Up-and-down-S

Combined up, down and cross converter with synchroniser

USER MANUAL

Crystal Vision

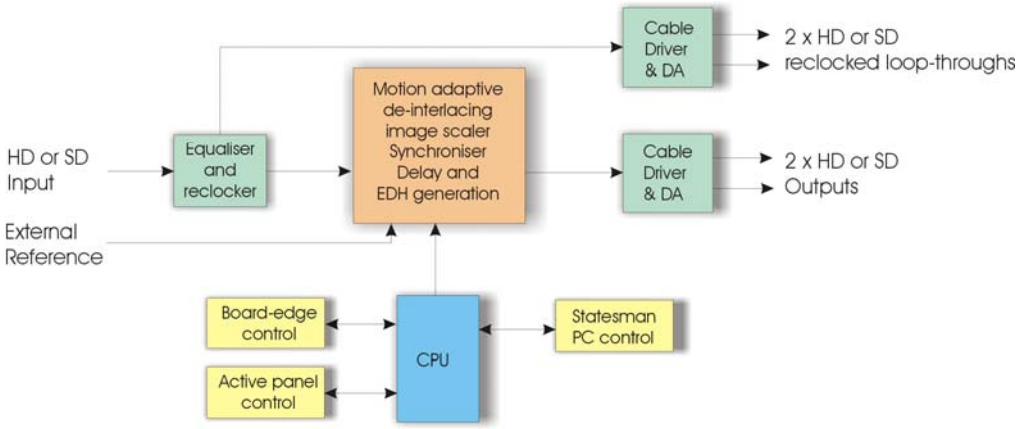
Crystal Vision Ltd., Lion Technology Park, Station Road East, Whittlesford, Cambridge, CB22 4WL, England.
E-mail: sales@crystalvision.tv Website: www.crystalvision.tv Tel: +44(0) 1223 497049 Fax: +44(0) 1223 497059

Contents

Revision 1	Page 11 GPI table renumbered	04-10-07
Revision 2	General update	07-11-07
Revision 3.	Cross conversion table amended, page 4.	10-03-09

1 Introduction

Up-and-down-S is a High Definition/Standard Definition serial digital synchroniser/delay module that also provides format conversion between High Definition and Standard definition and different HD formats sharing the same line rate, ideal for synchronising and converting non-studio timed signals. This is achieved by using the latest motion adaptive video de-interlacing techniques incorporating both detail and edge enhancement processing. DA outputs are available for both the reclocked input and converted programme. There is also an audio follow output for re-timing audio content.



Up-and-down-S converter

There are two operational modes: synchroniser and delay line. In synchroniser mode it will automatically correct the incoming frame rate and any delay by taking its timing from the analogue reference.

Delay line mode is ideal when the frame rate is correct but the source has been delayed by processing.

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
- Frame or line synchroniser or use as a fixed delay line
- Full vertical and horizontal adjustment from 1 to 2 frames in any mode (min delay 1 frame)
- Fast lock after up-stream switch
- Cross-lock feature
- Selectable output on input failure
- EDH generation

- Audio follow control output
- Two scaled outputs and two input loop-throughs
- Fits in standard frames alongside HD, SD and audio products

Up-and-down-S 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. Up-and-down-S uses the RM34 rear module.

The serial digital output has virtually no output jitter (less than 0.2UI at 1kHz SD and 0.2UI at 100kHz HD), both when used as a synchroniser (with a stable analogue reference) and when used as a delay line without a reference. Only in delay mode can jitter on the SDI input affect the output, but even then all high frequency jitter is removed by an internal phase-locked-loop.

Picture disturbances on untimed input cuts are avoided by a dual switching scheme. In most cases switching will occur on line 7 with no picture disturbance. Should the switch occur later, the switching point will be before the start of active video thus preserving the picture information but at the expense of any vertical interval data. The module regenerates all the video sync information in its output data stream and will always produce legal video.

There is a choice of black, blue or field/frame freeze with or without a delay on input failure. Indication is also given if the delay between the input video and external reference is shorter than the blanking period of the input video.

1.1 Operating modes

Up-and-down-S 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-S 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.

The Up-and-down-S can up convert, down convert or cross convert. The following tables show the available conversion selections.

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

Aspect ratio

In High Definition the aspect ratio is always 16:9, Standard Definition can be 16:9 or 4:3. Up-and-down-S 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)

The following table gives a pictorial representation of the various available aspect ratios.

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 loss 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 loss but possible significant distortion

Synchroniser mode

In Syncro (synchroniser) mode the unit takes its timing from the external analogue reference and will automatically synchronise sources between one and two frames (there is a fixed minimum delay through the Up-and-down-S of one frame). Synchroniser mode is ideal for external sources that are not timed to station references such as satellite or remote contribution feeds.

The timing can be adjusted through an entire frame using horizontal (fine) and vertical (line increments) settings. Increasing the vertical setting will delay the output relative to the reference in increments of one video line. Increasing the horizontal setting will increase this delay in samples or increments of approximately 74ns for SD and 13.5ns for HD. In synchroniser mode the total delay through the board will depend on this adjustment and the relative timing of the serial input and the analogue reference.

Should the reference be removed or the board powered without a connected reference input the Up-and-down-S will free-run at the previous received line rate. Another important feature is its ability to cross-lock when both the reference input and video input are of the same frame rate. This means that a High Definition video input can be referenced to either tri-level syncs or a black and burst reference and likewise a Standard Definition video input can also be referenced to either black and burst or tri-level syncs.

Applying an incorrect frame rate external reference will cause the Up-and-down-S to free run at the input video frame rate.

Delay mode

In Delay mode, timing is derived only from the video input. Typical applications are where a source passes through a processor such as a DVE, chroma keyer or standards converter where the delay can be a few microseconds, multiple lines or up to two fields.

The timing can be adjusted through an entire frame using the vertical and horizontal settings. When both settings are at their lowest setting the board will be set for the minimum delay (input to output) of one frame. Increasing the vertical setting will increase this delay in increments of one video line. Increasing the horizontal setting will increase the delay in sample increments. The maximum setting of both controls will provide a delay of two frames.

In either mode the video delay remains fully adjustable over two complete fields. This allows the output of the Up-and-down-S to be timed into any edit suite irrespective of the timing of the black and burst reference used in synchroniser mode.

Analogue timing reference

The Up-and-down-S provides a synchronisation function that allows the digital output to be timed to an analogue reference. The analogue reference can be tri-level syncs, video or composite syncs, although composite black and burst plus 300mV syncs into 75 Ohm as per EBU N14-1988 are preferred. When cross-locking it is necessary that both video input and reference share the same line rate.

Audio follow pulse

To allow an audio delay to track the delay through the Up-and-down-S, a TTL level pulse is provided. This pulse is output every frame. The length of the pulse (the time between the rising and falling edges) is the same as the delay through the time store.

Freezing the picture

The type of picture freeze used when the freeze command is given may be selected from frame, field 1 and field 2. If there is movement between both fields a frame freeze may show movement judder. A field freeze works by repeating the same field to produce a synthetic frame of video, without movement judder. However a field freeze is more likely to show jagged edges on near horizontal lines.

SDI loss behaviour

Behaviour after a loss of input can be selected from a list. These are Blue, Black, delay then Blue, delay then Black or picture freeze. The user can specify to show the last good whole frame in which failure happened (useful for diagnostic purposes) or field 1 or 2 of the last frame. This behaviour will be determined by the output freeze setting.

Vertical lock

Up-and-down-S synchronises at three separate points within each field or frame: at the start of the field or frame, just after the switching point, and at the start of the active field or frame.

Re-synchronising just after the switching point allows Up-and-down-S to cope seamlessly with switches on the input that are between synchronous sources and that occur at the switching point.

Re-synchronising at the start of the active field or frame avoids picture disturbances for switches on the input that are between nominally timed sources and that occur in vertical blanking.

EDH

EDH information is regenerated and inserted into the output video. The output video will always be correctly defined.

Bypass mode

To maintain best picture quality Up-and-down-S automatically enters a bypass mode when the input is the same as the selected output standard. This is achieved by bypassing the major processing blocks. Whilst in bypass mode the gain, offset, detail and aspect ratio controls will be inactive.

2 Hardware Installation

The Up-and-down-S 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.

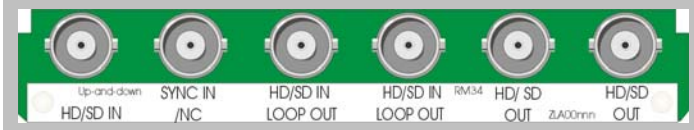
2.1 Rear modules and signal I/O

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 boxes have 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 RM34 is 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-S 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	Scaled serial digital output
HD/SD OUT	Scaled serial digital output
HD/SD 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	External reference input
HD/SD 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'	Reference input disconnected or missing	
6	'f'	Audio follow pulse	

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 6800Ω 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)

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)

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.

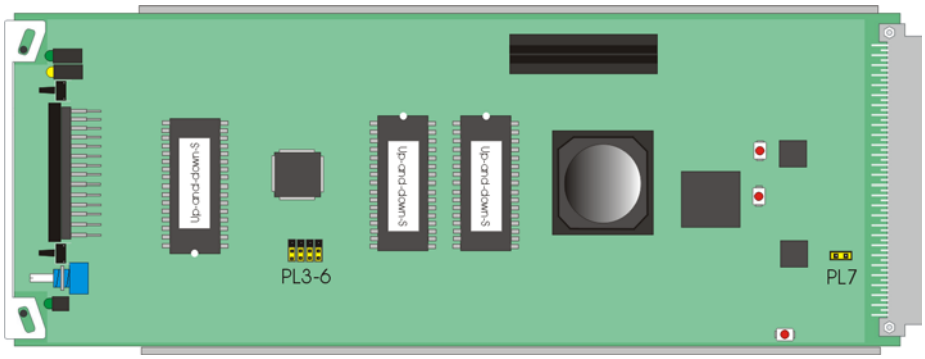
PCB links

There are two sets of user configurable links on the Up-and-down-S.

They are:

PL3-6 which configures the GPI 1-4 inputs to normal GPI functions or for board communications via the GPI port. These links are factory set to normal GPI functions and should be left in this position.

PL7 is used to terminate the external reference input. With the link made, the reference input will be terminated with 75 ohms. Should it be necessary to unterminate the reference input, remove the link and replace on one pin for storage.



Up-and-down-S PCB

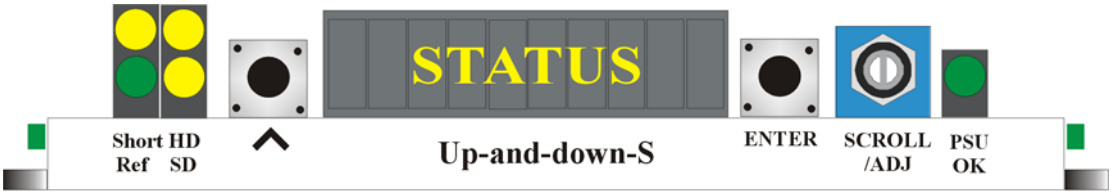
The three surface mounted LEDs near the board connector are there for factory diagnostics purposes only and are not viewable once the Up-and-down-S has been inserted into the frame.

3 Card edge operation

3.1 Card edge controls

Once the start-up initialisation procedure is complete, the Up-and-down-S 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-S front edge view

3.2 Card edge buttons

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

.

Button	Function	
⌑	Up Menu	Push to jump up a menu level or cancel a selection
ENTER	Select/Action	Push to select a menu, 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
Short	Yellow	No function at present	
Ref	Green	External reference present	Reference not present

3.5 Navigating card edge menus

To access the card edge menu system proceed as follows:

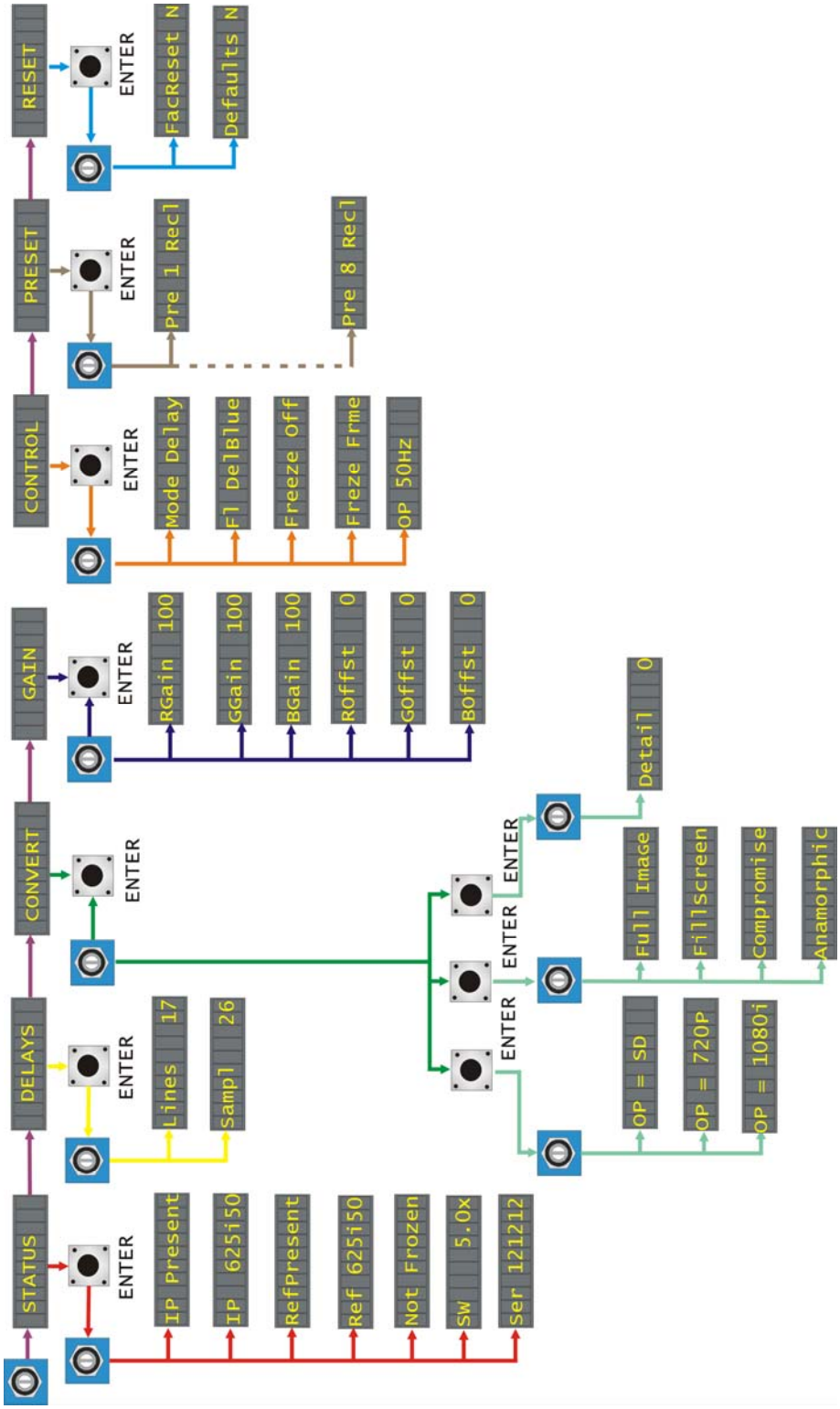
- Press the up-arrow [⮌] until a top menu category is reached
- Rotate the SCROLL control until the desired menu category is found
- Push ENTER to enter the sub menus of that category
- Rotate SCROLL to select a sub menu
- Push ENTER to select the desired function. Selection will be indicated by the 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

Note: To maintain best picture quality Up-and-down-S automatically enters a bypass mode when the input is the same as the selected output standard. This is achieved by bypassing the major processing blocks. Whilst in bypass mode the gain, offset, detail and aspect ratio controls will be inactive.

3.6 Card edge configuration

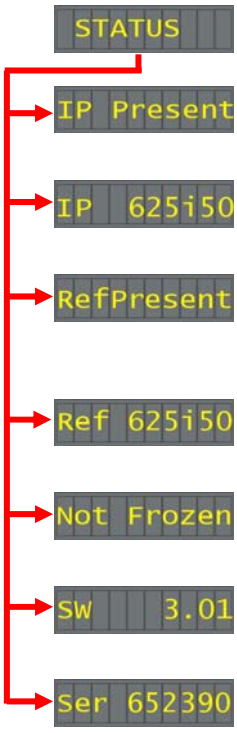
Menu Tree



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

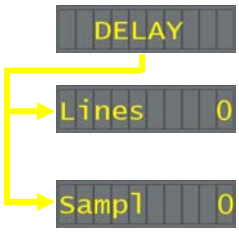
From the STATUS top menu press ENTER then SCROLL to access the status menu options.



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. ***625i, 525i, 720p, 1035i, 1080i, IP Missing***
External reference	Rotate the Scroll/Adj. control to show external reference present. ***RefPresent, RefMissing***
External reference line rate	Rotate the Scroll/Adj. control to show reference line standard. ***625i, 525i, 720p, 1035i, 1080i, RefMissing***
Output video status	Rotate the Scroll/Adj. control to show output video status. ***Not Frozen, OPVid Frzn***
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.

Delay menu

From this menu adjustment of the picture horizontal and vertical timing can be made. The minimum delay through the Up-and-down-S with both controls set to zero is one frame. With both controls set to their maximum two frames are available for all HD and SD standards.



Menu	Comment
Valid video input present	Rotate the Scroll/Adj. control to show the delay in lines menu. Press ENTER and rotate Adj. to set the delay in lines.
Input video line rate	Rotate the Scroll/Adj. control to show the delay in samples menu. Press ENTER and rotate Adj. to set the delay in samples.

Vertical position timing

The delay in lines menu sets the vertical position in numbers of whole lines the video is to be delayed in Delay Mode, or the vertical timing offset with respect to the reference input in Synchroniser Mode.

Standard	Lines
PAL	0-624
NTSC	0-524
720p 50	0-749
720p 59.94 / 60	0-749
1035i 59.94 / 60	0-1124
1080i 50	0-1124
1080i 59.94 / 60	0-1124

Horizontal position timing

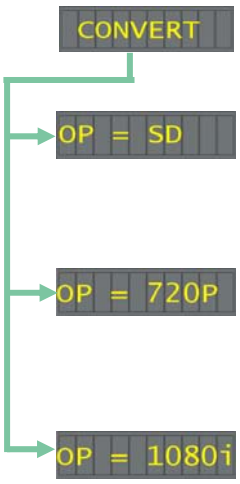
The delay in samples menu sets the horizontal position in numbers of samples/pixels the video is to be delayed in Delay Mode, or the horizontal timing offset with respect to the reference input in Synchroniser Mode.

Standard	Samples
PAL	0-863
NTSC	0-857
720p 50	0-1979
720p 59.94 / 60	0-1649
1035i 59.94 / 60	0-2199
1080i 50	0-2639
1080i 59.94 / 60	0-2199

Convert (output configuration)

Output Standard

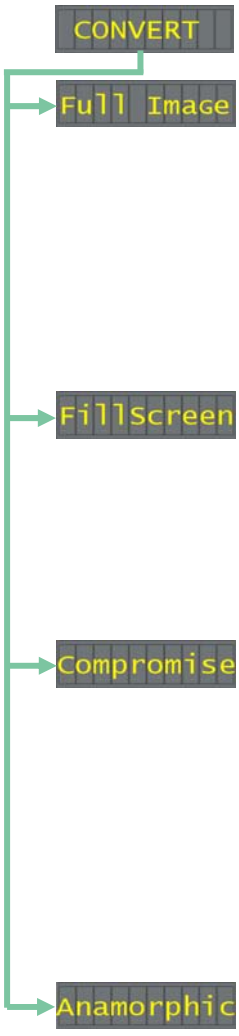
From the CONVERT top menu press ENTER then SCROLL to access the Output standard, Aspect Ratio selection or Detail control. Press enter to select Output standard.



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 Definition.
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 High Definition ***720p***.
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 High Definition ***1080i***.

Aspect Ratio controls

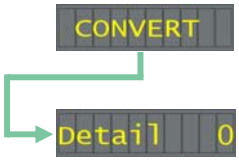
From the CONVERT top menu press ENTER then SCROLL to access Output standard, Aspect Ratio selection or Detail control. Press ENTER to select Aspect Ratio.



Menu	Comment
Full image (4:3 Pillarbox) (16:9 Letterbox)	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)
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. (4:3 Full Screen) Central 75% of 16:9 source width stretched to 4:3 monitor width. Full source height mapped to monitor height. Significant picture loss. (16:9 Full Screen)
Compromise (4:3 - 14:9 Pillarbox) (16:9 - 14:9 Letterbox)	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)
Anamorphic	Full 4:3 source width horizontally stretched to 16:9 monitor width. Full source height to map to monitor height. No picture loss but significant distortion. (4:3 Anamorphic) Full 16:9 source width mapped to 4:3 monitor width. Full source height stretched to monitor height. No picture loss but significant distortion. (16:9 Anamorphic)

Detail enhancement

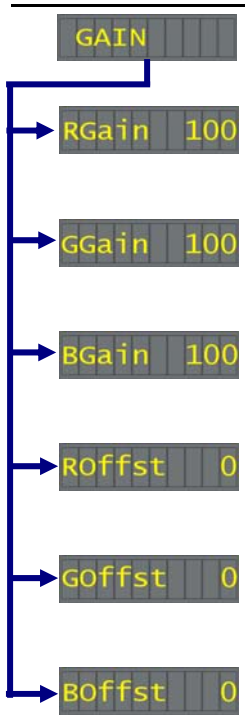
From the CONVERT top menu press ENTER then SCROLL to access Output standard, Aspect Ratio selection or Detail control. Press ENTER to select Detail.



Menu	Comment
Detail	Rotate the Scroll/Adj. control to set the amount of detail enhancement required. Press enter to action change. Adjustment 0-50.

Gain (Video gains and offsets)

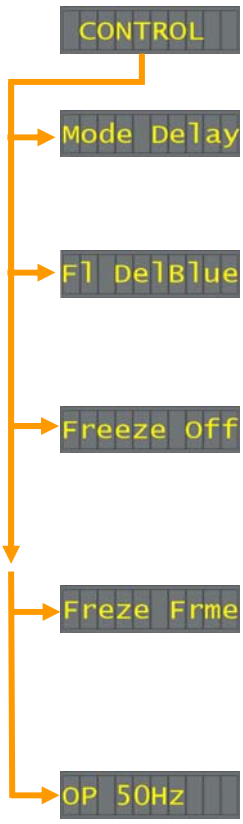
From the GAIN top menu press ENTER then SCROLL to access the video gain and offset controls.



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 (-20% to +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 (-20% to +20%). Example: **GOffst +5**
	Rotate SCROLL to show BOffst and press ENTER to select.
B Offset	Rotate [ADJ] shaft encoder to set the B offset (-20% to +20%). Example: **BOffst -2**

Control Menu

The control menu is where the main operating parameters are found such as mode selection i.e. synchroniser or delay mode, output format in the event of no reference or signal input and board reset.

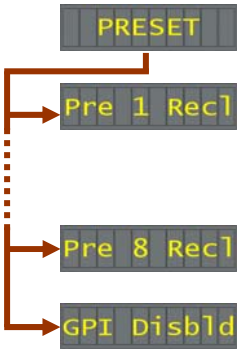


Menu	Comment
Syncro/Delay mode	Rotate the Scroll/Adj. control to show Mode selected. Press ENTER and rotate Scroll/Adj. to select. Press ENTER to select. ***Mode Syncr, Mode Delay***
Output on Input fail	Rotate the Scroll/Adj. control to show the Output on fail menu. Press ENTER and rotate Scroll/Adj. to select. Press ENTER to select. ***Fail Blue, Fail Black, Fl DelBlue, Fl DelBlck, Fail Frame***
Output Freeze	Rotate the Scroll/Adj. control to the Output Freeze menu. Press ENTER and rotate Scroll/Adj. to select. Press ENTER to force the output to be frozen. ***Freeze Off, Freeze On***
Output freeze selection	Rotate the Scroll/Adj. control to show the freeze preference menu. Press ENTER to select and rotate Scroll/Adj. to select. Press ENTER to action. ***Freeze Fld1, Freeze Fld2, Freze Frme***
Output line rate with no inputs	Rotate the Scroll/Adj. control to show output video line rate. Press ENTER to select and rotate Scroll/Adj. to select. Press ENTER to action. ***50Hz, 59.94Hz*** Note: Only relevant with no video or reference input present.

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 card status. The presets are numbered 1-8.

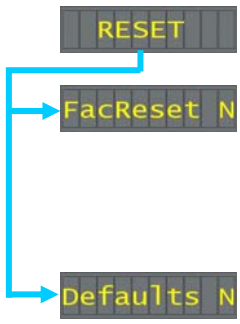
Note: Care should be taken when storing presets that the desired configuration is not changed by any external input prior to saving.



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.
Enable GPI control of presets	Selecting ENABLE allows the recall of previously saved user configurations via GPI inputs 0-3.

Reset (factory defaults)

The Reset button will return all parameters to their factory default levels.



Menu	Comment
Factory Reset	Rotate the Scroll/Adj. control to show Reset Menu selected. Press ENTER and rotate Scroll/Adj. to select Factory Reset. Press ENTER to select and rotate Scroll/Adj. to select Yes. Press ENTER to action. Indication is given that the card is being reset.
Factory Defaults	Rotate the Scroll/Adj. control to show Reset Menu selected. Press ENTER and rotate Scroll/Adj. to select Defaults. Press ENTER to select and rotate Scroll/Adj. to select Yes. Press ENTER to action. Indication is given that the card is being reset.

Note: Reset will cause all user-stored configurations to be erased. To retain user stored configurations use the Defaults option.

Parameter	Reset default values
Mode	Synchroniser
Gains	100%
Offsets	0
Detail	0
Timing Adjustment	0 lines, 0 samples
Output Freeze	Off
Output on frozen	Field 1
Output on Input fail	Blue
Output frame rate	Follows Input or 50Hz
Output format	Standard definition
GPI control	Disabled

4 Using the active front panel

4.1 Module selected

This operational guide assumes that the panel has been set up 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, the two-line 20-character screen will display 'Crystal Vision' followed by the firmware version number for the control panel. All eight control panel keys LEDs will illuminate.

The Crystal Vision control panel start up display

'Control Panel' then briefly replaces the version number display.

If the control panel firmware has been updated for Statesman control (version 1.5.0 or higher), Statesman Mode will be entered and the message, 'Press CAL to Exit' will be displayed and the CAL LED will light.

Statesman mode is entered by default

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-S

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 '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.

The available cards menu

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 first frame in slot number 3.

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-S has been selected.

The Up-and-down-S 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.

4.2 The Up-and-down-S 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-S 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:

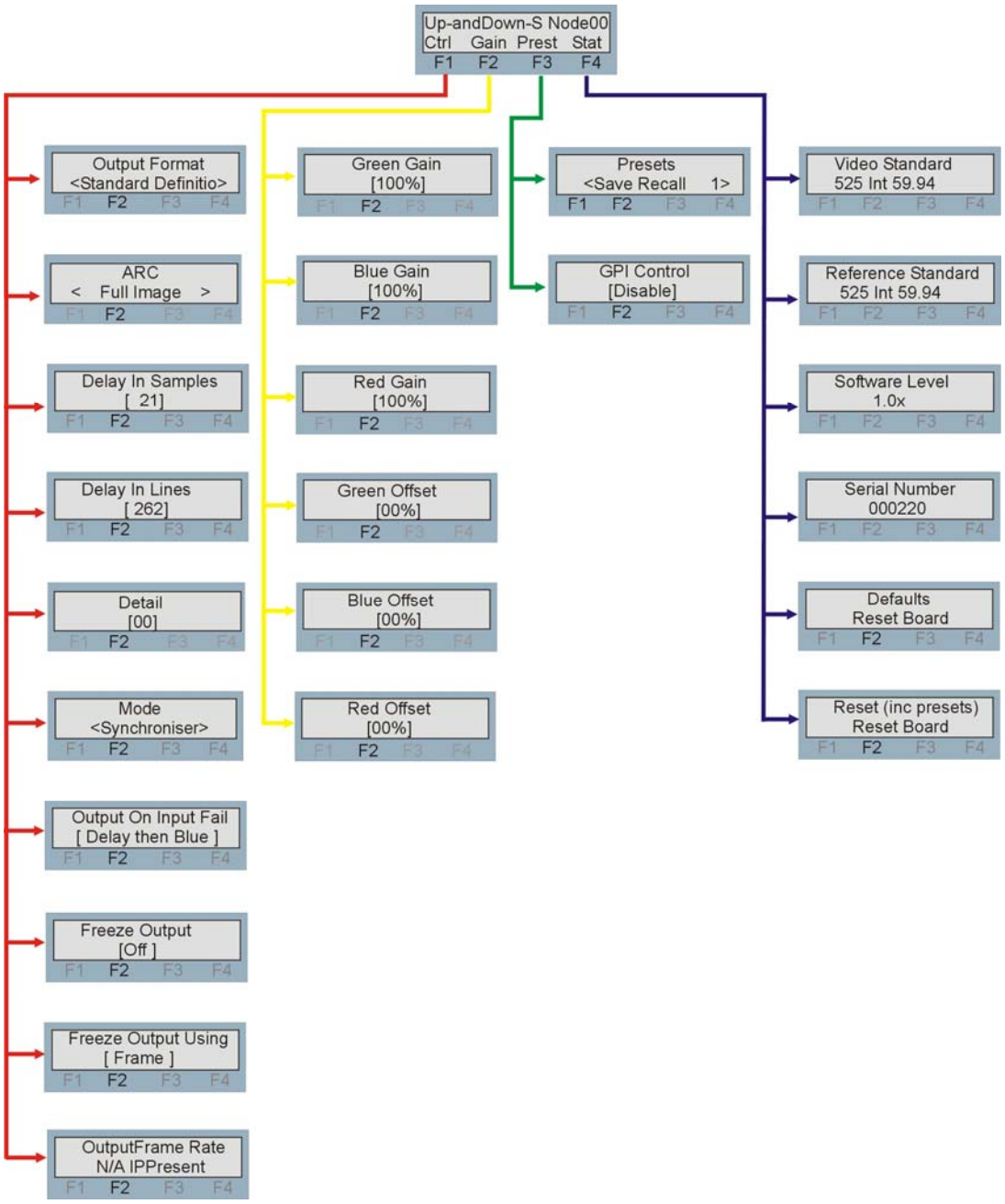
- Ctrl (Output format, Aspect ratio, Detail, Sync/Delay mode and Reset) – press F1
- Gain (Video gains and offsets) – press F2
- Prest (Save/Recall user configurations) – press F3
- Stat (Status and factory reset) – press F4

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 chart shows the available Up-and-down-S menus. The actual menus available may vary slightly as software is updated.

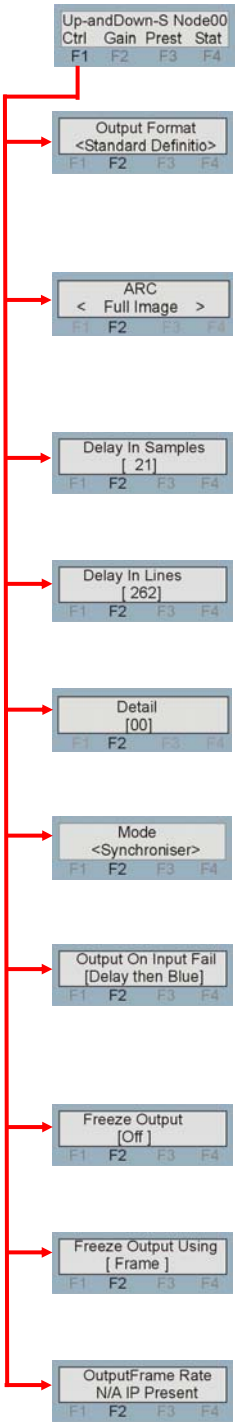
Note: To maintain best picture quality, Up-and-down-S automatically enters a bypass mode when the input is the same as the selected output standard. This is achieved by bypassing the major processing blocks. Whilst in bypass mode the gain, offset, detail and aspect ratio controls will be inactive.

Up-and-down-S Menu Structure



Control Menu

This menu contains all of the setup and configuration controls such as aspect ratio, mode of operation, video delay and freeze options.



Menu	Comment
Output Format	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 enter to accept the new value.
Aspect ratio conversion	Rotate shaft encoder to select the Aspect Ratio. Press F2 to select to change the value. Rotate shaft encoder to set the new value. ***Full Image, Fill Screen, Compromise 16:9, Anamorphic*** Press enter to accept the new value.
Delay in samples (pixels)	Rotate shaft encoder to select Delay in Samples. Press F2 to select to change the value. Rotate shaft encoder to set the new value. Press enter to accept the new value.
Day in full lines	Rotate shaft encoder to select Delay in lines. Press F2 to select to change the value. Rotate shaft encoder to set the new value. Press enter to accept the new value.
Detail enhancement	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 enter to accept the new value.
Mode of operation	Rotate shaft encoder to select Sync or Delay mode. Press F2 to select to change the mode. Rotate shaft encoder to select ***Synchroniser or Delay.*** Press enter to accept the new configuration.
Output selection on input fail	Rotate shaft encoder to select Output on Input Fail. Press F2 to select to change the selection. Rotate shaft encoder to select. ***Blue, Black, Delay then Blue, Delay then Black, Freeze Frame.*** Press enter to accept the new selection.
Output freeze	Rotate shaft encoder to select Freeze Output. Press F2 to select to change the selection. Rotate shaft encoder to select. ***Off, On.*** Press enter to accept the new selection.
Output freeze format	Rotate shaft encoder to select Output On Frozen. Press F2 to select to change the selection. Rotate shaft encoder to select. ***Field 1, Field 2, Frame***. Press enter to accept the new selection.
Output frame rate	Rotate shaft encoder to select the Output frame rate. Press F2 to select to change the selection. Rotate shaft encoder to select. ***50Hz, 59.94Hz.*** Press enter to accept the new selection. Not available when an input or reference is present.

Output Selection

With the video input present the output format can be selected from standard definition, 1280x720p and 1920x1080i, the frame rate will be the same as the input.

Note: With no input present the output can be set to any of the available video formats but at a frame rate determined by the external reference input. For instance, if the external reference is PAL black and burst the available output selection would be: Standard Definition PAL, 1280x720p 50Hz and 1920x1080i 50Hz. Should no external reference be present the output frame rate will be determined by the frame rate menu selection.

Aspect Ratio Conversion

High Definition television will always be in wide screen format therefore it is often necessary to reformat the aspect ratio when converting to and from High Definition. The aspect ratio can be selected from four preset formats - full screen, full image, compromise or Anamorphic. See chapter 1 for a pictorial explanation of the different aspect ratios.

Horizontal position timing

The delay in samples menu sets the horizontal position in numbers of samples/pixels the video is to be delayed in Delay Mode, or the horizontal timing offset with respect to the reference input in Synchro Mode.

Standard	Samples
PAL	0-863
NTSC	0-857
720p 50	0-1979
720p 59.94	0-1649
1035i 59.94	0-2199
1080i 50	0-2639
1080i 59.94	0-2199

Vertical position timing

The delay in lines menu sets the vertical position in numbers of whole lines the video is to be delayed in Delay Mode, or the vertical timing offset with respect to the reference input in Synchroniser Mode.

Standard	Lines
PAL	0-624
NTSC	0-524
720p 50	0-749
720p 59.94	0-749
1035i 59.94	0-1124
1080i 50	0-1124
1080i 59.94	0-1124

Detail enhancement

The Detail control sets the amount of fine edge sharpening applied to the picture.

Selecting the operating mode

The Up-and-down-S has two modes of operation, synchronisation and delay line. In Synchronisation Mode the unit takes its timing from the analogue external reference. In Delay Mode, timing is derived only from the SDI input.

Output on input fail

Behaviour after a loss of input can be selected from Blue, Black, delay then Blue, delay then Black or frame freeze. The user can then use the Output on Frozen menu to select to show the last good whole frame in which failure happened (useful for diagnostic purposes) or field 1 or 2 of the last frame.

Freeze output

This control sets the output to be frozen. The frozen picture can then be set to Field 1, Field 2 or Frame in the Output on Frozen menu.

Freeze output using

This menu is used to determine the type of freeze when Freeze Output is set to freeze. The type of picture freeze may be selected from frame, field 1 and field 2. If there is movement between both fields a frame freeze may show movement judder. A field freeze works by repeating the same field to produce a synthetic frame of video, without movement judder. However a field freeze is more likely to show jagged edges on near horizontal lines.

Output Frame rate

With neither an external reference nor video input is present the Up-and-down-S will free run giving an output set by the Output selection and Output on Input Fail selection. The frame rate is then selectable in the Output Frame Rate menu from 50 or 59.94Hz.

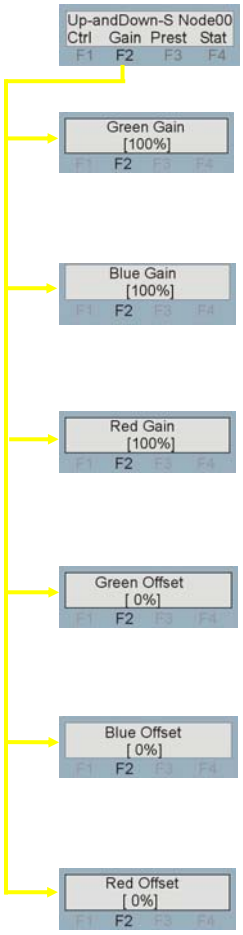
Should an external reference or video input be present they will determine the output frame rate irrespective of the setting of this control.

Gain and offsets

The component RGB video gain and offset can be adjusted from this menu.

These controls will adjust the RGB levels in real time but it is necessary to confirm any change by pressing the ENTER button. Leaving a menu without confirmation will result in any level change reverting to their last stored value.

Pressing CAL at any time will return the selected component to its default value.



Menu	Comment
Green component gain	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.
Blue component gain	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.
Red component gain	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.
Green component offset	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.
Blue component offset	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.
Red component offset	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.

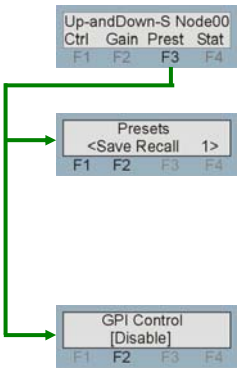
Note: When the Up-and-down-S is in bypass mode the detail control and gain and offset controls will be inactive.
Press CAL at any time to return a level to its default value.

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.



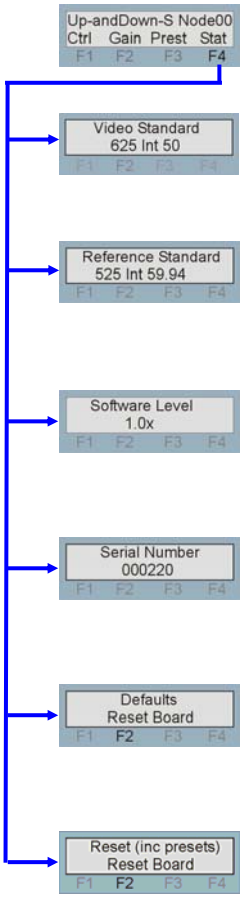
Menu	Comment
	Rotate shaft encoder to select Presets. Press F1 or F2 to initiate selection. Rotate shaft encoder to select the preset location. Press F1 to save current configuration. Press F2 to recall stored configuration.
	Rotate shaft encoder to select GPI Control. Press F2 to select to change selection. 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 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 show reference line standard.
	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	Reset default values
Mode	Synchroniser
Gains	100%
Offsets	0
Detail	0
Timing Adjustment	0 lines, 0 samples
Output Freeze	Off
Output on frozen	Field 1
Output on Input fail	Blue
Output frame rate	Follows Input or 50Hz
Output format	Standard definition
GPI control	Disabled

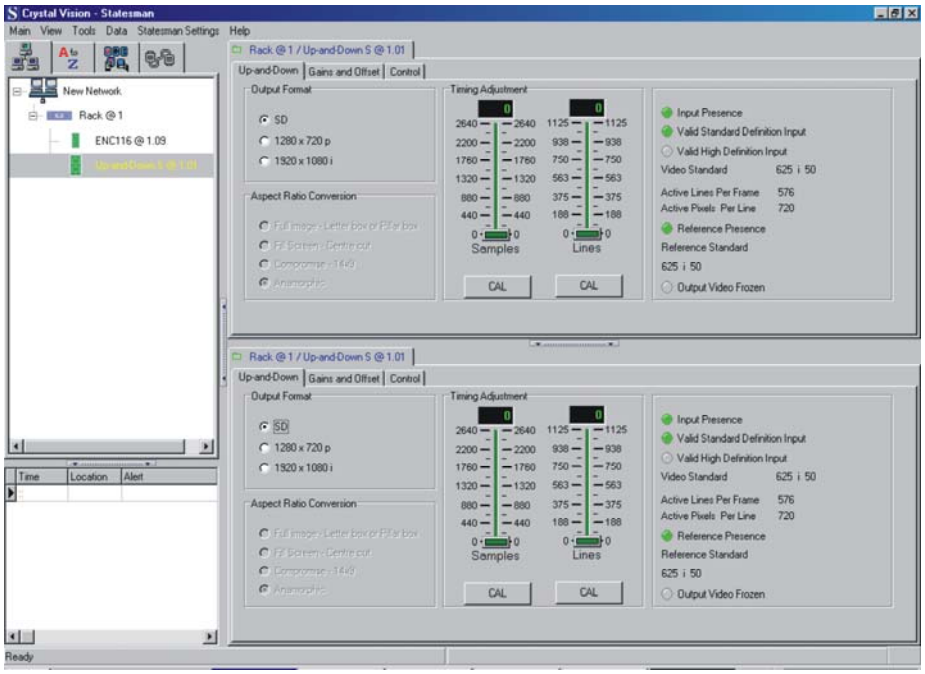
5 Statesman

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 screen 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.



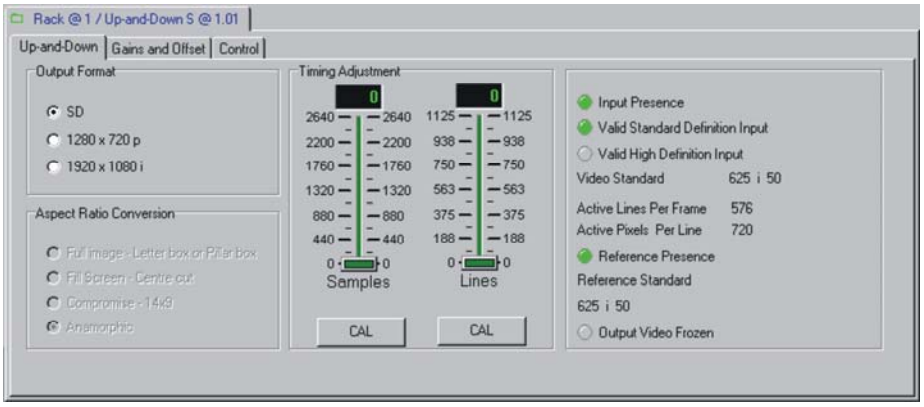
The Statesman main application window

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-S has three Statesman menu tabs. One labelled Up-and-down that provides status information and allows configuration of output format delay as well as aspect ratio conversion assignment, the second for RGB gain and dc offset and the control menu for operations such as mode, detail, freeze and preset save/recall.

The Up-and-down-S has only two types of controls available, radio buttons and slider/T bars. The radio buttons are used for making selections and are operated by hovering the cursor over the button whilst left clicking the mouse button. The slider control is used for setting levels or amplitudes. These sliders can be adjusted in several ways, the simplest being to click and drag the T bar to a new position on the scale. Also a new value can be typed directly into the digital display which will cause the T bar to jump to the new value. Finally the cursor can be placed anywhere on the slider scale and made to jump to that value by left clicking the mouse button.

Up-and-down menu



Up-and-down-S status and timing menu

The status pane is divided into five sections: Output Format, Aspect Ratio Conversion, Timing, and Status.

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-S will auto detect the input format.

Aspect Ratio Conversion

Similarly the aspect ratio can be selected by checking the appropriate radio button. See chapter 1 for a pictorial explanation of the different aspect ratios available.

Note: If the input and output selections are the same this group will be greyed out.

Timing Adjustment

The Samples and Lines slider controls are used to adjust the picture horizontal and vertical timing. The minimum delay through the Up-and-down-S with both controls set to zero will be one full frame, while with both controls set to maximum the delay available for all HD and SD standards will be two complete frames. The maximum delay setting for each slider control is determined by the input video standard. Should a value be set that is

beyond this maximum, the video delay will be limited and the slide control will automatically return to indicate this maximum.

Horizontal position timing

The Samples control (Horizontal Position) sets the number of samples/pixels the video is to be delayed in Delay Mode, or the vertical timing offset with respect to the reference input in Synchroniser Mode.

Standard	Samples
PAL	0-863
NTSC	0-857
720p 50	0-1979
720p 59.94 / 60	0-1649
1035i 59.94 / 60	0-2199
1080i 50	0-2639
1080i 59.94 / 60	0-2199

Vertical position timing

The Lines control (Vertical Position) sets the number of whole lines the video is to be delayed in Delay Mode, or the vertical timing offset with respect to the reference input in Synchroniser Mode.

Standard	Lines
PAL	0-624
NTSC	0-524
720p 50	0-749
720p 59.94 / 60	0-749
1035i 59.94 / 60	0-1124
1080i 50	0-1124
1080i 59.94 / 60	0-1124

Input Status

The Input Present indicator will illuminate green when a valid input is present or red if the input is missing.

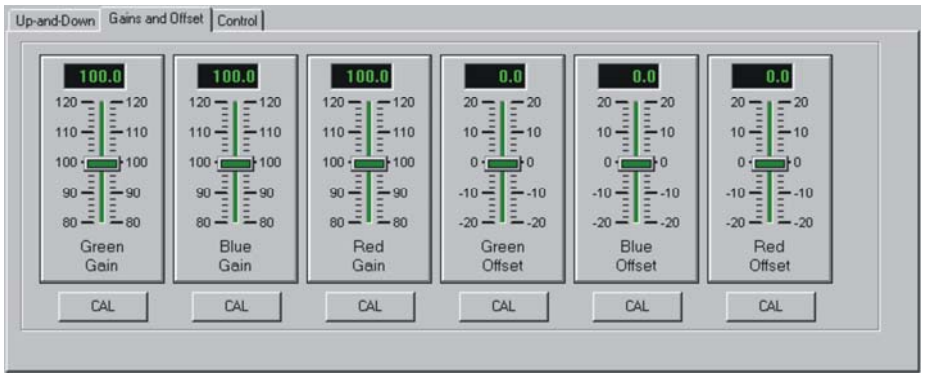
The video standard is automatically detected and is shown. The input format is indicated by the illumination of a green indicator.

The presence of an external reference and its standard is also shown along with picture frozen status.

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

Gains and Offsets

RGB picture level controls gain and dc offset allow control of the video image brightness, contrast and colour.



Up-and-down-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.

Control menu

The control menu is where the main operating parameters are found such as mode selection i.e. synchroniser or delay mode, output format in the event of no reference or signal input, freeze selection, user storable presets, detail enhancement control and board reset.

Up-and-down-S control menu

Selecting the operating Mode

The Up-and-down-S has two modes of operation, synchronisation and delay line. In Synchronisation Mode timing is taken from the analogue external reference. In Delay Mode, timing is derived only from the SDI input.

On loss of Input show

Behaviour after a loss of input can be selected from the pull-down box. Blue, Black, delay then Blue, delay then Black or frame freeze can be chosen from. The user can then use the Output Freeze menu to select to show the last good whole frame in which failure happened (useful for diagnostic purposes) or field 1 or 2 of the last frame.

Output Freeze

This control sets the output to be frozen. The frozen picture can then be set to show Field 1, Field 2 or Frame.

Preset Menu

Up to eight board set-ups may be stored 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.

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.

Reset (factory defaults)

The Reset button will return all parameters to their factory default levels.

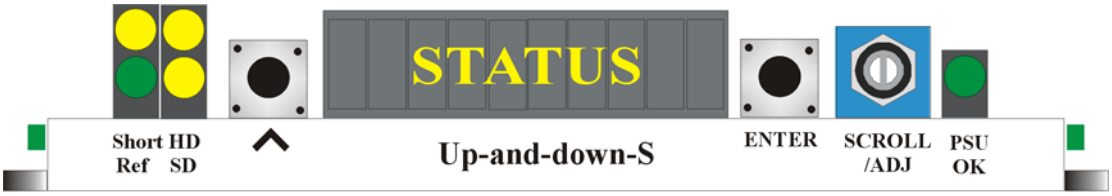
Parameter	Reset default values
Mode	Synchroniser
Gains	100%
Offsets	0
Detail	0
Timing Adjustment	0 lines, 0 samples
Output Freeze	Off
Output on frozen	Field 1
Output on Input fail	Blue
Output frame rate	Follows Input or 50Hz
Output format	Standard definition
GPI control	Disabled

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
Short	Yellow	No function at present	
Ref	Green	External Reference Present	Reference not 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	16 W

Inputs

Video	HD or SD SDI 270Mb/s to 1.485Gb/s serial digital compliant to SMPTE259M and SMPTE292M
	HD. Up to 140m with Belden 1694 or equivalent (Belden 8281 or equivalent up to 100m)
	SD (270Mb/s) >250 metres
External reference	Tri-level syncs or analogue Black and Burst and composite video 150mV to 600mV

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
	1-2 frames of variable delay
	TTL Audio tracking pulse output
	4 x GPI inputs for presets recall 2 x GPI outputs for external reference missing and Audio tracking pulse