Channel 1* *Input Channel 2* *Input Channel 3* *Input Channel 4* *Input Channel 5* *Input Channel 6* *Input Channel 7* *Input Channel 8* *Mono mix Ch 1 & 2* *Mono mix Ch 3 & 4* *Mono mix Ch 5 & 6* *Mono mix Ch 7 & 8* *Mute*	This control selects the source of audio for the output channel 1. The output can be taken from any of the input channels or a mono mix of pairs. The output can also be muted. The default is that the input channel will be the same as the output channel (i.e. output channel 1 will come from input channel 1).

6.9.2. Setting Gain for Each Audio Channel

There are eight controls that set the gain of the eight audio channels being processed. For simplicity, only the gain control for input channel 1 will be shown in the manual.

Audio Proc
Input Channel 1 Gain
0 dB
+/- 24 dB

The audio gain controls are used to adjust the level of the respective output audio channel. The gain controls have a range of +/-24 dB with 1/10 dB resolution. The displayed value is the amount of gain (+ve), or attenuation (-ve), in decibels, where 0dB corresponds to unity gain.

6.9.3. Setting the Inversion Control for Each Audio Channel

There are eight controls that set the inversion status for each of the eight audio channels being processed. For simplicity, only the inversion control for input channel 1 will be shown in the manual.

Audio Proc
Input Channel 1 Invert
Normal
Invert

The audio inversion controls are used to invert the audio channel being processed. To invert the audio Input Channel, set the control to *invert*. To bypass the inversion process, set the control to *normal*.

6.10. CONFIGURING CLOSED CAPTIONING

The 7711UC series manages closed captioning transparently. The modules will transcode any captions in the input SD video signal to the output HD signal. The *Closed Captioning* menus are used to configure parameters associated with the closed caption handling. The chart below shows the items available in the *Closed Captioning* menu. Sections 6.10.1 to 6.10.3 give detailed information about each of the parameters.

Main Captions	Turns closed caption handling on or off.
HD Write Line	Selects the HD line number where the HD VANC captions are inserted on the output video.
Loss of CC timeout	Sets the threshold value for CC timeouts.
CC1 to 708 Service	Sets the caption service in EIA708 that CC1 will be mapped to.
CC2 to 708 Service	Sets the caption service in EIA708 that CC2 will be mapped to.
CC3 to 708 Service	Sets the caption service in EIA708 that CC3 will be mapped to.
CC4 to 708 Service	Sets the caption service in EIA708 that CC4 will be mapped to.
T1 to 708 Service	Sets the caption service in EIA708 that T1 will be mapped to.
T2 to 708 Service	Sets the caption service in EIA708 that T2 will be mapped to.
T3 to 708 Service	Sets the caption service in EIA708 that T3 will be mapped to.
T4 to 708 Service	Sets the caption service in EIA708 that T4 will be mapped to.

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

6.10.1. Enabling Closed Captioning

Closed Captioning
- *Main Caption*
  - *Off*
  - *On*

This parameter will enable closed caption handling for the module. When turned on, any closed captioning will be mapped to line 21 if the output video is SD, or to the designated HD write line (see 6.10.2) if the output video is HD.

When turned off, no closed captioning is encoded in the VANC of the output video.

6.10.2. Setting the HD Write Line

Closed Captioning *HD Write Line* *7 to 24*	This parameter will set the HD line where the HD VANC captions are inserted on the output HD video as per SMPTE 334M.

6.10.3. Setting the Caption Services in EIA708

There are eight controls that will map closed caption and text channels into EIA708 caption services. For simplicity, only the selection control for the main card will be shown in the manual.

Closed Captioning *CC1 to 708 Service* *1 to 16* *Off*	This parameter will map CC1 into an EIA708 Caption Service. Currently, the modules only support 16 services (1 to 16). When set to off, the CC1 is not mapped to any EIA708 Caption Service.

6.11. AFD CONFIGURATION

The 7711UC-HD and the 7711UC-AES-HD have the ability to read incoming AFD values and stamp outgoing AFD values. Automatic steering of ARC modes is not supported in the card. *VLPRO Auto Response* may be used in conjunction with the card to deliver automatic steering of ARC modes (not frame accurate).

The following controls are available for AFD configuration:

AFD Out Enable	Enable and disable the AFD packet insertion on outgoing video.
AFD Output Line	Sets the write line for AFD packets.
AFD Source	Sets the source for AFD packet information.
Custom AFD	Menu selection to set Custom AFD information.
Pan-Scan Out Enable	Enables and disables the Pan-Scan packet insertion on outgoing video.
Pan-Scan Output Line	Sets the write line for Pan-Scan packets.
Pan-Scan Source	Sets the source for Pan-Scan packet information.
Custom Pan-Scan	Sets the menu selection to set Custom AFD information.

6.11.1. Enabling AFD Insertion

AFD Setup
AFD Out Enable
Enable
Disable

This control enables and disables the insertion of AFD packets in the outgoing video signal. When Enabled, AFD packets will be inserted. When Disabled, AFD packets will not be inserted.

6.11.2. Selecting the Line Number for AFD Insertion

AFD Setup
AFD Output Line
7-24

This control defines the line on which AFD packets will be inserted into the outgoing video when the AFD packet insertion is enabled. The valid range is from 7 to 24. With a default of line 9.

6.11.3. Selecting the Source for AFD Packet Information

Information for AFD packets may be automatically extracted from the cards scaler settings or manually authored using the Custom AFD Menu selections. The following control selects whether automatic or manual authoring of AFD information is selected.

AFD Setup
AFD Source
Scaler
Custom

Determines from what source the card will acquire the information needed to AFD packets. Select Custom to have the card use the Custom AFD metadata as defined under the Custom AFD menu selections. Select Scaler to have AFD packet information automatically set by the card's scaler and conversion settings.

6.11.4. Authoring Custom AFD Packet Information

Information for AFD packets may be automatically extracted from the cards scaler settings or manually authored using the *Custom AFD Menu* selections. The following controls define the manual AFD metadata authoring process.

Aspect Ratio	Sets the aspect ratio of the coded frame.
Active Format	Sets the active format of the coded frame.
Bar Data Flags	Sets the bar data status for the coded frame.
Bar Data Value 1	Set bar data value 1.
Bar Data Value 2	Set bar data value 2.

6.11.4.1. Custom AFD Metadata Authoring

- *Custom AFD*
  - *Aspect Ratio*
    - *4:3*
    - *16:9*

This control enables and disables the insertion of Pan-Scan packets in the outgoing video signal. When Enabled, Pan-Scan packets will be inserted. When Disabled, Pan-Scan packets will not be inserted.

6.11.4.2. Custom AFD Format and Code

- *Custom AFD*
  - *Active Format*
    - ***16x9 Aspect Ratio:***
    - *undefined*
    - *full frame (0010)*
    - *14:9 (center) (0011)*
    - *box > 16:9 (center)*
    - *full frame*
    - *4:3 (center)*
    - *16:9 (protected)*
    - *14:9 (center)*
    - *4:3 (14:9 center)*
    - *16:9 (14:9 center)*
    - *16:9 (4:3 center)*
    - ***4x3 Aspect Ratio:***
    - *undefined*
    - *box 16:9 (top)*
    - *box 14:9 (top)*
    - *box > 16:9 (center)*
    - *full frame*
    - *full frame (1001)*
    - *16:9 (center)*
    - *14:9 (center)*
    - *4:3 (14:9 center)*
    - *16:9 (14:9 center)*
    - *16:9 (4:3 center)*

This control selects the AFD format/code that will be inserted in the AFD packet.

16x9 Aspect Ratio	AFD Code
undefined	0000
full frame (0010)	0010
14:9 (center) (0011)	0011
box > 16:9 (center)	0100
full frame	1000
4:3 (center)	1001
16:9 (protected)	1010
14:9 (center)	1011
4:3 (14:9 center)	1101
16:9 (14:9 center)	1110
16:9 (4:3 center)	1111

4x3 Aspect Ratio	AFD Code
undefined	0000
box 16:9 (top)	0010
box 14:9 (top)	0011
box > 16:9 (center)	0100
full frame	1000
full frame (1001)	1001
16:9 (center)	1010
14:9 (center)	1011
4:3 (14:9 center)	1101
16:9 (14:9 center)	1110
16:9 (4:3 center)	1111

6.11.4.3. Setting the Custom AFD Bars Data Flag

- *Custom AFD*
  - *Bars Data Flag*
    - *left & right bars*
    - *Top & bottom bars*

This control sets the bar data status for the code frame to indicate that left & right bar or top & bottom bar information is included in the AFD packets

6.11.4.4. Setting the Custom AFD Bar Data Values

- *Custom AFD*
  - *Bar Data Value 1*
    - *0-1078*

Sets the bar data value 1. The valid range is from 0 to 1078. It is up to the user to ensure that bar data value is logical for the outgoing video standard.

Custom AFD *Bar Data Value 2* *1-1079*	Sets the bar data value 2. The valid range is from 1 to 1079. It is up to the user to ensure that bar data value is logical for the outgoing video standard.

6.11.5. Enabling and Setting Up Pan-Scan Insertion and Line Numbers

AFD Setup *Pan-Scan Out Enable* *Enable* *Disable*	This control enables and disables the insertion of Pan-Scan packets in the outgoing video signal. When Enabled, Pan-Scan packets will be inserted. When Disabled, Pan-Scan packets will not be inserted.

6.11.5.1. Defining the Pan-Scan Output Line

AFD Setup *Pan-Scan Output Line* *7-24*	This control defines the line on which Pan-Scan packets will be inserted into the outgoing video when Pan-Scan packet insertion is enabled. The valid range is from 7 to 24. With a default of line 9.

6.11.6. Selecting the Source for Pan-Scan Packet Information

Information for Pan-Scan packets may be automatically extracted from the cards scaler settings or manually authored using the Custom Pan-Scan menu selections. The following controls govern the manual Pan-Scan metadata authoring process.

AFD Setup *Pan-Scan Source* *Scaler* *Custom*	Determines from what source the card will acquire the information required for generating Pan-Scan packets. Select Custom to have the card use the Custom Pan-Scan metadata as defined under the Custom Pan-Scan menu selections. Select Scaler to have Pan-Scan packet information automatically set by the card's scaler and conversion settings.

6.11.7. Authoring Custom for Pan-Scan Packet Information

Data ID Set	Sets the data set ID of the coded frame.
Aspect Ratio	Sets the aspect ratio of the coded frame.
Pan Data	Sets the presence of Pan data for the coded frame.
Tilt Data	Sets the presence of tilt data for the coded frame.
Vertical Size Data	Sets the presence of vertical size data for the coded frame.
Horizontal Size Data	Sets the presence of horizontal size data for the coded frame.
Pan Horizontal Offset	Sets the pan horizontal offset of the viewport for the coded frame.
Tilt Vertical Offset	Sets the tilt vertical offset of the viewport for the coded frame.
Vertical Size Offset	Sets the vertical size of the viewport for the coded frame.
Horizontal Size Offset	Sets the horizontal size of the viewport for the coded frame.

6.12. UTILITIES

The *Utilities* menus are used to list the module firmware version, upgrade the firmware, and manage the user presets. The chart below shows the items available in the *Utilities* menu. Sections 6.12.1 to 6.12.8 give detailed information about each of the parameters.

Load Preset	Used to recall the current module configuration from one of the user presets or to reset the module to its factory preset condition.
Store Preset	Used to store the current module configuration to one of the user presets.
Auto Recall Presets	Used to enable or disable the default parameter recall.
GPI 1	Selects the function of GPI1 - Recall Preset 1-10/OFF.
GPI 2	Selects the function of GPI2 - Recall Preset 1-10/OFF.
GPI 3	Selects the function of GPI3 - Recall Preset 1-10/OFF.
GPI 4	Selects the function of GPI4 - Recall Preset 1-10/OFF.
6Hz Ref	Enables 6 Hz Reference.
Upgrade	Used to upgrade the firmware in the module.
Status Window	Enable or Disable display of the status screen.
About…	Shows the firmware version of the module.

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

The converter modules provide ten user preset areas to store the complete set of controls from the on screen menu.

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

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

6.12.1.1. Recalling Configurations from the User Presets

- *Utilities*
  - *Load Preset*
    - *None*
    - *Default*
    - *User1 to 10*
    - *525-1080i TB Cut*
    - *525-1080i 4:3 Side*
    - *525-720p TB Cut*
    - *525-720p 4:3 Side*
    - *625-1080i TB Cut*
    - *625-1080i 4:3 Side*
    - *625-720p TB Cut*
    - *625-720p 4:3 Side*

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

Use the toggle switch to select the preset location where you want to recall the module configuration. After selecting the preset, you must press the pushbutton before the store will take place. You can abort the operation by pressing the pushbutton when *None* is displayed.

There are a number of factory-installed presets that may be recalled as well. These are pre-defined and cannot be overwritten by the user. The factory presets are:

525i/59.94 ⇒ 1080i/59.94 TB Cut
525i/59.94 ⇒ 1080i/59.94 4:3 Side Panel
525i/59.94 ⇒ 720p/59.94 TB Cut
525i/59.94 ⇒ 720p/59.94 4:3 Side Panel
625i/50 ⇒ 1080i/50 TB Cut
625i/50 ⇒ 1080i/50 4:3 side panel
625i/50 ⇒ 720p/50 TB Cut
625i/50 ⇒ 720p/50 4:3 side panel

These presets are available as starting points to configuring the module. They can be stored as user presets and modified accordingly.

6.12.1.2. Storing Configurations from the User Presets

- *Utilities*
  - *Store Preset*
    - *None*
    - *1 to 10*

This control is used to initiate a store of the current card configuration into one of the user presets.

Use the toggle switch to select the preset location where you want to store the module configuration. After selecting the preset, you must press the pushbutton before the store will take place. You can abort the operation by pressing the pushbutton when *None* is displayed.

6.12.2. Disabling Preset Recall when the Video Input/Output Standards Change

- *Utilities*
  - *Auto Recall Presets*
    - *Enable*
    - *Disable*

This control is used to enable or disable the recall of the parameter store with each input and output combination. Each input and output combination stores all the card parameters. During any standard change the set is recalled. For a preset recall this causes a conflict in which parameter sets have priority. Disabling this ensure all the preset recall parameters take effect.

6.12.3. Recall Presets via GPIs

The converter modules provide ten user preset areas, which can be recalled via external GPI inputs. There are four controls that are used to set functions of the GPI inputs. For simplicity, only one control will be shown in the manual.

- *Utilities*
  - *GPI 1*
    - *OFF*
    - *Recall User Preset 1*
    - *Recall User Preset 2*
    - *Recall User Preset 3*
    - *Recall User Preset 4*
    - *Recall User Preset 5*
    - *Recall User Preset 6*
    - *Recall User Preset 7*
    - *Recall User Preset 8*
    - *Recall User Preset 9*
    - *Recall User Preset 10*

This control is used to set which preset will be recalled by the respective GPI input is closed to ground. To disable a GPI input set it to *Off.*

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

6.12.4. Setting the Function of GPI 4 (7711UC-HD only)

- *Utilities*
  - *GPI 4 Function*
    - *GPI*
    - *6Hz Source*

On the 7711UC-HD, the user can configure the function of GPI 4. The GPI can be set to recall presets or it can be set as a 6Hz source for 3:2 pulldown.

In order to use it as a 6Hz source, the user will also have to set a jumper on the Rear I/O plate. See 7.5 for instructions on setting the jumper for GPI4.

6.12.5. Setting 6Hz Reference

- *Utilities*
  - *6Hz*
    - *Off*
    - *On*

This control sets the location of the 6Hz reference used for 3:2 pull down. The 6 Hz reference pulse is an active high (TTL level) pulse that starts at the beginning of the A frame sequence and lasts for one field (1`6.6 ms). When the input video has a 2:3 picture content this pulse will identify the A frame in the incoming 2:3 sequence.

A 6 Hz reference pulse may be applied to **6 Hz IN**. However, the handling of the 6 Hz pulse is enabled/disabled by this control.

6.12.6. Displaying the Status Window on the OSD Output

Utilities
- *Status Window*
  - *Disable*
  - *Enable*

This control is used to enable the active display of various video and audio parameters on the OSD output when the menus are not being displayed.

The Status Window also displays the closed captioning information regarding EIA-608 or EIA-708 presence. There is a status field for the Caption Data Packet (CDP) Parser. This field reports the state of the CDP Parser. It will report *Ok,* if functioning properly.

6.12.7. Initiating a Software Upgrade

Utilities
- *Upgrade*
  - *Cancel*
  - *Upgrade*

This control is used to initiate an upgrade of the module software.

In addition to the software upgrade support detailed in the *Upgrading Firmware* chapter in the front of the binder, you can initiate an upgrade with this control. This will allow you to upgrade the software without unplugging the card and changing the upgrade jumper.

After selecting the upgrade operation, you must change the command to *Upgrade* and press the pushbutton before the upgrade can take place. Follow the remainder of the instructions in the *Upgrading Firmware* chapter. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

After the upgrade has finished, the unit will automatically restart and run in normal operating mode.

The Upgrade baud rate for the 7711UC-HD series modules is 115,200 baud.

6.12.8. Accessing Information about this Module and its Firmware

Utilities
- *About…*

This control lists the specifications about this module and the firmware residing within it. It gives quick access to information about revisions that can be used to determine when upgrades are required.

7. JUMPERS

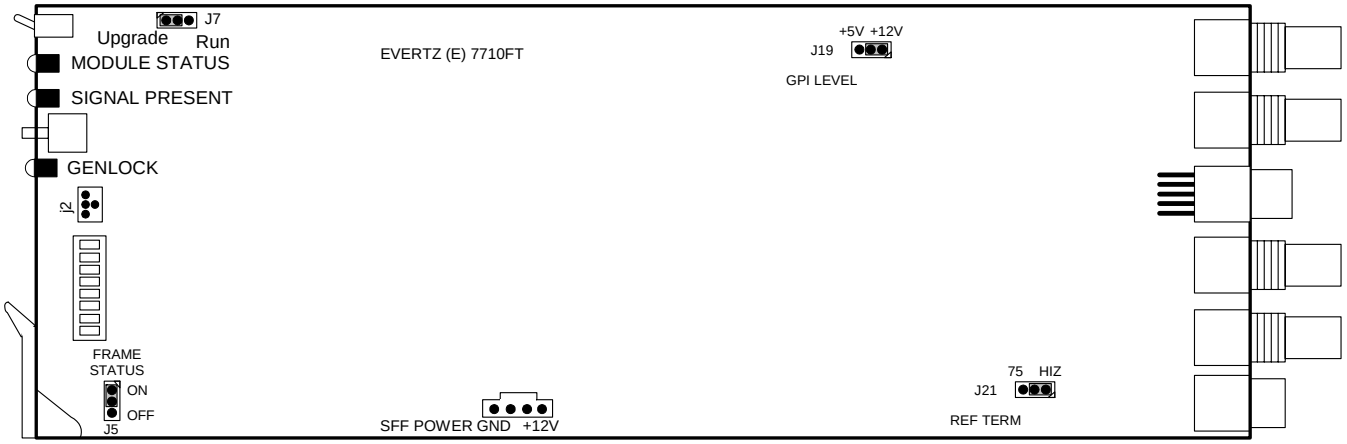


Figure 7-1: Location of Jumpers – Rev E Main Module

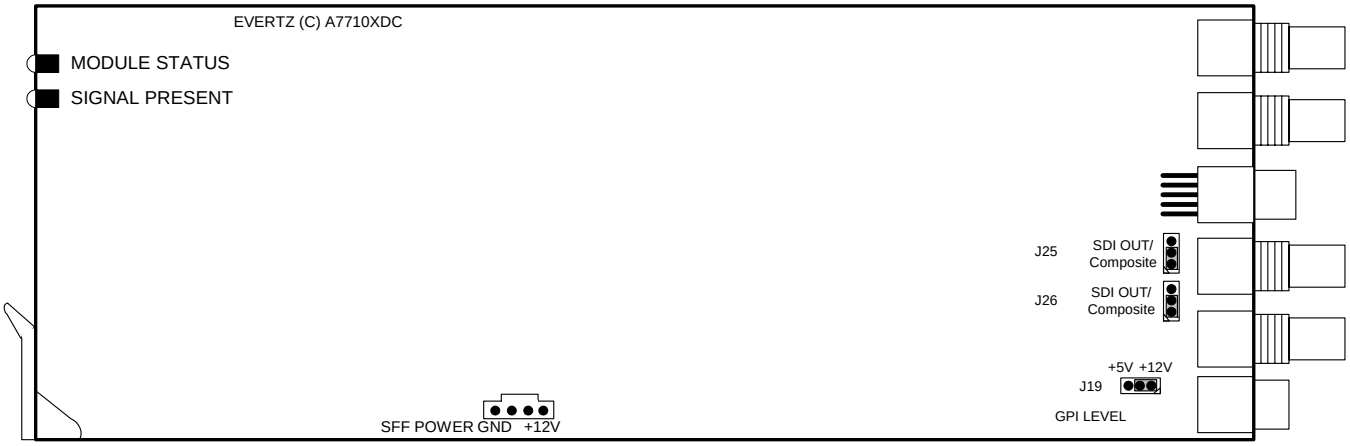


Figure 7-2: Location of Jumpers – Sub Module for 7711UC-AES4-HD

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

FRAME STATUS: The FRAME STATUS jumper J5, located at the front of the main module, determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR 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.

7.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

Firmware updates can be performed using the *Upgrade* menu item on the *Utilities* menu (see section 6.12.7) or using the **UPGRADE** jumper.

UPGRADE: The UPGRADE switch is located on the back side of the main module (On the rear of the J7 jumper location near the front card edge) and is used when firmware upgrades are being done to the module. For normal operation it should be switched to the *RUN* position as shown in the diagrams above. See the *Upgrading Firmware* chapter in the front of the binder for more information.

The silkscreen on the front side of the board for J7 is incorrect. The correct orientation of the switch is shown in Figure 7-1 and Figure 7-2.

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

The Upgrade baud rate for the 7711UC-HD series modules is 115,200 baud.

7.3. SELECTING WHETHER THE GENLOCK REFERENCE INPUT IS TERMINATED

TERM: The TERM jumper J21, located at the rear of the module, is used to terminate the genlock loop input. When it is in the 75R position, a 75 ohm terminating resistor will connect the input to ground. When it is in the HI-Z position the genlock input will be high impedance.

7.4. SELECTING THE GPI PULLUP VOLTAGE

The GPI jumper J19, located near the rear of the module, selects whether the general purpose inputs will be pulled up to +5 volts or +12 Volts. Figure 7-3 shows the jumper configuration and the GPI input schematic.

GPI LEVEL: To set the pull-up voltage to +5 volts set the jumper to the +5V position.

To set the pull-up voltage to +12 volts set the jumper to the +12V position.

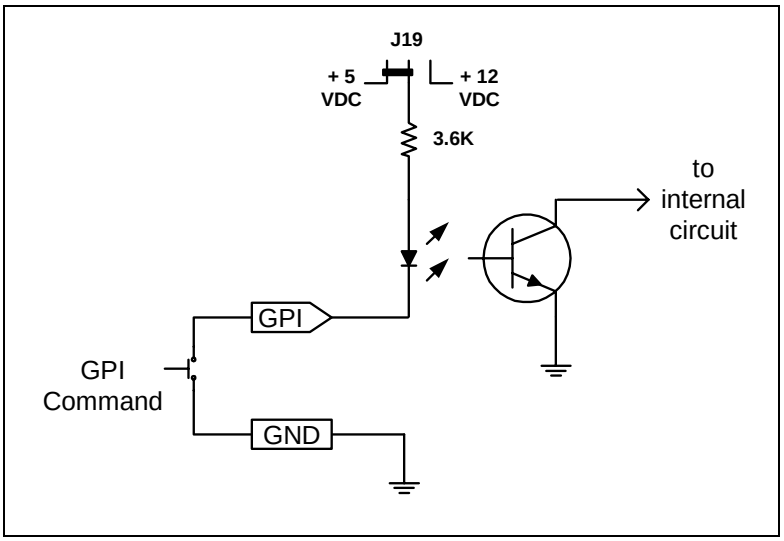


Figure 7-3: Setting the GPI Input Pullup Voltage

7.5. SELECTING GPI 4 FOR 6HZ SOURCE (7711UC-HD ONLY)

The 7711UC-HD module can set the functionality of GPI 4 (see section 6.12.4). However, the user will also have to change a jumper on the Rear I/O plate to ensure proper functionality. The location of the jumper shown in Figure 7-4 will configure the Rear I/O. The jumper settings are shown in Figure 7-5.

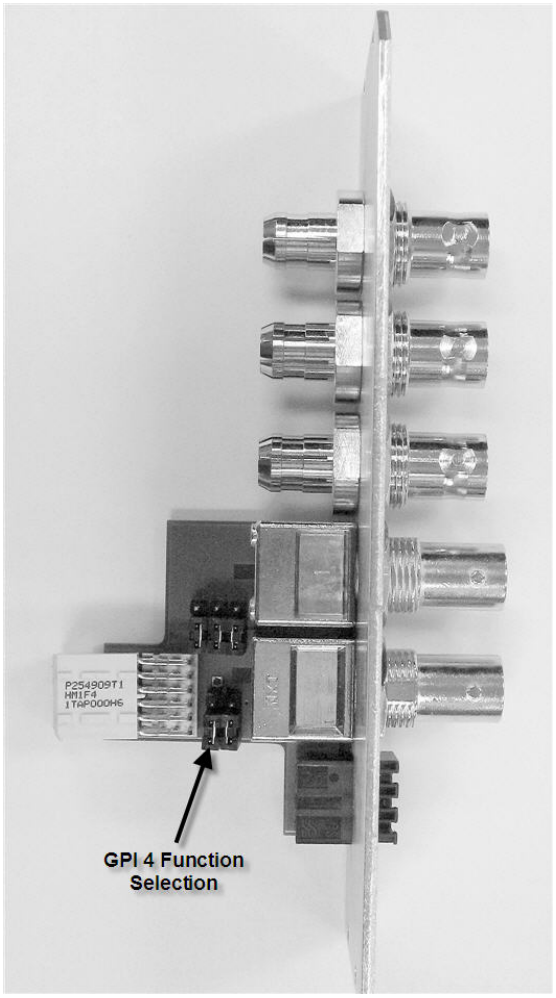


Figure 7-4: GPI 4 Function Selection Jumper

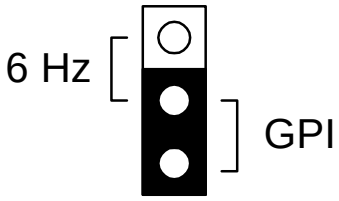


Figure 7-5: Jumper Settings

8. *VISTA*LINK® REMOTE MONITORING/CONTROL

8.1. WHAT IS *VISTA*LINK®?

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

There are 3 components of SNMP:

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

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

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

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

8.2. *VISTA*LINK® MONITORED PARAMETERS

The following parameters can be remotely monitored through the *Vista*LINK® interface:

Parameter	Description
Input Video Present	Indicates the presence of a valid video input signal (the state of the VIDEO PRESENT LED)
Input Video Standard	Indicates video standard of input signal
Input2 Video Present	Indicates the presence of a valid video input signal (the state of the VIDEO PRESENT LED)
Input2 Video Standard	Indicates video standard of input signal
Gen Lock Present	Indicates the presence of a valid genlock reference signal (the state of the GENLOCK LED)
Gen Lock Standard	Indicates video standard of genlock reference signal
GPI1 State	Indicates the state of the GPI1 input
GPI2 State	Indicates the state of the GPI2 input
GPI3 State	Indicates the state of the GPI3 input
GPI4 State	Indicates the state of the GPI4 input
Audio Group 1 Present	Indicates the presence of embedded audio in group 1 (the state of the Group 1 present LED)
Audio Group 2 Present	Indicates the presence of embedded audio in group 2 (the state of the Group 2 present LED)
Audio Group 3 Present	Indicates the presence of embedded audio in group 3 (the state of the Group 3 present LED)
Audio Group 4 Present	Indicates the presence of embedded audio in group 4 (the state of the Group 4 present LED)
AES 1&2 Present	Indicates the presence of AES 1&2
AES 3&4 Present	Indicates the presence of AES 3&4
Time Code Present	Indicates the presence of VITC time code on the input video
Closed Captions Present	Indicates the presence of EIA-608 closed captions on the input video
Delay Audio	Audio Delay
Video Delay	Video Delay
Local Remote Mode	Indicates the whether the module is under local control or *Vista*LINK® control

Table 8-1: *Vista*LINK® Monitored Parameters

8.3. *VISTA*LINK® CONTROLLED PARAMETERS

Parameter	Description
Video Frame Rate	Selects the video input frame rate
Video Standard Input	Selects the video input standard
Video Standard Output	Selects the video output standard
Video Input Source	Select source of video input
Pgm Out/In Mode	Select mode of Pgm Out/In
SD Blanking	Last line of blanking in SD. SD input only
VITC Read Select	Selects decode line for VITC. SD input only
VITC Write Select	Selects the line for VITC insert. SD output only
Loss of Video	Selects the action to take when the input video is missing
Force Minimum Delay	Sets the H and V phase such that the path delay in minimized
Reference Select	Sets video or external genlock for card locking
V Phase Offset	Sets the vertical phase
H Phase Offset	Sets the horizontal phase
H Filter Cutoff	Sets the type of the horizontal filter in the scaler
V Filter Cutoff	Sets the type of the vertical filter in the scaler
Aspect Ratio	Selects the aspect ratio of the output picture
Panel Colours Red	Sets the Red colour of the panels
Panel Colours Green	Sets the Green colour of the panels
Panel Colours Blue	Sets the Blue colour of the panels
Input H Start	Sets the left side crop positions
Input H Stop	Sets the right side crop position
Input V Start	Sets the top crop position
Input V Stop	Sets the bottom crop position
Output H Start	Sets the left side of the output
Output H Stop	Sets the right side of the output
Output V Start	Sets the top of the output image
Output V Stop	Sets the bottom of the output image
RGB Clip	Enables the RGB clipper
Gamma Adjust	Enables the gamma adjust
Y Gain	Varies the Source Y
Y Offset	Varies the Source Y
Cr Gain	Varies the Source Cr
Cr Offset	Varies the Source Cr
Cb Gain	Varies the Source Cb
Cb Offset	Varies the Source Cb
Hue	+/- 10 degrees in 0.1 degree increments
R Gain	Varies the R Gain in RGB Domain
G Gain	Varies the G Gain in RGB Domain
B Gain	Varies the B Gain in RGB Domain
Gamma Level	Sets the gamma correction level
Luma Floor	Sets the gamma correction factor
Detail Noise Floor	Sets the minimum level of detail required before the enhancer is enabled
Enhancement Limit	Sets the maximum enhancement allowed
Horizontal Band	Sets the horizontal frequency band
Vertical Intensity	Sets the intensity of vertical enhancement

Detail Gain	Sets the level for the detail gain
Deinterlacer Mode	Sets the mode of the deinterlacer to field or frame based down conversion
Freeze Frame Threshold	Sets the number of frames before frozen/missing video is detected
Motion Detection Threshold	Sets the threshold for motion detection on the deinterlacer
Interfield Weighting Factor	Sets the interfiled weighting factor
Noise Reduction	Sets the level of noise reduction
Side-by-side mode	Sets the side-by-side comparison mode for noise reduction
De-embedder A	Sets the audio group source for de-embedder A
De-embedder B	Sets the audio group source for de-embedder B
Embedder A	Sets the audio group destination for embedder A
Embedder B	Sets the audio group destination for embedder B
Audio Delay	Adjusts the audio delay from the card nominal
SRC Mode	Sets mode of sample rate converter
Input Ch 1&2 Source	Sets the source for input channel 1 and 2 of the SRC
Input Ch 3&4 Source	Sets the source for input channel 3 and 4 of the SRC
Input Ch 5&6 Source	Sets the source for input channel 5 and 6 of the SRC
Input Ch 7&8 Source	Sets the source for input channel 7 and 8 of the SRC
Output Ch1	Sets the source of audio that will be output on channel 1
Output Ch2	Sets the source of audio that will be output on channel 2
Output Ch3	Sets the source of audio that will be output on channel 3
Output Ch4	Sets the source of audio that will be output on channel 4
Output Ch5	Sets the source of audio that will be output on channel 5
Output Ch6	Sets the source of audio that will be output on channel 6
Output Ch7	Sets the source of audio that will be output on channel 7
Output Ch8	Sets the source of audio that will be output on channel 8
Input Ch1 gain	Sets the gain of input channel 1
Input Ch2 gain	Sets the gain of input channel 2
Input Ch3 gain	Sets the gain of input channel 3
Input Ch4 gain	Sets the gain of input channel 4
Input Ch5 gain	Sets the gain of input channel 5
Input Ch6 gain	Sets the gain of input channel 6
Input Ch7 gain	Sets the gain of input channel 7
Input Ch8 gain	Sets the gain of input channel 8
Captions	Enables closed captioning handling
HD Write Line	Selects the HD line number for HD VANC captions
CC1 to 708 Service	Selects which EIA708 caption service to map CC1 to
CC2 to 708 Service	Selects which EIA708 caption service to map CC2 to
CC3 to 708 Service	Selects which EIA708 caption service to map CC3 to
CC4 to 708 Service	Selects which EIA708 caption service to map CC4 to
T1 to 708 Service	Selects which EIA708 caption service to map T1 to
T2 to 708 Service	Selects which EIA708 caption service to map T2 to
T3 to 708 Service	Selects which EIA708 caption service to map T3 to
T4 to 708 Service	Selects which EIA708 caption service to map T4 to
Load Preset	Used to recall the current module configuration
Store Preset	Used to store the current module configuration
Auto Recall Presets	Enables automatic preset recall when the input or output changes
GPI 1	Selects the function of GPIO1
GPI 2	Selects the function of GPIO2

GPI 3	Selects the function of GPIO3
GPI 4	Selects the function of GPIO4
6Hz Ref	Enables the 6Hz reference

Table 8-2: *Vista*LINK® Controlled Parameters

8.4. *VISTA*LINK® TRAPS

The 7711UC-HD modules will raise a *Vista*LINK® trap if the temperature of the main or sub cards rises above 100 °F.

9. MENU QUICK REFERENCE

Video
- Video Standard Input
- Video Standard Output
- Video Input Source
- Pgm Out/In Mode
- FILL Input
- FILL Timing Error
- Pulldown Reference
- A Frame Offset
- SD Blanking
- VITC Read Select
- VITC Write Select
- Time Code Source
- Loss of Video
- No Glitch Mode
- FS Only Mode
- Force Minimum Delay
- Reference Select
- V Phase Offset
- H Phase Offset

Scaler
- H Filter Cutoff
- V Filter Cutoff
- H Slew Rate Limit
- V Slew Rate Limit
- AR
- Panel Colours Red
- Panel Colours Green
- Panel Colours Blue
- Input H Start
- Input H Stop
- Input V Start
- Input V Stop
- Output H Start
- Output H Stop
- Output V Start
- Output V Stop

Deinterlacer
- Freeze FrameThreshold
- Motion Detection Threshold
- Interfield Weighting Factor

Video Proc Main
- RGB clip
- Gamma adjust
- Y Gain
- Y Offset
- Cr Gain
- Cr Offset
- Cb Gain
- Cb Offset
- Hue
- R Offset
- R Gain
- G Offset
- G Gain
- B Offset
- B Gain
- Video Gain (Video Level)
- Saturation Gain
- Gamma Level
- R Gamma Level
- G Gamma Level
- B Gamma Level
- Luma Floor
- Detail Noise Floor
- Enhancement Limit
- Horizontal Band
- Vertical Intensity
- Detail Gain

Noise Reduction
- Noise Reduction
- Side-by-side

Audio Settings
- De-embedder A
- De-embedder B
- Embedder A
- Embedder B
- Audio Delay
- Ch 1&2 Delay Offset
- Ch 3&4 Delay Offset
- Ch 5&6 Delay Offset
- Ch 7&8 Delay Offset
- SRC Mode
- Input Ch1&2 Source
- Input Ch3&4 Source
- Input Ch5&6 Source
- Input Ch7&8 Source

Audio Proc Embedded Main
- Output Ch1
  …
- Output Ch8
- Input Ch1 Gain
  …
- Input Ch8 Gain
- Input Ch1 Invert
  …
- Input Ch8 invert

Audio Proc External
- Output Ch1
  …
- Output Ch8
- Input Ch1 Gain
  …
- Input Ch8 Gain
- Input Ch1 Invert
  …
- Input Ch8 invert

Closed Captioning
- Main Captions
- HD Write Line
- Loss of CC Timeout
- CC1 to 708 Service
- CC2 to 708 Service
- CC3 to 708 Service
- CC4 to 708 Service
- T1 to 708 Service
- T2 to 708 Service
- T3 to 708 Service
- T4 to 708 Service

AFD Configuration
- AFD Out Enable
- AFD Output Line
- AFD Source
- Custom AFD
- Pan-Scan Out Enable
- Pan-Scan Output Line
- Pan-Scan Source
- Custom Pan-Scan

Custom AFD Packet Information
- Aspect Ratio
- Active Format
- Bar Data Flags
- Bar Data Value 1
- Bar Data Value 2

Custom Pan-Scan Packet Information
- Data ID Set
- Aspect Ratio
- Pan Data
- Tilt Data
- Vertical Size Data
- Horizontal Size Data
- Pan Horizontal Offset
- Tilt Vertical Offset
- Vertical Size Offset
- Horizontal Size Offset

Utilities
- Load Preset
- Store Preset
- Auto Recall Presets
- GPI 1
- GPI 2
- GPI 3
- GPI 4
- 6Hz Ref
- Upgrade
- Status Window
- About…

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