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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.2	Preliminary Version	Aug 02
0.3	Updated with features of first firmware version 1.01 build 310	Feb 03
1.0	Updated with Vistalink™ features, added Delay in Table 6-1 and Table 6-2 Updated menus to current firmware level	Mar 03
1.0.1	Updated Delay Tables	Aug 03
1.1	Updated formatting	May 09

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1. OVERVIEW

The 7711HDC High Definition Downconverter provides broadcast quality down conversion of your 1.5 Gb/s HDTV signals. This High Definition Downconverter has 10-bit processing with Serial Digital & optional Composite Analog outputs and is designed to fit easily into a plant that is fully digital, analog or mixed. The 7711HDC accepts all the major HD video formats as shown in Table 3-1 and provides extensive control over the downconversion process. When the 7711HDC downconverts 1080p/24sf input video to 525i/60 with a 3:2, the 3:2 pulldown can be free run or locked to embedded RP188 or an external 6Hz input.

The 7711HDC provides card edge LEDs to indicate signal present, genlock present and audio groups present. The 7711HDC has colour space conversion from ITU rec. 709 to ITU rec. 601, and will provide various down converted formats such as 16:9 letterbox, 14:9 letterbox, 13:9 letterbox, 4:3 center crop, and 4:3 anamorphic squeeze.

The 7711HDC is available in two versions to support a wide variety of customer applications.

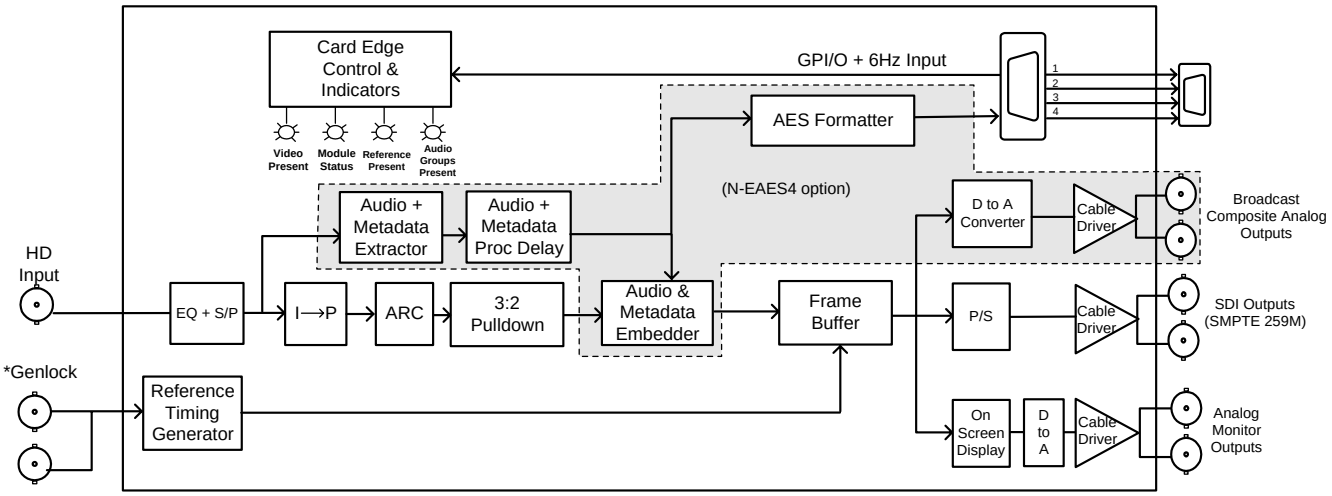
Model	Video			Audio			TimeCode/ Captions
	SDI	Monitor Analog	Broadcast Analog	Embedded In	Embedded Out	AES Out	
7711HDC-S	2	2	---		---		
7711HDC-SN-EAES4	2	2	2	2 groups	2 groups	4	Yes

The 7711HDC-SN-EAES4 version de-embeds two groups of audio and re-embeds the audio on the SDI output in time with the video. The audio is also available as 4 unbalanced AES outputs. The 7711HDC-SN-EAES4 also handles VANC data like captioning and timecode on the HD and moves it onto the SDI outputs.

The 7711HDC occupies two card slots in the 3 RU frame, which will hold up to 15 modules or one slot in the 1RU frame, which will hold up to three modules.

Features:

- Broadcast quality HD -> SD down conversion
- Optional broadcast quality analog outputs
- Supports 16:9 letterbox, 14:9 letterbox, 13:9 letterbox, 4:3 center crop, and 4:3 anamorphic squeeze aspect ratio conversions
- 1080p/24sF conversion to 525i/60 with 3:2 pulldown sequence determined by RP188 or 6Hz input
- HD to SD colour space conversion (ITU rec. 709 to ITU rec. 601)
- 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
- Analog monitor output on screen display used to configure the operating modes
- EAES4 version de-embeds Audio from HD video and embeds into SD video (2 groups)
- EAES4 version moves VANC data (e.g. captioning, timecode) from the HD video onto the SDI outputs
- VistaLINK® - enabled offering remote monitoring, control and configuration capabilities via SNMP. VistaLINK® is available when modules are used with the 3RU 7700FR-C frame and a 7700FC VistaLINK® Frame Controller module in slot 1 of the frame



* A genlock loop is provided for output phasing capability only

Figure 1-1: 7711HDC Block Diagram

2. INSTALLATION

The 7711HDC-S comes with a companion rear plate that occupies two slots in the frame and has 7 BNC connectors, and one female DB9 connector. The 7711HDC-SN-EAES4 comes with a companion rear plate that occupies two slots in the frame and has 9 BNC connectors, and one female DB9 connector. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

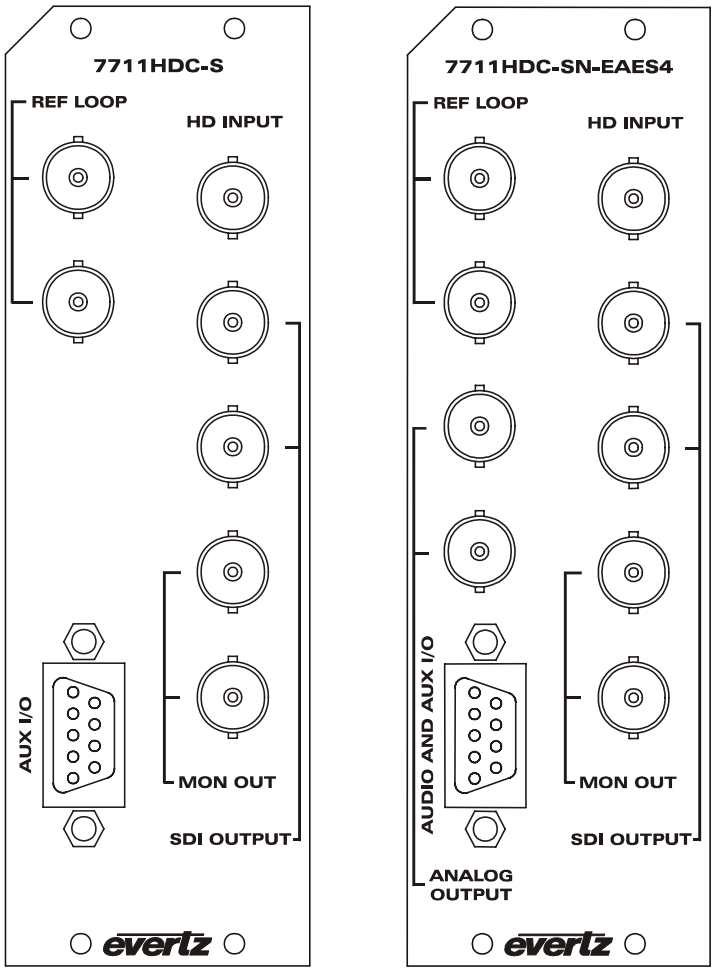


Figure 2-1: 7711HDC Rear Panels

2.1. VIDEO CONNECTIONS

HD INPUT: Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 292M standard. The 7711HDC can be set to automatically detect the standard or set to a specific video standard using the on screen menu. See Table 3-1 for a list of the video standards supported.

SDI OUTPUT: These two BNC connectors are used to output the downconverted input video as serial component video, compatible with the SMPTE 259M standard.

MON OUTPUT: These two BNC connectors are used to output the downconverted input video as monitor grade analog composite video. They can be used to conveniently view the on screen menu and status display on a low cost analog monitor.

ANALOG OUTPUT: (7711HDC-SN-EAES4 only) These two BNC connectors are used to output the downconverted input video as broadcast quality analog composite video.

2.2. GENLOCK REFERENCE

For proper synchronization of the output video, the downconverter must be locked to a genlock signal of the output video format.

GENLOCK: These two BNCs form a loop through for connecting an analog Genlock reference. The genlock signal may be NTSC or PAL colour black, and is auto-detected by the module. Jumper J9 on the APB3FMTCON submodule 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 video using the *H Phase Offset* and *V Phase Offset* menu items. (See section 6.3.3) When no Genlock is provided, the output video is timed with respect to the input video.

2.3. AUXILIARY I/O

On the 7711HDC-S a 9 pin D connector labeled **AUX I/O** contains 2 GPI inputs, a 6 Hz input and 1 GPO output. On the 7711HDC-SN-EAES4 a 9 pin D connector labeled **AUDIO AND AUX I/O** contains 2 GPI inputs, a 6 Hz input, 1 GPO output and 4 unbalanced AES outputs. The connector pinout is shown in Table 2-1.

Pin #	Name	Description
1	AES1	AES 1 Output **
2	GPO	General Purpose Output – Not used at this time
3	Gnd	Signal Ground
4	GPI2	Select User Preset 2
5	AES4	AES 4 Output**
6	6 Hz	6 Hz sequence input
7	AES2	AES 2 Output**
8	AES3	AES 3 Output**
9	GPI1	Select User Preset 1

** AES outputs on EAES4 version only.

Table 2-1: 9 Pin D Connector Pin Definitions

2.3.1. AES Audio Connections (7711HDC-SN-EAES4 version)

Four unbalanced AES outputs are provided on the 9 pin D connector. These outputs are for unbalanced AES signals conforming to SMPTE 276M. Two groups of embedded audio from the HD input are extracted and re-embedded on the output video. The transferred audio is also output as four AES channels.

2.3.2. General Purpose Inputs and Outputs

Three pins on the 9 pin D connector are used for three general purpose inputs (GPIs). One of these inputs is used for a 6 Hz input to the downconverter. The GPI1 and GPI2 inputs are used to select user presets 1 and 2 respectively. The GPIs are active low with an internal pull up (3.6k ohm) resistor to +5V or +12V. The user can activate GPIs simply by connecting the GPI input pins to Ground. This can be done with a button, switch, relay or an open collector transistor. See section 7.4 for information on selecting the pull-up voltage. Figure 2-2 shows the input circuit for the general purpose inputs.

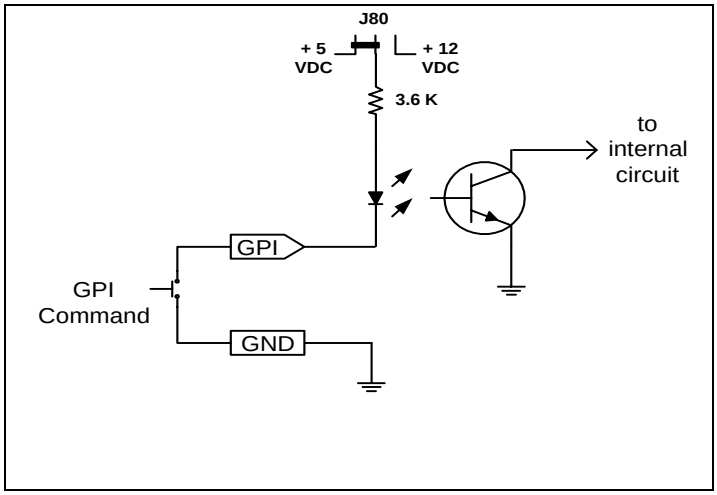


Figure 2-2: GPI Input Circuitry

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.

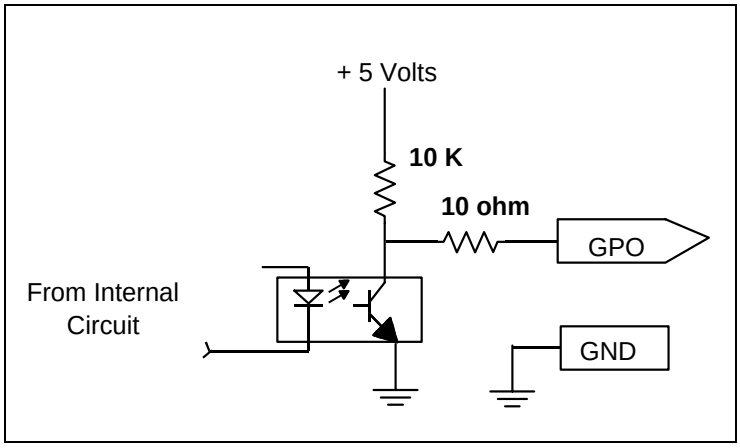


Figure 2-3: GPO Output Circuitry

3. SPECIFICATIONS

3.1. SERIAL VIDEO INPUT

Standard: 1.485 Gb/sec SMPTE 292M – menu selectable.
SMPTE 260M, SMPTE 274M, SMPTE 296M, SMPTE 349M

Common Name	Pixels / Active Lines	Frame Rate	Progressive /Interlace	SMPTE Standard	Output Format
1080i/59.94	1920 x 1080	29.97 (30/1.001)	I	274M	525i/59.94 (NTSC)
1080i/50	1920 x 1080	25	I	274M	625i/50 (PAL)
1080p/29.97sF	1920 x 1080	29.97 (30/1.001)	P (sF)	274M	525i/59.94 (NTSC)
1080p/25sF	1920 x 1080	25	P (sF)	274M	625i/50 (PAL)
1080p/23.98sF	1920 x 1080	23.98 (24/1.001)	P (sF)	274M	525i/59.94 (NTSC)
1035i/59.94	1920 x 1035	29.97 (30/1.001)	I	260M	525i/59.94 (NTSC)
720p/59.94	1280 x 720	59.94 (60/1.001)	P	296M	525i/59.94 (NTSC)
480p/59.94	720 x 483	59.94 (60/1.001)	P	293M, 349M	525i/59.94 (NTSC)

Table 3-1: Video Input Formats

Connector: BNC per IEC 169-8
Input Equalization: Automatic to 100m @ 1.5Gb/s with Belden 1694 or equivalent cable
Return Loss: >10 dB up to 1. 5Gb/s

3.2. SERIAL VIDEO OUTPUT

Standard: SMPTE 259M-C 270 Mb/s
Number of Outputs: 2
Connector: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 740ps nominal
Overshoot: <10% of amplitude
Return Loss: > 15 dB to 270 Mb/s

3.3. GENLOCK INPUT

Type: NTSC or PAL Colour Black 1 V p-p
Connector: BNC Loop per IEC 169-8
Termination: High impedance loop or internal 75 ohm termination (jumper selectable)

3.4. ANALOG MONITOR VIDEO OUTPUT

Standard: NTSC, SMPTE 170M
PAL, ITU624-4
Number of Outputs: 2
Connector: BNC per IEC 169-8
Signal Level: 1V nominal
DC Offset: 0V ±0.1V
Return Loss: > 35dB up to 5MHz
Frequency Response: 0.8dB to 4 MHz
Differential Phase: < 0.9° (<0.6° typical)
Differential Gain: < 0.9% < 0.5% typical)
SNR: > 56dB to 5 MHz (shallow ramp)

3.5. ANALOG VIDEO OUTPUT (7711HDC-SN-EAES4 only)

Standard: NTSC, SMPTE 170M
PAL, ITU624-4
Number of Outputs: 2
Connector: BNC per IEC 169-8
Signal Level: 1V nominal (user adjustable from menu)
DC Offset: 0V ±0.02V
Return Loss: > 35dB up to 5MHz
Frequency Response: 0.1dB to 4 MHz, 0.15dB to 5.5 MHz
Differential Phase: < 0.5°
Differential Gain: < 0.5%
SNR: > 78dB to 5 MHz

3.6. AES AUDIO OUTPUTS (7711HDC-SN-EAES4 only)

Number of Outputs: 4
Standard: SMPTE 276M, single ended synchronous or asynchronous AES
Connectors: Female 9 pin D
Resolution: 24 bits
Sampling Rate: 48 kHz
Impedance: 75 Ω
Signal Level: 1 V p-p nominal

3.7. GENERAL PURPOSE INPUTS

Number of Inputs: 3
Type: Opto-isolated, active low with internal pull-ups to +5 or +12V (jumper settable)
Connector: 3 pins (plus ground) on female 9 pin D
Signal Level: closure to ground
Function: 6 Hz reference, and user Preset 1 & 2 select

3.8. GENERAL PURPOSE OUTPUT

Number of Outputs: 1
Type: Opto-isolated, active low with internal pull-ups to +5V
Connector: 1 pin plus ground on Female 9 pin D
Signal Level: +5V nominal
Function: Not used at this time

3.9. INPUT TO OUTPUT PROCESSING DELAY

Minimum Delay Mode: 2 to 4 frames depending on input video format and processing mode. (See Table 6-1 and Table 6-2)
Additional Delay: up to 1 additional frame dependent on output phasing to genlock reference.
Audio and VANC: Audio, captions and VITC are delayed and re-embedded in time with the output picture (7711HDC-SN-EAES4 only)

3.10. ELECTRICAL

Voltage: +12VDC
Power: 26 Watts.
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
7701 frame mounting: 1

4. STATUS INDICATORS

The 7711HDC has 3 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 does not indicate that a correct 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 7711HDC series modules are equipped with an 8 position DIP switch to allow the user to select various functions. 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 assigned DIP switch functions. The On position is down, or closest to 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	On screen display on program out
2	Default video standard when no video in
3	Reserved for future use
4	
5	
6	
7	
8	

Table 5-1: Overview of DIP Switch Functions

5.1. DISABLING THE ON SCREEN DISPLAY ON THE PROGRAM VIDEO OUTPUTS

DIP switch 1 determines whether the On screen menu display will be shown on the Program SDI outputs and the broadcast analog outputs (on the 7711HDC-SN-EAES4 version).

DIP 1	DESCRIPTION
Off	On Screen Menus disabled on program video outputs (SDI OUTPUT and ANALOG OUTPUT). On screen menus will only be on the analog MON OUT outputs.
On (default)	On Screen Menus enabled on program video outputs (SDI OUTPUT and ANALOG OUTPUT) and the analog MON OUT outputs.

Table 5-2: On Screen Display Control Switch Settings

5.2. CONTROLLING THE OUTPUT VIDEO STANDARD ON LOSS OF VIDEO

DIP switch 2 controls the behaviour of the down converter when there is no input video.

DIP 2	DESCRIPTION
Off	Output 525i/59.94 (NTSC) video on loss of input video.
On	Output 625i/50 (PAL) on loss of input video.

Table 5-3: Default Video Switch Settings

6. ON SCREEN MENUS

6.1. NAVIGATING THE ON SCREEN MENU SYSTEM

A toggle switch and pushbutton allow card edge navigation on a set of on-screen menus used to configure the card. To enter the on-screen menu system, press the pushbutton once. 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 options, 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 6.11 provide detailed descriptions of each of the sub-menus. The tables in sections 6.3 to 6.11 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 input and output video standards and timing for the video output.
Output Picture	Configuration of the output picture aspect ratio, action on loss of input, panel colours, and other items related to the output picture.
De-interlacer	Configuration of the de-interlacer modes.
Scaler	Configuration of the scaler filter sharpness.
VANC Data Processing	Controls how vertical interval data is processed. (7711HDC-SN-EAES4 version only)
Audio	Sets the Audio groups (7711HDC-SN-EAES4 version only)
Broadcast Analog Output	Configuration of the Broadcast Analog output parameters. (7711HDC-SN-EAES4 version only)
Monitor Analog Output	Configuration of the Monitor Analog output parameters.
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 6.3.3.5 give detailed information about each of the menu items.

Video Standard	Selects the video input and output standards.
Output 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.
525 V Phase Offset	Sets the vertical phase of the output signal to the NTSC Genlock reference input.
525 H Phase Offset	Sets the horizontal phase of the output signal to the NTSC Genlock reference input.
625 V Phase Offset	Sets the vertical phase of the output signal to the PAL Genlock reference input.
625 H Phase Offset	Sets the horizontal phase of the output signal to the PAL Genlock reference input.
NTSC Colour Frame Offset	Sets the offset in frames between colour frame 1 of the NTSC output signal with respect to colour frame 1 of the NTSC Genlock reference input.

6.3.1. Setting the Video Input and Output Standard

Video *Video Std* *Auto* *1080i/59.94 to 525i/59.94* *720p/59.94 to 525i/59.94* *1080i/50 to 625i/50* *1080p/23.98sF to 525i/59.94* *1080p/29.97sF to 525i/59.94* *1080p/25sF to 625i/50* *1035i/59.94 to 525i/59.94* *480p/59.94 to 525i/59.94*	With this control, you can set the input and output video standards. Note: When set to *Auto,* the module cannot distinguish between *1080i/59.94* and *1080p/29.97sF*, so it will be treated as *1080i/59.94*. Similarly *1080p/25sF* will be treated as *1080i/50*.

6.3.2. 3:2 Pulldown Processing

When using a 1080i/59.94 input video feed containing 3:2 pulldown, the 7711HDC must be operated in *Field Mode* in order to minimize motion artifacts. In *Field mode* each field of the incoming image will be downconverted to one field of 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 7711HDC will operate in *Frame Mode* where each frame of the incoming image will be downconverted to one field of 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 7711HDC operates in *Frame Mode* where each segment of the incoming image is combined back to a progressive frame before down conversion. After down 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.

6.3.2.1. 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 6.3.3 and 6.3.3.3 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 6.3.2.2)

When you select *Auto* the 7711HDC will auto detect the pulldown reference according to the following priority:

- 6 Hz pulse if present
- RP188 ancillary timecode if present (model 7711HDC-SN-EAES4 only)
- 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.

Select *6 Hz Input* when a 6 Hz pulse connected to pin 6 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.

6.3.2.2. 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.

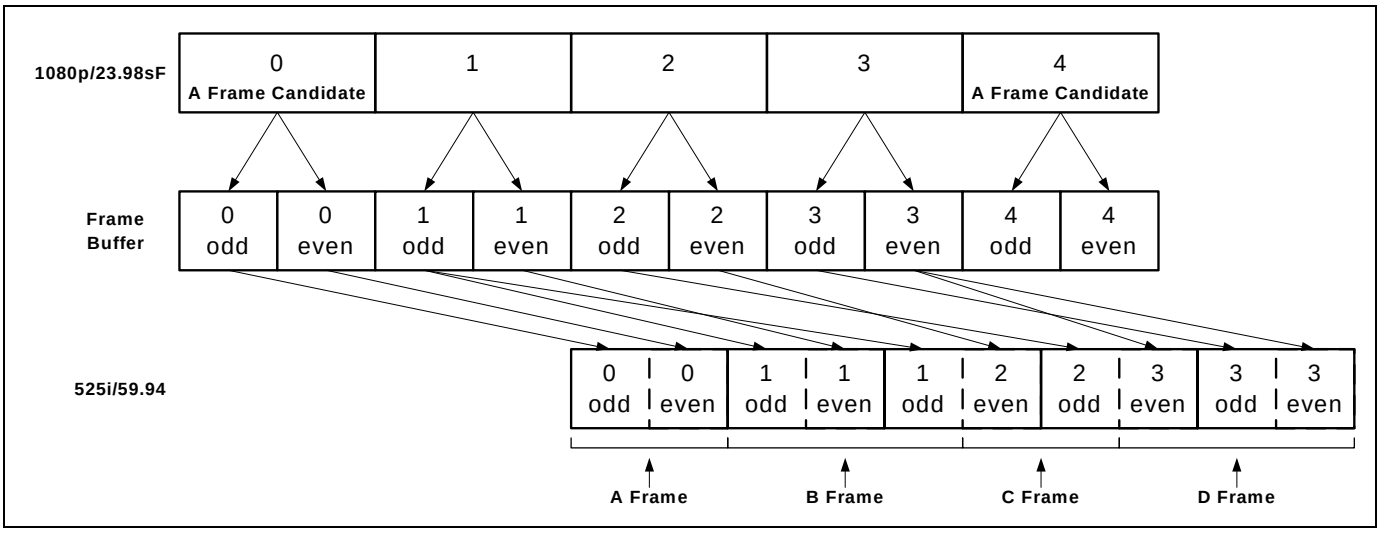


Figure 6-1: 3:2 Pulldown Sequence Insertion – 1080p/23.98sF Input Video

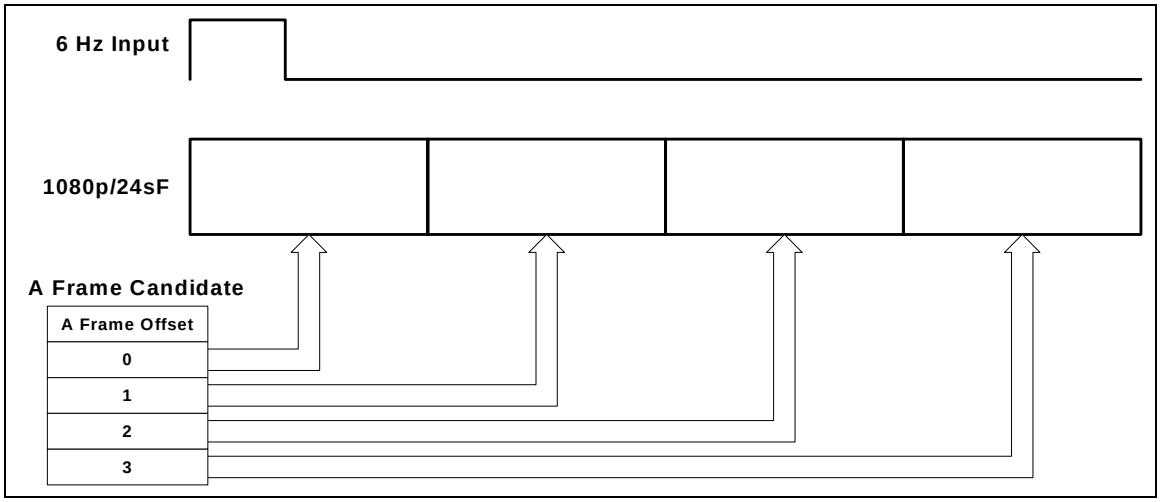


Figure 6-2: 6 Hz Pulldown Sequence A Frame Alignment – 1080p/23.98sF Input Video

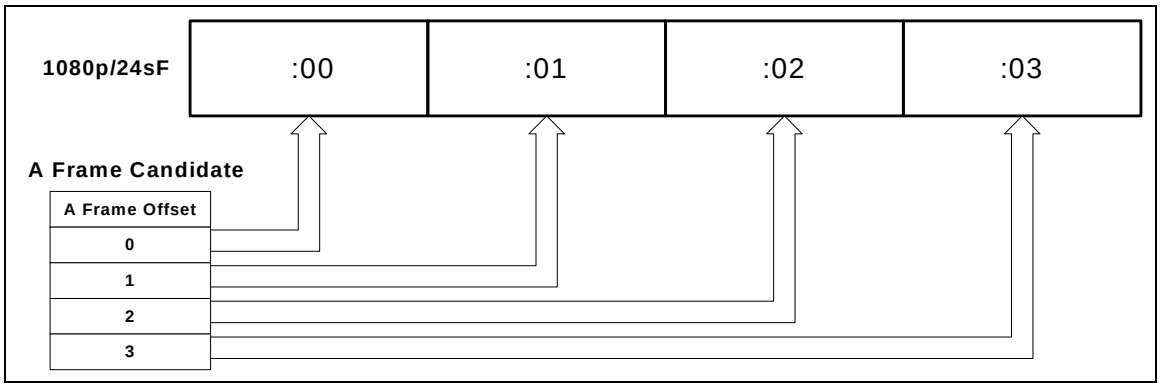


Figure 6-3: RP188 Pulldown Sequence A Frame Alignment – 1080p/23.98sF Input Video

6.3.3. Setting up the Video Output Timing

The output stage of the downconverter contains a frame buffer and a line buffer so that the output video can be timed with respect to the colour black reference applied to the **GENLOCK** input loop. In the absence of a genlock signal the output video will be timed with respect to the incoming HD Video.

There are separate controls to adjust the horizontal and vertical timing of the output video for both the 525 and 625 line video standards. The controls work in the same way for each video standard, except that the *V Phase Offset* control has valid values from 1 to the number of lines per frame in the respective video standard.

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.

6.3.3.1. Calculating the Delay through the Downconverter

The delay through the downconverter is dependent on the video input format, the downconverter processing mode and the H and V phase settings. Table 6-1 and Table 6-2 show the default and maximum and minimum delays for each video standard when locked to the genlock input and the input video respectively. The delays shown are in the standard definition output video format.

The default delay will be when the *V Phase Offset* and *H Phase Offset* parameters are set to zero. When increasing the *V Phase Offset* value causes it to go beyond the limit of the frame buffer (the line value shown in the maximum delay column), the *V Phase Offset* will wrap to the beginning of the frame buffer, resulting in a loss of one frame of throughput delay between the HD input and the video output. When increasing the *H Phase Offset* value causes it to go beyond the limit of the line buffer (the sample value shown in the maximum delay column), the *H Phase Offset* will wrap to the beginning of the line buffer. Thus, the minimum delay is achieved when both the *V Phase Offset* and *H Phase Offset* wrap to the beginning of the frame and line buffers, and will occur when the *V Phase Offset* is set to the line value shown and the *H Phase Offset* is set to the sample value shown in the minimum delay columns. The maximum delay is achieved one line before the *V Phase Offset* wraps to the beginning of the frame buffer and one sample before the *H Phase Offset* wraps to the beginning of the line buffer and will occur when the *V Phase Offset* is set to the line value shown and the *H Phase Offset* is set to the sample value shown in the maximum delay columns.

	Default Delay	Maximum Delay			Minimum Video Delay		
	Frames	Frames	Lines	Samples	Frames	Lines	Samples
1080I59.94 Field	2	2	524	919	1	524	920
1080I59.94 Frame	2	2	523	697	1	523	698
1080I50 Field	2	2	310	329	1	310	330
1080I50 Frame	2	2	308	1371	1	308	1372
1080p23.98sF	4	4	393	1505	3	393	1506
1080p29.97sF	3	3	271	1296	2	271	1297
1080p25sF	4	4	60	1549	3	60	1550
1035I59.94 Field	2	2	524	919	1	524	920
1035I59.94 Frame	2	2	270	411	1	270	412
720p59.94	2	2	390	1403	1	390	1404
480p59.94	2	2	524	919	1	524	920

Table 6-1: Video Delay – Locked to Genlock Input

	Default Delay	Maximum Delay			Minimum Video Delay		
	Frames	Frames	Lines	Samples	Frames	Lines	Samples
1080i59.94 Field	2	2	524	918	1	524	919
1080i59.94 Frame	2	2	524	693	1	524	694
1080i50 Field	2	2	310	334	1	310	335
1080i50 Frame	2	2	308	1526	1	308	1527
1080p23.98sF	4	4	393	1506	3	393	1507
1080p29.97sF	3	3	524	1049	2	524	1050
1080p25sF	4	4	310	60	3	310	61
1035i59.94 Field	2	2	524	919	1	524	920
1035i59.94 Frame	2	2	270	421	1	270	422
720p59.94	2.5	3	127	1565	2	127	1566
480p59.94	2	2	524	918	1	524	919

Table 6-2: Video Delay – Locked to Input Video

6.3.3.2. Setting the Vertical Phase of the Output Video – 525 Line Video

Video
525 V Phase Offset
0 to 524
0

With this control, you can set the vertical timing of the output video with respect to the NTSC genlock reference input when operating with a 525 line video output. 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. In order to advance the vertical timing of the output video with respect to the genlock video, set the control to 525 minus the number of lines that you wish to advance the output video. (E.g. to advance the output video 5 lines set the value to 520.) 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 HD input and the video output. See Table 6-1 and Table 6-2 for the minimum and maximum delays possible.

6.3.3.3. Setting the Horizontal Phase of the Output Video – 525 Line Video

Video
525 H Phase Offset
0 to 1715
0

With this control, you can set the horizontal timing of the output video with respect to the NTSC genlock reference input when operating with a 525 line video output. 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 1716 minus the number of samples that you wish to advance the output video. (E.g. to advance the output video 5 samples set the value to 1711.) When increasing the *H Phase Offset* value causes it to go beyond the limit of the line buffer, the *H Phase Offset* will wrap to the beginning of the line buffer, resulting in a change of one line of throughput delay between the HD input and the video output. See Table 6-1 and Table 6-2 for the minimum and maximum delays possible.

6.3.3.4. Setting the Vertical Phase of the Output Video – 625 Line Video

Video
625 V Phase Offset
0 to 624
0

With this control, you can set the vertical timing of the output video with respect to the PAL genlock reference input when operating in a 625 line video output. 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-line increments. In order to advance the output video with respect to the genlock video; set the control to 625 minus the number of lines that you wish to advance the output video. (E.g. to advance the output video 5 lines set the value to 620.) 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 HD input and the video output. See Table 6-1 and Table 6-2 for the minimum and maximum delays possible.

6.3.3.5. Setting the Horizontal Phase of the Output Video – 625 Line Video

Video
625 H phase Offset
0 to 1727
0

With this control, you can set the horizontal timing of the output video with respect to the PAL genlock reference input when operating with a 625 line video output. 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 1728 minus the number of samples that you wish to advance the output video. (E.g. to advance the output video 5 samples set the value to 1723.) When increasing the *H Phase Offset* value causes it to go beyond the limit of the line buffer, the *H Phase Offset* will wrap to the beginning of the line buffer, resulting in a change of one line of throughput delay between the HD input and the video output. See Table 6-1 and Table 6-2 for the minimum and maximum delays possible.

6.3.3.6. Setting the Colour Frame sequence of the Analog Output Video – 525 Line Video

Video
NTSC Colour Frame Offset
0, 1
0

With this control, you can set offset between colour frame A of the NTSC reference and colour frame A of the NTSC analog output video.

Setting this control to 0 aligns the colour frame A of the output video with colour frame A on the Genlock reference. Increasing the value will delay the output colour frame A in one-frame increments.

6.4. CONFIGURING THE OUTPUT PICTURE

The *Output Picture* menus are used to configure parameters associated with the output picture. The chart below shows the items available in the *Output Picture* menu. Sections 6.4.1 to 6.10.1 give detailed information about each of the menu items.

Aspect Ratio	Selects the aspect ratio of the output picture.
Loss of Video	Selects the action to take when the input video is missing.
Panel Colours	Sets the colour of the letterbox panels.

6.4.1. Setting the Aspect Ratio of the Output Picture

Output Picture
- *Aspect Ratio*
  - *16:9 Letterbox*
  - *4:3 Side Cut*
  - *4:3 Squeeze*
  - *14:9 Letterbox*
  - *13:9 Letterbox*

SDTV monitors are usually 4:3, so there is a need for some simple aspect ratio conversion from the HDTV 16:9 format. With this control, you can set the aspect ratio of the output Picture.

When we display a 16:9 picture on a 4:3 (12:9) monitor, the picture becomes anamorphic (4:3 squeeze) resulting in tall thin people. To correct this problem, we have a choice of cropping the edges (4:3 side cut) or making the whole picture smaller (16:9 letter box). The 14:9 and 13:9 letterbox solutions are a compromise where the picture is larger than 16:9 letterbox and less of the edges are cropped than 4:3 side cut.

The anamorphic solution uses all the horizontal lines of the 4:3 raster. Clipping discards video information at the start and end of each line. For the letter box solution, we have to re-map the picture to occupy less lines. The unused lines are left black at the top and bottom of the picture.

Figure 6-4 shows the various output aspect ratios available.

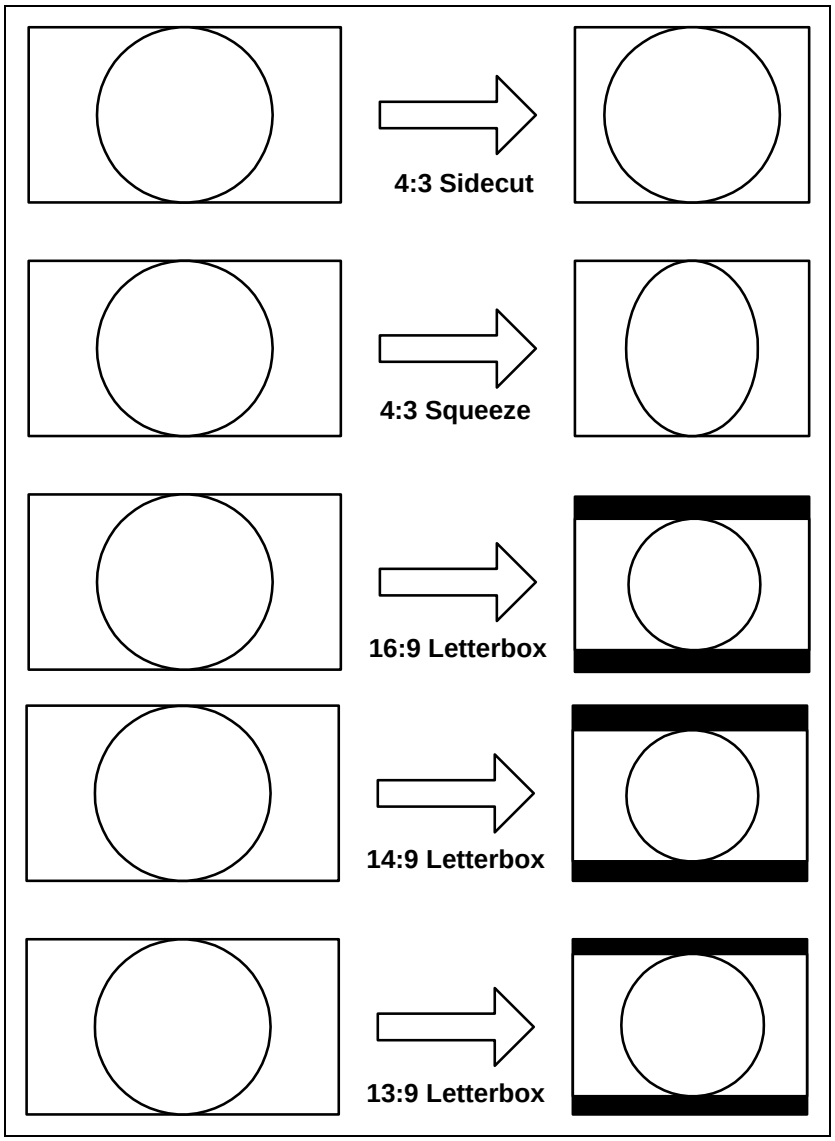


Figure 6-4: Aspect Ratio Conversions

6.4.2. Setting the Action to take when Input Video Is Missing

Output Picture
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 *Black* or *Blue* the video standard of the output is set by DIP switch 1. (See section 5.2)

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

6.4.3. Set the Colour of the Letterbox Panels

Output Picture *Panel Colours* *Black* *Blue* *Red* *White*	The user can set the colour of the letterbox panels with this control.

6.5. CONFIGURING THE DEINTERLACER

The *Deinterlacer* menus are used to configure parameters associated with the de-interlacer hardware. The chart below shows the items available in the *Deinterlacer* menu. Section 6.5.1 gives detailed information about each of the menu items.

Deinterlacer Mode	Selects whether the module will perform field or frame based down conversion.
Freeze Frame Threshold	Sets number of frames before frozen video is detected.
Noise Reduction Resolution	Sets resolution of the Noise reduction control.
Noise Reduction Level	Sets level of the Noise reduction control.
Detail Enhancement Resolution	Sets resolution of the Detail Enhancement control.
Detail Enhancement Level	Sets level of the Detail Enhancement control.
Edge Detection Threshold	Sets the Edge Detection Threshold used by the Edge Enhancement controls.
H Edge Enhancement	Sets the Horizontal Edge Enhancement control.
V Edge Enhancement	Sets the Vertical Edge Enhancement control.
Motion Detection Threshold	Sets the Motion Detection Threshold used by the Edge Enhancement controls.
Interfield Weighting Factor	Sets the Interfield Weighting factor used by the de-interlacer.

6.5.1. Setting the De-Interlacer Mode

De-interlacing is only required for interlaced HDTV signals (e.g.1080i/59.94). It is used in order to restore motion dependent elements to their correct positions in the down-converted raster. In 1080i/59.94 television, the interlaced line 2 commences 16.667ms after the start of line 1 and 16.636ms *after* the start of line 3. Any significant movement on line 2 will be displaced in time, because of the delay in scanning field 2 after the scanning of field 1 has been completed. This will cause motion related artifacts. For interlaced material, it is therefore desirable to provide compensation for horizontally and vertically displaced motion. Selecting the frame based mode of the down-converter enables these corrections. In *frame based* mode, the signal is de-interlaced and both horizontal and vertical motion adaptive interpolators are employed to correct the motion displacement. The de-interlacing process converts each field into a full 1080 line frame at 59.94 frames per second. This signal is subsequently re-interlaced into the new SDTV output format, with significantly reduced motion artifacts.

Deinterlacer
Deinterlacer Mode
Field
Frame

With this control, you can set whether the module will perform field or frame based down conversion.

In *Field* mode the Downconverter works on a field by field basis. This mode is recommended for 3:2 pulldown content on interlaced video formats but gives a softer vertical down conversion. This mode is applicable to interlaced video input formats only. If *Field* mode is selected for progressive or sF video formats the down converter will operate in *Frame* mode.

In *Frame* mode the downconverter works on a complete frame basis thus providing a crisper image. It is a good choice for interlaced images that do not contain 3:2 pulldown or for progressively scanned video. This mode is the only mode available for progressive and sF video formats.

6.5.2. Setting the Freeze Frame Threshold

Deinterlacer
Freeze Frame Threshold
16
0 to 31

With this control, you can set the number of frames before frozen/missing video is detected.

6.5.3. Setting the Noise Reduction

Two controls allow you to control the de-interlacer noise reduction.

Deinterlacer
Noise Reduction Resolution
1
0 to 7

With this control, you can set the resolution for the *Noise Reduction Level* control. Larger numbers mean coarser steps in the level control.

Deinterlacer
Noise Reduction Level
0 *0 to 31*

With this control, you can set *Noise Reduction Level* control. Larger numbers mean more noise reduction will be applied. The step sizes for the level control are set using the *Noise Reduction Resolution* control.

6.5.4. Setting the Detail Enhancement

Two controls allow you to control the de-interlacer detail enhancement.

Deinterlacer
Detail Enhancement Resolution
1 *0 to 5*

With this control, you can set the resolution for the *Detail Enhancement Level* control. Larger numbers mean coarser increments in the level control.

Deinterlacer
Detail Enhancement Level
0 *0 to 31*

With this control, you can set *Detail Enhancement Level* control. Larger numbers mean more detail enhancement will be applied. The step sizes for the level control are set using the *Detail Enhancement Resolution* control.

6.5.5. Setting the Edge Enhancement Controls

3 controls allow you to set the Edge enhancement controls

Deinterlacer
Edge Detection Threshold
4 *0 to 15*

With this control, you can set the *Edge Detection Threshold* control.

Deinterlacer
H Edge Enhancement
50 *0 to 255*

With this control, you can set the *Horizontal Edge Enhancement* control.

Deinterlacer
V Edge Enhancement
30 *0 to 255*

With this control, you can set the *Vertical Edge Enhancement* control.

6.5.6. Setting the Motion Detection Controls

Two controls allow you to set the Motion Detection controls.

Deinterlacer *Motion Detection Threshold* *4* *0 to 15*	With this control, you can set the *Motion Detection Threshold* control.
Deinterlacer *Interfield Weighting Factor* *40* *0 to 255*	With this control, you can set the *Interfield Weighting Factor* control.

6.6. CONFIGURING THE SCALER

The 7711HDC scaler chip uses a process of filtering in order to reduce the resolution from 1920 x 1080 (or 1280 x 720) to 720 x 480 (or 720 x 576). 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 6.6.1 to 6.6.2 give detailed information about each of the menu items.

H Filter Cutoff	Sets the cutoff frequency of the horizontal filter in the scaler.
V Filter Cutoff	Sets the cutoff frequency of the vertical filter in the scaler.

6.6.1. Setting the Scaler Horizontal filter Sharpness

Scaler *H Filter Cutoff* *0.45 fs* *0.15 to 0.50 fs*	With this control, you can set the sharpness of the horizontal filter used during the down conversion process. Larger numbers mean a sharper picture.

6.6.2. Setting the Scaler Vertical filter Sharpness

Scaler *V Filter Cutoff* *0.45 fs* *0.15 to 0.50 fs*	With this control, you can set the sharpness of the vertical filter used during the down conversion process. Larger numbers mean a sharper picture.

6.7. CONFIGURING THE VERTICAL INTERVAL PROCESSING (MODEL 7711HDC-SN-EAES4 ONLY)

The *VANC Data Processing* menus are used to configure how vertical interval signals such as closed captions and vertical interval time code (VITC) are processed. The chart below shows the items available in the *VANC Data Processing* menu. Sections 6.7.1 to 6.10.1 give detailed information about each of the menu items.

Captions	Controls whether closed captions will be displayed on the program video outputs.
RP188 Reader	Controls whether RP188 Ancillary Time Code reader will read LTC or VITC.
VITC Generator	Controls whether Vertical Interval Time Code (VITC) will be displayed on the program video outputs.
VITC User Bits	Controls whether the VITC user bits will contain the original time or user bits.
525 VITC Line	Sets VITC insertion line on 525 line video outputs.
625 VITC Line	Sets VITC insertion line on 625 line video outputs.

6.7.1. Displaying Closed Captions on the Program Video Outputs

VANC Data Processing
- *Captions*
  - *Off*
  - *On*

This control determines whether closed captions will be encoded on line 21 according to EIA 608B on the program SDI and broadcast analog outputs. The encoding of captions on the monitor analog output is set by the *Mon Caption Decoder* menu item on the *Monitor Analog Output* menu.

Set the control to *Off* to disable closed caption encoding.

Set the control to *On* to encode closed captions that have been extracted from SMPTE 334M VANC data on the incoming HD video.

6.7.2. Putting VITC on the Program Video Outputs

VANC Data Processing
- *VITC Generator*
  - *Off*
  - *On*

This control determines whether vertical interval time code (VITC) will be inserted on the program SDI and broadcast analog outputs. 525 VITC Line and 625 VITC Line menu items set the insertion line for the VITC. The time bits will be converted from the RP188 ancillary time code on the HD Video input. The User bits can be set to the original time or user bits by the *VITC User Bits* menu item.

6.7.3. Setting the Contents of the VITC User Bits

VANC Data Processing
VITC User Bits
Original Time
Original User Bits

This control determines whether VITC User bits will contain the original time numbers or the original user bit numbers. The VITC generator must be enabled using the *VITC Generator* menu item.

When the incoming video is at a different frame rate than the downconverted video, it is often useful to carry the original time code information in the VITC user bits.

For other applications it is necessary to carry the user bits from the incoming time code into the VITC User Bits.

6.7.4. Setting the VITC Line for 525 Line Video Outputs

VANC Data Processing
525 VITC Line
14
10 to 20

This control determines the line number where VITC will be inserted in 525 line video when the *VITC Generator* control is set to *On*.

6.7.5. Setting the VITC Line for 625 Line Video Outputs

VANC Data Processing
625 VITC Line
19
6 to 22

This control determines the line number where VITC will be inserted in 625 line video when the *VITC Generator* control is set to *On*.

6.8. CONFIGURING THE AUDIO PROCESSING (MODEL 7711HDC-SN-EAES4 ONLY)

The SMPTE 299M standard permits up to 4 groups of 4 audio channels to be embedded into the 1.5 Gb/s video bitstream. The model 7711HDC-SN-EAES4 de-embeds two groups of audio that are the source for re-embedding on the SDI output video. The *Audio* menus are used to configure the de-embedder and embedder groups. The menu is not available on the 7711HDC-S version, as it does not process audio. The chart below shows the items available in the *Audio* menu. Sections 6.8.1 to 6.8.2 give detailed information about each of the menu items.

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

6.8.1. Selecting the Audio Groups That Will Be De-Embedded

There are two controls that set the source groups for the two de-embedders. For simplicity, only one control will be shown in the manual.

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

With these controls, you can set the source group for de-embedder A and B. Under normal conditions the settings for de-embedder A and B should be different otherwise the audio will be repeated on the SDI output.

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

6.8.2. Selecting the Audio Groups That Will Be Embedded

The model 7711HDC-SN-EAES4 has two embedders that each insert one group of audio on the SDI output. The source for embedder A is the audio being extracted by de-embedder A. The source for embedder B is the audio being extracted by de-embedder B. There are two controls that set the audio groups where the embedders will put the audio on the SDI output. For simplicity, only one control will be shown in the manual.

- *Audio*
  - *Embedder A*
    - *Off*
    - *Follow A*
    - *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.

When set to *Follow A* or *Follow B*, the embedder destination will follow the setting of the respective De-embedder. (See section 6.8.1)

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.

6.9. SETTING UP THE BROADCAST ANALOG OUTPUT PARAMETERS (MODEL 7711HDC-SN-EAES4 ONLY)

The 7711HDC-SN-EAES4 version provides a broadcast analog output in addition to the standard SDI and Monitor Analog outputs. The *Broadcast Analog Output* menus are used to configure parameters associated with the broadcast analog output. The menu is not available on the 7711HDC-S version. The chart below shows the items available in the *Broadcast Analog Output* menu. Sections 6.9.1 to 6.9.7 give detailed information about each of the parameters.

Composite Display	Controls whether the analog video output will be colour or monochrome.
Output Level	Sets the analog video output level.
Hue	Sets the analog video hue level.
Saturation	Sets the analog video saturation level.
Contrast	Sets the analog video contrast level.
Brightness	Sets the analog video brightness level.
NTSC Setup Pedestal	Sets whether the NTSC setup pedestal will be on the broadcast analog video output.
Line 21 Setup Pedestal	Sets whether the NTSC setup pedestal will be on line 21 on the broadcast analog video output.

6.9.1. Setting the Composite Display Mode – Colour or Monochrome

Broadcast Analog Output
  Composite display
  Colour
  B/W
	If monochrome operation is desired on the composite output, colour may be turned off with this control.

6.9.2. Setting the Analog Video Output Level

Broadcast Analog Output
  Output level
  -120 to 56
  0
	This control allows the user to adjust the output level of the analog video. When set to 0, the nominal output video level will be 100 IRE.

6.9.3. Setting the Hue

Broadcast Analog Output
Hue
-17.5 to 17.5
0.0

This control allows the user to adjust the Hue of the analog video in increments of 0.5 degrees.

6.9.4. Setting the Saturation

Broadcast Analog Output
Saturation
-10 to 10
0

This control allows the user to adjust the saturation level of the analog video in increments of 1%.

6.9.5. Setting the Contrast

Broadcast Analog Output
Contrast
0 to 20
0

This control allows the user to adjust the contrast of the analog video in increments of 1%.

6.9.6. Setting the Brightness

Broadcast Analog Output
Brightness
-7.5 to 15.0
0.0

This control allows the user to adjust the brightness of the analog video in increments of 0.1 IRE.

6.9.7. Setting the NTSC Setup Pedestal on the Broadcast Analog Video Output

Broadcast Analog Output
NTSC Setup Pedestal
Off
On

This control determines how the NTSC Setup Pedestal will be applied on the Broadcast Analog video output. The NTSC setup pedestal should not be present when operating in Japan.

Set the control to *On* to apply the Setup pedestal to the active picture starting.

Set the control to *Off* to remove the Setup pedestal from the active picture.

6.9.8. Setting the NTSC Setup Pedestal on Line 21 of the Broadcast Analog Video Output

Broadcast Analog Output	
Line 21 Setup Pedestal	
Auto	
Off	

This control determines how the NTSC Setup Pedestal will be applied on line 21 of the Broadcast Analog video output. The NTSC setup pedestal should not be present when there is an EIA-608 closed caption signal on line 21.

When the control is set to *Auto* the Setup pedestal will be added to line 21 when captions are not being encoded. (The *Captions* item on the *VANC Data Processing* menu is set to *Off)*. If captions are being encoded, NTSC setup will not be added to line 21.

When the control is set to *Off* the NTSC Setup pedestal will not be added to line 21.

6.10. SETTING UP THE MONITOR ANALOG OUTPUT PARAMETERS

The *Monitor Analog Output* menus are used to configure parameters associated with the monitor analog output. The chart below shows the items available in the *Broadcast Analog Output* menu. Sections 6.9.1 to 6.9.7 give detailed information about each of the parameters.

Mon Status Window	Determines whether the module status display will be on or off.
Mon NTSC Setup Pedestal	Sets whether the NTSC setup pedestal will be on the Monitor Analog output.
Mon Captions	Sets whether captions will decoded and displayed on the Monitor Analog Output. (7711HDC-SN-EAES4 version only)

6.10.1. Displaying the module Status Window

Utilities
- *Mon Status Window*
  - *On*
  - *Off*

This menu item is used to display the module status window. This display shows the current module configuration at a glance. The display will be similar to the following:

```
Video = 1080i/59.94
Video motion = moving
Video Delay = xx frms, yy lines, zz samples (d.ddd msec)
Genlock = present
Audio group 1 = present
Audio group 2 = present
Audio group 3 = present
Audio group 4 = present
Captions = present
Time Code = present
```

6.10.2. Setting the NTSC Setup Pedestal on the Monitor Analog Output

Output Picture
- *Mon NTSC Setup Pedestal*
  - *Off*
  - *On*

This control determines how the NTSC Setup Pedestal will be applied on the Monitor Analog Output. The NTSC setup pedestal should not be present when operating in Japan.

Set the control to *On* to apply the Setup pedestal to all lines of the active picture.

Set the control to *Off to remove* the NTSC Setup Pedestal from all lines.

6.10.3. Displaying Closed Captions on the Monitor Analog Output (7711HDC-SN-EAES4 version only)

Output Picture
- *Mon Caption Decoder*
  - *Off*
  - *On*

This control determines whether the closed caption decoder on the Monitor Analog Output will display captions encoded on line 21 according to EIA 608B. The *Captions* item in the *VANC Data Processing* menu must also be set to *On* in order to display Captions on the caption decoder.

Set the control to *Off* to disable the monitor output closed caption decoder.

Set the control to *On* to enable the monitor output closed caption decoder.

6.11. 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 6.11.1 to 6.10.3 provide 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.
Upgrade	Used to upgrade the firmware in the module.
About…	Shows the firmware version of the module.

6.11.1. Recalling Configurations to the User Presets or the Factory Preset

The 7711HDC modules provide ten user preset areas to store the complete set of controls from the on screen menu.

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 or from the factory preset.
	
	Use the toggle switch to select the preset you wish to recall. After selecting the preset, you must press the pushbutton before the recall will take place. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

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.

6.11.2. Saving Configurations to the User Presets

The 7711HDC modules provide ten user preset areas to store the complete set of controls from the on screen menu.

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.

6.11.3. 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.

6.11.4. Accessing Information About this Module and its Firmware

Utilities
- *About…*

This control lists the basic information 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

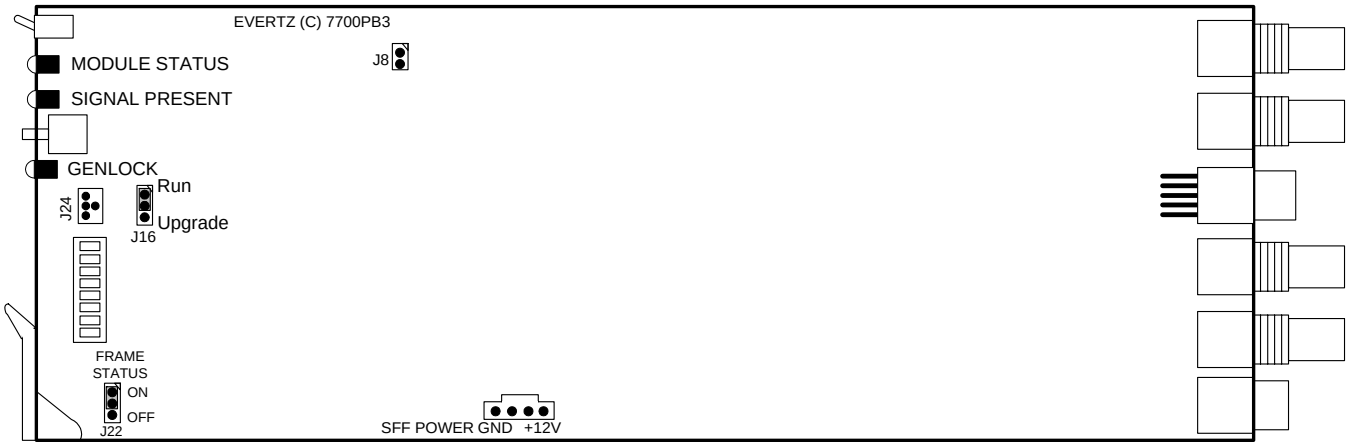


Figure 7-1: Location of Jumpers – Main Module

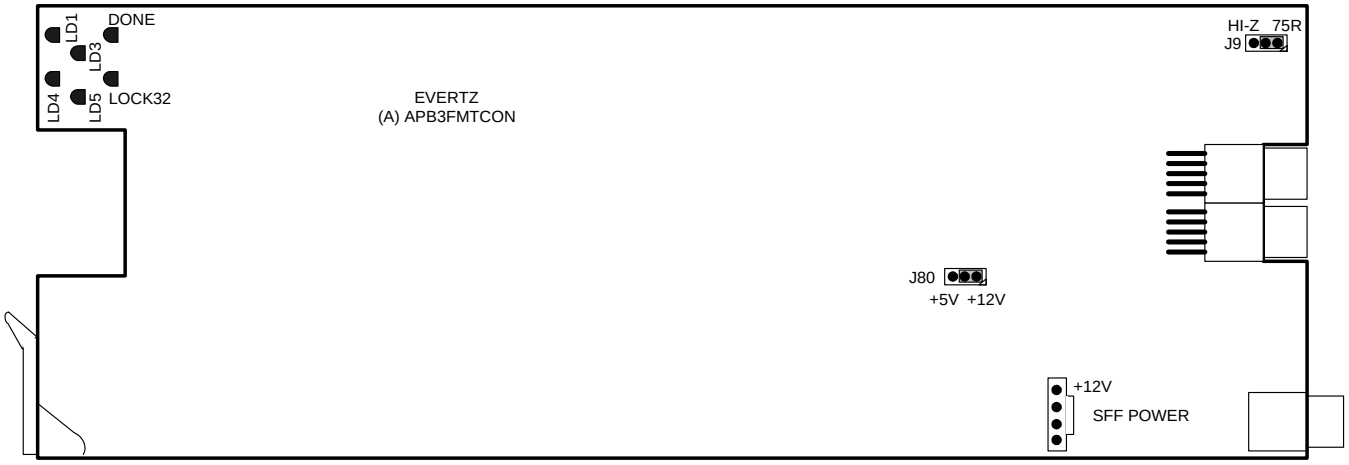


Figure 7-2: Location of Jumpers – Sub Module

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

FRAME STATUS: The FRAME STATUS jumper J22 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 6.11.3) or using the **UPGRADE** jumper.

UPGRADE: The UPGRADE jumper J16 located at the front of the main module is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. 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 J16 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J24 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 J16 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

7.3. SELECTING WHETHER THE GENLOCK REFERENCE INPUT IS TERMINATED

TERM: The TERM jumper J9 located at the rear of the APB3FMTCON sub-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 loop input will be high impedance.

7.4. SELECTING THE GPI PULLUP VOLTAGE

The GPI jumper J80, located near the rear of the APB3FMTCON sub-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: 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,

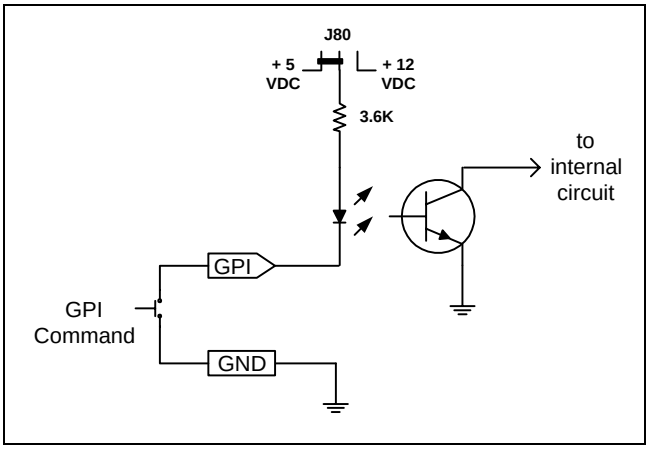


Figure 7-3: Setting the GPI Input Pullup Voltage

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 products.

2. Managed devices (such as 7711HDC), 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 and 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
6 Hz Present	Indicates the state of the 6 Hz input signal
GPI1 State	Indicates the state of the GPI1 input
GPI2 State	Indicates the state of the GPI2 input
GPO1 State	Indicates the state of the GPO1 output

Table 8-1: *Vista*LINK® Monitored Parameters – all Versions

Parameter	Description
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)
Captions Present	Indicates the type of SMPTE 334M captions present on the input video
Time Code Present	Indicates the presence of RP188 time code on the input video

Table 8-2: *Vista*LINK® Monitored Parameters – 7711HDC-SN-EAES4 Versions

8.3. *VISTA*LINK® CONTROLLED PARAMETERS

Parameter	Description
Video Standard	A range of values indicating the video input and output standards
Pulldown Reference	Reference for inserting 3:2 pulldown on output
A Frame Offset	A frame Offset from pulldown reference
525 V Phase Offset	Vertical phase offset from Genlock reference for 525 line video
525 H Phase Offset	Horizontal phase offset from Genlock reference for 525 line video
625 V Phase Offset	Vertical phase offset from Genlock reference for 525 line video
625 H Phase Offset	Horizontal phase offset from Genlock reference for 525 line video
NTSC Colour Frame Offset	NTSC Colour frame offset from genlock video
Output Aspect Ratio	A range of values indicating the aspect ratio format of the output picture
Loss of Video	Action on loss of video
Panel Colours	Letterbox panel colours
De-interlacer mode	De-interlacer mode
Freeze Frame Threshold	Number of frames before frozen video is detected
Noise Reduction Resolution	Noise reduction resolution control
Noise Reduction Level	Noise reduction level control
Detail Enhancement Resolution	Detail enhancement resolution control
Detail Enhancement Level	Detail enhancement level control
Edge Detection Threshold	Edge detection threshold control
H Edge Enhancement	H edge enhancement control
V Edge Enhancement	V edge enhancement control
Motion Detection Threshold	Motion detection threshold control
Interfield Weighting Factor	Interfield weighting factor control
H Filter Cutoff	Cutoff frequency of scaler horizontal filter
V Filter Cutoff	Cutoff frequency of scaler vertical filter
Monitor Status Window	Controls if Status display will be shown on the monitor analog output
Monitor NTSC Setup	Controls whether there will be NTSC Setup pedestal on the monitor analog output

Table 8-3: *Vista*LINK® Controlled Parameters – All Versions

Parameter	Description
Closed Captions	Controls whether closed captions will be encoded on the output
VITC Generator	Controls whether there will be VITC on output
VITC User Bits	Sets whether VITC time will be original time or user bits
525 VITC Line	Sets VITC line number for 525 video
625 VITC Line	Sets VITC line number for 625 video
Audio De-embedder A Source	Sets source group for de-embedder A
Audio De-embedder B Source	Sets source group for de-embedder B
Audio Embedder A Group	Sets destination group for embedder A
Audio Embedder B Group	Sets destination group for embedder B
Composite Display	Sets whether broadcast analog output will be colour or monochrome
Composite Output Level	Sets video level of broadcast analog output
Hue	Sets Hue of broadcast analog output
Saturation	Sets Saturation of broadcast analog output
Contrast	Sets Contrast of broadcast analog output
Brightness	Sets Brightness of broadcast analog output
Broadcast NTSC Setup	Controls whether there will be NTSC Setup pedestal on the broadcast analog output
Broadcast Line 21 Setup	Controls whether there will be NTSC Setup pedestal on line 21 of the broadcast analog output
Monitor Caption Display	Controls whether decoded captions will be displayed on the monitor analog output

Table 8-4: *Vista*LINK® Controlled Parameters – 7711HDC-SN-EAES4 Versions

8.4. *VISTA*LINK® TRAPS

There are currently no traps for the 7711HDC.

9. MENU QUICK REFERENCE

Video
- Video Standard
- Pulldown Reference
- A Frame Offset
- 525 V Phase Offset
- 525 H Phase Offset
- 625 V Phase Offset
- 625 H Phase Offset
- NTSC Colour Frame Offset

Output Picture
- Aspect Ratio
- Loss of Video
- Panel Colours

Deinterlacer
- Deinterlacer Mode
- Freeze Frame Threshold
- Noise Reduction Resolution
- Noise Reduction Level
- Detail Enhancement Resolution
- Detail Enhancement Level
- Edge Detection Threshold
- H Edge Enhancement
- V Edge Enhancement
- Motion Detection Threshold
- Interfield Weighting Factor

Scaler
- H Filter Cutoff
- V Filter Cutoff

VANC Data Processing
- Closed Captions
- RP188 Reader
- VITC Generator
- VITC User Bits
- 525 VITC Line
- 625 VITC Line

Audio
- De-embedder A
- De-embedder B
- Embedder A
- Embedder B

Broadcast Analog Output
- Composite Display
- Output Level
- Hue
- Saturation
- Contrast
- Brightness
- NTSC Setup Pedestal
- Line 21 Setup Pedestal

Monitor Analog Output
- Mon Status Window
- Mon NTSC Setup Pedestal
- Mon Caption Display

Utilities
- Recall Preset
- Store Preset
- Upgrade
- About...