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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	Jul 05
1.0	First Release Version	Oct 05
1.1	Updated format	May 09

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1. OVERVIEW

The 7714HDC High Quality Down Converter provides high quality down conversion of your high definition (SMPTE 292M) signals to standard definition (SMPTE 259M) with detail enhancement and gamma correction. The 7714HDC has up to 4 SD Serial Digital outputs and up to 2 composite analog video outputs. Of the 4 outputs, 2 have OSD output. There is also an external genlock input.

The module accepts 2 groups of embedded audio on the input and re-embeds them into the serial video outputs. It also accepts 4 discrete unbalanced AES inputs and provides 4 AES outputs with the same audio that is being embedded. The re-embedded audio normally has the appropriate delay added to compensate for video delay incurred by the conversion process, thus avoiding the need for external de-embedding and re-embedding of audio. An additional audio delay adjustment can also be made for lip sync correction.

The unit also transfers the closed caption and time code information from input to output performing all necessary HD to SD translation and time code recalculations.

The units occupy one card slot in the 3 RU frame, which will hold up to 14 modules or one slot in the 1RU frame, which will hold up to three modules.

The units also provide card edge LEDs to indicate signal present, genlock present and audio groups present.

Features:

- High quality HD -> SD down conversion with Image enhancement
- Supports standard aspect ratio conversions plus all user definable
- Support all necessary colour space conversions (ITU rec. 601 to ITU rec.709)
- Full video processing functions, GBR gain YCrCb gain and offset, hue adjustment and RGB colour limiter
- Image Detail Enhancement with RGB gamma correction
- Reference input allows for phasing of output video
- Module supports min. delay or variable delay for video output without reference
- Module supports video output referenced to genlock with variable delay
- Output on screen display used to configure the operating modes
- De-embeds Audio from HD video input and embeds into SD video output (2 groups)
- Supports 4 retimed external AES inputs and outputs
- Moves RP-188 VITC and LTC from HD input to SD output, recalculated for frame rate changes
- Moves HD closed captions from HD input to SD output.

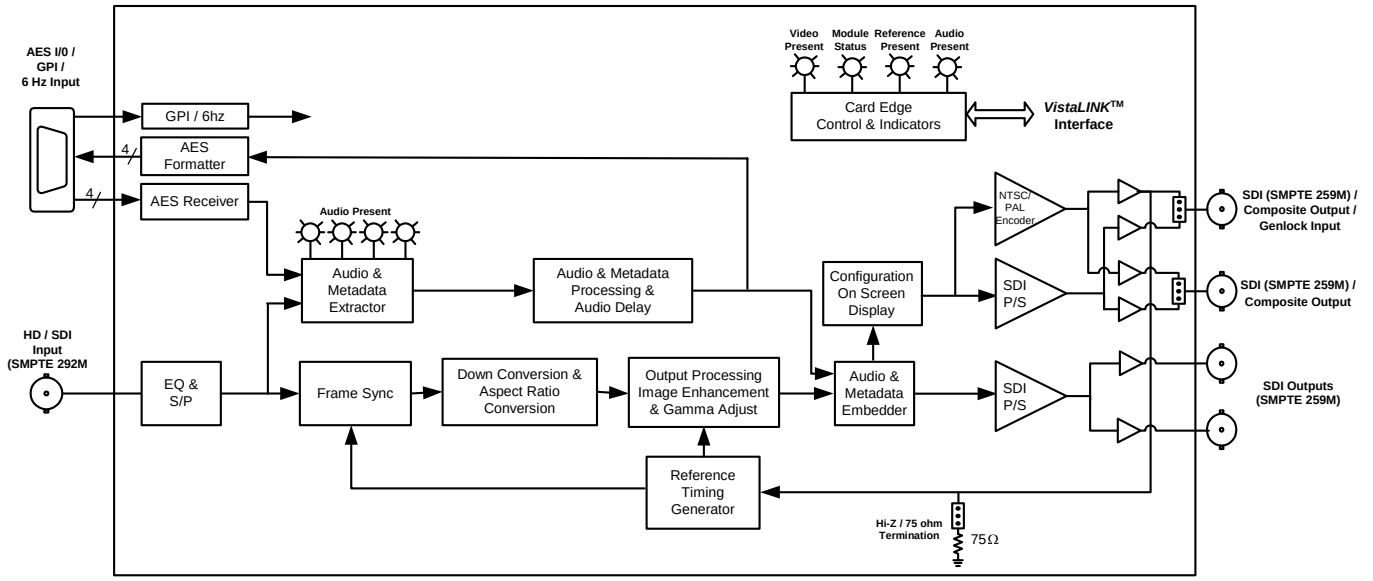


Figure 1-1: Block Diagram

2. INSTALLATION

The 7714HDC comes with a companion rear plate that occupies one slot in the frame. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

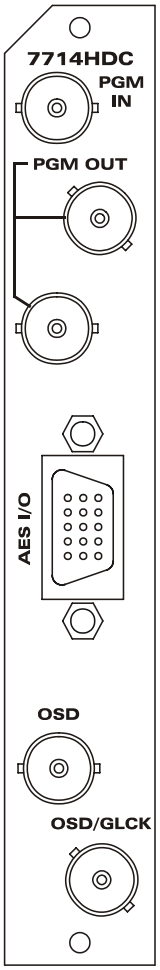


Figure 2-1: Rear Panel

2.1. VIDEO CONNECTIONS

PGM IN: Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 292M standard. The module needs to be set to a specific video input standard using the on screen menu at this current time.

PGM OUT: These two BNC connectors are used to output the converted input video as serial component video, compatible with the SMPTE 259M standard.

OSD: This BNC connector is used to output the downconverted input video with on screen display menus (OSD) superimposed over the video as serial component video. The output can be selected as with serial digital video compatible with the SMPTE 259M standard or as analog composite video depending on the setting of jumper J25.

OSD/GLCK: When the *OSD/GLCK BNC* menu setting is set to *OSD,* this BNC connector is used to output the downconverted input video with on screen display menus (OSD) superimposed over the video as serial component video compatible with the SMPTE 259M standard or as analog composite video depending on the setting of jumper J26. It can also be used as a genlock input reference (see section 2.2).

2.2. GENLOCK REFERENCE

For proper synchronization of the output video, the 7714HDC Down Converter must be locked to a genlock signal of the output video frame rate.

OSD/GLCK: When the *OSD/GLCK BNC* menu setting is set to *Genlock,* this BNC is used for connecting a video or tri-level sync reference and is auto-detected by the module. The output video can be timed with respect to the genlock video using the *H Phase Offset* and *V Phase Offset* menu items. (See section 6.3.1) When no Genlock is provided, the output video is timed with respect to the input video. To use this BNC as a genlock input, jumper J26 must be in the composite position. Jumper 21 selects the desired termination. (75 ohm / Hi-Z)

2.3. AES INPUT AND OUTPUT AUDIO CONNECTIONS

Four unbalanced AES input and outputs are provided on a HD DB-15 connector labeled **AES I/O.** 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. The transferred audio is also output as four AES pairs. Figure 2-1 shows the pinout of the DB-15 connector.

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

Table 2-1: AES Audio Connector Pinout

The 7714HDC is shipped with a breakout cable for the 15 pin D connector (Evertz Part # WPAES8-BNCM-6F) which can be used to facilitate wiring the audio and GPI connections. The pinout of the cable is shown in Table 2-2.

High Density DB-15 PIN (male)	Wire	Ground/Shield Connection	Labeled Name	Connector Type
1	Red		W1 RED	WIRE
2	Green		W2 GREEN	WIRE
3	Blue		W3 BLUE	WIRE
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
8	Yellow		W5 YELLOW	WIRE
9	Coax	Soldered to DB15 Shell	AES B2	BNC MALE
10	Coax	Soldered to DB15 Shell	AES B1	BNC MALE
11	Coax	Soldered to DB15 Shell	AES A1	BNC MALE
12	Coax	Soldered to DB15 Shell	AES B4	BNC MALE
13	Coax	Soldered to DB15 Shell	AES B3	BNC MALE
14	Coax	Soldered to DB15 Shell	AES A4	BNC MALE
15	Coax	Soldered to DB15 Shell	AES A3	BNC MALE
Shell	Black		GND	WIRE

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

2.4. GENERAL PURPOSE INPUTS

On the 7714HDC the HD DB-15 connector also contains 3 General Purpose Inputs (One used for 6HZ input and the other two are general purpose). See section 7.3 for information about configuring the GPI configuration.

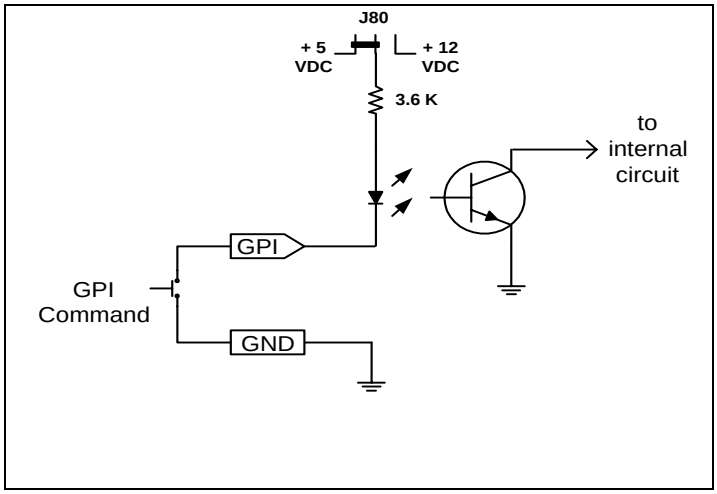


Figure 2-2: GPI Input Circuitry

3. SPECIFICATIONS

3.1. SERIAL DIGITAL VIDEO INPUTS

Standards: 270Mb/sec SMPTE 259M or 1.485 Gb/sec SMPTE 292M – menu selectable. SMPTE 260M, SMPTE 274M, SMPTE 296M, SMPTE 349M
Number of Inputs: 1
Connector: BNC per IEC 61169-8 Annex A
Input Equalization: Automatic to 100m @ 1.5Gb/s with Belden 1694 or equivalent cable.
Return Loss:
SD Standards: >15 dB up to 540Mb/s
HD Standards: >15 dB up to 1. 5Gb/s

3.2. SERIAL DIGITAL VIDEO OUTPUTS

Standard: 270Mb/sec SMPTE 259M
Number of Outputs: 2 Program, 2 selectable with OSD
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 740ps nominal
Overshoot: <10% of amplitude
Return Loss: > 15 dB at 540MHz

3.3. ANALOG COMPOSITE VIDEO OUTPUT

Standard: SMPTE 170M (NTSC), ITU-R BT470-6 (PAL)
Number of Outputs: 2 selectable with OSD
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 1V nominal
Output Impedance: 75 Ohm
DC Offset: 0V +/- 50mV
Return Loss: >45dB to 10MHz
Frequency Response: <+/- 0.1dB to 4 MHz (response will depend on selected filtering)
Differential Phase: < 0.5° (< 0.3° typical)
Differential Gain: < 0.5% (< 0.3% typical)
SNR: >75dB (black video, 100kHz to 5MHz)
Output level control range: ±10%
Black level control range: ±7.5 IRE
Chroma level control range: ±10%
Hue control range: ±15 deg. (NTSC only)

3.4. GENLOCK INPUT

Type: HD Tri-Level sync, NTSC or PAL Colour Black 1 V p-p
Connector: BNC per IEC 61169-8 Annex A
Termination: 75 ohm (jumper selectable)

3.5. AES AUDIO INPUTS / OUTPUTS

Number of Inputs / Outputs: 4
Standard: SMPTE 276M, single ended synchronous AES
Connectors: DB15 or BNC per IEC 61169-8 Annex A
Resolution: 24 bits
Sampling Rate: 48 kHz
Impedance: 75 Ω
Signal Level: 1 V p-p nominal

3.6. GENERAL PURPOSE INPUTS

Number: 3
Type: Opto-isolated, active low with internal pull-ups to +5 or +12V (jumper settable)
Connector: DB15
Signal Level: closure to ground
Function:
GPI2: 6 Hz
GPI: User Preset select

3.7. ELECTRICAL

Voltage: +12VDC
Power: 15 Watts
EMI/RFI: Complies with FCC regulations for class A devices.
Complies with EU EMC directive.

3.8. PHYSICAL

Number of slots: 1

4. STATUS INDICATORS

The 7714HDC has 4 LED Status indicators on the main circuit board front card edge to show operational status of the card at a glance. Figure 7-1 shows the location of the LEDs and card edge controls.

Two large LEDS on the front of the 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.

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.

4.1. AUDIO STATUS LEDS

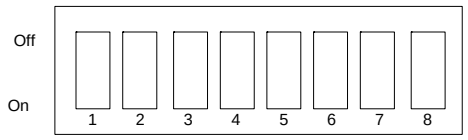
Four LEDs located on the lower end of the module (near the card extractor) indicate which audio groups are present in the input video. Audio group LED 1 is located closest to the center of the module.

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

5. CARD EDGE CONTROLS

The 7714HDC module is equipped with an 8 position DIP switch to allow the user to select various functions. All positions are assigned sequentially such that 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	Reserved for future use
2	
3	
4	
5	
6	Frame Rate Divisor Selection
7	
8	VistaLINK® Control Enable

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 VistaLINK®
On	Off	59.94/29.97/23.98
Off	On	50/25
On	On	Reserved for future use

Table 5-2: Frame Rate Divisor DIP Switch Settings

When DIP switches 6 and 7 are both off, the frame rate can be set by either the menu system or VistaLINK® only (they cannot be set by the DIP switches). The other three settings of DIP switches 6 and 7 allow setting of the frame rate manually using the DIP switches only (they cannot be set by the menu system or VistaLINK®).

5.2. SELECTING WHETHER THE MODULE WILL BE CONTROLLED FROM THE LOCAL CONTROLS OR THROUGH THE VISTALINK® INTERFACE

DIP switch 8 selects whether the module will be controlled from the local user controls or through the *Vista*LINK® interface.

DIP 8	VistaLINK® CONTROL
Off	The card functions are controlled through the local menus and DIP switches only.
On	The card functions are controlled through the *Vista*LINK™® interface (see section 8), the local menus and DIP switches.

Table 5-3: VistaLINK® Control Switch Settings

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, 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 gives 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 6.10 provide detailed descriptions of each of the sub-menus. The tables in sections 6.3 to 6.10 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.

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 output picture aspect ratio presets. Configuration of the scaler filter sharpness, panel colors, user cropping and output picture window size.
Proc Functions	Control the proc amp functions.
Audio	Sets up the audio embedders and de-embedders and delay.
Audio Process	Controls audio processing.
Closed Captioning	Controls closed captioning settings.
Composite Output	Controls composite output settings.
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 6.3.10 give detailed information about each of the menu items.

Frame Rate	Select the video input frame rate
Video Input	Selects the video input standard.
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
VITC Reader Line	Select line for VITC reader - SD input formats only (*)
VITC Generator Line	Select line for VITC generator. (*)
Time Code Source	Selects the source of Time Code. (*)
Loss of Video	Selects the action to take when the input video is missing
Force Minimum Delay	Set the H and V phase such that the path delay in minimized
Reference Select	Selects internal or video and locking reference
OSD / GLCK BNC	Selects whether the BNC is used as an OSD output or genlock input reference
V Phase Offset	Sets the vertical phase of the output signal relative to the genlock reference input
H Phase Offset	Sets the horizontal phase of the output signal relative to the genlock reference input

* - These functions are not yet implemented

6.3.1. Setting the Video Input and Output Frame rate

Video *Frame Rate* *59.94/29.97/23.98* *50/25*	This control selects the group of frame rates that are available on the *Input Standard* menu item. The card does not do temporal processing so converting from one frame rate to another is not possible.

6.3.2. Setting the Input Video Standard

Video
- *Input Standard*
  - *Auto*
  - *1080i59.94/60*
  - *1080p29.97/30*
  - *1080p29.97/30sF*
  - *1080p23.98/24*
  - *1080p23.98/24sF*
  - *1035i59.94/60*
  - *720p59.94/60*
  - *720p29.97/30*
  - *480p59.94/60*
  - *525i59.94/60*
  - *1080p25*
  - *1080p25sF*
  - *1080i50*
  - *720p50*
  - *625i50*

This control selects the input video standard being used. The choice of input standards available is dependent upon the *Frame Rate* menu setting. For example to select 1080i/59.94 as the input format set the *Frame Rate* menu to *59.94/29.97/23.98* and set this menu item to *1080i59.94/60*. Interlaced video formats are shown with the number of fields per second. Progressive formats are shown with the number of frames per second.

The module is not capable of temporal processing, so it will not convert between 59.94 and 50 and related frame rates. The card will add or remove 3:2 pulldown when converting between nominal 24Hz and 30/60 Hz but will not do a temporal frame conversion.

6.3.3. 3:2 Pulldown Processing

When using a 1080p/23.98sF input video 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.

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

This menu setting is only used when the input video is 1080p/23.98sF. In other input video formats it is not applicable

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

On 1080p/23.98sF video inputs 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 be delayed by 2 frames, will consist of two video fields and will normally be in time with the genlock input. (See sections 6.3.1 and 6.3.15 for information on phasing of the output video with respect to the genlock.) 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 6.3.5)

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

- 6 Hz pulse if present
- RP188 ancillary timecode if present (feature not implemented yet)
- Free Run pulldown if neither 6 Hz pulse or RP188 is present

Select *RP 188* when the embedded ancillary timecode present on the input video is used to determine the pulldown. The input frames with time code frame numbers divisible evenly by 4 will normally identify the input A frame candidates. (Feature not implemented at time of writing)

Select *6 Hz Input* when a 6 Hz pulse connected to pin 1 of the **AUXILIARY I/O** connector is used to determine the pulldown. The 6 Hz pulse should be a 1/30th second wide TTL level active high pulse occurring 6 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 specific frames of the input video.

* This function is not yet implemented

6.3.5. Accommodating Non-Standard 3:2 Sequences

This menu setting is only used when the input video is 1080p/23.98sF. In other input video formats it is not applicable

Video
A Frame Offset
0
1
2
3

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

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.

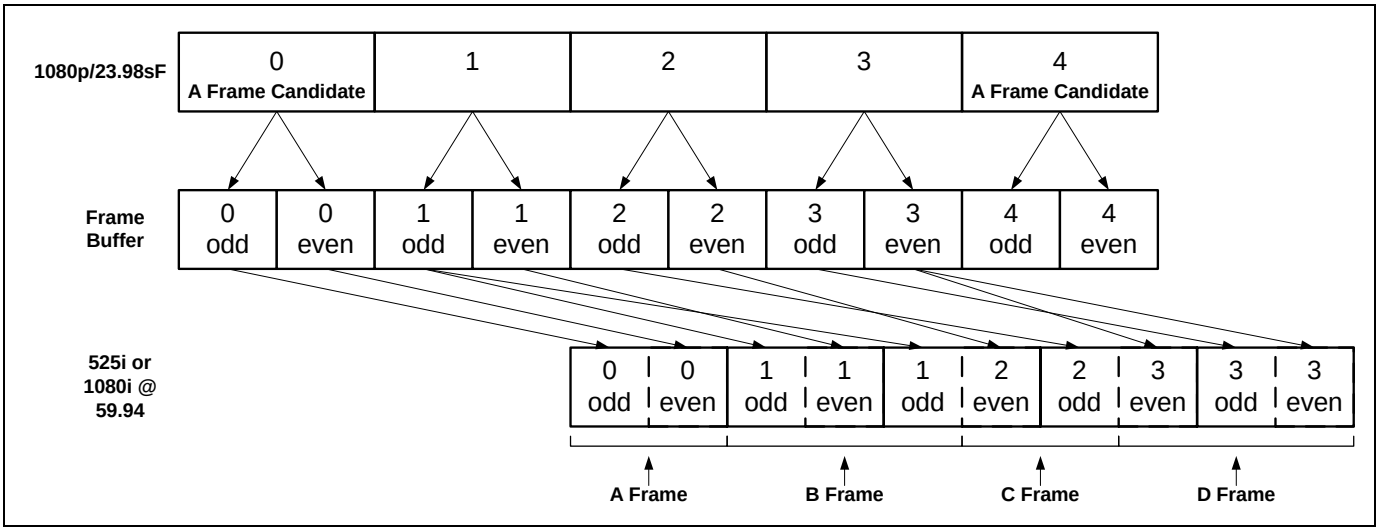


Figure 6-1: 3:2 Pulldown Sequence Insertion – 1080p/23.98sF Input Video

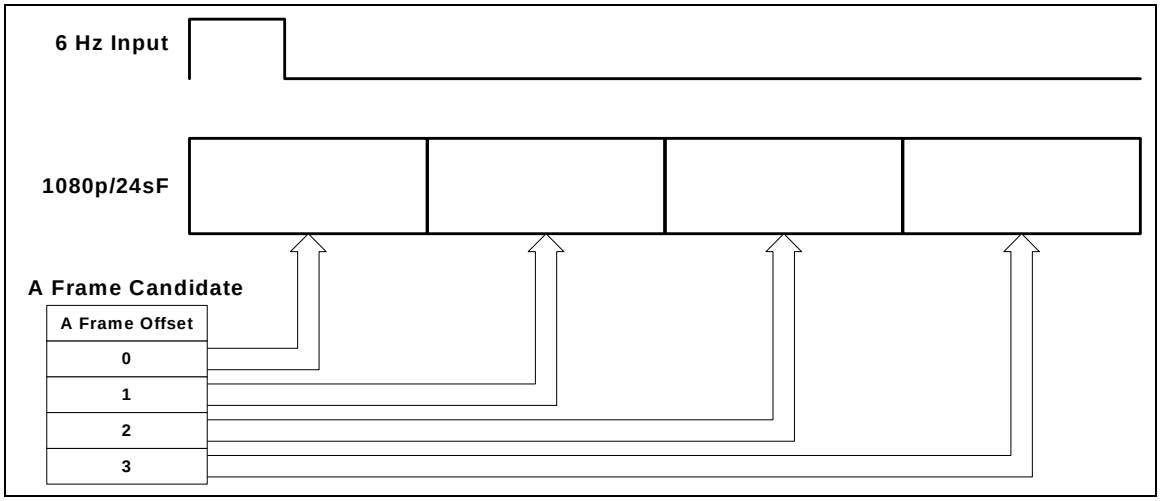


Figure 6-2: 6 Hz Pulldown Sequence A Frame Alignment – 1080p/23.98sF Input Video

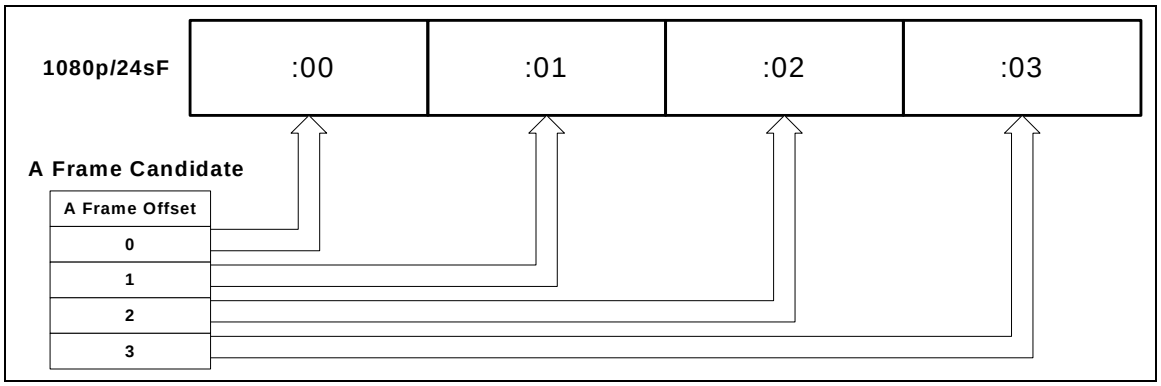


Figure 6-3: RP188 Pulldown Sequence A Frame Alignment – 1080p/23.98sF Input Video

6.3.6. Setting the VITC Reader Line for SD Video Inputs (Not Yet Implemented)

Video
VITC Reader Line
14 for 525
19 for 625
n/a

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 22 for 625i/50* inputs*.*

The value shown is *n/a* when this menu item does not apply to the input standard.

6.3.7. Setting the VITC Writer Line for SD Video Outputs (Not Yet Implemented)

Video
VITC Generator Line
14 for 525
19 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 22 for 625i/50* inputs*.*

6.3.8. Setting the source of Time Code (Not Yet Implemented)

Video
Time Code Source
Embedded
External LTC
off

This control selects the source of Timecode. Either Embedded or the external LTC input if available.

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.

The value shown is *off* when this menu item does not apply to the input standard.

6.3.9. 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.

6.3.10. Setting up the Video Output Timing

The input stage of the 7714HDC Down Converter 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.

6.3.10.1. Calculating the Delay through the Down Converter

The delay through 7714HDC Down Converter is dependent on the video input format, the Down Converter processing mode and the *V Phase Offset* and *H Phase Offset* settings. 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.

6.3.11. Force minimum Delay

Video
Force minimum Delay

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.

Note: The input video must be synchronous with the selected genlock for this control to have any meaning.

6.3.12. Selecting the Video Reference Source

Video
Reference Select
Video
External

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

6.3.13. Selecting the Direction of the OSD / Genlock BNC

Video
OSD / GLCK BNC
OSD
Genlock

With this control the direction or use of the OSD / GCLK BNC is set.

Select *Genlock* to use the BNC as a genlock input.

Note: This control can only be set to *Genlock* when Reference Select is set to *External*.

Select *OSD* to use the BNC as another composite output or to use it as an SD output.

Note: To use this BNC as a genlock input, jumper J26 must be set to composite.

6.3.14. 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 in time 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. 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 input and the video output.

6.3.15. 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 in time 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.

6.4. CONFIGURING THE SCALER

The Down Converter scaler uses a process of filtering in order to increase or reduce the resolution during down conversion. The *Scaler* menus are used to configure the cut-off frequencies of the filters associated with the scaler hardware. The chart below shows the items available in the *Scaler* menu. Sections 6.4.1 to 6.4.4 give detailed information about the menu items.

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
AR	Selects the aspect ratio conversion to be performed
Panel Colors Red	Sets the color of the letterbox panels.
Panel Colors Green	Sets the color of the letterbox panels.
Panel Colors Blue	Sets the color 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* *1 to 64*	With this control, you can set the cutoff frequency of the horizontal filter. Set to either Auto or select 1 of 64 filters 1 thru 64, which are full bandwidth to 1/64th the bandwidth of the input signal.
Scaler *V Filter Cutoff* *Auto* *1 to 64*	With this control, you can set the cutoff frequency of the vertical filter. Set to either Auto or select 1 of 64 filters 1 thru 64, which are full bandwidth to 1/64th the bandwidth of the input signal.

6.4.2. Setting the Aspect Ratio of the Output Picture

The *Aspect Ratio* menu presets the user image conversion parameter to build its presets. Once selected the user can fine adjust the picture parameters via the input and output H and V stop 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 colored 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.
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.
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 settings for converting 16:9 aspect ratio images to common 4:3 formats.

6.4.3. 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 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 the colour of the side panels. Set the R, G or B value for the side panel colour that you want.

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

6.4.4. 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.

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.

6.5. CONFIGURING THE VIDEO PROCESSING FUNCTIONS

The *Proc Functions* menu is used to configure parameters associated with the video processing functions of the down converter. The chart below shows the items available in the *Proc Functions* menu. Sections 6.5.1 to 6.5.12 give detailed information about each of the menu items.

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.

Image Enhancement	Controls all Image Enhancement Adjustments.
RGB Clip	Controls RGB Clipping.
Gamma Adjust	Controls all Gamma Adjustments.
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	+/- 10 degrees 0.1 degree steps.
R Gain	Sets the Gain in RGB Domain.
G Gain	Sets the Gain in RGB Domain.
B Gain	Sets the Gain in RGB Domain.
Gamma Level	Sets the gamma correction factor.
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 gain for vertical enhancements.
Detail Gain	Sets the detail gain for image enhancement.

6.5.1. Setting Image Enhancement Adjustment

Proc Functions
- *Image Enhancement*
  - *Enable*
  - *Disable*

With this control the user can disable or enable all image enhancement adjustments that have been made. This option will override all image enhancement menu items (*Luma Floor, Detail Noise Floor, Enhancement Limit, Horizontal Band, Vertical Intensity, Detail Gain)* without changing their values.

6.5.2. Setting RGB Clipping

Proc Functions
- *RGB Clip*
  - *Disable*
  - *Enable*

With this control the user can disable or enable RGB clipping. When enabled, RGB clipping will automatically limit RGB values that fall beyond legal limits.

6.5.3. Setting Gamma Adjustment

Proc Functions
- *Gamma Adjust*
  - *Disable*
  - *Enable*

With this control the user can disable or enable all gamma adjustments that have been made. This option will override the *Gamma Level* menu item without changing its values.

6.5.4. Setting the Gain Levels

There are six controls that set the gain of the video. For simplicity, only one control will be shown in the manual.

Proc Functions
- *Y Gain*
  - *+/- 30%*

With these controls the user can adjust the gain of the 3 components in either the Y Cr Cb domain or the R G B domain over a range of +/-10% in 0.1% steps.

Gain adjustments in the Y, Cb, Cr domain are made first, then gain adjustments in the RGB domain. Illegal values are clipped after gain adjustments.

6.5.5. Setting the DC Offset

There are three controls that set the DC Offset of each component of the video. For simplicity, only one control will be shown in the manual.

Proc Functions
Y Offset
+/- 100

With these controls the user can adjust the DC offset of the 3 components in the Y Cr Cb domain in +/- 100 quantization levels.

6.5.6. Setting the Hue

Proc Functions
Hue
+/- 10

With this control the user can adjust the Hue or color of components +/- 10 degrees.

6.5.7. Setting the Gamma Level

Proc Functions
Gamma Level
+/- 128

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

6.5.8. Setting the Luma Floor

Proc Functions
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.

6.5.9. Setting the Detail Noise Floor

Proc Functions
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 will be left untouched.

6.5.10. Setting the Enhancement Limit

Proc Functions
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.

6.5.11. Setting the Horizontal Band

Proc Functions
Horizontal Band
0 to 20

Selects the Horizontal frequency band to be enhanced.

Where 0 selects the lowest frequency band available and 20 the highest. The range is 0 to 20 in increments of 5.

6.5.12. Setting the Vertical Intensity

Proc Functions *Vertical Inensity* *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.

6.5.13. Setting the Detail Gain

Proc Functions *Detail Gain* *0 to 127*	Selects the amount of detail that is present in the picture.

6.6. 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. The down converter 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 down converter also has 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. Sections 6.6.1 to 6.6.2 give detailed information about each of the menu items.

De-embedder A	Sets the audio group for de-embedder A (Channels 1 to 4)
De-embedder B	Sets the audio group for de-embedder B (Channels 5 to 8)
Embedder Group A	Sets the audio group destination for embedder A
Embedder Group B	Sets the audio group destination for embedder B
Audio Delay	Adjusts the audio delay from the nominal video delay
SRC Mode	Sets the mode of the Sample Rate Converters
Input Ch 1 & 2 Source	Sets the source of audio channels 1 and 2
Input Ch 3 & 4 Source	Sets the source of audio channels 3 and 4
Input Ch 5 & 6 Source	Sets the source of audio channels 5 and 6
Input Ch 7 & 8 Source	Sets the source of audio channels 7 and 8

6.6.1. Selecting the Audio Source for the De-embedders

There are two controls that set the sources of audio to de-embed with the card delays. 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 de-embedder B should be different otherwise the audio will be repeated on the SD SDI output.

The default for De-embedder A is group 1 and the default group for De-embedder B is group 2.

6.6.2. Selecting the Audio Groups That Will Be Embedded

The down converter card has two embedders that each insert one group of audio on the serial digital video output. The source for Embedder A is the audio selected by the *De-embedder A* menu item and the source for Embedder B is *De-embedder B* menu item. 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.

6.6.3. Selecting the Audio Delay

- *Audio*
  - *Audio Delay*
    - *+/- 100.0 ms*

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

Note: Negative values are limited to the amount of video delay that causes the delay to be only the audio processing delay. The card does not have negative delay capability.

6.6.4. Configuring the Sample Rate Converters

Audio
SRC Mode
Auto
Bypass
Enable

This control is used to configure the sample rate converters.

Select *Auto* to use the sample rate conversion if the conditions presented by the input are suitable.

Select *Bypass* to bypass all audio synchronization and sample rate conversion functions.

Select *Enable* for normal audio synchronization and sample rate conversion functions.

6.6.5. Configuring the Audio Input Source

The source of the audio channels can be set to either embedded audio from the video stream, or AES audio from the AES inputs. There are four controls, one for each audio pair: 1 & 2, 3 & 4, 5 & 6, and 7 & 8. For simplicity, only one control will be shown in the manual.

Audio
Input Ch 1&2 Source
DMX A1
AES1

Select *DMX A1* for audio from the de-embedders.

Select *AES1* for audio from the AES inputs.

6.7. CONFIGURING THE AUDIO PROCESSING FUNCTIONS

The *Audio Proc* menus are used to configure parameters associated with the audio processing functions of the down converter. The chart below shows the items available in the *Audio Process* menu. Sections 6.7.1 to 6.7.2 give detailed information about each of the menu items.

Output Ch1	Sets what audio will be output on channel 1 of group A
Output Ch2	Sets what audio will be output on channel 2 of group A
Output Ch3	Sets what audio will be output on channel 3 of group A
Output Ch4	Sets what audio will be output on channel 4 of group A
Output Ch5	Sets what audio will be output on channel 1 of group B
Output Ch6	Sets what audio will be output on channel 2 of group B
Output Ch7	Sets what audio will be output on channel 3 of group B
Output Ch8	Sets what audio will be output on channel 4 of group B
Input Ch1 Gain	Sets the gain of audio input channel 1 of group A
Input Ch2 Gain	Sets the gain of audio input channel 2 of group A
Input Ch3 Gain	Sets the gain of audio input channel 3 of group A
Input Ch4 Gain	Sets the gain of audio input channel 4 of group A
Input Ch5 Gain	Sets the gain of audio input channel 1 of group B
Input Ch6 Gain	Sets the gain of audio input channel 2 of group B
Input Ch7 Gain	Sets the gain of audio input channel 3 of group B
Input Ch8 Gain	Sets the gain of audio input channel 4 of group B

6.7.1. 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 output ch1 will be shown in the manual.

Audio Process
Output Ch1
Input Ch1
Input Ch2
Input Ch3
Input Ch4
Input Ch5
Input Ch6
Input Ch7
Input Ch8
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 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 on de-embedder A)

6.7.2. 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 Process
Input Ch1 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.

6.8. CONFIGURING THE CLOSED CAPTIONING PARAMETERS

The *Closed Captioning* menu is used to configure how closed captions are processed. The chart below shows the items available in the *Closed Captions* menu. Sections 6.8.1 gives detailed information about each of the menu items.

Main Captions	Controls whether closed captions will be displayed on the program video outputs.

6.8.1. Enabling Closed Captions

Closed Captions
  Main Captions
  Off
  On
	The main captions control enables and disables closed captions on all outputs.

6.9. CONFIGURING THE ANALOG VIDEO OUTPUT PARAMETERS

The 7714HDC Down Converter provides a broadcast composite analog standard definition video output in addition to the standard serial digital output. The *Composite Output* menus are used to configure parameters associated with the composite analog video output. The chart below shows the items available in the *Composite Output* menu. Sections 6.9.1 to 6.9.10 give detailed information about each of the parameters.

NTSC setup pedestal	Selects whether the NTSC 7.5 IRE pedestal will be added to the composite analog output video.
Colour Bars	Turn on internally generated colour bar test signal.
Composite display mode	Selection of colour or B/W modes.
Video level	Controls the output video level.
Hue	Controls the output video hue.
H blanking	Controls the width of horizontal blanking.
VBI processing	Either pass or blank the vertical blanking interval lines.
Y Filter Selection	Standard composite filtering or adjustable filtering is selectable.
Wideband Frequency	Controls the frequency response with the wideband filter selected.
Chroma Filter	Various chroma bandwidths are available with this control.

6.9.1. Adding the NTSC Setup Pedestal

Composite Output
NTSC setup pedestal
Off On

Composite NTSC analog video may have a 7.5 IRE pedestal while 4:2:2 SDI video does not. This control, when set to *On*, will add the pedestal and re-scale the video accordingly. The setup pedestal should not be present on composite video when operating in Japan.

6.9.2. Colour Bars

Composite Output
Colour bars
On, Off

This control enables and disables an internally generated colour bar signal to aid in video level calibration.

Note: If the composite output is being used to view the OSD menu, the menu will disappear when the test signal is engaged.

6.9.3. Setting the Composite Display Mode – Colour or Monochrome

Composite Output
Composite display mode
Colour B/W

If monochrome operation is desired on the composite output, colour may be turned off with this control.

6.9.4. Setting the Video Level

Composite Output
Video level
-64 to 64, 0

This control allows the user to adjust the output level of the analog video (including sync). When set to 0, the nominal output video level will be 140 IRE.

6.9.5. Setting the Hue

Composite Output
Hue
-22.5 to 22.5 0.0

This control allows the user to adjust the Hue of the analog video in steps of 0.1 degrees.

6.9.6. Setting the Horizontal Blanking

Composite Output
H Blanking
Wide, Narrow

When set to *Narrow*, the H blanking will be 10.7µsec wide. When set to Wide, the H blanking will be 11.2µsec.

6.9.7. Configuring the VBI Processing

Composite Output VBI Processing *Blank,* *Pass*	The Vertical Blanking Interval may be passed to the component outputs or may be blanked (removed) to not interfere with display of the image.

6.9.8. Selecting the Y Filter

Composite Output Y Filter Selection *Wide bandwidth,* *Composite*	The Y channel may be filtered with a standard composite filter or may be wideband. When *Wide bandwidth* is selected, the following control allows the frequency response to be adjusted.

6.9.9. Setting the Wideband Frequency

Composite Output *Wideband Frequency* *-6 to 6* *0*	When the above parameter is set to *Wide bandwidth*, this controls a set of high frequency response curves with +/- 4dB range. **Note:** If you want to observe the filtering, supply a component multi-burst or H sweep test signal.

6.9.10. Setting the Chroma Filter Bandwidth

Composite Output Chroma Filter *650kHz,* *1.0Mhz,* *1.3MHz,* *2.0MHz,* *3.0MHz*	The Cb and Cr channels may be filtered with any of these bandwidths. **Note:** If you want to observe the filtering, supply a component multi-burst or H sweep test signal.

6.10. UTILITIES

The *Utilities* menu items 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 6.10.1 to 6.10.6 give detailed information about each of the parameters.

Recall 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.
Upgrade	Used to upgrade the firmware in the module.
Status WIndow	Enable or Disable display of the status screen.
GPI 1	Selects the function of GPI1 - Recall Preset 1-10/OFF.
GPI 2	Selects the function of GPI2 - Recall Preset 1-10/OFF
About…	Shows the firmware version of the module.

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

The down converter provides 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.

6.10.1.1. Recalling Configurations from the User Presets

Utilities
- *Recall Preset*
  - *Cancel*
  - *Factory*
  - *1 to 10*

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 *Cancel* is displayed.

6.10.1.2. Storing Configurations from the User Presets

Utilities
Store Preset
Cancel 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 *Cancel* is displayed.

6.10.2. Disabling Auto Recall Presets when the Video Input/Output Standards Change

Utilities
Auto Recall Presets
Disable Enable

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 ensures that all the preset recall parameters take effect.

6.10.3. Recall Presets via GPIs

The converter modules provide ten user presets that can be recalled via external GPI inputs. There are two 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 1-10

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.*

6.10.4. 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 parameters on the OSD output when the menus are not being displayed.

6.10.5. 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 7714HDC is 115,200 baud.

6.10.6. Accessing Information About this Module and its Firmware

Utilities
About…

This control provides the basic module information and the firmware version of the card. It gives quick access to information about revisions that can be used to determine when upgrades are required.

7. JUMPERS

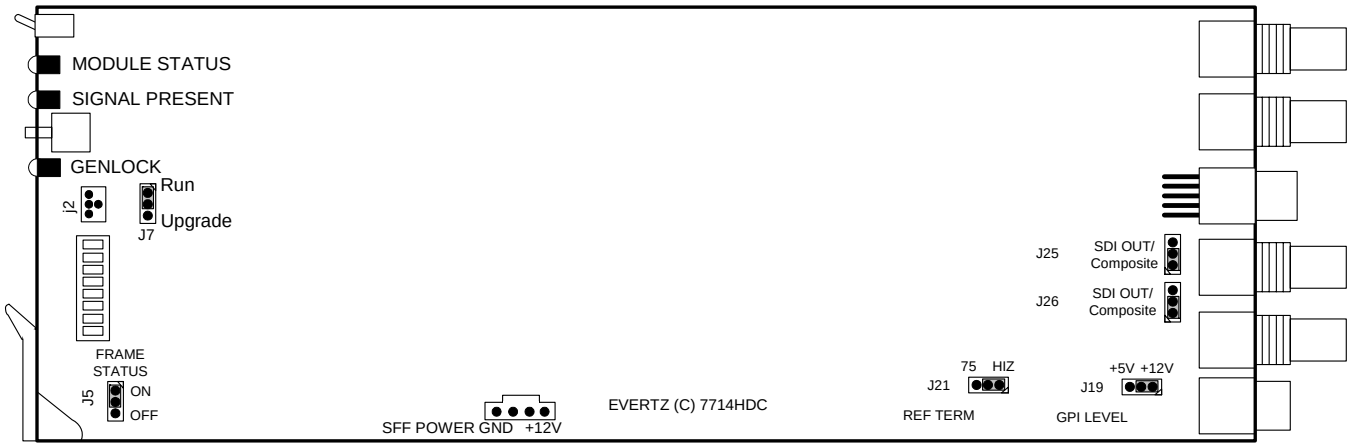


Figure 7-1: Location of LEDs and Jumpers

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 6.10.5) or using the **UPGRADE** jumper.

UPGRADE: The UPGRADE jumper J7, is located near the front card edge and is used when firmware upgrades are being done to the module. For normal operation it should be in the *RUN* position as shown in the diagrams above. See the *Upgrading Firmware* chapter in the front of the binder for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move Jumper 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 complete, 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 7714HDC series modules is 115,200 baud.

7.3. SELECTING THE GPI PULLUP VOLTAGE

The GPI jumper J19, located near the rear of the module, selects whether the 6 HZ and general purpose inputs will be pulled up to +5 volts or +12 Volts. Figure 7-2 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,

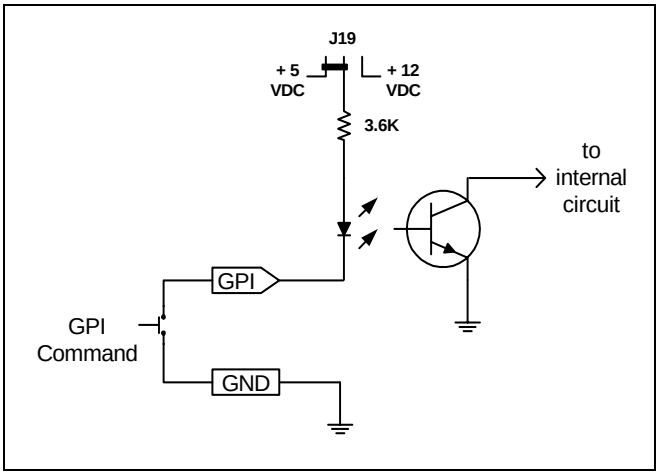


Figure 7-2 : Setting the GPI Input Pullup Voltage

7.4. SELECTING COMPOSITE OR SDI OUTPUT

The 7714HDC can output either analog composite video or SDI via jumper selections J25 and J26 illustrated in Figure 7-1 above. When the *OSD/GLCK BNC* is configured for composite output (J26 set to composite) the REF TERM jumper must be set to Hi-Z or the analog output levels will be attenuated.

7.5. SELECTING WHETHER THE GENLOCK REFERENCE INPUT IS TERMINATED

TERM/UNTERM: The REF TERM jumper J21 is used to terminate the genlock input. When it is in the 75 position a 75 ohm terminating resistor will connected the input to ground. When it is in the HiZ position the genlock input will be high impedance. The jumper is located in different places depending on the version of the frame synchronizer.

When the *OSD/GLCK BNC* is configured for composite output (J26 set to composite) the REF TERM jumper must be set to HIZ or the analog output levels will be attenuated.

8. *VISTA*LINK® REMOTE MONITORING/CONTROL

8.1. WHAT IS *VISTA*LINK®?

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

There are 3 components of SNMP:

1. An SNMP manager also known as a Network Management System (NMS) is a computer running special software that communicates with the devices in the network. Evertz *Vista*LINK® Pro 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 7714HDC), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK® frame controller module, which serves as the Agent.

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

For more information on connecting and configuring the *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.
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.
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 Present	Indicates the presence of AES 1.
AES 2 Present	Indicates the presence of AES 2.
AES 3 Present	Indicates the presence of AES 3.
AES 4 Present	Indicates the presence of AES 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.
Six Hertz Present	Indicates the presence of 6 Hz signal.
CDP Parser	Indicates the state of the CDP parser.
Audio Delay	Audio Delay.
Video Delay	Video Delay.
Dip Switch Active	Indicates whether the 7714HDC is under local control or *Vista*LINK® control (the state of DIP switch 8).

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

8.3. *VISTA*LINK® CONTROLLED PARAMETERS

Parameter	Description
Video Frame Rate	Select the video input frame rate.
Video Standard Input	Selects the video input standard.
Output Pulldown Reference	Selects 3:2 pulldown reference.
A Frame Offset	Sets the offset of the A Frame.
VITC Line Read	Select decode line for VITC. SD input only
VITC Line Write	Select line for VITC insert. SD output only
Loss of Video	Selects the action to take when the input video is missing.
Force Minimum Phase	Set the H and V phase such that the path delay in minimized.
Reference Select	Set video or external genlock for card locking.
OSD/ GLCK BNC	Sets the direction of the OSD / GLCK BNC.
V Phase Offset	Sets the vertical phase.
H Phase Offset	Sets the horizontal phase.
H Filter	Sets the type of the horizontal filter in the scaler.
V Filter	Sets the type of the vertical filter in the scaler.
H Rate Limit	Enable a rate limit on the horizontal edges.

V Rate Limit	Enable a rate limit on the vertical edges.
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.
Image Enhancement	Enable image enhancement controls.
RGB Clip	Enables RGB clipping.
Gamma Adjust	Enables gamma controls.
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 0.1 degree steps.
R Gain	Varies the Gain in RGB Domain.
G Gain	Varies the Gain in RGB Domain.
B Gain	Varies the Gain in RGB Domain.
Gamma Level	Gamma correction Level.
Luma Floor	Sets the gamma correction factor.
Detail Noise Floor	Sets the value in which all image detail below will be considered noise.
Enhancement Limit	Sets the minimum level of detail required before the enhancer is enabled.
Horizontal Band	Sets the horizontal frequency band.
Vertical Intensity	Sets the intensity of the vertical enhancement process.
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 the mode of the sample rate converters.
Input Ch 1&2 Source	Sets the source of audio channels 1 and 2.
Input Ch 3&4 Source	Sets the source of audio channels 3 and 4.
Input Ch 5&6 Source	Sets the source of audio channels 5 and 6.
Input Ch 7&8 Source	Sets the source of audio channels 7 and 8.

Output Ch1	Sets what audio will be output on channel 1.
Output Ch2	Sets what audio will be output on channel 2.
Output Ch3	Sets what audio will be output on channel 3.
Output Ch4	Sets what audio will be output on channel 4.
Output Ch5	Sets what audio will be output on channel 5.
Output Ch6	Sets what audio will be output on channel 6.
Output Ch7	Sets what audio will be output on channel 7.
Output Ch8	Sets what audio will be output on channel 8.
Input Ch1 Gain	Sets the gain of Audio channel 1 of group A.
Input Ch2 Gain	Sets the gain of Audio channel 2 of group A.
Input Ch3 Gain	Sets the gain of Audio channel 3 of group A.
Input Ch4 Gain	Sets the gain of Audio channel 4 of group A.
Input Ch5 Gain	Sets the gain of Audio channel 1 of group B.
Input Ch6 Gain	Sets the gain of Audio channel 2 of group B.
Input Ch7 Gain	Sets the gain of Audio channel 3 of group B.
Input Ch8 Gain	Sets the gain of Audio channel 4 of group B.
Main Captions	Enables closed captions.
NTSC setup pedestal	Selects whether the NTSC 7.5 IRE pedestal will be added to the composite analog output video.
Colour Bars	Turn on internally generated colour bar test signal.
Composite display mode	Selection of colour or B/W modes.
Video level	Controls the output video level.
Hue	Controls the output video hue.
H blanking	Controls the width of horizontal blanking.
VBI processing	Either pass or blank the vertical blanking interval lines.
Y Filter Selection	Standard composite filtering or adjustable filtering is selectable.
Wideband Frequency	Controls the frequency response with the wideband filter selected.
Chroma Filter	Various chroma bandwidths are available with this control.
Recall Preset	Used to recall the current module configuration.
Store Preset	Used to store the current module configuration.
GPI 1	Selects the function of GPIO1.
GPI 2	Selects the function of GPIO2.
Status Window	Enables the status window.

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

8.4. *VISTA*LINK® TRAPS

The 7714HDC contains a temperature trap that indicates whether or not the current temperature of the device is within operating temperatures. The trap turns on at 100 degrees Celsius, and turns off at 95 degrees Celsius.

9. MENU QUICK REFERENCE

Video
- Video Frame Rate
- Video Standard Input
- Pulldown Reference
- A Frame Offset
- VITC Read Select (*)
- VITC Write Select (*)
- Time Code Source (*)
- Loss of Video
- Force Minimum Delay
- Reference Select
- OSD / Genlock BNC
- V Phase Offset
- H Phase Offset

Scaler
- H Filter Cutoff
- V Filter Cutoff
- Aspect Ratio
- 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

Proc Functions
- Image Enhancement
- RGB Clip
- Gamma Adjust
- Y Gain
- Y Offset
- Cr Gain
- Cr Offset
- Cb Gain
- Cb Offset
- Hue
- R Gain
- G Gain
- B Gain
- Gamma Level
- Luma Floor
- Detail Noise Floor
- Enhancement Limit
- Horizontal Band
- Vertical Intensity
- Detail Gain

Audio
- De-embedder A
- De-embedder B
- Embedder A
- Embedder B
- Audio Delay
- SRC Mode
- Input Ch 1 & 2 Source
- Input Ch 3 & 4 Source
- Input Ch 5 & 6 Source
- Input Ch 7 & 8 Source

Audio Process
- Output Ch1
  …
- Output Ch8
- Input Ch1 gain
  …
- Input Ch8 gain

Closed Captioning
- Main Captions

Composite Output
- NTSC setup pedestal
- Colour Bars
- Composite display mode
- Video level
- Hue
- H blanking
- VBI processing
- Y Filter Selection
- Wideband Frequency
- Chroma Filter

Utilities
- Recall Preset
- Store Preset
- Auto Recall Presets
- Upgrade
- Status Window
- GPI 1
- GPI 2

About…