Up-and-down-AAFD

Combined up, down and cross converter with embedded audio handling and AFD inserter

USER MANUAL

Crystal Vision

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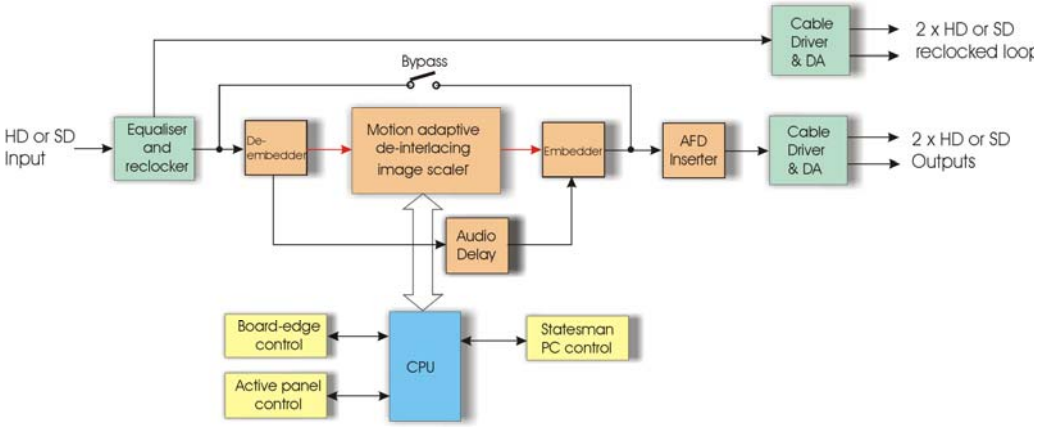
Revision 2 Note added to WSS blanking control. 15/11/2010

1 Introduction

Up-and-down-AAFD provides format conversion between High Definition and Standard Definition and different HD formats sharing the same line rate. This is achieved by using the latest motion adaptive video de-interlacing techniques incorporating both detail and edge enhancement processing. The Up-and-down-AAFD can pass up to two groups of embedded audio and four groups in bypass mode. The board also includes a flexible aspect ratio converter and AFD inserter. The Active Format Descriptor inserter is included to insert picture aspect ratio data into the output video for aspect ratio correction by down-stream equipment. DA outputs are available for both the reclocked input and converted program.



Up-and-down-AAFD converter

The main features are as follows:

- Combined up, down and cross conversion
- Motion adaptive video de-interlacing with both detail and edge enhancement
- Flexible aspect ratio conversion
- Auto bypass when input and output are the same standard
- Handles embedded audio
- SMPTE 2016-3 Vertical Ancillary Data Mapping of Active Format Descriptor
- One frame video delay in all modes
- Two scaled outputs and two input loop-throughs
- Fits in standard frames alongside HD, SD and audio products

Up-and-down-AAFD is a 100mm x 266mm module, which fits in the four standard frames and can be integrated with any boards from the company's full product range. The RM34 is the rear module of choice although the RM29 can also be used.

1.1 Operating modes

Up-and-down-AAFD incorporates a number of processing features to ensure that maximum performance is maintained under all circumstances. To obtain the best results when scaling up or down generally requires different techniques depending on whether the video contains slow or fast moving images. Up-and-down-AAFD employs motion adaptive video de-interlacing to maximise the picture's vertical resolution alongside a scaler and frame rate converter to achieve the best picture that always appears smooth and natural-looking. Up converting from SD to HD will give a softer picture: the adjustable detail enhancement feature allows image sharpening. Fine edge detail processing additionally ensures that the picture remains clear and sharp without creating unpleasant jagged edges.

To maintain the best picture quality, Up-and-down-AAFD automatically enters a bypass mode when the input is the same as the selected output standard and no aspect ratio conversion is selected. This is achieved by bypassing the major processing blocks. Whilst in bypass mode the gain, offset, detail and aspect ratio controls will be inactive.

In normal operation Up-and-down-AAFD can handle two groups of embedded audio which will then be presented at its output. In the event that more than two groups of embedded audio are present, Up-and-down-AAFD will automatically take the two lowest numbered groups and re-embed them on groups 1 and 2 of its output.

Up-and-down-AAFD can also be used as a flexible Standard Definition aspect ratio converter.

Up conversion	
	625/50 to 720p 50 525/59.94 to 720p 59.94 625/50 to 1080i 50 525/59.94 to 1080i 59.94
Down conversion	
	720p 50 to 625/50 720p 59.94 to 525/59.94 1080i 50 to 625/50 1080i 59.94 to 525/59.94
Cross conversion	
	720p 50 to 1080i 50 720p 59.94 to 1080i 59.94 1080i 50 to 720p 50 1080i 59.94 to 720p 59.94

High Definition aspect ratio is always 16:9, but Standard Definition can be 16:9 or 4:3. Up-and-down-AAFD has a selection of aspect ratio settings for both SD inputs and SD outputs.

Input/Output format	Output aspect ratio
HD(16:9)/SD(4:3)	16:9 Letterbox (Full image) 14:9 Letterbox (Compromise) 16:9 Full Screen (Centre cut) Anamorphic (compressed horizontally)

Input/Output format	Input aspect ratio
SD(4:3)/HD(16:9)	4:3 Pillarbox (Full image) 14:9 Pillarbox (Compromise) 4:3 Full Screen (Centre cut) Anamorphic (compressed vertically)

4:3 to 16:9

4:3 Full Screen

Full 4:3 source width mapped to 16:9 monitor width
Central 75% of source height stretched to monitor height
No vertical black bands required
Significant picture lost

14:9 Pillarbox

Full 4:3 source width compressed to central 87.5% of 16:9 monitor width
Central 87.5% of source height stretched to monitor height
Vertical black bands added to left and right
Minimal picture lost

4:3 Pillarbox

Full 4:3 source width compressed to central 75% of 16:9 monitor width
Full source height mapped to monitor height
Vertical black bands added to left and right
No picture lost

4:3 Anamorphic

Full 4:3 source width horizontally stretched to 16:9 monitor width
Full source height mapped to monitor height
No picture lost but possible significant distortion

16:9 to 4:3

16:9 Full Screen

Central 75% of 16:9 source width stretched to 4:3 monitor width
Full source height mapped to monitor height
No horizontal black bands required
Significant picture lost

14:9 Letterbox

Central 87.5% of 16:9 source width stretched to 4:3 monitor width
Full source height compressed to 87.5% of monitor height
Horizontal black bands added to top and bottom
Minimal picture lost

16:9 Letterbox

Full 16:9 source width mapped to 4:3 monitor width
Full source height compressed to 75% of monitor height
Horizontal black bands added to top and bottom
No picture lost

16:9 Anamorphic

Full 16:9 source width mapped to 4:3 monitor width
Full source height stretched to monitor height
No picture lost but possible significant distortion

Active Format Descriptor (AFD)

Although nearly all programs are now produced in true 16:9 wide screen there is a vast amount of archive material existing in 4:3. Conversely large numbers of second sets and portables are still using 4:3 displays. Because of this it is necessary for the end of chain transmission equipment such as a set top box to adjust the incoming pictures aspect ratio to suit the final display aspect ratio.

The way in which the image should be adapted for display is controlled by the broadcaster by means of signalling embedded in the transmission. The Active Format Descriptor (AFD) code describes the portion of the image which is important and should therefore be presented to the viewer.

The ANC data packets containing the AFD information are inserted within the active line portion of the fourth line, after the switching line in the vertical ancillary space by Up-and down-A-AFD's AFD inserter.

2 Hardware installation

The Up-and-down-AAFD single height module uses the RM34 rear connector that will fit into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

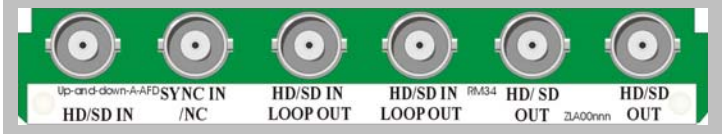
2.1 Rear modules and signal I/O

The Indigo 4 4U frame will house up to 24 single height modules with up to three power supplies. The Indigo 2 2U frame will house up to 12 single height modules and dual power supplies. The Indigo 1 1U frame will house six single height modules and a single power supply. The Indigo DT desk top box has a built-in power supply and will house up to two single height modules.

Note: For details of fitting rear connectors please refer to the appropriate frame manual.

Rear module connections with RM34

The rear module of choice is the RM34, a single height module that will allow maximum packing density with the maximum number of outputs available.

RM34 rear module connector	Description
	**RM34** • 24 Up-and-down-AAFD modules per Indigo 4 frame • 12 per Indigo 2 frame • Six per Indigo 1 frame • 2 per Indigo DT • All frame slots can be used

BNC	I/O assignment
HD/SD OUT	Scaler serial digital output
HD/SD OUT	Scaler serial digital output
HD/SDI IN LOOP OUT	High Definition/Standard Definition serial digital input reclocked loop-through
HD/SD IN LOOP OUT	High Definition/Standard Definition serial digital input reclocked loop-through
SYNC IN/NC	No user connection
HD/SD INPUT	High Definition/Standard Definition serial digital input

Rear module connections with RM29

The RM29, although no longer available for new installations can be used with the Up-and-down-AAFD. This is also a single height rear module giving maximum packing density with the maximum number of outputs available.

RM29 rear module connector	Description
	**RM29** • 24 Up-and-down-AAFD modules per Indigo 4 frame • 12 per Indigo 2 frame • Six per Indigo 1 frame • 2 per Indigo DT • All frame slots can be used

BNC	I/O assignment
HD SDI OUT	Scaler serial digital output
HD SDI OUT	Scaler serial digital output
HD SDI IN LOOP	High Definition/Standard Definition serial digital input reclocked loop-through
HD SDI IN LOOP	High Definition/Standard Definition serial digital input reclocked loop-through
HD SDI INPUT	High Definition/Standard Definition serial digital input

2.2 General Purpose Interface (GPI)

Each frame slot has up to six connections ‘a-f’ for GPI control and monitoring. These connections are available at the rear of the frame on the 26-way D-type remote connectors.

GPI		Low (<1V)	High (+5V)
1	**‘a’**	GPI recall of Presets a,b,c, high = Preset1, a,b,c, low = Preset8	
2	**‘b’**		
3	**‘c’**		
4	**‘d’**	No function at present	
5	**‘e’**	Input missing	
6	**‘f’**	No function at present	

As supplied, each GPI output has a 270Ω resistor in series with its output. This allows for an external LED to be driven, connected to a DC voltage of +5V.

Each General Purpose Input (GPI) is fitted with a 10kΩ resistor connected to the internal +5V.

4U frame GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to two of eight rear remote connectors as follows:

Slot no.	‘a’ pin	‘b’ pin	‘c’ pin	‘d’ pin	‘e’ pin	‘f’ pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	8 (3)	9 (3)	18 (3)	26 (3)	19 (4)	20 (4)
4	7 (3)	16 (3)	17 (3)	25 (3)	10 (4)	11 (4)
5	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
6	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
7	5 (3)	6 (3)	15 (3)	24 (3)	1 (4)	2 (4)
8	4 (3)	14 (3)	13 (3)	23 (3)	3 (4)	4 (4)
9	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
10	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)
11	3 (3)	12 (3)	22 (3)	21 (3)	12 (4)	13 (4)
12	10 (3)	11 (3)	19 (3)	20 (3)	21 (4)	22 (4)

Upper

Table shows pin number (remote number)

Slot no.	‘a’ pin	‘b’ pin	‘c’ pin	‘d’ pin	‘e’ pin	‘f’ pin
1	8 (5)	9 (5)	18 (5)	26 (5)	19 (6)	20 (6)
2	7 (5)	16 (5)	17 (5)	25 (5)	10 (6)	11 (6)
3	8 (7)	9 (7)	18 (7)	26 (7)	19 (8)	20 (8)
4	7 (7)	16 (7)	17 (7)	25 (7)	10 (8)	11 (8)
5	5 (5)	6 (5)	15 (5)	24 (5)	1 (6)	2 (6)
6	4 (5)	14 (5)	13 (5)	23 (5)	3 (6)	4 (6)
7	5 (7)	6 (7)	15 (7)	24 (7)	1 (8)	2 (8)
8	4 (7)	14 (7)	13 (7)	23 (7)	3 (8)	4 (8)
9	3 (5)	12 (5)	22 (5)	21 (5)	12 (6)	13 (6)
10	10 (5)	11 (5)	19 (5)	20 (5)	21 (6)	22 (6)
11	3 (7)	12 (7)	22 (7)	21 (7)	12 (8)	13 (8)
12	10 (7)	11 (7)	19 (7)	20 (7)	21 (8)	22 (8)

Lower

Table shows pin number (remote number)

Note: Remote 1, Remote 3, Remote 5 and Remote 7 are 26-way high-density D-Type female sockets. Frame ground is pin 2 and +5V @500mA is pin 1 in each case.

Remote 2, Remote 4, Remote 6 and Remote 8 are 26-way high-density D-Type male plugs and frame ground is pin 6 in each case and +5V @500mA is pin 15 on Remote 2 and Remote 6.

Note. The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A. Remotes 5-8 are similarly protected.

2U frame GPI connections

GPI lines 'a' to 'f' of each card connect to two of four rear remote connectors as follows:

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	8 (3)	9 (3)	18 (3)	26 (3)	19 (4)	20 (4)
4	7 (3)	16 (3)	17 (3)	25 (3)	10 (4)	11 (4)
5	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
6	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
7	5 (3)	6 (3)	15 (3)	24 (3)	1 (4)	2 (4)
8	4 (3)	14 (3)	13 (3)	23 (3)	3 (4)	4 (4)
9	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
10	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)
11	3 (3)	12 (3)	22 (3)	21 (3)	12 (4)	13 (4)
12	10 (3)	11 (3)	19 (3)	20 (3)	21 (4)	22 (4)

Table shows pin number (remote number)

Note: Remote 1 and Remote 3 are 26-way high-density D-Type female sockets. Frame ground is pin 2 and +5V @500mA is pin 1 in each case.

Remote 2 and Remote 4 are 26-way high-density D-Type male plugs and frame ground is pin 6 in each case and +5V @500mA is pin 15 on Remote 2.

Note. The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A.

1U frame GPI connections

GPI lines 'a' to 'f' of each card connect to two rear remote connectors as follows:

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
4	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
5	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
6	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)

Table shows pin number (remote number)

Note: Remote 1: 26-way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.

Remote 2: 26-way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15.

Note. The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

Indigo DT desk top box GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to two rear remote connectors as follows:

Slot no.	‘a’ pin	‘b’ pin	‘c’ pin	‘d’ pin	‘e’ pin	‘f’ pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)

Table shows pin number (remote number)

Note: Remote 1: 26-way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.

Remote 2: 26-way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15.

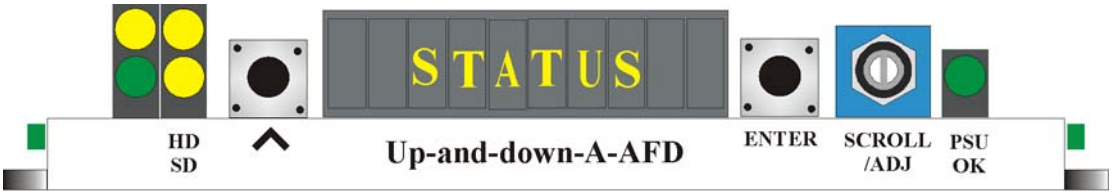
Note. The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

3 Card edge operation

3.1 Card edge controls

Once the start-up initialisation procedure is complete, the Up-and-down-AAFD card can be controlled or configured from the card edge, the active control panel or the Statesman PC interface. This chapter will concentrate on the card edge controls.

The front edge of the card provides power rail monitoring, menu selection, variables adjustment and a ten-digit visual status display.



Up-and-down-AAFD front edge view

3.2 Card edge buttons

Up-and-down-AAFD is fitted with two tactile push button switches that allow the operator to navigate within the menu structure.

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Button	Function	Normal state Up, Action Down
⌑	Up Menu	Push to jump up a menu level or cancel a selection
ENTER	Select/Action	Push to select a menu and to action and confirm a change

3.3 Card edge rotary control

The board edge rotary encoder is used to navigate through the menu categories and adjust parameter values.

Control	Function
SCROLL /ADJUST	Rotate SCROLL to identify a menu category. In combination with the ENTER button select and ADJUST to change the current level or select a further option.

Notes: The rotary control can access menus and parameter values by clockwise or anti-clockwise rotation.

3.4 Reading card edge LEDs

Card edge LEDs may be used in conjunction with status information from any connected remote status panel display or from Statesman if available.

Refer also to the trouble shooting chapter for more help with solving problems and monitoring status information.

The following table summarises the card edge LED functions and colours:

Name	LED Colour	Function when ON	Function when Off
HD	Yellow	Video input standard is HD (High Definition)	Input not present
SD	Yellow	Video input standard is SD (Standard Definition)	
PSU OK	Green	Good power supply (PSU) rails.	One or more of the monitor supplies is out of specification
	Yellow	No function at present	
	Green	No function at present	

3.5 Navigating card edge menus

To access the card edge menu system proceed as follows:

- Press the up-arrow [^] until a top menu category is reached
- Rotate the SCROLL control until the desired menu category is found
- Push ENTER to enter the sub menus of that category
- Rotate SCROLL to select a sub menu
- Push ENTER to select the desired function. Selection will be indicated by the text being displayed in ***italic*** text
- Rotate ADJUST to make the desired change to the selected parameter. The display brightness will flash slowly to indicate that a change has been made and requires confirmation
- Push ENTER to action the change. The display will cease flashing
- Use the up-arrow [^] and SCROLL control to navigate to further menus

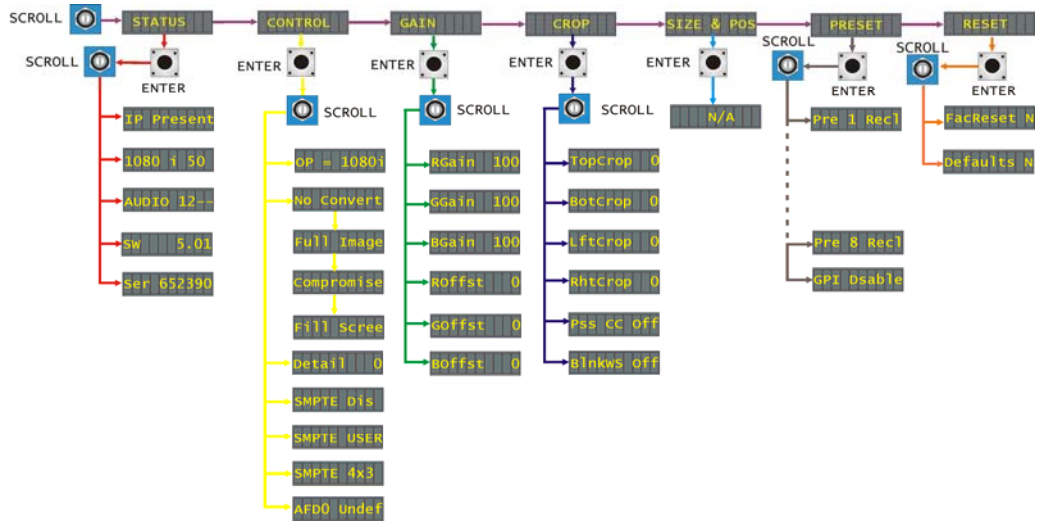
Note. The displayed menu brightness will flash slowly if confirmation of a change is required.

3.6 Card edge configuration

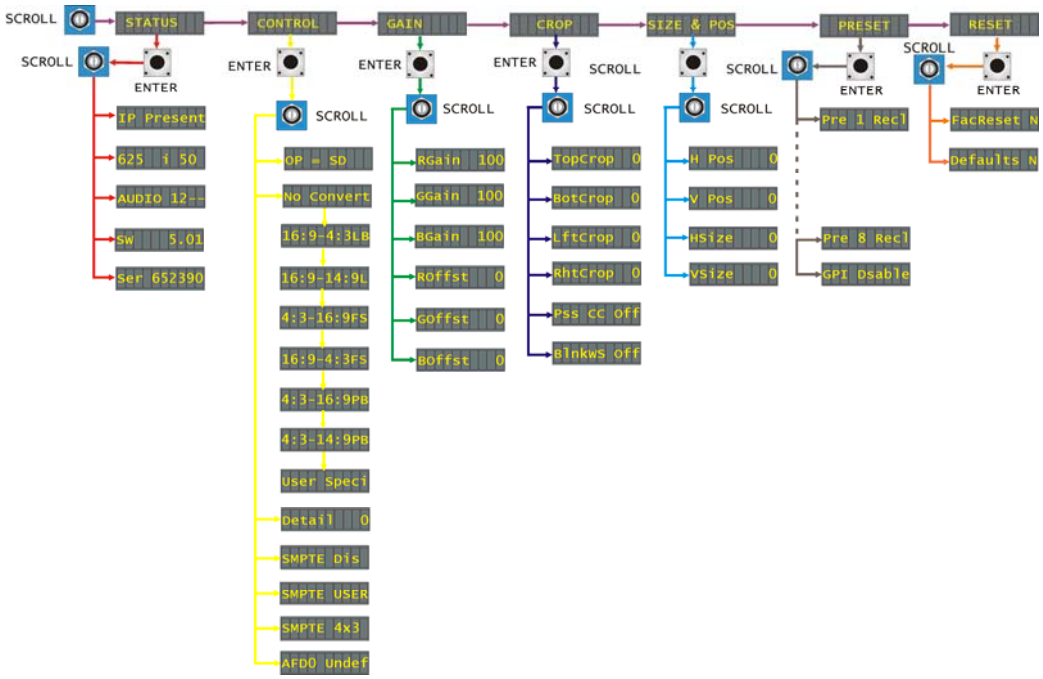
The available menu structure will vary depending on the mode of use.

When Up-and-down-AAFD is used for format conversion the aspect ratio selection is limited to four preset ratios. Up-and-down-AAFD can also be used as a Standard Definition aspect ratio converter. In this mode the selection of preset ratios are expanded and the addition of custom setting is available.

Format converter menu tree



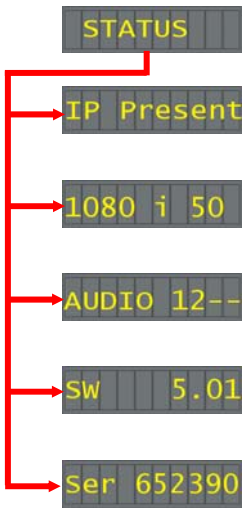
Standard Definition aspect ratio converter menu tree



Tip To reach the top menu push the ∧ button repeatedly until a top menu is reached. Rotate the SCROLL control anti-clockwise until the STATUS menu appears

Card edge status

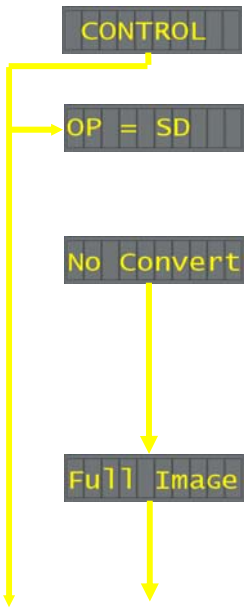
From the STATUS top menu press ENTER then SCROLL to access the status menu options.



Menu	Comment
Valid video input present	Rotate the Scroll/Adj. control to show input video status. ***IP Present, IP Missing.***
Input video line rate	Rotate the Scroll/Adj. control to show input video standard. ***525 i 59, 625 i 50, 720 p 59, 720 i 50, 1080 i 59, 1080 i 50, Invalid Ip***
Input audio groups present	Rotate the Scroll/Adj. control to show the embedded audio groups present in the input video.
Software version fitted	Rotate the Scroll/Adj. control to show version number of the software currently fitted.
PCB serial number	Rotate the Scroll/Adj. control to show the electronically stored PCB serial number. This should correspond with the serial number label affixed to the PCB connector.

Setting the output configuration (format converter mode)

From the CONTROL top menu press ENTER then SCROLL to access either the Output standard, Aspect Ratio selection or Detail control.



Menu	Comment
Output standard	Rotate Scroll/Adj. to show output standard. Press ENTER to select. Rotate Scroll/Adj. to select output standard and press ENTER to select. ***SD, 720p, 1080i***
No conversion	Rotate Scroll/Adj. to show No conversion (anamorphic). Press ENTER to select. The input image will be mapped directly to the native aspect ratio of the output format. Likely considerable distortion of image.
Full image	Full 4:3 source width compressed to central 75% of 16:9 monitor width. Full source height mapped to monitor height. Vertical black bands added to both sides, no picture loss. (4:3 Pillarbox) Full 16:9 source width mapped to 4:3 monitor width. Full source height compressed to 75% of monitor height. Horizontal black bands added to top and bottom, no picture loss. (16:9 Letterbox)

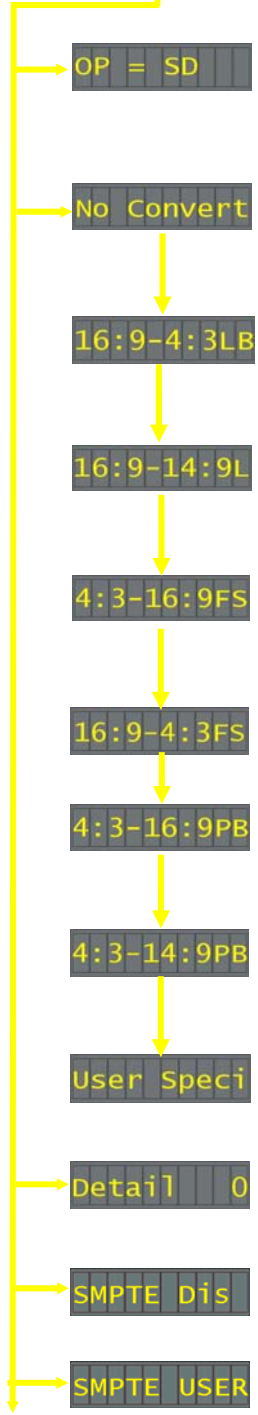
Compromise	Full 4:3 source width compressed to central 87.5% of 16:9 source width. Central 87.5% of source height stretched to monitor height. Vertical black bands added left and right. Minimal picture loss. (14:9 Pillarbox) Central 87.5% of 16:9 source width stretched to 4:3 monitor width. Full source height compressed to 87.5% of monitor height. Horizontal black bands added to top and bottom. Minimal picture loss. (14:9 Letterbox)
Full screen	Full 4:3 source width mapped to 16:9 monitor width. Central 75% of source height stretched to monitor height. Significant picture loss. Central 75% of 16:9 source width stretched to 4:3 monitor width. Full source height mapped to monitor height. Significant picture loss.
Detail	Rotate the Scroll/Adj. control to set the amount of detail enhancement required. Press enter to action change. Adjustment 0-50.
AFD insertion enable	Rotate the Scroll/Adj. control to show SMPTE state selected. Press ENTER and rotate Scroll/Adj. to select. Press ENTER to select. ***SMPTE En, SMPTE Dis.***
Auto enable	Rotate the Scroll/Adj. control to show AFD inserter status. Press ENTER and rotate Scroll/adj. to select. Press ENTER to select. ***Enable, Disable.***
Entire image aspect ratio	Rotate the Scroll/Adj. control to show selected image AR. Press ENTER and rotate Scroll/Adj. to select. Press ENTER to select. ***16x9, 4x3.***
AFD code select	Rotate the Scroll/Adj. control to show AFD code selection. Press ENTER and rotate Scroll/Adj. to select. Press ENTER to select. ***0-15.***

Note: For all selections the output line rate will be determined by the input line rate.

The aspect ratio and detail controls are not active in bypass mode. i.e. the input and output format are the same.

Setting the output configuration (aspect ratio converter mode)

From the CONTROL top menu press ENTER then SCROLL to access either the Output standard, Aspect Ratio selection or Detail control.



Menu	Comment
Output standard	Rotate Scroll/Adj. to show output standard. Press ENTER to select. Rotate Scroll/Adj. to select output standard and press ENTER to select standard. ***SD, 720p, 1080i***
No conversion	Rotate Scroll/Adj. to show No conversion (anamorphic). Press ENTER to select. The input image will be mapped directly to the native aspect ratio of the output format. Likely considerable distortion of image.
Full image 4:3 (Letterbox)	Full 16:9 source width mapped to 4:3 monitor width. Full source height compressed to 75% of monitor height. Horizontal black bands added to top and bottom, no picture loss.
Compromise 14:9 (Letterbox)	Central 87.5% of 16:9 source width stretched to 4:3 monitor width. Full source height compressed to 87.5% of monitor height. Horizontal black bands added top and bottom. Minimal picture loss.
Full screen 16:9	Full 4:3 source width mapped to 16:9 monitor width. Central 75% of source height stretched to monitor height. No black bands required, significant picture loss.
Full screen 4:3	Central 75% of 16:9 source width stretched to 4:3 monitor width. Full source height mapped to monitor height. No black bands required, significant picture loss.
Full image 16:9 (Pillarbox)	Full 4:3 source width compressed to central 75% of 16:9 monitor width. Full source height mapped to monitor height. Vertical black bands added to both sides, no picture loss.
Compromise 14:9 (Pillarbox)	Full 4:3 source width compressed to central 87.5% of 16:9 monitor width. Central 87.5% of source height stretched to monitor height. Vertical black bands added to both sides, minimal picture loss.
User Specified Conversion	When activated this menu allows the user to produce custom aspect ratios using the position and size controls.
Detail	Rotate the Scroll/Adj. control to set the amount of detail enhancement required. Press enter to action change. Adjustment 0-50.
AFD insertion enable	Rotate the Scroll/Adj. control to show SMPTE state selected. Press ENTER and rotate Scroll/Adj. to select. Press ENTER to select. SMPTE En, SMPTE Dis.
Auto enable	Rotate the Scroll/Adj. control to show AFD inserter status. Press ENTER and rotate Scroll/adj. to select. Press ENTER to select. Enable, Disable.

Entire image aspect ratio	Rotate the Scroll/Adj. control to show selected image AR. Press ENTER and rotate Scroll/Adj. to select. Press ENTER to select.
AFD code select	Rotate the Scroll/Adj. control to show AFD code selection. Press ENTER and rotate Scroll/Adj. to select. Press ENTER to select.

Note: For all selections the output line rate will be determined by the input line rate.

The detail controls are not active in bypass mode. i.e. the aspect ratio is set to No conversion.

AFD controls

Up-and-down-AAFD has four AFD (Active Format Descriptor) controls which allow the user to enable or disable the inserter, select the entire image aspect ratio (coded frame) and the AFD code to be embedded. When the auto control is selected the AFD code insertion will be determined by the aspect ratio selection.

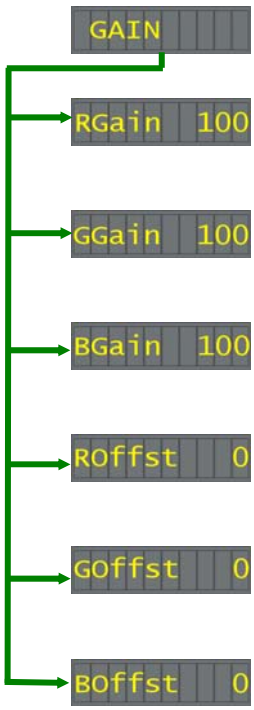
The sixteen available codes are described in the following table.

AFD code	Description
0	Undefined
1	Reserved
2	16:9 top
3	14:9 top
4	>16:9
5	Reserved
6	Reserved
7	Reserved
8	Full Frame (as coded frame)
9	4:3 image
10	16:9 image
11	14:9 image centred
12	Reserved for future use
13	4:3 with shoot and protect 14:9 centre
14	16:9 with shoot and protect 14:9 centre
15	16:9 with shoot and protect 4:3 centre

Note: When inserting SMPTE 2016 data the inserter will blank any incoming SMPTE 2016 data.

Video gains and offsets (Gain)

From the GAIN top menu press ENTER then SCROLL to access the video gain and offset controls.



Menu	Comment
	Rotate SCROLL to show RGain and press ENTER to select.
R Gain	Rotate [ADJ] shaft encoder to set the R amplitude (80% to 120%). Example: **RGain 100%**
	Rotate SCROLL to show GGain and press ENTER to select.
G Gain	Rotate [ADJ] shaft encoder to set the G amplitude (80% to 120%). Example: **GGain 100%**
	Rotate SCROLL to show BGain and press ENTER to select.
B Gain	Rotate [ADJ] shaft encoder to set the B amplitude (80% to 120%). Example: **BGain 100%**
	Rotate SCROLL to show ROffst and press ENTER to select.
R Offset	Rotate [ADJ] shaft encoder to set the R offset (0 ± 20%). Example: **ROffst 0%**
	Rotate SCROLL to show GOffst and press ENTER to select.
G Offset	Rotate [ADJ] shaft encoder to set the G offset (0 ± 20%). Example: **GOffst 0%**
	Rotate SCROLL to show BOffst and press ENTER to select.
B Offset	Rotate [ADJ] shaft encoder to set the B offset (0 ± 20%). Example: **BOffst 0%**

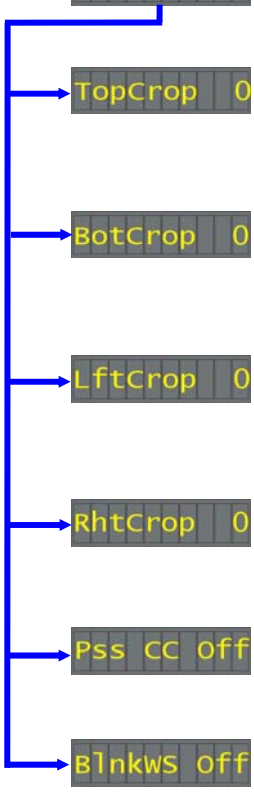
Picture Crop

From the CROP top menu press ENTER then SCROLL to access the picture crop options along with the closed caption and wide screen signalling controls. These controls act to crop the input video so their action will be affected by the aspect ratio selection. Up to 31 lines of vertical crop both top and bottom are available and up to 31 pixels horizontally both left and right.

When an aspect ratio is selected which results in a vertical shortening of the picture any NTSC closed caption information would become visible and any horizontal scaling would corrupt this information. The closed caption control if selected will blank lines 20 and 21 of the input video to remove this information from the visible picture and reinsert the information in lines 20-21 of the output video so preserving its integrity.

PAL wide screen signalling on line 23 may also be selected for blanking.

Note: The wide screen blanking control is only active when up-converting. In bypass mode (SD-SD) the crop control will blank WSS data.

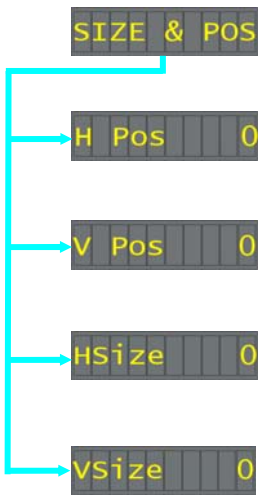


Menu	Comment
	Rotate SCROLL to show TopCrop and press ENTER to select.
Picture crop top	Rotate [ADJ] shaft encoder to set the amount of top of picture crop in lines (0-31 lines).
	Example: **TopCrop 10**
	Rotate SCROLL to show BotCrop and press ENTER to select.
Picture crop bottom	Rotate [ADJ] shaft encoder to set the amount of bottom of picture crop in lines (0-31 lines).
	Example: **BotCrop 10**
	Rotate SCROLL to show LftCrop and press ENTER to select.
Picture crop left	Rotate [ADJ] shaft encoder to set the amount of left side picture crop in pixels (0-31 pixels).
	Example: **LftCrop 10**
	Rotate SCROLL to show RhtCrop and press ENTER to select.
Picture crop right	Rotate [ADJ] shaft encoder to set the amount of right side of picture crop in pixels (0-31 pixels).
	Example: **RhtCrop 10**
	Rotate SCROLL to show Pss cc and press ENTER to select.
Pass Closed caption	Rotate [ADJ] shaft encoder to set ***On, Off, N/A*** = not NTSC
	Example: **Pss cc On**
Wide screen signalling blanking	Rotate SCROLL to show Blnkws and press ENTER to select.
	Rotate [ADJ] shaft encoder to set blanking ***On, Off***
	Example: **Blnkws On**

Position and Size menu

From the Position and Size top menu press ENTER then SCROLL to access the menu options.

With these controls the user is able to build a custom aspect ratio. Both picture horizontal and vertical size may be set as well as the position of the image within the screen area to allow caption or other data insertion.

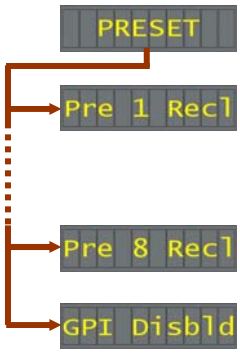


Menu	Comment
Picture horizontal position adjust	Rotate the Scroll/Adj control to move the picture horizontally in sample steps. ± 100, N/A
Picture vertical position adjust	Rotate the Scroll/Adj control to move the picture vertically in line steps. ± 100, N/A
Picture size horizontal (width)	Rotate the Scroll/Adj control to adjust the picture width in 2 sample symmetrical steps. ± 100, N/A.
Picture size vertical (height)	Rotate the Scroll/Adj control to adjust the picture height in 2 line symmetrical steps. ± 100, N/A.

Note: These controls are only active in aspect ratio mode and when the User Specified control in the control menu has been selected. When not selected the display will show N/A.

Preset menu

Up to eight set-ups may be stored for the board and recalled either from the board control, active front panel, Statesman or through the use of external GPIs. Presets store board setup data including operating mode and card status. The presets are numbered 1-8.

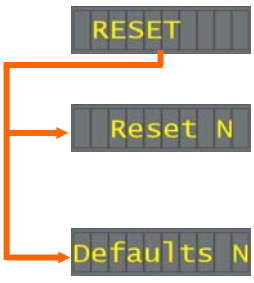


Menu	Comment
Save and recall Presets 1-8	Rotate the Scroll/Adj. control to show Preset Menu selected. Press ENTER and rotate Scroll/Adj. to select preset location. Press ENTER to select and rotate Scroll/Adj. to select Recall or Save Recall. Press ENTER to action.
GPI control of presets	Selecting ENABLE allows the recall of previously saved user configurations via GPI inputs 0-3.

Note: Care should be taken when storing presets that the desired configuration is not changed by any external input prior to saving.
A factory reset will erase all user-stored presets.

Recalling factory default settings (Reset)

From the RESET top menu press ENTER then SCROLL to select YES option.



Menu	Comment
Reset	Press ENTER to access Reset menu. Rotate the Scroll/Adj control to select Yes, press ENTER to action reset. Display will confirm reset done.
Default	Press ENTER to access Defaults menu. Rotate the Scroll/Adj control to select Yes, press ENTER to action reset. Display will confirm reset done.

Note: Factory reset will erase all saved preset configurations. To preserve contents of the preset locations use the Defaults command.

Parameter	Default value
Aspect Ratio	No Conversion
Detail	0
Gains	100%
Offsets	0
Crops	0
Pass Closed Caption	Off
Blank Wide Screen Signalling	Off
Presets	Erased (factory reset only)
GPI Enable	Not enabled

4 Using the front control panel

This operational guide assumes that the panel has been setup according to the Panel setup procedure described in the Crystal Vision Control Panel manual.

Note: It is **ESSENTIAL** that the panel setup procedure is followed and any old or unknown passwords cleared prior to using the panel for the first time.

At power up all eight control panel keys LEDs will illuminate briefly. Once the panel has completed its power up and configuration sequence the panel will enter Statesman mode and the message 'Press Cal to Exit' will be displayed.

The Crystal Vision control panel start up display

To continue with control panel operation or configuration, press the CAL key once. A second press of the CAL key will return to Statesman control.

The control panel will display the name of the card that first responds to the polling request together with its location number.

The location number consists of the frame number plus the card position in the frame.

Navigating the display

The functions assigned to control panel keys are:

- DEVICE – enters Device menu to select a card or show cards available / enters Panel setup when held down during power up / shows frame status when pressed from Statesman mode
- CAL – enters or leaves Statesman mode / enters panel diagnostics mode when held down during power up / updates the display
- Asterisk – enters board rename menu from the Device menu
- F1 to F4 – soft keys, function assigned within each menu
- HOME – moves the display to the Home menu
- ENTER – accept current selection
- Upward arrow – used to move up the menu structure / enter lock panel menu from the Device menu
- Rotary control – shaft encoder used to select options or variable data

Note: Please refer to the Crystal Vision Control Panel manual for details of the Panel setup, Lock Panel and Diagnostic menus.

Selecting Up-and-down- AAFD

To select a particular card in a frame, press the DEVICE key to go to the Device menu.

Note: There may be a delay whilst the frame is interrogated during which time the 'No cards Found' could be displayed.

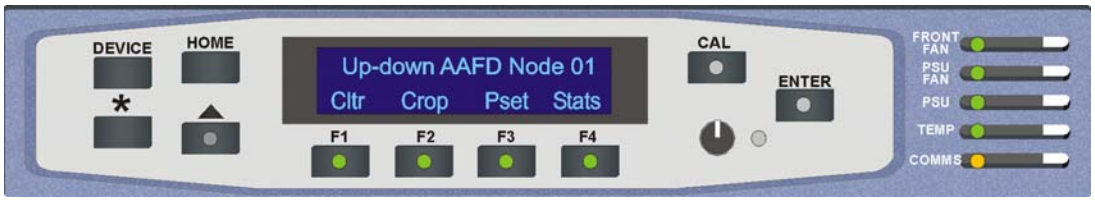
The top line of the display will show 'Available Cards X', where X is the number of cards that have responded so far to the polling request.

Control panel showing available cards

Rotate the shaft encoder and the bottom row will display the successfully polled cards by name and location or slot number.

In the example above, the card displayed is located in the second frame in slot number 1.

When the desired card is selected press the ENTER key to access that card's HOME menu. The message shows that an Up-and-down-AAFD has been selected.



Up-and-down-AAFD home menu

Updating the display

The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If changes occur through the use of card edge controls or other remote control, the text displayed on the active front panel will not be updated immediately. If necessary, use the upward arrow to leave and then re-enter a menu to update the display.

4.1 The Up-and-down-AAFD active panel menu structure

At any time the main top-level menu (Home) is obtained by pressing the HOME key. From the home menu further selections can be made. Active function keys are indicated by illuminated, integrated LEDs.

The main top-level menus for the Up-and-down-AAFD module are obtained by pressing the F1- F4 keys from the HOME menu. Menu keys are illuminated when active and when further menus are available. The top-level menus are:

- Ctrl (Output format selection, Aspect ratio and Detail) – press F1
- Crop (Factory defaults) – press F2
- Pset (Video gains and offsets) – press F3
- Stats (Status) – press F4

When a sub menu has been selected, further options may be obtained by using the Shaft control to scroll through them. Once the desired option has been located a selection or value change can be made by either toggling the appropriate function key or by selecting and using the shaft control to alter a numerical value. A configuration change or value will be activated as the shaft control is rotated or function button is toggled. The variable being adjusted will appear in brackets. Pressing Enter will fix the new value.

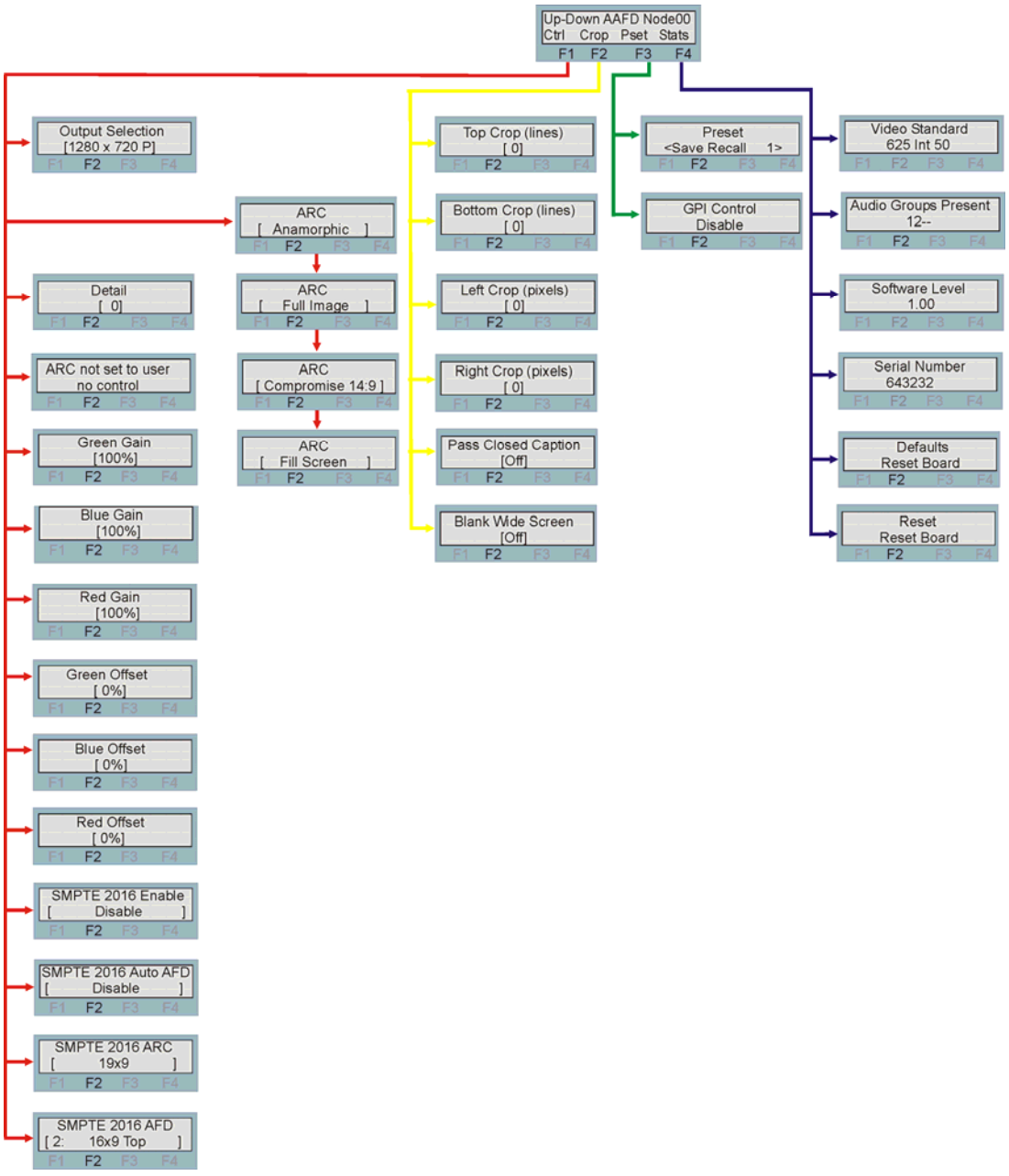
The following tables show the available Up-and-down-AAFD menus. The actual menus available may vary slightly as software is updated.

Up-and-down-AAFD Menu Structure

The menus offered will depend on which mode of operation is selected.

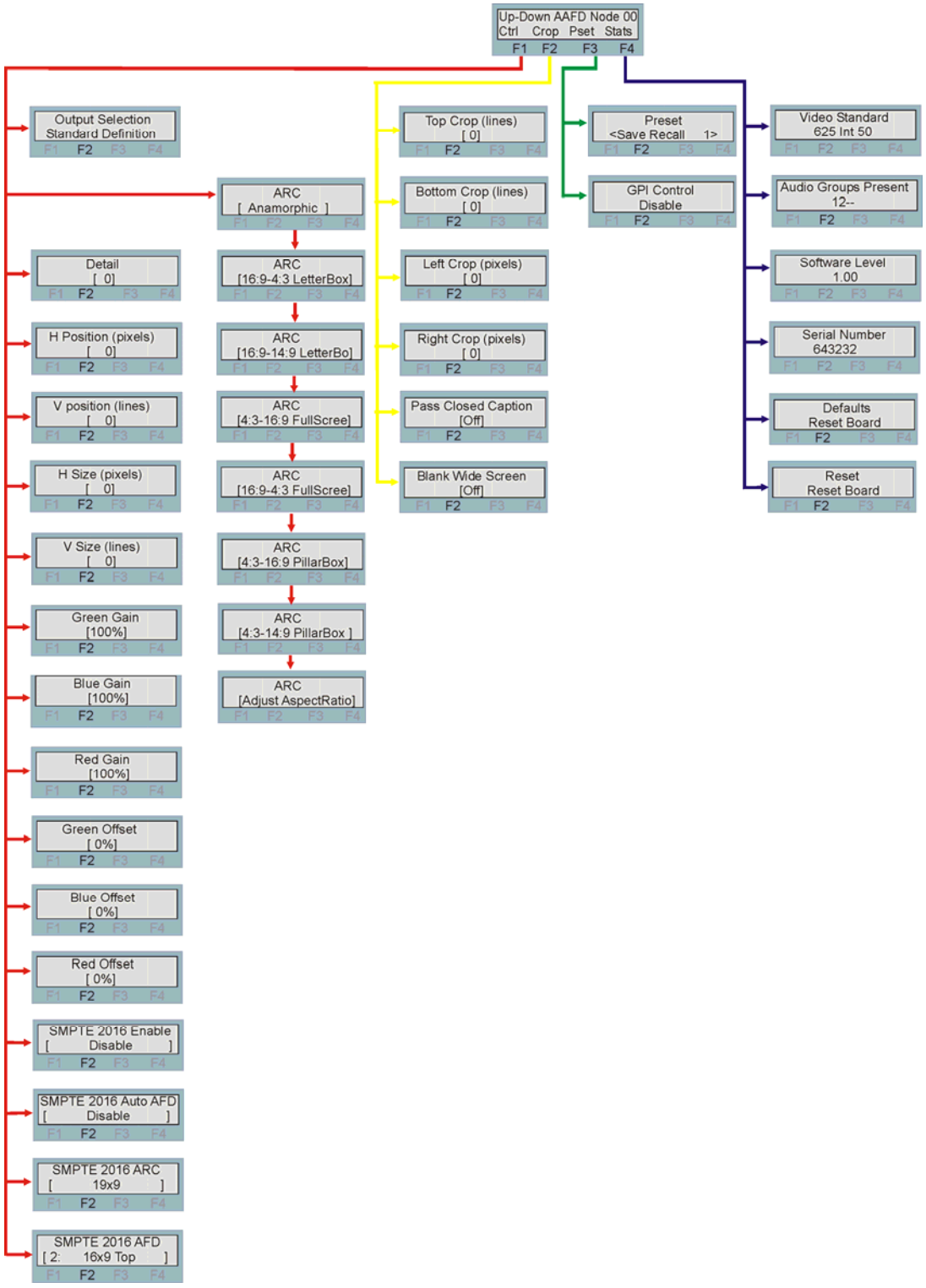
Format converter menu tree

In the format conversion mode only the four standard aspect ratios are available for down converting to Standard Definition. When cross converting in High Definition no conversion is available as High Definition television is always wide screen.



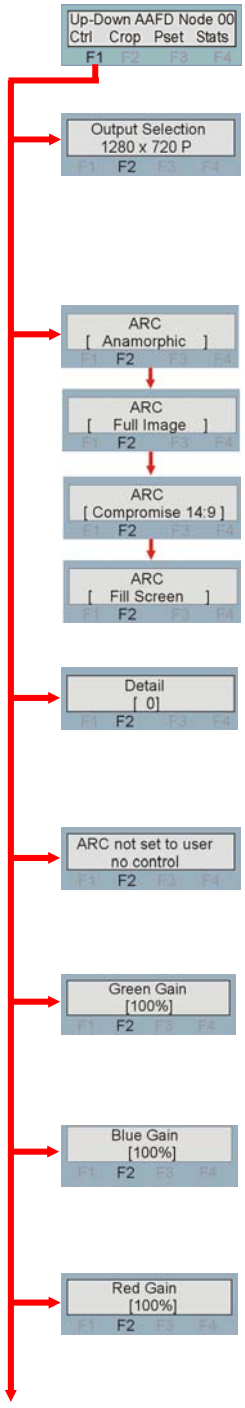
Standard Definition aspect ratio converter menu tree

When cross converting Standard Definition, Up-and-down-AAFD enters aspect ratio converter mode. In this mode aspect ratio control is given for converting from and to wide screen pictures. Size and positioning is also available.

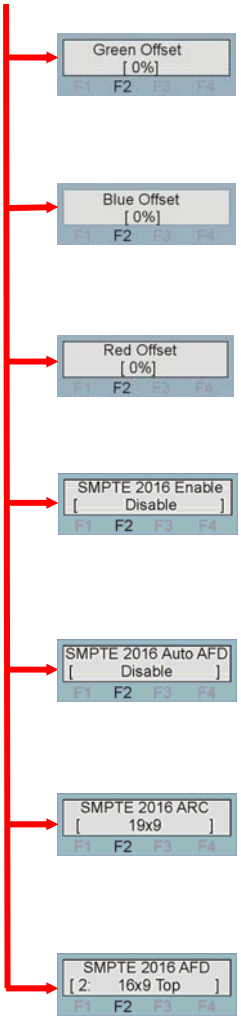


Video Control Menu (format converter mode)

Pressing F1 from the home menu will bring up the Control menu which contains the output select, ARC controls and gains and controls. The final menu structure will depend on the operating mode selected.



Menu	Comment
Output standard selection	Rotate shaft encoder to select Output Selection. Press F2 to select to change the value. Rotate shaft encoder to set the new value. ***Standard Definition, 1280 x 720p, 1920 x 1080i.*** Press the Enter button to accept the new value. **Note:** The output line rate will always follow the input rate.
Aspect ratio selection	Rotate shaft encoder to select the ARC Selection. Press F2 to select to change the value. Rotate shaft encoder to set the new value. Press the Enter button to accept the new value. **Note:** With a High Definition input, if the output standard is selected to be the same as the input, the message **ARC – IP = OP No ARC Cntrl** will be displayed and the Up-and-down-A will automatically enter bypass mode.
	Rotate shaft encoder to select the Detail control. Press F2 to select to change the value. Rotate shaft encoder to set the new value **(0-50).** Press the Enter button to accept the new value.
	User controls are not available in format conversion mode.
	Rotate shaft encoder to select Green Gain. Press F2 to select to change the value. Rotate shaft encoder to select value (80-120%). Press the Enter button to accept the new value.
	Rotate shaft encoder to select Blue Gain. Press F2 to select to change the value. Rotate shaft encoder to select value (80-120%). Press the Enter button to accept the new value.
	Rotate shaft encoder to select Red Gain. Press F2 to select to change the value. Rotate shaft encoder to select value (80-120%). Press the Enter button to accept the new value.



Rotate shaft encoder to select Green Offset.
Press F2 to select to change the value.
Rotate shaft encoder to select value (0 ± 20%).
Press the Enter button to accept the new value.

Rotate shaft encoder to select Blue Offset.
Press F2 to select to change the value.
Rotate shaft encoder to select value (0 ± 20%).
Press the Enter button to accept the new value.

Rotate shaft encoder to select Red Offset.
Press F2 to select to change the value.
Rotate shaft encoder to select value (0 ± 20%).
Press the Enter button to accept the new value.

Rotate shaft encoder to select SMPTE 2016 Enable.
Press F2 to select.
Rotate shaft encoder to select new value **(*Enable, Disable*).**
Press the Enter button to accept the new selection.

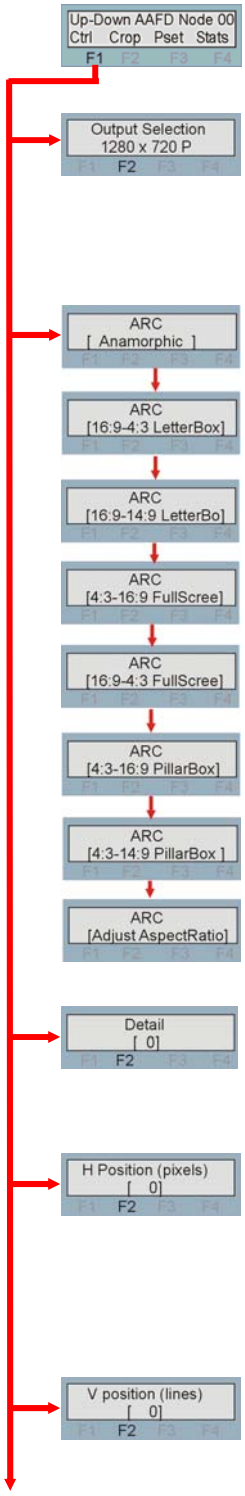
Rotate shaft encoder to select SMPTE 2016 Auto AFD.
Press F2 to select.
Rotate shaft encoder to select new value **(*Enable, Disable*).**
Press the Enter button to accept the new selection.

Rotate shaft encoder to select SMPTE 2016 Aspect ratio.
Press F2 to select.
Rotate shaft encoder to select new value ***(4x3, 16x9).***
Press the Enter button to accept the new selection.

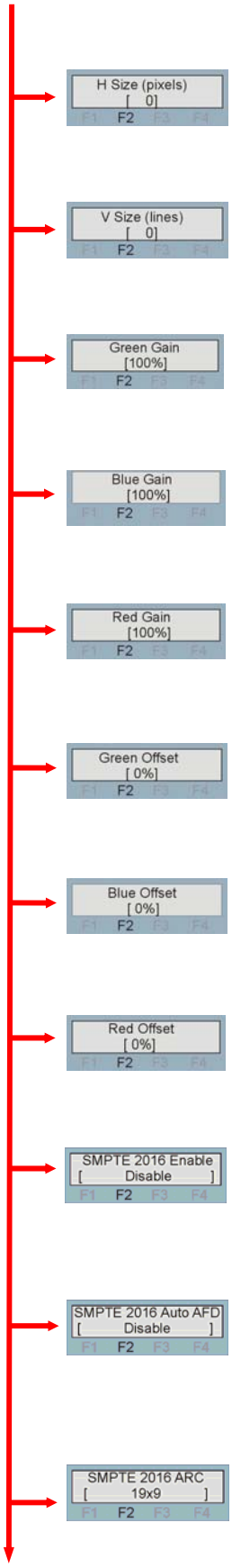
Rotate shaft encoder to select SMPTE 2016 Enable.
Press F2 to select.
Rotate shaft encoder to select new value ***(0-15).***
Press the Enter button to accept the new selection.

Note: When Up-and-down-AAFD is in bypass mode the detail control and gain and offset controls will be inactive.
Press CAL at any time to return a level to its default value.

Video Control Menu (aspect ratio converter mode)



Menu	Comment
Output standard selection	Rotate shaft encoder to select Output Selection. Press F2 to select to change the value. Rotate shaft encoder to set the new value. ***Standard Definition,1280 x 720p, 1920 x 1080i.*** Press the Enter button to accept the new value. **Note:** The output line rate will always follow the input rate.
Aspect ratio selection	Rotate shaft encoder to select the ARC Selection. Press F2 to select to change the value. Rotate shaft encoder to set the new value. Press the Enter button to accept the new value.
	Rotate shaft encoder to select the Detail control. Press F2 to select to change the value. Rotate shaft encoder to set the new value **(0-50).** Press the Enter button to accept the new value.
	Rotate shaft encoder to select the Detail control. Press F2 to select to change the value. Rotate shaft encoder to set the new value **(0-50).** Press the Enter button to accept the new value. **Note:** The position controls are only available when the ARC control is set to ***Adjust Aspect Ratio.*** When not set, display shows ***ARC not set to user – no control*** and the following position menus are hidden.
	Rotate shaft encoder to select the Detail control. Press F2 to select to change the value. Rotate shaft encoder to set the new value **(0-50).** Press the Enter button to accept the new value.



Rotate shaft encoder to select the Detail control.
Press F2 to select to change the value.
Rotate shaft encoder to set the new value **(0-50).**
Press the Enter button to accept the new value.

Rotate shaft encoder to select the Detail control.
Press F2 to select to change the value.
Rotate shaft encoder to set the new value **(0-50).**
Press the Enter button to accept the new value.

Rotate shaft encoder to select Green Gain.
Press F2 to select to change the value.
Rotate shaft encoder to select value (80-120%).
Press the Enter button to accept the new value.

Rotate shaft encoder to select Blue Gain.
Press F2 to select to change the value.
Rotate shaft encoder to select value (80-120%).
Press the Enter button to accept the new value.

Rotate shaft encoder to select Red Gain.
Press F2 to select to change the value.
Rotate shaft encoder to select value (80-120%).
Press the Enter button to accept the new value.

Rotate shaft encoder to select Green Offset.
Press F2 to select to change the value.
Rotate shaft encoder to select value (0 ± 20%).
Press the Enter button to accept the new value.

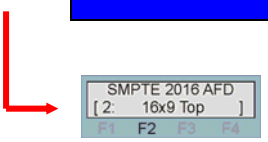
Rotate shaft encoder to select Blue Offset.
Press F2 to select to change the value.
Rotate shaft encoder to select value (0 ± 20%).
Press the Enter button to accept the new value.

Rotate shaft encoder to select Red Offset.
Press F2 to select to change the value.
Rotate shaft encoder to select value (0 ± 20%).
Press the Enter button to accept the new value.

Rotate shaft encoder to select SMPTE 2016 Enable.
Press F2 to select.
Rotate shaft encoder to select new value (Enable, Disable).
Press the Enter button to accept the new selection.

Rotate shaft encoder to select SMPTE 2016 Auto AFD.
Press F2 to select.
Rotate shaft encoder to select new value (Enable, Disable).
Press the Enter button to accept the new selection.

Rotate shaft encoder to select SMPTE 2016 Aspect ratio.
Press F2 to select.
Rotate shaft encoder to select new value (4x3, 16x9).
Press the Enter button to accept the new selection.



Rotate shaft encoder to select SMPTE 2016 Enable.
Press F2 to select.
Rotate shaft encoder to select new value (0-15).
Press the Enter button to accept the new selection.

Note: When the ARC control is set to anamorphic (no conversion) Up-and-down-AAFD will enter bypass mode and the detail and gain and offset controls will be inactive.

AFD controls

Up-and-down-AAFD has four AFD (Active Format Descriptor) controls which allow the user to enable or disable the inserter, select the entire image aspect ratio (coded frame) and the AFD code to be embedded. When the auto control is selected the AFD code insertion will be determined by the aspect ratio selection.

The sixteen available codes are described in the following table.

AFD code	Description
0	Undefined
1	Reserved
2	16:9 top
3	14:9 top
4	>16:9
5	Reserved
6	Reserved
7	Reserved
8	Full Frame (as coded frame)
9	4:3 image
10	16:9 image
11	14:9 image centred
12	Reserved for future use
13	4:3 with shoot and protect 14:9 centre
14	16:9 with shoot and protect 14:9 centre
15	16:9 with shoot and protect 4:3 centre

Note: When inserting SMPTE 2016 data the inserter will blank any incoming SMPTE 2016 data.

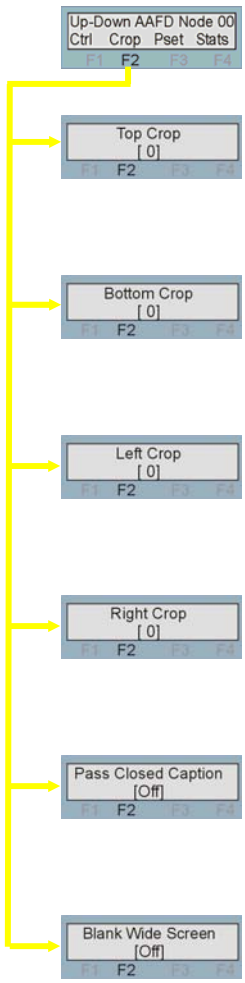
Picture Crop

From the Home menu press F2 then SCROLL to access the picture crop options along with the closed caption and wide screen signalling controls. These controls act to crop the input video so their action will be affected by the aspect ratio selection. Up to 31 lines of vertical crop both top and bottom are available and up to 31 pixels horizontally both left and right.

When an aspect ratio is selected which results in a vertical shortening of the picture any NTSC closed caption information would become visible and any horizontal scaling would corrupt this information. The closed caption control if selected will blank lines 20 and 21

of the input video to remove this information from the visible picture and reinsert the information in lines 20-21 of the output video so preserving its integrity.

PAL wide screen signalling on line 23 may also be selected for blanking.



Menu	Comment
	Rotate shaft encoder to select the Top Crop control. Press F2 to select to change the value. Rotate shaft encoder to set the new value **(0-31 lines).** Press enter to accept the new value.
	Rotate shaft encoder to select the Bottom Crop control. Press F2 to select to change the value. Rotate shaft encoder to set the new value **(0-31 lines).** Press enter to accept the new value.
	Rotate shaft encoder to select the Left Crop control. Press F2 to select to change the value. Rotate shaft encoder to set the new value **(0-31 samples).** Press enter to accept the new value.
	Rotate shaft encoder to select the Right Crop control. Press F2 to select to change the value. Rotate shaft encoder to set the new value **(0-31 samples).** Press enter to accept the new value.
NTSC Closed caption	Rotate shaft encoder to select Pass Closed Caption. Press F2 to select to change the attribute. Rotate shaft encoder to set. ***On, Off, N/A*** = not NTSC. Press enter to accept the new value.
PAL Wide screen signalling	Rotate shaft encoder to select Blank wide screen. Press F2 to select to change the attribute. Rotate shaft encoder to set ***On, Off.*** Press enter to accept the new value.

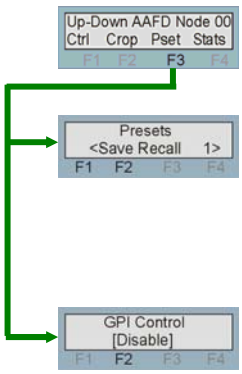
Note: The wide screen blanking control is only active when up-converting. In bypass mode (SD-SD) the crop control will blank WSS data.

Presets Menu

Up to eight set-ups may be stored for the board and recalled either from the board control, active front panel, Statesman or through the use of external GPIs. The presets will store board setup data including operating mode and board configuration. The presets are numbered 1-8.

The GPI lines used to recall user saved presets can be disabled to prevent inadvertent triggering whilst under active control by Statesman or a front panel.

Note: Care should be taken when storing presets that the desired configuration is not changed by any external input prior to saving.



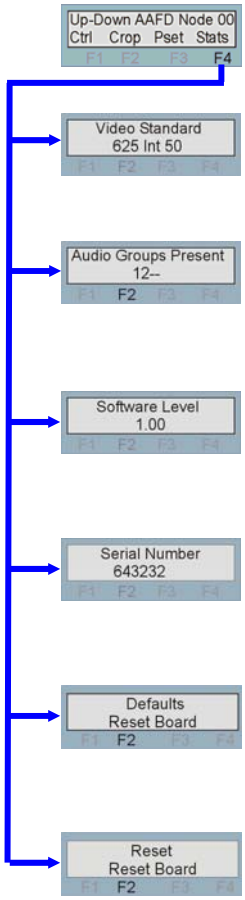
Menu	Comment
	Rotate shaft encoder to select Presets. Press F1 or F2 to initiate selection. Rotate shaft encoder to select the preset location. Press F1 to save current configuration. Press F2 to recall stored configuration.
	Rotate shaft encoder to select GPI Control. Press F2 to select to change selection. Rotate shaft encoder to select enable or disable. Press enter to accept the new selection.

Note: A factory reset will erase all user-stored presets

GPI Preset	Bit 3	Bit 2	Bit 1
1	0	0	0
2	0	0	1
3	0	1	0
4	1	1	1
5	1	0	0
6	1	0	1
7	1	1	0
8	1	1	1

Status

The Status menu contains various information about the board and its video input.



Menu	Comment
Input video standard and status	From the Home menu, press F4 to select the status menu. Rotate the shaft control to view the video input standard and line rate. ***525 Int 59.94, 625 Int 50,720 Pgs 50, 720 Pgs 59.94, 1080 Int 50, 1080 Int 59.94, No Valid Input***
	Rotate the shaft control to view the embedded audio groups present on the input video. Groups = ***1,2,3,4 or –*** not present.
	Rotate the shaft control to view the currently fitted software version.
	Rotate the shaft control to view the electronically stored board serial number.
	Rotate shaft encoder to select Defaults. Press F2 to select. ***Are you sure? Y (F3)*** Press F3 to confirm reset.
	Rotate shaft encoder to select Reset. Press F2 to select. ***Are you sure? Y (F3)*** Press F3 to confirm reset.

Parameter	Default value
Aspect Ratio	No Conversion
Detail	0
Gains	100%
Offsets	0
Crops	0
Pass Closed Caption	Off
Blank Wide Screen Signalling	Off
Presets	Erased (factory reset only)
GPI Enable	Not enabled

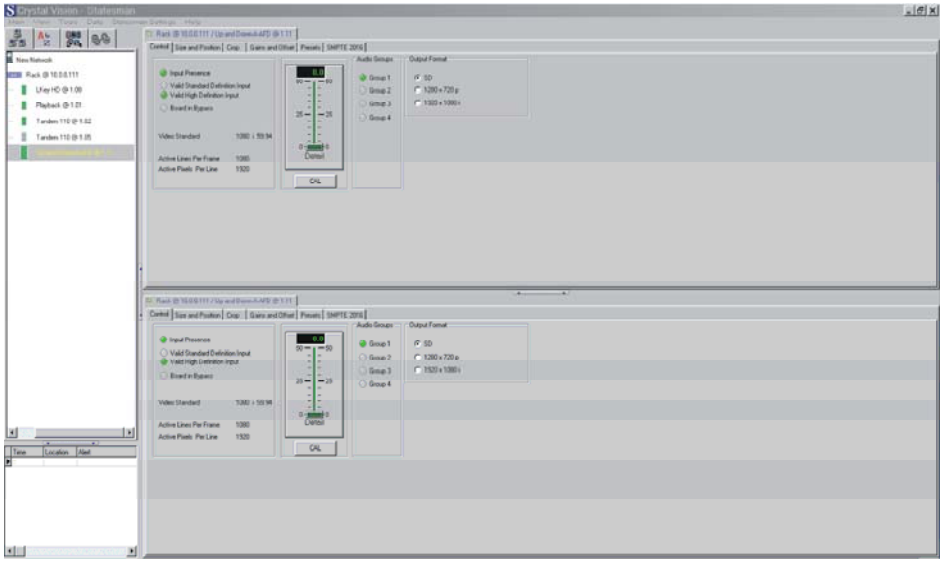
5 Statesman

The Crystal Vision Statesman PC control software is designed to control a range of Crystal Vision modules via serial control from a PC. Statesman provides a user friendly means of configuring and operating Crystal Vision modules with the benefit of "see-at-a-glance" status monitoring.

The main Statesman application communicates with each module in a frame through a Statesman capable or active control panel. An active panel or REMIND remote control panel must be fitted to allow for Statesman control.

5.1 Statesman operation

The initial view will show an Explorer style view of the connected frames and modules. Double clicking on a module will enable the display of the main application menus.



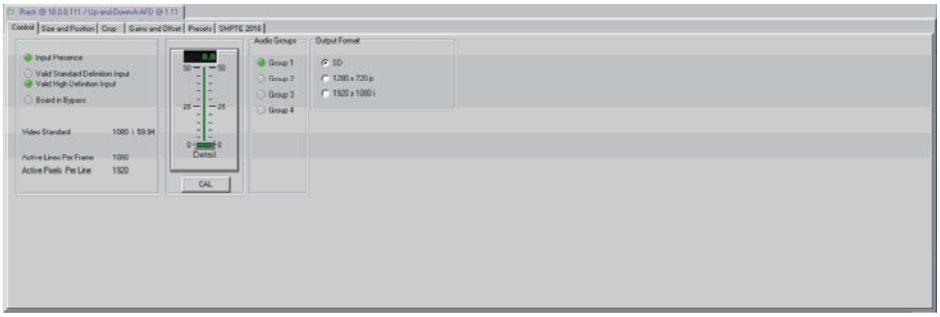
The Statesman main application window

The menu display is repeated for convenience to allow dual-control display of modules with duplicate signal paths or to allow two functions to be viewed at the same time.

Up-and-down-AAFD has six Statesman menu tabs to provide status information, allow configuration of the output format, Aspect ratio conversion and detail enhancement, RGB gain and dc offset, user configurable presets and the AFD inserter.

Control menu

The status pane is divided into four sections: Input status, Detail Enhancement, Audio groups present and output format.



Up-and-down-AAFD control menu

Input Status

The Input Present indicator will illuminate green when a valid input is present or red if the input is missing. Indication is also as to whether the input is High Definition or Standard Definition. Should the input and output be set to the same format and no aspect ratio conversion selected, the bypass LED will also be lit.

The video standard is automatically detected and is shown by text along with its lines and pixels information.

Further status information is provided by the Statesman logging and alarms feature, which is described in more detail in the Statesman manual.

Detail Enhancement

The Detail slider sets the amount of enhancement applied to the picture. The enhancement slider can be affected in several ways - the cursor may be placed directly onto the slider bar and dragged whilst holding the left mouse button. The required value may be typed directly into the numeric display or if the cursor is placed over the slider, clicking with the left mouse button will cause the slider bar to jump directly to that value.

The enhancement level can be returned to zero at any time by pressing the CAL button. Detail enhancement will be unavailable in bypass mode.

Audio groups

The presence of embedded audio is given by a simulated LED for each of the four available groups. An LED will show green for each group present.

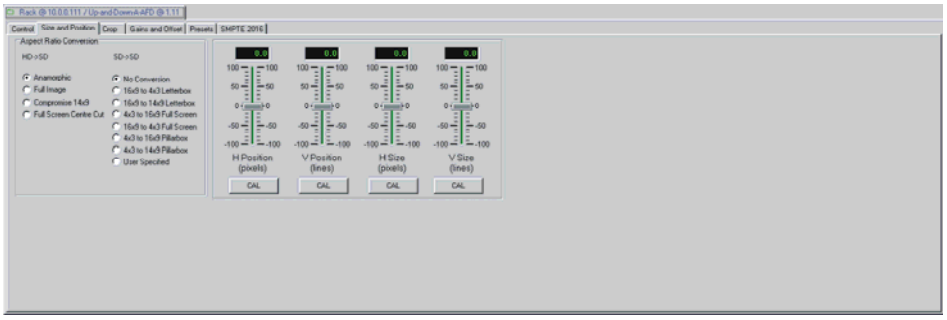
Output Format

The output format is selected by checking the appropriate radio button. The selection is Standard Definition (525/625 line), High Definition 1280x720p and 1920x1080i.

Note: The output line rate will follow the input line rate. Up-and-down-A will auto detect the input format.

Size and position

The size and position tab is where the aspect ratio controls reside. The tab is divided into two group boxes – one for ARC settings and the other for variable picture positioning.



Up-and-down-AAFD size and position menu

Aspect Ratio Conversion

The available aspect ratio selection will be dependant on the operating mode. For format conversion mode, HD-SD or SD-HD the ratio selection is described by the text to the left of the radio button. In ARC mode (SD-SD) the text on the right side describes the selection. A selection is made by checking the appropriate radio button, see chapter 1 for a pictorial explanation of the different aspect ratios available.

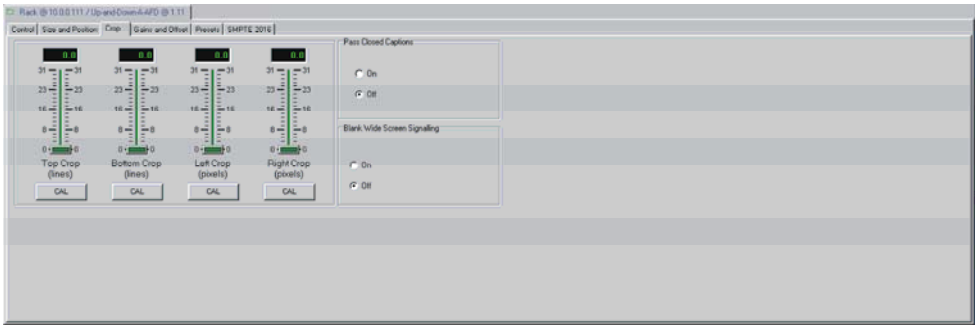
These controls will be inoperative and greyed out whilst in bypass mode.

Size and position

When user specified control is selected these sliders set the height, width and position of the output picture. When user specified control is not selected these controls will be inactive and their slider T bars greyed out. A previously made selection will remain for later activation.

Picture Crop

The Crop tab gives access to the picture crop options along with the closed caption and wide screen signalling controls. These controls act to crop the input video so their action will be affected by the aspect ratio selection. Up to 31 lines of vertical crop both top and bottom are available and up to 31 pixels horizontally both left and right. Adjust the appropriate slider control to crop the top, bottom, left side and right side of the picture. Pressing the cal button under each slide control will return that slider to 0 (no crop).



Up-and-down-AAFD crop menu

When an aspect ratio is selected which results in a vertical shortening of the picture any NTSC closed caption information would become visible and any horizontal scaling would corrupt this information.

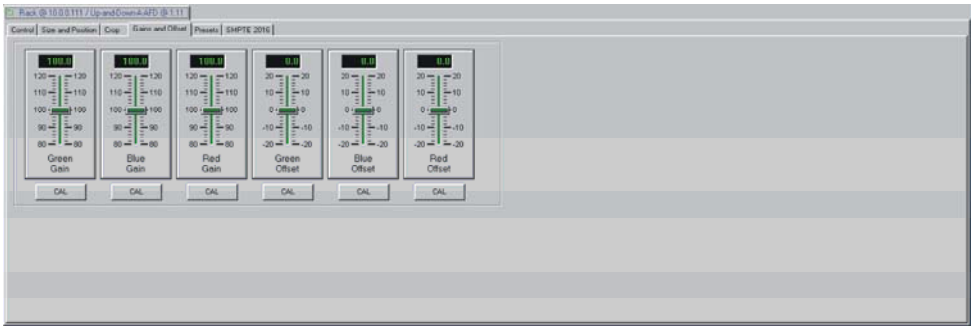
The closed caption control if selected will blank lines 20 and 21 of the input video to remove this information from the visible picture and reinsert the information in lines 20-21 of the output video so preserving its integrity.

PAL wide screen signalling on line 23 may also be selected for blanking.

Note: The wide screen blanking control is only active when up-converting. In bypass mode (SD-SD) the crop control will blank WSS data.

Gains and Offsets

RGB picture level controls gain and dc offset allows control of the video image brightness, contrast and colour. These controls will be inactive whilst in bypass mode.



Up-and-down-AAFD's gain and offset menu

The required value may be typed directly into the numeric display or if the cursor is placed over the slider left clicking with the mouse will cause the slider bar to jump directly to that value.

The gains and offset levels can be returned to zero at any time by pressing the CAL button under each slider.

Presets and factory reset

Up to eight set-ups may be stored as presets and recalled either from the board control, active front panel, Statesman or through the use of external GPIs. The presets will store board setup data including operating mode and board configuration. The presets are numbered 1-8. Select a preset location and then store or recall.

Up-and-down-AAFD Presets and factory recall menu

The GPI lines used to recall user saved presets can be disabled to prevent inadvertent triggering whilst under active control by Statesman or a front panel.

Care should be taken when storing presets that the desired configuration is not changed by any external input prior to saving.

Reset (factory defaults)

Performing a factory reset will return all values to their default levels and erase all stored presets.

If user stored presets require preserving use the Default control which will return all values to their default levels but leave user stored presets intact.

The following table lists Up-and-down-AAFD default values.

Parameter	Default value
Aspect Ratio	No Conversion
Detail	0
Gains	100%
Offsets	0
Crops	0
Pass Closed Caption	Off
Blank Wide Screen Signalling	Off
Presets	Erased (factory reset only)
GPI Enable	Not enabled

AFD (SMPTE 2016)

Up-and-down-AAFD has four AFD (Active Format Descriptor) controls which allow the user to enable or disable the inserter, select the entire image aspect ratio (coded frame) and the AFD code to be embedded. When the auto control is selected the AFD code insertion will be determined by the aspect ratio selection.

Up-and-down-AAFD SMPTE 2016 menu

The sixteen available codes are described in the following table.

AFD code	Description
0	Undefined
1	Reserved
2	16:9 top
3	14:9 top
4	>16:9
5	Reserved
6	Reserved
7	Reserved
8	Full Frame (as coded frame)
9	4:3 image
10	16:9 image
11	14:9 image centred
12	Reserved for future use
13	4:3 with shoot and protect 14:9 centre
14	16:9 with shoot and protect 14:9 centre
15	16:9 with shoot and protect 4:3 centre

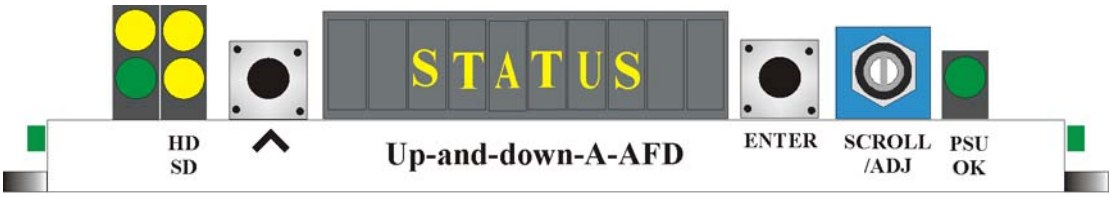
Note: When inserting SMPTE 2016 data the inserter will blank any incoming SMPTE 2016 data.

6 Trouble shooting

Simple trouble shooting can be performed by using either the card edge or a remote status panel display.

6.1 Card edge status LEDs

Board edge LEDs provide status reporting and may be useful when fault finding.



The following table summarises the card edge LED functions and colours:

Name	LED Colour	Function when ON	Function when Off
HD	Yellow	Video input standard is HD (High Definition)	Input not present
SD	Yellow	Video input standard is SD (Standard Definition)	
PSU OK	Green	Good power supply (PSU) rails	One or more of the monitor supplies is out of specification
	Yellow	No function at present	
	Green	No function at present	

The board edge display may also give some useful information when trouble-shooting

Basic fault finding guide

The Power OK LED is not illuminated

Check that the frame PSU is functioning – refer to the appropriate frame manual for detailed information

There is no video output

Check that a valid input is present and that any cabling is intact. Use the board edge, active control panel or Statesman status information to determine a likely fault

The video output exhibits jitter

Check that the input signal stability is within normal limits and that the maximum cable length has not been exceeded

The card no longer responds to card edge or front panel control

Check that the card is seated correctly and that the Power OK LED is lit

Check any active control panel cabling

Check if the control panel can control another card in the same rack

If necessary re-set the card by simply removing it from the rack whilst powered and re-inserting it after a few seconds. It is safe to re-insert the card whilst the rack is powered.

7 Specification

General

Dimensions	100mm x 266 mm module with DIN 41612 connector.
Weight	225g
Power consumption	14.5 W

Inputs

Video	HD or SD SDI 270Mb/s to 1.485Gb/s serial digital compliant to SMPTE 259M and SMPTE 292M. HD. Up to 140m with Belden 1694 or equivalent (Belden 8281 or equivalent up to 100m) SD (270Mb/s) >250 metres.

Outputs

Number and type:	4 reclocked SDI outputs 270Mb/s - 1.485Gb/s to SMPTE 259M and SMPTE 292M (2 x scaler outputs and 2 x input loop-throughs).
Jitter	Typically SDI 0.2UI @ 1kHz, HD 0.2UI @ 100kHz.

Processing

	10-bit. Active picture only.
Embedded audio	Four groups detected in the input. Two lowest numbers re-embedded on the output.
AFD Insertion	Manual section or auto depending on aspect ratio selection to SMPTE 2016
Aspect ratio conversion	Preset selection or user defined