TABLE OF CONTENTS

Figures

Tables

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	Feb 03
1.0	First release version Functions of J6 and J7 corrected (sections 6.2 and 6.4)	May 03
1.1	Fixed Diff Gain Spec, corrected feature description	Jun 03
1.2	Added section on Upgrading Firmware	Jul 03
1.3	Updated Delay table and menu structure, fixed typographical errors	Sep 03
1.3.1	Added into that most menus are not applicable in standard definition mode	Oct 03
1.4	Added support for 60 Hz video formats. Added VistaLINK™ support	Feb 04
2.0	Added support for Caption Decoder	Jun 04
2.1	Added Markers menu, menu cleanup for released firmware version 2.0	Aug 04
2.2	Updated standard EIA608-EIA708 to CEA608-CEA708	Dec 06

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1. OVERVIEW

The 500DCDA-HD is a reclocking high definition serial digital video distribution amplifier and a high quality downconverter for 1.5 Gb/s HDTV signals. It can also function as a monitoring distribution amplifier for standard definition 270 Mb/s signals. The 500DCDA-HD provides 5 reclocked DA outputs and 4 downconverted SDI or composite analog NTSC/PAL outputs (selectable). The 500DCDA-HD accepts all the popular international SMPTE 292M video formats. When the 500DCDA-HD down converts 1080p/23.98sF input video to 525i/59.94 with a 3:2 pulldown, the 3:2 pulldown cadence can be free running or locked to embedded RP188 time code.

The 500DCDA-HD has color 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. Full 10 bit processing is provided throughout the signal path to achieve excellent downconversion quality. The module allows for selectable horizontal and vertical filters to control picture sharpness. It also de-embeds two groups of audio and re-embeds the audio on the SDI output in time with the video. All parameters may be controlled by use of the on screen display menu.

The 500DCDA-HD has a closed caption monitoring capability that decodes CEA-608 or CEA-708 captions that have been encoded into the VANC data space of an HD video input, or CEA-608 captions from a SD video input.

The 500DCDA-HD provides card edge LEDs to indicate signal present, cable length warning and audio groups present. The 500DCDA-HD occupies one card slot in the 500FR exponent frame that will hold up to 16 modules.

Features:

- Serial digital 1.5 Gb/s HD input per SMPTE 292M
- Supports most international standards including 1080i/60, 1080i/59.94, 1080i/50, 1080p/24, 1080p/23.98, 1080p/24sF, 1080p/23.98sF, 720p/60, 720p/59.94, 480p/60, and 480p/59.94
- Will also accept 270 Mb/s SD input SDI per SMPTE 259M in a pass through mode – auto senses HD or SD inputs
- 5 Reclocked DA outputs (HD if HD inputs applied, SD if SD inputs applied)
- 4 Selectable SDI or Composite Outputs (downconverted from HD if HD input applied), (from reclocked SD if SD input applied)
- High quality HD -> SD down conversion
- Supports 16:9 letterbox, 14:9 letterbox, 13:9 letterbox, 4:3 center crop, and 4:3 anamorphic squeeze aspect ratio conversions.
- 1080p/23.98sF conversion to 525i/59.94 with 3:2 pulldown sequence
- HD to SD colour space conversion (ITU rec. 709 to ITU rec. 601)
- On screen display used to configure the operating modes
- De-embeds Audio from HD video and embeds into standard definition SDI video (2 groups)
- Decodes and displays CEA-608 or CEA-708 captions from incoming video.
- Moves ANC data (e.g. captioning, timecode) from HD video to standard definition SDI video
- On Screen aspect ratio marker
- Card Edge LEDs for signal presence, equalization warning, audio groups present, module status
- VistaLINK™ - enabled offering remote monitoring, control and configuration capabilities via SNMP. VistaLINK™ is available when modules are used with the 3RU 500FR-C frame and a 500FC VistaLINK™ Frame Controller module in slot 1 of the frame using the Evertz VistaLINK™ PRO or other third party SNMP manager software.

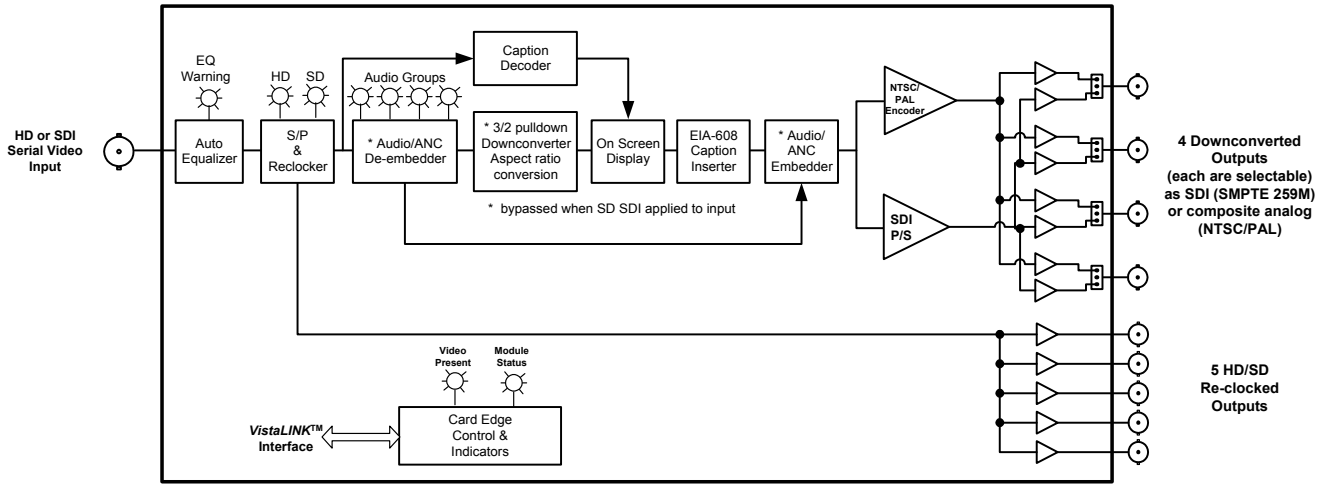

Figure 1: 500DCDA-HD Block Diagram

2. INSTALLATION

The 500DCDA-HD comes with a companion rear panel overlay that can be placed over the rear panel BNC connectors to identify their function. For information on inserting the module into the frame see the 500FR chapter section 3.

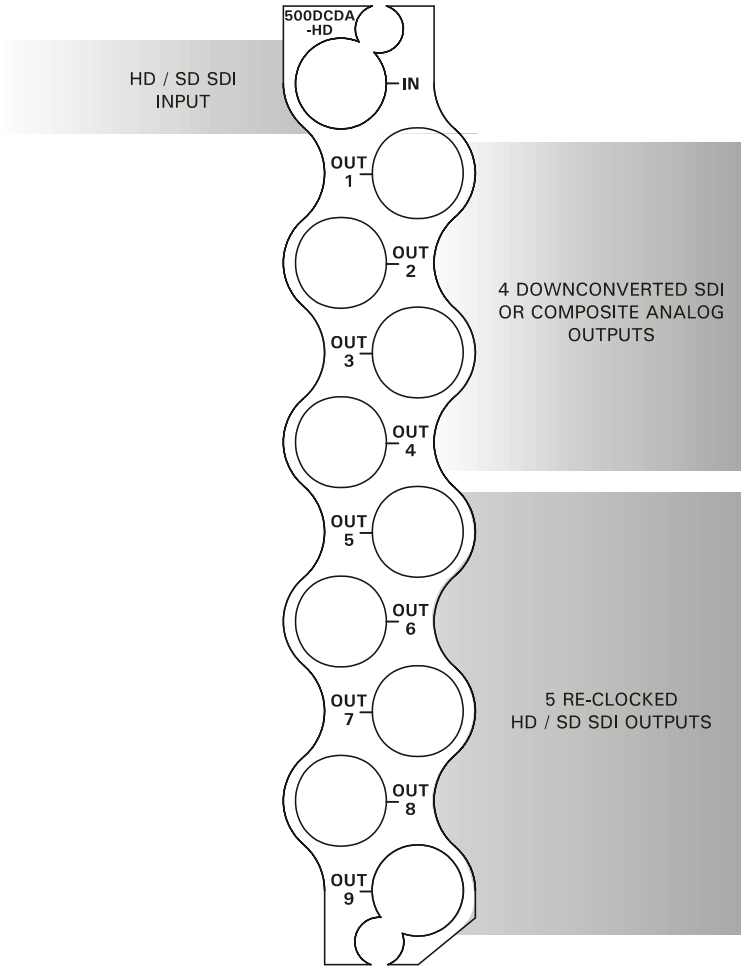

Figure 2: 500DCDA-HD Rear Panel Overlay

IN Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 292M or SMPTE 259M-C standards. (SMPTE 259M not supported at the time of writing.)

OUT 1 to 4 These four BNC connectors can be individually configured either as downconverted SDI video outputs, compatible with the SMPTE 259M-C standard, or as composite analog (NTSC/PAL) video outputs. See section 6.5 for information on selecting the output type.

OUT 5 to 9 These five BNC connectors are used to output reclocked serial component video, in the same standard as the video input.

3. SPECIFICATIONS

3.1. SERIAL VIDEO INPUT

Standard: 270 Mb/s SMPTE 259M - pass through mode
1.485 Gb/sec SMPTE 292M – auto-detects standard
SMPTE 260M, SMPTE 274M, SMPTE 296M, SMPTE 349M – see Table 1 for a list of supported HD video standards

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

Table 1: Video Input Formats

Connector: BNC per IEC 60169-8 Ammendment 2.
Input Equalization: Automatic to 100m @ 1.5Gb/s with Belden 1694 or equivalent cable.
Return Loss: >15 dB up to 1.5GHz

3.2. RECLOCKED SERIAL VIDEO DA OUTPUTS

Standard: Same as input
Number of Outputs: 5 Per Card reclocked
Connector: BNC per IEC 60169-8 Ammendment 2
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 200ps nominal for HD
750ps nominal for SD
Overshoot: <10% of amplitude
Return Loss: > 15 dB at 1.5 Gb/s
Jitter: < 0.2 UI

3.3. DOWNCONVERTED SERIAL VIDEO OUTPUTS

Standard: SMPTE 259M-C (270 Mb/s)
Number of Outputs: up to 4 Per Card (jumper selectable)
Connector: BNC per IEC 60169-8 Amendment 2
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 750ps nominal
Overshoot: <10% of amplitude
Return Loss: > 15 dB at 270 Mb/s
Jitter: < 0.2 UI

3.4. DOWNCONVERTED COMPOSITE ANALOG VIDEO OUTPUTS

Standards: Analog composite NTSC (SMPTE 170M) or
Analog composite PAL (ITU-R BT.470)
Number of Outputs: up to 4 Per Card (jumper selectable)
Connectors: BNC per IEC 60169-8 Amendment 2.
Signal Level: 1 V p-p nominal
DC Offset: 0V ±0.1V
Return Loss: >35dB up to 5 MHz
Frequency Response: 0.1dB to 4 MHz, 0.15dB to 5.5 MHz
Differential Phase: <0.5°(<0.3° typical)
Differential Gain: <0.8% (<0.5 % typical)
SNR: >78dB to 5 MHz (shallow ramp)
Impedance: 75 ohm

3.5. INPUT TO OUTPUT PROCESSING DELAY (HD INPUT VIDEO)

Video Delay: Just less than 1 to 2 frames depending on input video format, processing mode and phase setting
Audio Delay: Audio is delayed and re-embedded in time with the output picture

3.6. ELECTRICAL

Voltage: +12VDC
Power: 10 Watts.
EMI/RFI: Complies with FCC regulations for class A devices.
Complies with EU EMC directive.

3.7. PHYSICAL

Number of slots: 1

4. STATUS INDICATORS

The 500DCDA-HD has 10 LED Status indicators on the main circuit board front card edge to show operational status of the card at a glance. Figure 6 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 board power is good.

There are four small LEDs near the upper edge of the board that indicate the status of the equalizer and reclocker.

VIDEO PRESENT: This Green LED will be On when there is a valid signal present at the module input.

HD INPUT: This Green LED will be On when there is a valid high definition signal present at the module input.

SD INPUT: This Green LED will be On when there is a valid standard definition (525 or 625 line) SDI signal present at the module input.

CABLE LENGTH WARNING: This Yellow LED will be On when the cable equalizer detects that the cable length is greater than a preset threshold (factory set for 100 meters of Belden 1694A or equivalent cable).

4.1. AUDIO STATUS LEDs

Four LEDs located on the lower edge 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 2: Audio Group Status LEDs

5. ON SCREEN MENUS

5.1. NAGIVATING 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 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 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.

5.2. 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 5.3 to 5.11 provide detailed descriptions of each of the sub menus. The tables in sections 5.3 to 5.11 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.
Scaler	Configuration of the scaler filter sharpness
VANC Data Processing	Controls how vertical interval data is processed
CC Setup	Controls the Closed Caption Decoder
Audio	Sets the Audio groups
Analog Output	Configuration of the analog video output parameters
Marker	Configuration of On Screen aspect ratio marker
Utilities	Card preset management and various debug and maintenance features.

5.3. CONFIGURING THE VIDEO CONTROLS

The *Video* menus are used to configure parameters associated with the input and output video standards and output video timing. Other than the Video Type menu, these menu items are not applicable when a standard definition input video is connected. The chart below shows the items available in the *Video* menu. Sections 5.3.1 to 5.3.5 give detailed information about the menu item.

Video Type	Selects the video input will be High Definition or Standard definition.
Std	Selects the video input and output standards.
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 525 line output signal.
525 H Phase Offset	Sets the horizontal phase of the 525 line output signal.
625 V Phase Offset	Sets the vertical phase of the 625 line output signal.
625 H Phase Offset	Sets the horizontal phase of the 625 line output signal.
Set Minimum Delay	Sets the output timing to achieve minimum delay.
Limiter	Clips the video data to legal SDI values

5.3.1. Setting the Video Input Type

- *Video*
  - *Video Type*
    - *Auto*
    - *SD*
    - *HD*

With this control, you can set whether the 500DCDA-HD will function as a reclocking high definition serial digital video distribution amplifier and a high quality downconverter for 1.5 Gb/s HDTV signals or function as a monitoring distribution amplifier for standard definition 270 Mb/s signals.

When set to *Auto,* the module will autodetect the input video type. You can also force it to either high definition mode (*HD)* or standard definition mode (*SD).*

When the input video is Standard Definition, the 500DCDA-HD operates as a monitoring distribution amplifier. In this mode it does not process the audio or vertical interval data but merely passes it through. Accordingly, the menu items that control these functions (as described in sections 5.3.2 to 5.7) have no effect when the 500DCDA-HD is operating with standard definition video.

5.3.2. Setting the Video Input and Output Standard

- *Video*
  - *Std*
    - *Auto*
    - *1080i/60 to 525i/60*
    - *1080i/59.94 to 525i/59.94*
    - *720p/60 to 525i/60*
    - *720p/59.94 to 525i/59.94*
    - *1080i/50 to 625i/50*
    - *1080p/24 to 525i/60*
    - *1080p/23.98 to 525i/59.94*
    - *1080p/24sF to 525i/60*
    - *1080p/23.98sF to 525i/59.94*
    - *1080p/30sF to 525i/60*
    - *1080p/29.97sF to 525i/59.94*
    - *1080p/25sF to 625i/50*
    - *1035i/60 to 525i/60*
    - *1035i/59.94 to 525i/59.94*
    - *480p/60 to 525i/60*
    - *480p/59.94 to 525i/59.94*

With this control, you can set the input and output video standards. This menu item is not applicable when a standard definition input video is connected.

Note: When set to *Auto,* the module can not distinguish between *1080i/59.94, 1080p/29.97sF and 480p/59.94*, so it will be treated as *1080i/59.94*. Similarly *1080p/25sF* will be treated as *1080i/50*.

5.3.3. 3:2 Pulldown Processing

When using a 1080i/60 or 1080i/59.94 input video feed containing 3:2 pulldown, the 500DCDA-HD downconverts each field of the incoming image 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/60, 720p/59.94, 480p/60 or 480p/59.94 input video feed the 500DCDA-HD downconverts each frame of the incoming image 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/24sF or 1080p/23.98sF input video feed the 500DCDA-HD combines each segment of the incoming image back to a progressive frame before down conversion. When using a 1080p/24 or 1080p/23.98 input video feed the 500DCDA-HD downconverts each frame of the incoming image. After down conversion, extra fields are inserted to create a 3:2 pulldown at the output. The *Pulldown Reference* and *A Frame Offset* menus are used to determine the cadence of the 3:2 output.

5.3.3.1.Selecting the 3:2 Pulldown Reference with 24 Fps and 23.98 Fps Input Video

This menu setting is only used when the input video is 1080p/24, 1080p/23.98, 1080p/24sF or 1080p/23.98sF. In other input video formats it is not applicable.

Video
- *Pulldown Reference*
  - *Auto*
  - *RP 188*
  - *Free Run*

On 24 Fps and 23.98 Fps 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 3). The output of the *A frame candidate* frame will delayed by 2 frames, will consist of two video fields and will normally be in time with the genlock input. (See sections 5.3.4 and 5.3.4.3 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 5.3.3.2)

When you select *Auto* the 500DCDA-HD will auto detect the pulldown reference according to the following priority:
- RP188 ancillary timecode if present
- Free Run pulldown if RP188 is not 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 *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.

5.3.3.2.Accommodating Non-Standard 3:2 Sequences

This menu setting is only used when the input video is 1080p/24, 1080p/23.98, 1080p/24sF or 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 4 shows how this control defines the A frame when RP188 Ancillary data is used to control the 3:2 pulldown.

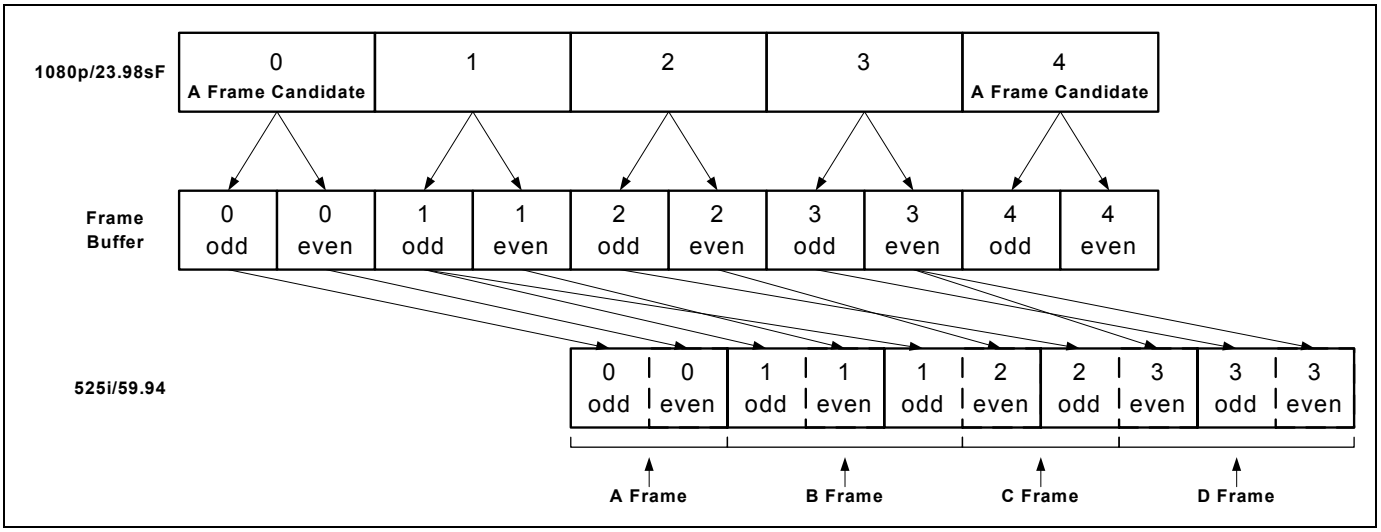

Figure 3: 3:2 Pulldown Sequence Insertion – 24 Fps and 23.98 Fps Input Video

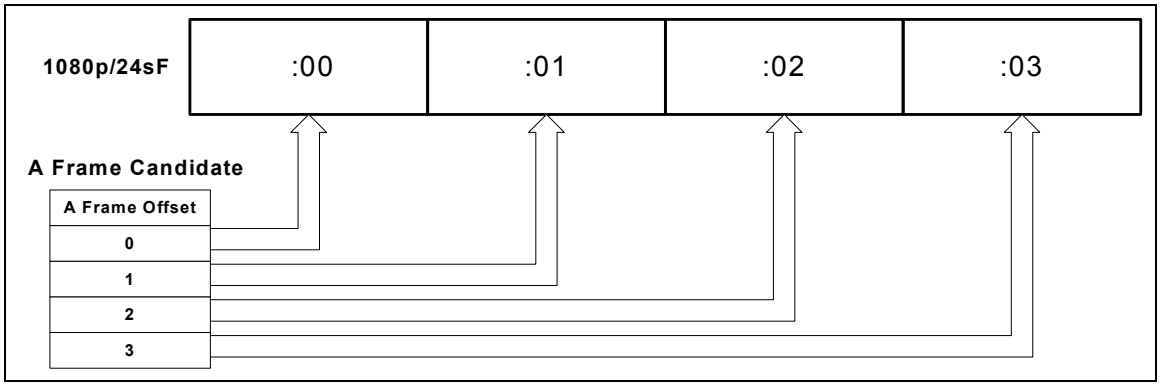

Figure 4: RP188 Pulldown Sequence A Frame Alignment – 24 Fps and 23.98 Fps Input Video

5.3.4. 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 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.

5.3.4.1.Calculating the Delay through the Downconverter.

The delay through the downconverter is dependent on the video input format and the H and V phase settings. Table 3 shows the default and maximum and minimum delays for each video standard. Delays shown are expressed in the units of the output video.

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
1080i/60 1080i/59.94	1	1	518	27	0	518	28
1080i/50	1	1	615	1594	0	615	1595
1080p/24sF 1080p/23.98sF	2	2	516	1403	1	516	1404
1080p/24 1080p/23.98	2	2	516	1403	1	516	1404
1080p/30sF 1080p/29.97sF	2	2	269	777	1	269	777
1080p/25sF	2	2	303	767	1	303	768
1035i/60 1035i/59.94	1	1	518	81	0	518	82
720p/60 720p/59.94	1.5	1	516	220	0	516	221
480p/60 480p/59.94	1	1	517	1633	0	517	1634

Table 3: Video Delay

5.3.4.2.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 input video when operating with a 525 line video output. Setting this control to 0 keeps the output video in time with the input video.

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 input 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 3 for the minimum and maximum delays possible.

5.3.4.3.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 input video when operating with a 525 line video output. Setting this control to 0 keeps the output video in time with the input video.

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 input 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 3 for the minimum and maximum delays possible.

5.3.4.4.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 input video when operating in a 625 line video output. Setting this control to 0 keeps the output video in time with the input video.

Increasing the value will delay the output video in one-line increments. In order to advance the output video with respect to the input 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 3 for the minimum and maximum delays possible.

5.3.4.5.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 input video when operating with a 625 line video output. Setting this control to 0 keeps the output video in time with the input video.

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 input 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 3 for the minimum and maximum delays possible.

5.3.4.6.Setting the Minimum Delay

Video
Set Minimum Delay
Cancel
Set

With this control, you can set the timing of the output video with respect to the current input video so that the minimum delay is achieved through the module.

When you choose *Set* and press the pushbutton, the *H Phase Offset* and *V phase Offset* menu items for the current video standard will be adjusted to achieve the minimum delay through the card.

5.3.5. Limiting the video output to Legal Values

Video
Limiter
Disable
Enable

With this control, you can enable a limiter that will clip the video data to legal SDI values.

5.4. CONFIGURING THE OUTPUT PICTURE

The *Output Picture* menus are used to configure parameters associated with the output picture. These menu items are not applicable when a standard definition input video is connected. The chart below shows the items available in the *Output Picture* menu. Sections 5.4.1 to 5.4.3 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.

5.4.1. 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 letterbox solution, we have to re-map the picture to occupy fewer lines. The unused lines are left black at the top and bottom of the picture.

Figure 5 shows the various output aspect ratios available.

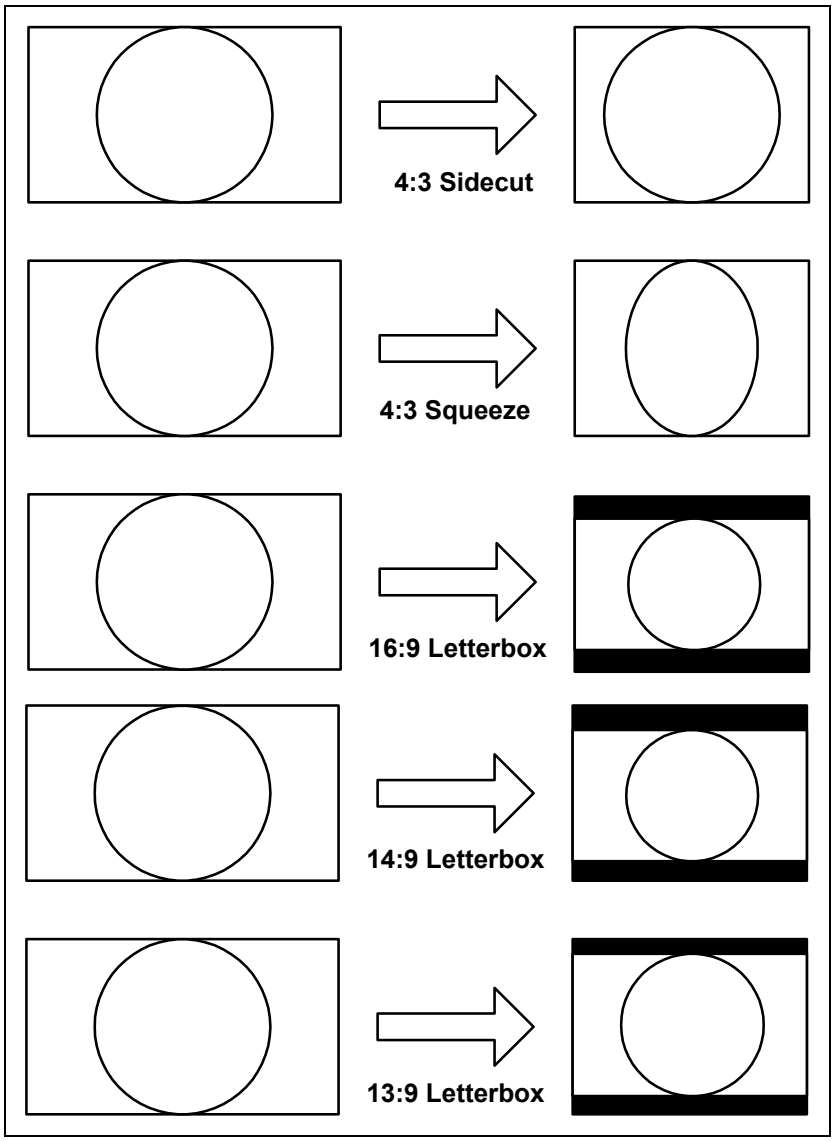

Figure 5: Aspect Ratio Conversions

5.4.2. 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 jumper J7. (See section 6.2)

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

5.4.3. 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.

5.5. CONFIGURING THE SCALER

The 500DCDA-HD scaler chip uses a process of filtering to 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. These menu items are not applicable when a standard definition input video is connected. The chart below shows the items available in the *Scaler* menu. Sections 5.5.1 to 5.5.2 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

5.5.1. Setting the Scaler Horizontal filter Sharpness

Scaler *H Filter Cutoff* *0.35 Fs* *0.15 to 0.5 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.

5.5.2. Setting the Scaler Vertical filter Sharpness

Scaler *V Filter Cutoff* *0.35 Fs* *0.15 to 0.5 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.

5.6. CONFIGURING THE VERTICAL INTERVAL PROCESSING

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. These menu items are not applicable when a standard definition input video is connected. The chart below shows the items available in the *VANC Data Processing* menu. Sections 5.6.1 to 5.6.5 give detailed information about each of the menu items.

Closed Captions	Controls whether SMPTE 334M closed captions will be decoded from the input and output as CEA-608 captions on the program video outputs.
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.

5.6.1. Displaying Closed Captions on the Program Video Outputs

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

This control determines whether closed captions will be encoded on line 21 according to EIA 608B on the SDI and analog outputs.

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. When there is no incoming SMPTE 334M caption data, a null CEA-608B waveform is inserted on line 21 of the output video.

5.6.2. 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 analog video 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.

5.6.3. 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.

5.6.4. 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*.

5.6.5. 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*.

5.7. CONFIGURING THE CLOSED CAPTION DECODER

The *CC Setup* menu is used to configure the caption decoder output of the 500DCDA-HD.

Display Select	Selects the information that will be displayed On Screen
CEA-608 Decoder	Configures the CEA-608 decoder display
CEA-708 Decoder	Configures the CEA-708 decoder display
525 CC Decode Line	Sets closed caption decode line on 525 line video inputs
625 CC Decode Line	Sets closed caption decode line on 625 line video inputs

5.7.1. Configuring the CEA-608 Decoder

There are 7 menu items that are used to configure various items relating to the CEA-608 closed caption decoder.

5.7.1.1.Configuring the CEA-608 Decoder Closed Caption Channel

- *CC Setup*
  - *CEA-608 Decoder*
    - *CC Channel*
      - *Off*
      - *1 to 4*

This control selects the CEA-608 caption channel that will be decoded. Channels 1 through 4 can be selected or the CEA-608 caption decoder can be turned off.

5.7.1.2.Configuring the CEA-608 Decoder Text Channel

- *CC Setup*
  - *CEA-608 Decoder*
    - *Text Channel*
      - *Off*
      - *1 to 4*

This control selects the CEA-608 text channel that will be decoded. Channels 1 through 4 can be selected or the CEA-608 caption decoder can be turned off.

5.7.1.3.Configuring the CEA-608 Decoder Text Window Position

- *CC Setup*
  - *CEA-608 Decoder*
    - *Text Top Row*
      - *6*
      - *1 to 15*

This control allows the user to set the position of the Text Window displayed on the On screen display.

5.7.1.4.Configuring the CEA-608 Decoder Text Window Height

- *CC Setup*
  - *CEA-608 Decoder*
    - *Text Height*
      - *4*
      - *2 to 15*

This control allows the user to select the height of the Text Window displaying the Text Channel information on the OSD

5.7.1.5.Configuring the CEA-608 Decoder XDS Window Display Type

- *CC Setup*
  - *CEA-608 Decoder*
    - *XDS Display*
      - *Off*
      - *Fixed Position*
      - *Scrolling Display*

This control allows the user to configure the information display of the XDS window.

When set to *Fixed position* the window is a constant height and will display the XDS information within the selected area.

When set to *Scrolling Display* the XDS information will scroll up through the window as it is received by the 500DCDA-HD.

When set to *Off* the XDS decoder is disabled.

5.7.1.6.Configuring the CEA-608 Decoder XDS Window Position

CC Setup
CEA-608 Decoder
XDS Top Row
1
1 to 15

This control allows the user to set the position of the XDS Window displayed on the On screen display

5.7.1.7.Configuring the CEA-608 Decoder XDS Window Height

CC Setup
CEA-608 Decoder
XDS Height
4
2 to 15

This control allows the user to select the height of the XDS Window displaying the XDS information on the OSD

5.7.2. Configuring the CEA-708 Decoder

CC Setup
CEA-708 Decoder
CC Service Channel
1
1 to 63

This control allows the user to select the CEA-708 CC service to be decoded. Services 1 through 63 can be selected.

5.7.3. Setting the Closed Caption Decode Line for 525 Line Video Inputs

CC Setup
525 CC Decode Line
21
10 to 21

This control determines the line number where CEA-608 closed captions will be decoded in 525 line video

5.7.4. Setting the Closed Caption Decode Line for 625 Line Video Inputs

CC Setup
625 CC Decode Line
22
6 to 22

This control determines the line number where CEA-608 closed captions will be decoded in 625 line video

5.8. CONFIGURING THE AUDIO PROCESSING

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 500DCDA-HD 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. These menu items are not applicable when a standard definition input video is connected. The chart below shows the items available in the *Audio* menu. Sections 5.8.1 to 5.8.2 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

5.8.1. 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.

5.8.2. Selecting The Audio Groups That Will Be Embedded

The model 500DCDA-HD 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 5.8.1) 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.

5.9. SETTING UP THE ANALOG OUTPUT PARAMETERS

The *Analog Output* menus are used to configure parameters associated with the analog output. These menu items are not applicable when a standard definition input video is connected. The chart below shows the items available in the *Analog Output* menu. Sections 5.9.1 to 5.9.7 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 analog video output
Line 21 Setup Pedestal	Sets whether the NTSC setup pedestal will be on line 21 on the analog video output

5.9.1. Setting the Composite Display Mode – Colour or Monochrome

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

5.9.2. Setting the Analog Video Output Level

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.

5.9.3. Setting the Hue

Analog Output
Hue
-17.5 to 17.5
0.0

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

5.9.4. Setting the Saturation

Analog Output
Saturation
-10 to 10
0

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

5.9.5. Setting the Contrast

Analog Output
Contrast
0 to 20
0

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

5.9.6. Setting the Brightness

Analog Output
Brightness
-7.5 to 15.0
0.0

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

5.9.7. Setting the NTSC Setup Pedestal on the Analog Video Output

Analog Output
NTSC Setup Pedestal
Off
On

This control determines how the NTSC Setup Pedestal will be applied on the 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 at the line determined by the *Line 21 Setup Pedestal* menu item.

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

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

Analog Output
Line 21 Setup Pedestal
Auto
Off

This control determines how the NTSC Setup Pedestal will be applied on line 21 of the analog video output. The NTSC setup pedestal should not be present when there is an CEA-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.

5.10. CONFIGURING THE ON SCREEN MARKERS

The *Marker* menus are used to configure the on screen aspect ratio markers. The chart below shows the items available in the *Marker* menu. Sections 5.10.1 to 5.10.3 give detailed information about each of the parameters.

Marker Type	Sets the type of on screen marker
Marker Opacity	Sets the opacity of the on screen markers.
Marker Output	Sets the outputs where the Aspect ratio Markers are displayed.

5.10.1. Setting The On Screen Marker Type

Marker
Marker Type
4:3 Line
4:3 Shaded
4:3 Line with center

This control determines the type of On screen markers.

Select *4:3 Line* to display On Screen markers with vertical lines at the 4:3 aspect ratio of the original image.

Select *4:3 Shaded* to display On Screen markers with areas outside the 4:3 aspect ratio of the original image shaded.

Select *4:3 Line with center* to display On Screen markers with vertical lines at the 4:3 aspect ratio and a cross at the center of the original image.

5.10.2. Setting The On Screen Marker Opacity

Marker
Marker Opacity
25 percent
50 percent
75 percent
100 percent

This control selects the opacity of the On Screen markers.

5.10.3. Setting The Outputs that have the On Screen Marker

Marker
Marker Output
Off
NTSC/PAL & SDI
NTSC/PAL
SDI

This control selects which outputs the On Screen markers are displayed on.

Select *Off* to disable the On Screen markers.

Select *NTSC/PAL & SDI* to display the On Screen markers on both the NTSC/PAL composite analog and SDI outputs.

Select *NTSC/PAL* to display the On Screen markers on the NTSC/PAL composite analog outputs.

Select *SDI* to display the On Screen markers on the SDI outputs.

5.11. 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 5.11.1 to 5.11.5 give detailed information about each of the parameters.

On Screen Display	Selects what will be displayed by the On Screen Display windows
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.

5.11.1. Selecting the On Screen Display

Utilities
On Screen Display
Off
Status Window
CEA-608 Decoder
CEA-708 Decoder

With this control, you can select what information is being displayed by the closed caption decoder display.

Select *Off* to disable the On Screen Display Windows.

Select *Status Window* to show module status at a glance

Select *CEA-608 Decoder* to show various windows that are configured using the *CEA-608 Decoder* menu described in section 5.7.1.

Select *CEA-708 Decoder* to show various windows that are configured using the *CEA-708 Decoder* menu described in section 5.7.2.

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

The 500DCDA-HD 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.

5.11.3. Saving Configurations to the User Presets

The 500DCDA-HD 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.

5.11.4. 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.

5.11.5. Accessing Information About this Module and its Firmware

Utilities
About…

This control lists the particulars 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.

6. JUMPERS

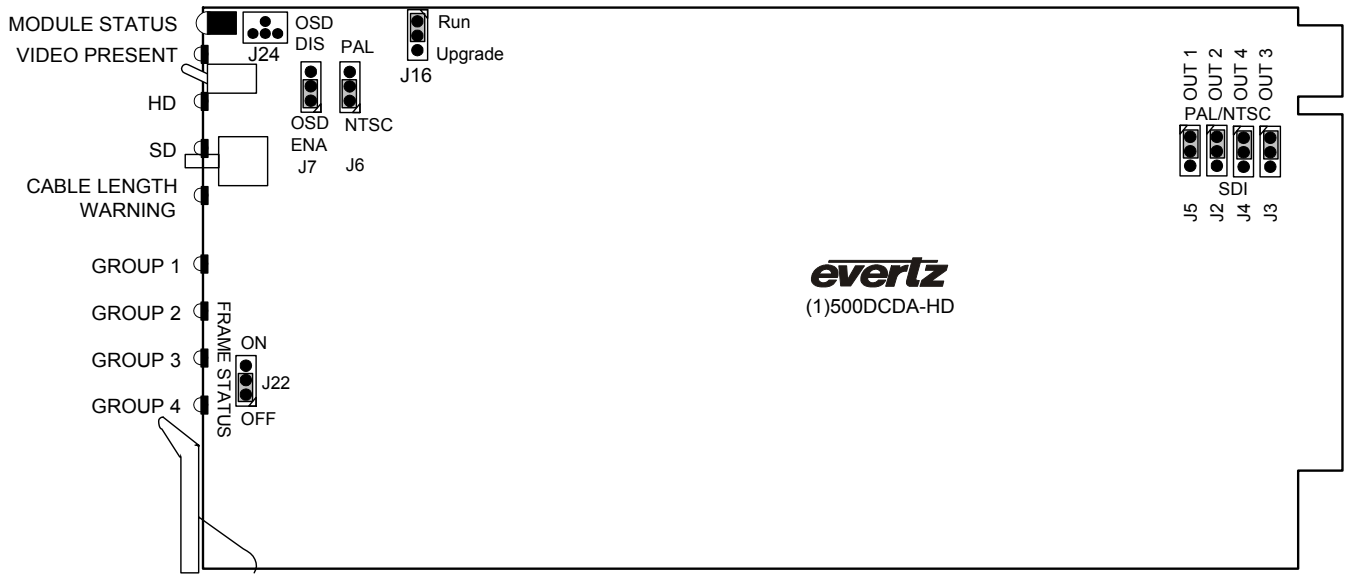

Figure 6: LED and Jumper Locations

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

The FRAME STATUS jumper J22, located at the front of the module determines whether local faults (as shown by the Local Fault indicator) will be connected to the 500FR frame's global status bus.

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

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

6.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE The UPGRADE jumper J16 located at the top edge of the 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* section 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 *UPGRD* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J24 just behind the small LEDs. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section in the front of the binder. Once the upgrade is completed, 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.

6.3. CONTROLLING THE OUTPUT VIDEO STANDARD ON LOSS OF VIDEO

Jumper J6, located immediately behind jumper J7 (near the toggle switch at the front of the module) controls the behaviour of the down converter outputs when there is no input video

J6: To output 525i/59.94 (NTSC) video on loss of input video on the downconverted video outputs install this jumper in the position closest to the top of the module.

To output 625i/50 (PAL) on loss of input video on the downconverted video outputs install this jumper in the position closest to the center of the module.

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

Jumper J7, located immediately behind the toggle switch at the front of the module determines whether the On screen menu display will be shown on the downconverted SDI and analog outputs.

J7: To enable the On Screen Menus on the downconverted video outputs install this jumper in the position closest to the top of the module.

To disable the On Screen Menus on the downconverted video outputs install this jumper in the position closest to the center of the module.

6.5. SELECTING THE FUNCTION OF OUTPUTS 1 TO 4

OUTPUT SELECT: Four jumpers J5, J2, J3 and J4 located near the rear of the module are used to select whether outputs 1 to 4 will contain SDI video or composite analog (NTSC/PAL) video.

To select SDI on the output install the respective jumper in the SDI position (closest to the centre of the card)

To select composite analog on the output install the respective jumper in the NTSC/PAL position (closest to the top edge of the card)

7. *VISTA*LINK™ REMOTE MONITORING/CONTROL

7.1. What is *Vista*LINK™?

*Vista*LINK™ is Evertz's remote monitoring and control capability 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. For monitoring there needs to be a detecting device that automatically reports all errors to a central alarm and error logging station. We also need to be able to interrogate individual detector devices from the central station to determine the status of individual channels. Finally, we need to be able to configure devices in the network from the 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 500DCDA-HD), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK™ enabled 500 series modules reside in the 3RU 500FR MultiFrame and communicate with the manager via the 500FC 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 500FC Frame Controller chapter.

7.2. *Vista*LINK™ MONITORED PARAMETERS

The following parameters can be remotely monitored through the *Vista*LINK™ interface.

Parameter	Description
Input Video Type	Indicates the video type (SD or HD)
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
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 4: *Vista*LINK™ Monitored Parameters

7.3. *Vista*LINK™ TRAPS

There are currently no traps for the 500DCDA-HD.

7.4. *Vista*LINK™ CONTROLLED PARAMETERS

Parameter	Description
Video Type	A range of values indicating the video type (SD or HD)
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 for 525 line video
525 H Phase Offset	Horizontal phase offset for 525 line video
625 V Phase Offset	Vertical phase offset for 525 line video
625 H Phase Offset	Horizontal phase offset for 525 line video
Limiter	Clips the video data to legal SDI values
Output Aspect Ratio	A range of values indicating the aspect ratio of the output picture
Loss of Video	Action on loss of video
Panel Colours	Letterbox panel colours
H Filter Cutoff	Cutoff frequency of scaler horizontal filter
V Filter Cutoff	Cutoff frequency of scaler vertical filter
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 analog output will be colour or monochrome
Composite Output Level	Sets video level of analog output
Hue	Sets Hue of analog output
Saturation	Sets Saturation of analog output
Contrast	Sets Contrast of analog output
Brightness	Sets Brightness of analog output
NTSC Setup	Controls NTSC Setup pedestal on the analog output
Line 21 Setup	Controls NTSC Setup pedestal on line 21 of the analog output
608 CC Channel	Sets CEA-608 decoder CC channel
608 Text Channel	Sets CEA-608 decoder text channel
608 Text Top Row	Sets CEA-608 decoder text channel display top row
608 Text Height	Sets CEA-608 decoder text channel display height
608 XDS Display	Sets CEA-608 decoder XDS display type
608 Text Top Row	Sets CEA-608 decoder XDS display top row
608 Text Height	Sets CEA-608 decoder XDS display height
708 CC Service Channel	Sets CEA-708 decoder CC service channel
525 CC Decode Line	Sets CEA-608 decoder line number for 525 video
625 CC Decode Line	Sets CEA-608 decoder line number for 625 video
Marker Type	Sets Aspect ratio marker type
Marker Opacity	Sets Aspect ratio marker opacity
Marker Output	Selects Outputs that contain Aspect ratio marker type
On Screen Display	Controls Status, CEA-608 or CEA-708 caption decoder OSD

Table 5: *Vista*LINK™ Controlled Parameters

8. MENU QUICK REFERENCE

Video
- Video Type
- Std
- Pulldown Reference
- A Frame Offset
- 525 V Phase Offset
- 525 H Phase Offset
- 625 V Phase Offset
- 625 H Phase Offset
- Set Minimum Delay
- Limiter

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

Scaler
- H Filter Cutoff
- V Filter Cutoff

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

CC Setup
- CEA-608 Decoder
  - CC Channel
  - Text Channel
  - Text Top Row
  - Text Height
  - XDS Display
  - XDS Top Row
  - XDS Height
- CEA-708 Decoder
  - CC Service Channel
- 525 CC Decode Line
- 625 CC Decode Line

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

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

Markers
- Marker Type
- Marker Opacity
- Marker Output

Utilities
- On Screen Display
- Recall Preset
- Store Preset
- Upgrade
- About…