CoCo HD

HD/SD colour corrector and legaliser

USER MANUAL

Crystal Vision

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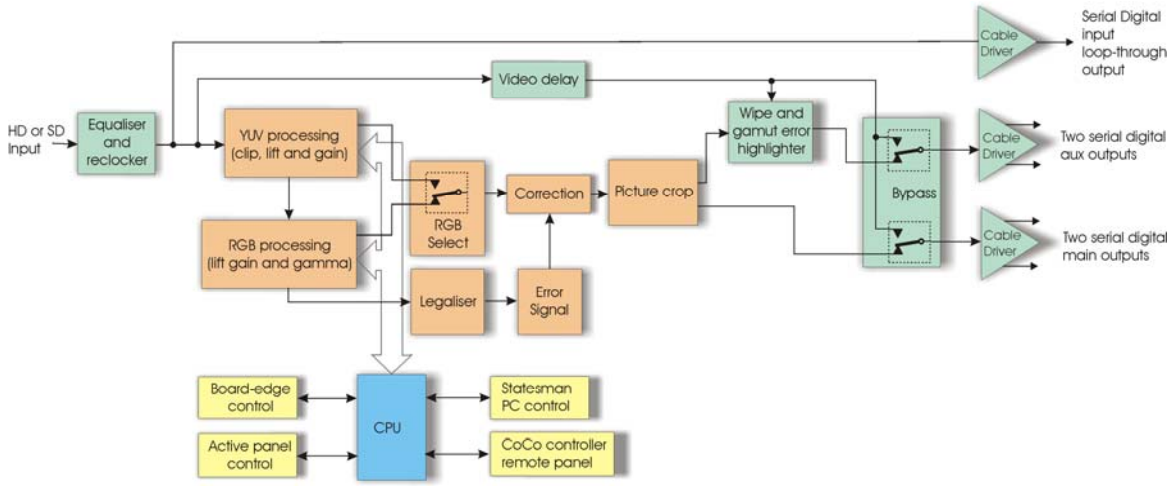
1 Introduction

CoCo HD is a 10 bit High Definition/Standard Definition digital colour corrector and legaliser, which allows independent digital image adjustments in YUV and RGB domains, essential for maintaining colour fidelity. CoCo HD passes all ancillary data, including embedded audio, transparently. 16 memories are provided to store user-defined adjustments and there is GPI output indication of YUV and RGB clip status.



CoCo HD colour corrector and legaliser

The main features are as follows:

- High Definition digital colour corrector and legaliser
- Independent digital image adjustments in YUV and RGB domains
- Tools to adjust level, gain, clipping and timing
- YUV threshold slope selection
- Performs true colour correction using RGB lift and gain
- Changes YUV colours illegal in RGB to be valid in RGB
- Overall gamma and independent adjustment of red, green and blue gamma
- Split-screen output to preview adjustments with gamut error highlighter – AUX out only
- Bypass control
- Passes ancillary information including embedded audio
- 16 user memories
- EDH generation
- Control from dedicated 1U CoCo Controller, Statesman or active panel
- Rear module (RM51) with relay bypass and RS422 controller connector available

Applications include correcting computer-generated or post-production output and ensuring broadcast colour gamut is always legal.

CoCo HD is equipped with an impressive range of colour correction tools, with independent gain, lift and gamma in the RGB domain. The gain and lift tools are used together to effortlessly increase or reduce the red, green or blue individually, allowing CoCo HD to perform true colour correction. Overall gamma can be used to lighten or darken the picture without crushing the blacks or the whites, while independent adjustment of red, green and blue gamma allows extremely sophisticated colour manipulation. The YUV adjustment tools include independent lift, independent gain, overall lift and gain, hue phase adjustment and adjustable horizontal and vertical cropping.

CoCo HD is an excellent legaliser too. It has advanced correction for gamut errors, that will change any YUV colours that are illegal in RGB to be valid in RGB. CoCo HD legalises by reducing the colour saturation without changing the hue, processing the RGB components on each pixel at the same time and achieving a legal and natural-looking picture. When there is no RGB processing, the signal is legalised in the YUV domain to make it RGB legal, avoiding the distortion inevitable when changing colour space. CoCo HD will correctly pass transients caused by the different bandwidths in the RGB and YUV colour spaces. CoCo HD will even pass negative RGB values without legalising them, ideal for circumstances where removing small areas of invalid colour would create an inferior picture.

It is easy to preview and perfect any adjustments using CoCo HD's auxiliary output, of which there are two. Connecting to a monitor will allow the operator to either wipe horizontally or vertically between the processed and unprocessed signal or switch between input and output for a 'before' and 'after' comparison. The auxiliary outputs can also be used to highlight any pixels containing illegal signal values, making it easier to locate the problem and make any adjustments to equipment in the system. There are 16 presets available to store the precise adjustments for future use, for example, if you need to continually correct a feed from the same camera. CoCo HD can be used with embedded audio sources, passing all ancillary data including embedded audio without modification.

CoCo HD can be controlled with its board edge controls, from an active front panel, via Statesman PC control or by using its own CoCo remote control panel.

Processing modes

Hue shift UV channels

Increase/decrease Y, U and V channel lift and gain independently

Set and soft limit Y channel positive (Hi) and negative (Lo) excursions

Set and soft limit U, and V channel positive/negative excursions symmetrically

Increase/decrease RGB channel lift and gain independently

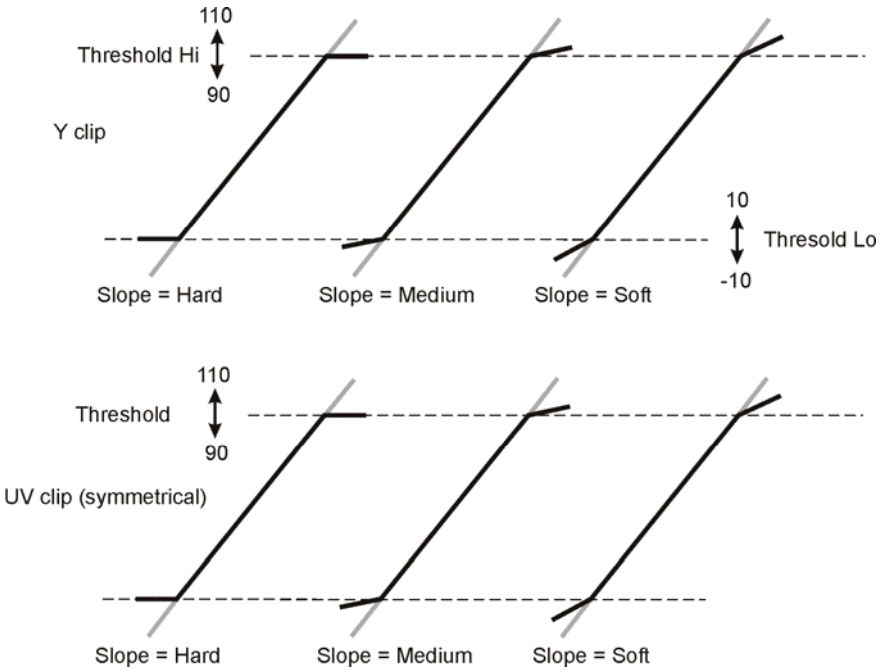
Increase/decrease RGB gamma independently and together

Set and soft limit RGB channel positive/negative excursions independently

Set horizontal and vertical active picture area cropping region on final output

YUV soft limiting

Soft limiting or clipping is provided by a combination of adjustable threshold and slope controls. The luminance channel has both high and low limiting, whilst the UV channels have one clipping control for each colour component. UV clipping operates symmetrically about black level.



CoCo HD soft limiting

Transient Tolerance

Some sources of video contain hard transients between different levels of luminance and chrominance. These transients can produce "overshoots" outside of the legal gamut range which can result in RGB errors being flagged downstream of the CoCo HD. Legalising these overshoots using a hard clip range may result in over clipping the video content.

The Transient Tolerance control is provided to allow these overshoots to pass through the CoCo HD without resulting in downstream RGB errors.

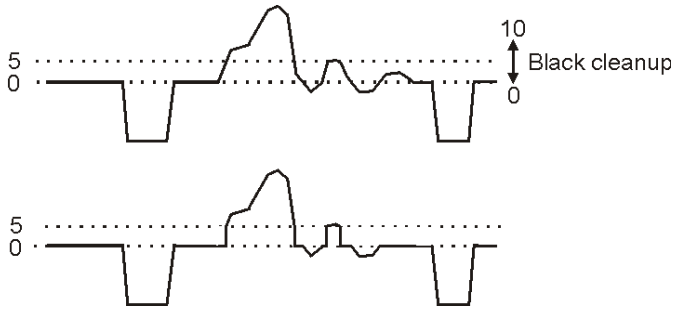
There are three levels of tolerance to transient overshoot selection:

Maximum	Large transients that are less than eight pixels in length will be allowed to pass.
Minimum	Small transients that are less than eight pixels in length will be allowed to pass.
Off	No tolerance to transients. All transients are not allowed to exceed gamut levels.

Black cleanup

A useful feature of the CoCo HD is its black cleanup control. The black cleanup works by returning any video Luma content that falls below a previously set threshold level to black. Sub black information is passed unaffected.

The range of adjustment for the black cleanup threshold control is 0-10% of peak white.



Black cleanup example threshold set to 5%

2 Hardware installation

The CoCo HD colour corrector and legaliser is a single height module which fits into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

CoCo HD is a 100mm x 266mm module, which fits in all of the standard frames and can be integrated with any board from the company's full product range.

Rear modules and signal I/O

CoCo HD is used with either the RM34 or RM51 single slot rear connectors in all Crystal Vision frames.

The 4U Indigo 4 frame will house up to 24 modules and triple power supplies.

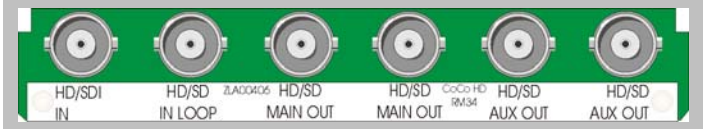
The 2U Indigo 2 frame will house up to 12 modules and dual power supplies.

The 1U Indigo 1 frame will house 6 modules and a single power supply.

The 1U Indigo DT desk top box has a built-in power supply and will house up to 2 modules.

On the 1U, 2U and 4U frames a hinged front panel gives access to the PSU and all modules. The desk top box has a removable front. The universal frame wiring system allows any of the interface range of modules to be fitted in any position with the use of removable rear modules.

RM34 rear module connections:

RM34 fits in all current frames	Description
	**RM34** • 24 modules per 4U frame, 12 per 2U frame, six per 1U frame & two per desk top box • All frame slots can be used

BNC	Signal
HD/SD IN	High Definition/Standard Definition serial digital input
HD/SD IN LOOP	Reclocked input loop through
HD/SD MAIN OUT	Main output
HD/SD MAIN OUT	Duplicate main output
HD/SD AUX OUT	Auxiliary output
HD/SD AUX OUT	Duplicate auxiliary output

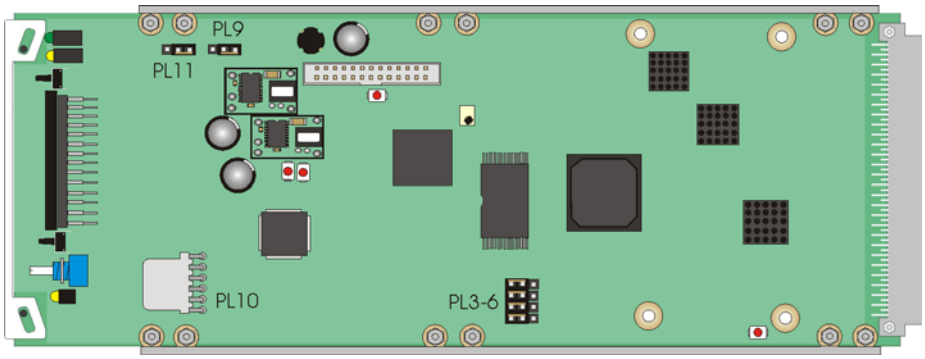
RM51 rear module connections:

RM51 fits in all current frames	Description
	**RM51** • 24 modules per 4U frame, 12 per 2U frame, six per 1U frame & two per desk top box • All frame slots can be used

BNC	Signal
HD/SD IN	High Definition/Standard Definition serial digital input
MAIN OUT (Switched)	Main output with relay bypass
MAIN OUT (Unstd)	Duplicate main output
AUX OUT	Auxiliary output
RJ45	Controller RS422 input with loop through

CoCo HD configuration

The jumper links on the board are set correctly when CoCo HD is tested before despatch and should be left as set at the factory. The following information is for jumper position confirmation only.



CoCo HD showing default factory jumpers

Link positions - board viewed as above

Link	Required position
PL3, PL4, PL5, PL6	Leave all four jumpers in the left hand position (1-2) to enable the CoCo Controller panel. Leave in the right hand position (2-3) for GPI outputs
PL9	Spare, leave set to 2-3
PL10	Ethernet header for software updates
PL11	Spare, leave set to 2-3

Using module GPIs

Each slot has an associated set of GPI connections for remote control and external status outputs on the frame rear-panel remote connectors. For convenience, GPI lines are associated with reference codes 'a' to 'f' in the connector pin-out tables for each frame. GPI lines can be used for either remote preset control or a second serial port for the CoCo Controller panel. To enable GPI preset selection, ensure that the four jumpers PL3, PL4, PL5 and PL6 are all positioned *away* from the edge connector.

The following table shows the binary weighted code required to recall presets 1 to 16 according to the state of GPI 'e'. A '0' is an open GPI input and a '1' is a grounded GPI input.

Recall Preset	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
GPI 'a'	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
GPI 'b'	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
GPI 'c'	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
GPI 'd'	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

	OPEN (+5V)	GROUND
'a', 'b', 'c', 'd'	See table above	
'e'		RGB clip active
'f'		YUV clip active

GPI input assignment

GPI input connections have 10k Ω pull-up resistors to +5V. Closed-contact switches or +5V to +24V logic levels can be used

GPI output connections (when provided) have 270Ω series resistors fitted to drive LEDs and 6k8 Ω pull-up to +5V (to drive a remote input).

Note: Jumpers PL 3, 4, 5 and 6 should be left in the RIGHT hand GPI position to enable normal GPI operation and in the LEFT hand position to enable RS485 comms for a CoCo Controller.

GPI connections

4U frame GPI Connections

GPI lines 'a' to 'f' of each card connects to 1 of 8 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)
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)

Upper

Lower

Note: Remote 1, remote 3, remote 5 and remote 7 are 26-way high density D-Type female sockets and 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 and +5V @500mA is pin 15 in each case.

2U frame GPI Connections

GPI lines 'a' to 'f' of each card connects to 1 of 4 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 and 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 and +5V @500mA is pin 15 in each case.

1U frame GPI connections

GPI lines 'a' to 'f' of each card connects to 1 of 2 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 socket. Frame ground is pin 2 and +5V @500mA is pin 1.
Remote 2: 26-way high density D-Type plug. Frame ground is pin 6 and +5V @500mA is pin 15.

Indigo DT desk top box GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to the rear remote connector 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)

Note: Remote 1: 26-way high density D-Type socket. Frame ground is pin 2 and +5V @500mA is pin 1.
Remote 2: 26-way high density D-Type plug. Frame ground is pin 6 and +5V @500mA is pin 15.

The modules can be plugged in and removed while the frame is powered without damage.

Setting node addresses

In current 2U frames the node address is calculated in one of two ways:

- slot number minus 1 – giving a range of 0 - 11 in frame #1, ***OR***
- slot number plus fifteen – giving a range of 16 – 27 in frame #2

The two ranges are provided to allow one control panel to control two frames.

Set the front panel selector switch to lower for range 0-11 and upper for range 16-27

Note: The lower and upper node range equates to lower slots 1.01-1.12 and upper slots 2.01-2.12

3 Card edge operation

Card edge controls

CoCo HD board edge

Card edge buttons

The two tactile push button switches 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

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.

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
PSU	Green	Good power supply (PSU) rails	One or more of the monitor supplies is out of specification
nCal	Yellow	Gain, lift controls etc away from their default/calibrate position	Controls at default
HD	Yellow	Video input standard is HD (High Definition)	Input not present
SD	Yellow	Video input standard is SD (Standard Definition)	
GPO5	Yellow	GPO5 active / low	GPO5 inactive / high
GPO6	Yellow	GPO6 active / low	GPO6 inactive / high

Navigating card edge menus

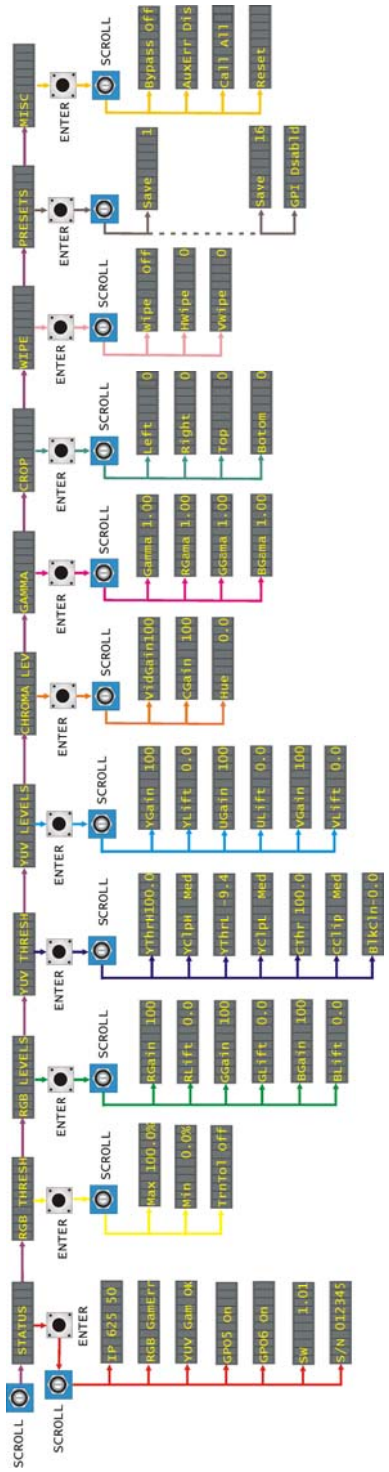
To access the card edge menu system proceed as follows:

- 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.

Card edge configuration

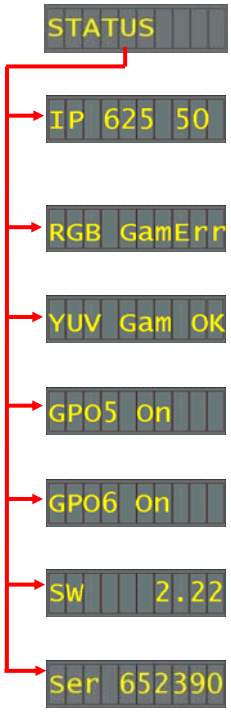
Menu tree



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.

Status menu

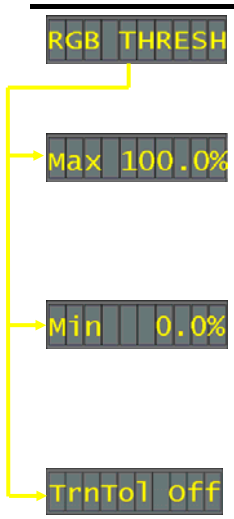
From the STATUS top menu press ENTER then SCROLL to access the status menu options.



Menu	Comment
Input line Standard	The Input video line standard is shown. IP 625i 50, IP 525i 59, IP 720p 50/59, IP 1080i50/59, No Input Not known.
RGB gamut error	RGB gamut error detector status. OK, Err.
YUV gamut error	YUV gamut error detector status. OK, Err.
GPO5 status	GPO5 status, Indicates the RGB gamut error detector status. GPO5 On, GPO5 Off.
GPO6 Status	GPO6 status, Indicates the YUV gamut error detector status. GPO6 On, GPO6 Off.
Software version fitted	The version number of the currently installed software.
PCB serial number	The electronically stored PCB serial number. This should correspond with the serial number label affixed to the PCB connector.

RGB Threshold menu

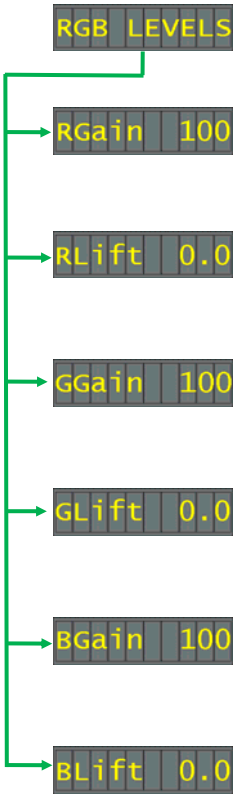
From the STATUS menu SCROLL to display the RGB threshold menu and press ENTER to access.



Menu	Comment
Max 100.0%	Rotate the Scroll/Adj. control to show RGB threshold max. Press ENTER and rotate Scroll/Adj. to make a new adjustment. Press ENTER to select. ***90-110%.***
Min 0.0%	Rotate the Scroll/Adj. control to show RGB threshold min. Press ENTER and rotate Scroll/Adj. to make a new adjustment. Press ENTER to select. ***0 ±10%.***
TrnTol Off	Rotate the Scroll/Adj. control to show the transient tolerance control. Press ENTER and rotate Scroll/Adj. to make a new selection. Press ENTER to select. ***Off, Mid, Max.***

RGB levels menu

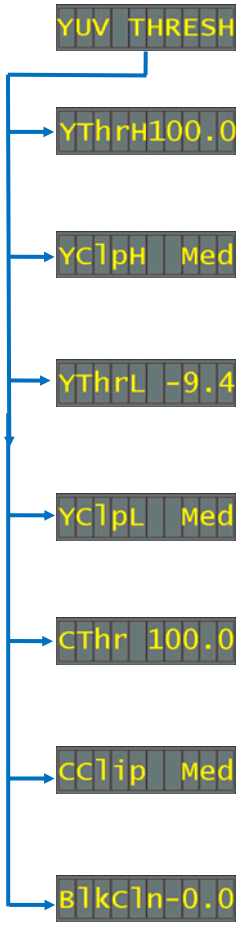
From the STATUS menu SCROLL to display the RGB levels menu and press ENTER to access.



Menu	Comment
Red component gain	Rotate the Scroll/Adj. control to show the R gain adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***90-110%***
Red component lift	Rotate the Scroll/Adj. control to show the R lift adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix. ***0 ±10%.***
Green component gain	Rotate the Scroll/Adj. control to show the G gain adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***90-110%.***
Green component lift	Rotate the Scroll/Adj. control to show the G lift adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix. ***0 ±10%.***
Blue component gain	Rotate the Scroll/Adj. control to show the B gain adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***90-110%.***
Blue component lift	Rotate the Scroll/Adj. control to show the B lift adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix. ***0 ±10%.***

YUV threshold menu

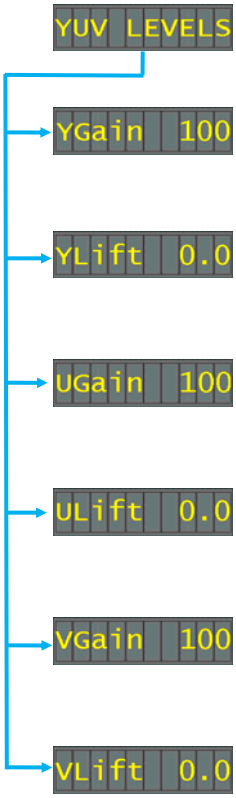
From the STATUS menu SCROLL to display the YUV threshold menu and press ENTER to access.



Menu	Comment
Y threshold Hi	Rotate the Scroll/Adj. control to show the Y Hi threshold. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***90-110%.***
Y clip Hi	Rotate the Scroll/Adj. control to show the Y Hi clip selection. Press ENTER and rotate Scroll/Adj. to select. Press ∧ to fix. ***Hard, Medium, soft.***
Y threshold Lo	Rotate the Scroll/Adj. control to show the Y Lo threshold. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix. ***0 ±10%.***
Y clip Lo	Rotate the Scroll/Adj. control to show the Y Lo clip selection. Press ENTER and rotate Scroll/Adj. to select. Press ∧ to fix. ***Hard, Medium, soft.***
C threshold	Rotate the Scroll/Adj. control to show the C threshold. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***90-110%.***
C clip	Rotate the Scroll/Adj. control to show the C clip selection. Press ENTER and rotate Scroll/Adj. to select. Press ∧ to fix. ***Hard, Medium, soft.***
Black cleanup	Rotate the Scroll/Adj. control to show the Black cleanup adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix. ***0 ±10%.***

YUV levels menu

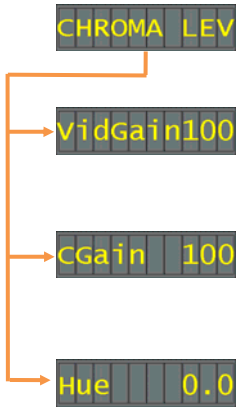
From the STATUS menu SCROLL to display the YUV levels menu and press ENTER to access.



Menu	Comment
Y component gain	Rotate the Scroll/Adj. control to show the Y gain adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-200%.***
Y component lift	Rotate the Scroll/Adj. control to show the Y lift adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix. ***0 ±10%.***
U component gain	Rotate the Scroll/Adj. control to show the U gain adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-200%.***
U component lift	Rotate the Scroll/Adj. control to show the U lift adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix. ***0 ±10%.***
V component gain	Rotate the Scroll/Adj. control to show the V gain adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-200%.***
V component lift	Rotate the Scroll/Adj. control to show the V lift adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix. ***0 ±10%.***

Chroma levels menu

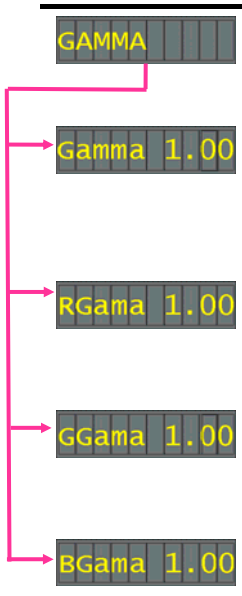
From the STATUS menu SCROLL to display the Chroma levels menu and press ENTER to access.



Menu	Comment
Video gain	Rotate the Scroll/Adj. control to show the video gain adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-200%.***
Chroma gain	Rotate the Scroll/Adj. control to show the Chroma gain adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-200%.***
U component gain	Rotate the Scroll/Adj. control to show the Hue adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0 ±30deg.***

Gamma controls menu

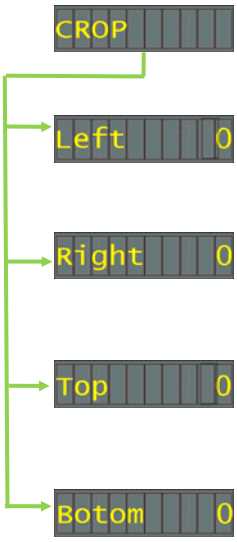
From the STATUS menu SCROLL to display the gamma controls menu and press ENTER to access.



Menu	Comment
Overall gamma control	Rotate the Scroll/Adj. control to show the Overall gamma adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0.50-2.00%.***
Red gamma control	Rotate the Scroll/Adj. control to show the R gamma adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0.50-2.00%.***
Green gamma control	Rotate the Scroll/Adj. control to show the G gamma adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0.50-2.00%.***
Blue gamma control	Rotate the Scroll/Adj. control to show the B gamma adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0.50-2.00%.***

Crop controls menu

From the STATUS menu SCROLL to display the crop controls menu and press ENTER to access.

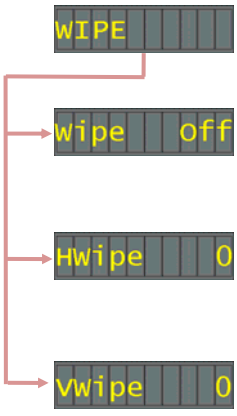


Menu	Comment
Left crop	Rotate the Scroll/Adj. control to show the left crop adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-1920 pixels.***
Right crop	Rotate the Scroll/Adj. control to show the right crop adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-1920 pixels.***
Top crop	Rotate the Scroll/Adj. control to show the top crop adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-1080 lines.***
Bottom crop	Rotate the Scroll/Adj. control to show the bottom adjustment. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-1080 lines.***

Note: The crop controls are a global control which will allow them to be set beyond the maximum number of lines or pixels for any given input format. This can result in a severely cropped or black screen when the input format is changed.

Wipe control menu

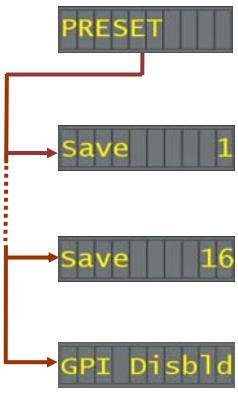
From the STATUS menu SCROLL to display the wipe control menu and press ENTER to access.



Menu	Comment
Wipe enable	Rotate the Scroll/Adj. control to show the wipe enable control. Press ENTER and rotate Scroll/Adj. to select. Press ∧ to fix change. ***On, Off.***
Horizontal wipe	Rotate the Scroll/Adj. control to show the horizontal wipe control. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-1920 pixels.***
Vertical wipe	Rotate the Scroll/Adj. control to show the vertical wipe control. Press ENTER and rotate Scroll/Adj. to vary. Press ∧ to fix change. ***0-1080 lines.***

Presets menu

Up to 16 user-defined configurations may be stored 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 1-16.



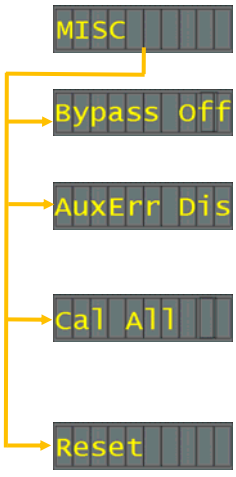
Menu	Comment
Save and recall Presets 1-16	Rotate the Scroll/Adj. control to show Preset Menu selected. Press ENTER and rotate Scroll/Adj. to select preset location. Press ENTER to select and rotate Scroll/Adj. to select Save or Recall. Press ENTER to action.
Enable GPI control of presets	Selecting ENABLE allows the recall of previously saved user configurations via GPI inputs 0-3.

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

Note: GPI control of presets is not available when a CoCo controller is connected to the GPI inputs.

Misc levels menu

From the STATUS menu SCROLL to display the misc menu and press ENTER to access.



Menu	Comment
Bypass control	Rotate the Scroll/Adj. control to show the Bypass control. Press ENTER and rotate Scroll/Adj. to select. Press ∧ to fix change. ***On, Off.***
Display errors on aux output	Rotate the Scroll/Adj. control to show the Aux error control. Press ENTER and rotate Scroll/Adj. to select. Press ∧ to fix. ***Enable, Disable.***
Calibrate all	Rotate the Scroll/Adj. control to show the cal all selection. Press ENTER to arm. Press ENTER to action. All gains, levels etc will be set to their factory default with stored presets retained.
Factory Reset	Rotate the Scroll/Adj. control to show the reset selection. Press ENTER to arm. Press ENTER to action. All gains, levels etc will be set to their factory default with stored presets erased.

Note: Factory reset will erase all user stored presets.

Factory reset default settings

Parameter	Default value
Board Bypass	Unchecked
Display Gamut Errors	Unchecked
Cal All	All controls to cal
RGB clips lifts and gains	0 and 100 as appropriate
Transient Tolerance	Off
Y Hi threshold	104.9
Y Lo threshold	-10
C threshold	108.3
Black cleanup	0
YUV lifts and gains	0 and 100 as appropriate
Video and Chroma levels	0 and 100 as appropriate
Gamma controls	1.0
Crop and wipe	0 and Off
Presets	Set to Preset 1 and all contents erased
Enable GPI Preset Recall	Not enabled

4 Using the active front panel

This operational guide assumes that the panel has been setup according to the Panel setup procedure described in the Crystal Vision control panels 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 set up 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 CoCo HD

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 a CoCo HD has been selected.

CoCo HD 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.

The CoCo HD 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.

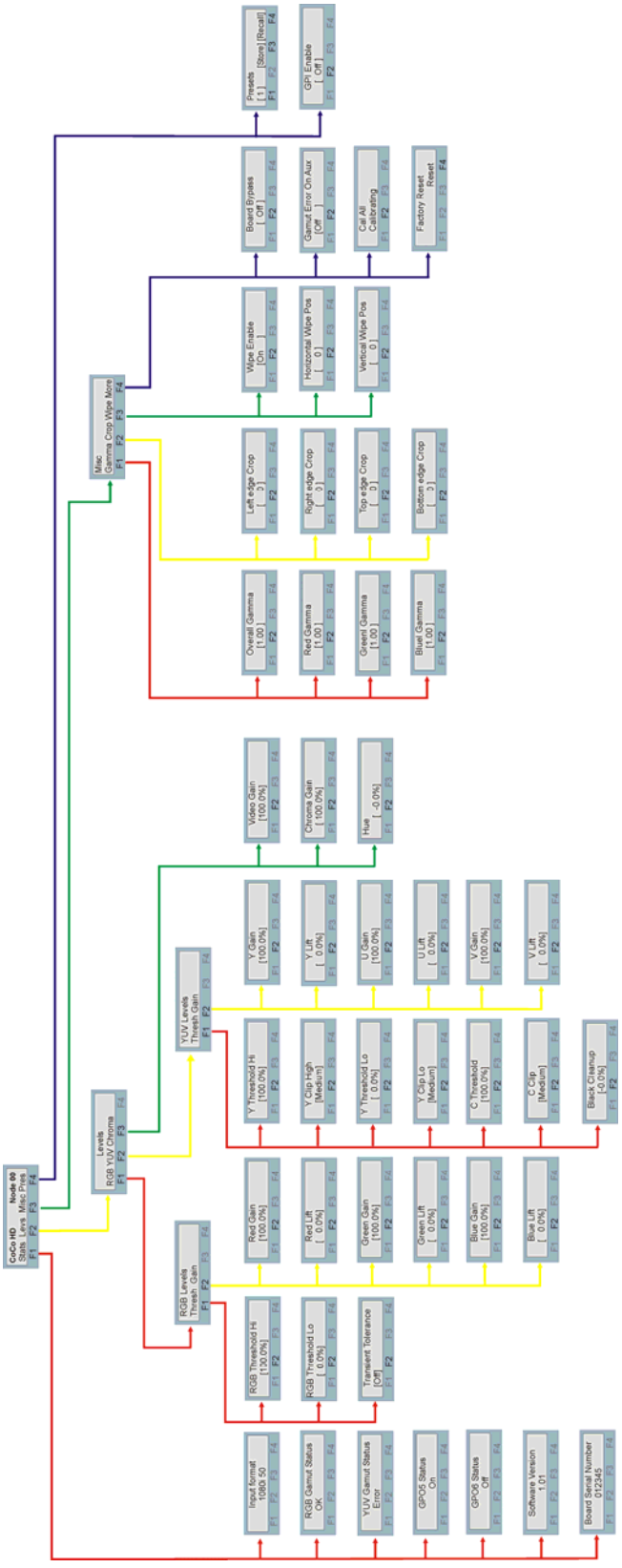
The main top-level menus for the CoCo HD are obtained by pressing the F1-F4 keys from the HOME menu. Menu keys are illuminated when active and when further menus are available.

The top-level menus are:

- Status – Press F1
- Vid (filter and output selection, aspect ratio control and video delay) – Press F2
- Alarm (frozen, black and silence controls, delay timer) – Press F3
- Presets (User presets 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. If the variable updates in real time it will be contained within square brackets [Medium] or if the change requires to be accepted angular brackets will be used < >. Pressing Enter will fix the new value.

The following chart shows the available CoCo HD menus. The actual menus available may vary slightly as software is updated.

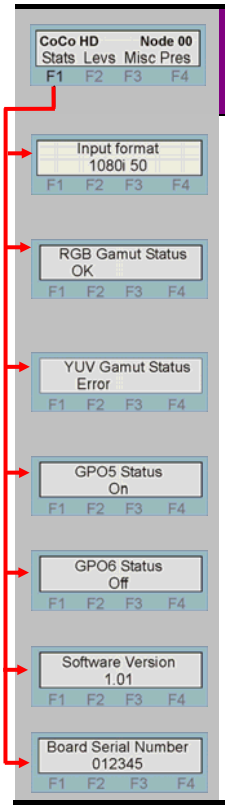


The CoCo HD menu tree

The Status menu

Pressing button F1 from the home menu will enter the status menu. This menu is traversed by rotating the shaft control. No changes can be made from this menu as it is read only.

Note: Not all status information will be updated in real time. If necessary press the * button to cause the display to update.



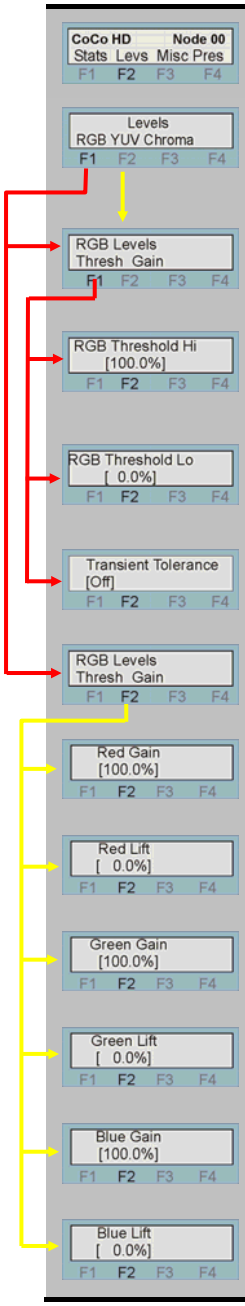
Menu	Description
Input present and format	Press F1 from the home menu and rotate the shaft control to view the input status. ***NTSC, PAL, 720p 50, 720p 59.94, 1080i 50, 1080i 59.94. Not Supported, Missing.***
RGB gamut status	Rotate the shaft control to view the RGB Gamut status. ***OK, Error.***
YUV gamut status	Rotate the shaft control to view the YUV Gamut status. ***OK, Error.***
GPI5 output status	Rotate the shaft control to view GPO5 alarm status. ***On, Off.***
GPI6 output status	Rotate the shaft control to view GPO6 alarm status. ***On, Off.***
Software version	Fitted software level.
PCB serial number	Electronically stored board serial number.

Levels menu (YUV/RGB processing)

Legalising works in the RGB domain to correct YUV values, which could be illegal in RGB colour space. RGB processing is automatically bypassed in areas of the picture where RGB legalising and/or colour correction is not required. RGB processing can also be disabled if not required.

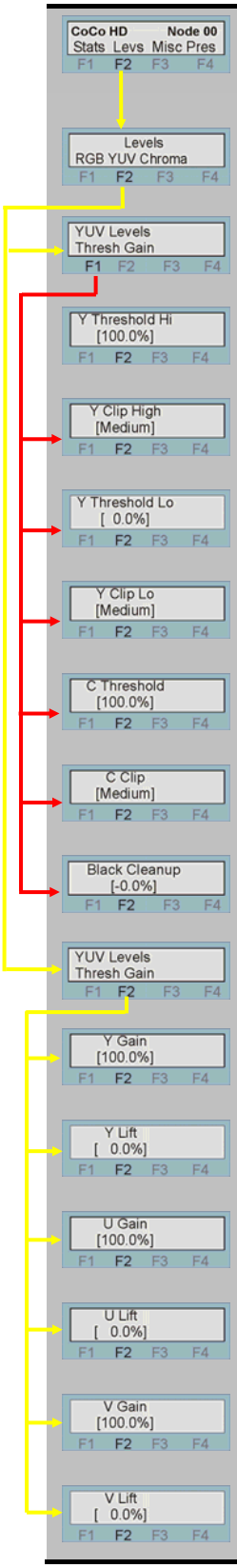
Pressing F2 from the home menu will bring up the top levels menu. The RGB menu provides access to RGB gains, lifts and threshold levels. The YUV menu provides access to gain, lift, threshold and slope parameters for Luminance (Y), and the Pb (U) and Pr (V) colour difference components of the incoming SDI signal. The Chroma menu provides access to the video, chrominance and hue adjustment controls.

RGB threshold and level controls



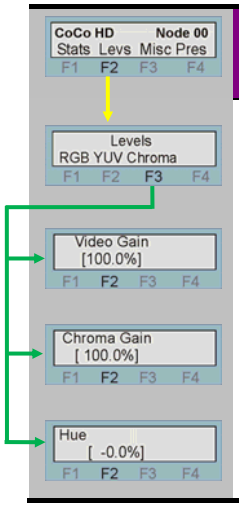
Menu	Description
Levels menu	Press F2 from the home menu to view the levels menus. Press F1 from the levels menu to view the RGB controls.
RGB levels	Press F1 from the RGB levels menu to view the RGB threshold controls.
RGB threshold (High)	Rotate the shaft control to view the RGB threshold (max clip). Press F2 to select and rotate the shaft control to set the level. ***90-110%.***
RGB threshold (Low)	Rotate the shaft control to view the RGB threshold (min clip). Press F2 to select and rotate the shaft control to set the level. ***0 ±10%.***
Transient Tolerance	Rotate the shaft control to view the Transient Tolerance control. Press F2 to select and rotate the shaft control to set the level. ***Off, Mid, Max.***
RGB gains	Press F2 from the RGB levels menu to view the RGB gain controls.
Red component gain	Rotate the shaft control to view the RGB red gain. Press F2 to select and rotate the shaft control to set the level. ***0-200%.***
Red component lift	Rotate the shaft control to view the RGB red lift. Press F2 to select and rotate the shaft control to set the level. ***0 ±10%.***
Green component gain	Rotate the shaft control to view the RGB green gain. Press F2 to select and rotate the shaft control to set the level. ***0-200%.***
Green component lift	Rotate the shaft control to view the RGB green lift. Press F2 to select and rotate the shaft control to set the level. ***0 ±10%.***
Blue component gain	Rotate the shaft control to view the RGB blue gain. Press F2 to select and rotate the shaft control to set the level. ***0-200%.***
Blue component lift	Rotate the shaft control to view the RGB blue lift. Press F2 to select and rotate the shaft control to set the level. ***0 ±10%.***

YUV threshold and level controls



Menu	Description
Levels menu	Press F2 from the home menu to view the levels menus. Press F2 from the levels menu to view the YUV controls.
YUV levels	Press F1 from the YUV levels menu to view the YUV threshold controls.
YUV threshold (High)	Rotate the shaft control to view the YUV threshold (max clip). Press F2 to select and rotate the shaft control to set the level. ***90-110%.***
YUV Clip (High)	Rotate the shaft control to view the YUV clip (max clip). Press F2 to select and rotate the shaft control to set the level. ***Hard, Medium, Soft.***
YUV threshold (Low)	Rotate the shaft control to view the YUV threshold (min clip). Press F2 to select and rotate the shaft control to set the level. ***0 ±10%.***
YUV Clip (Low)	Rotate the shaft control to view the YUV clip (min clip). Press F2 to select and rotate the shaft control to set the level. ***Hard, Medium, Soft.***
C Threshold	Rotate the shaft control to view the C threshold. Press F2 to select and rotate the shaft control to set the level. ***90-100%.***
C Clip	Rotate the shaft control to view the C clip. Press F2 to select and rotate the shaft control to set the level. ***Hard, Medium, Soft.***
Black cleanup	Rotate the shaft control to view the Black Cleanup. Press F2 to select and rotate the shaft control to set the level. ***0-10%.***
YUV gains	Press F2 from the YUV levels menu to view the YUV gain controls.
Y component gain	Rotate the shaft control to view the Y gain. Press F2 to select and rotate the shaft control to set the level. ***0-200%.***
Y component lift	Rotate the shaft control to view the Y lift. Press F2 to select and rotate the shaft control to set the level. ***0 ±10%.***
U component gain	Rotate the shaft control to view the U gain. Press F2 to select and rotate the shaft control to set the level. ***0-200%.***
U component lift	Rotate the shaft control to view the U lift. Press F2 to select and rotate the shaft control to set the level. ***0 ±10%.***
V component gain	Rotate the shaft control to view the V gain. Press F2 to select and rotate the shaft control to set the level. ***0-200%.***
V component lift	Rotate the shaft control to view the V lift. Press F2 to select and rotate the shaft control to set the level. ***0 ±10%.***

Chroma controls



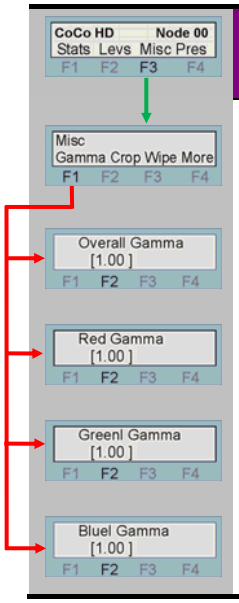
Menu	Description
Levels menu	Press F2 from the home menu to view the levels menus. Press F3 from the levels menu to view the Chroma controls.
Video gain	Rotate the shaft control to view the video gain. Press F2 to select and rotate the shaft control to set the level. ***0-200%.***
Chroma gain	Rotate the shaft control to view the Chroma gain. Press F2 to select and rotate the shaft control to set the level. ***0-200%.***
Hue	Rotate the shaft control to view the hue control. Press F2 to select and rotate the shaft control to set the level. ***0 ±30deg.***

Miscellaneous Controls menu

Pressing F3 from the home menu will bring up the miscellaneous menu. The Miscellaneous menu provides access to gamma, crop, wipe, bypass, setup and Factory Reset controls.

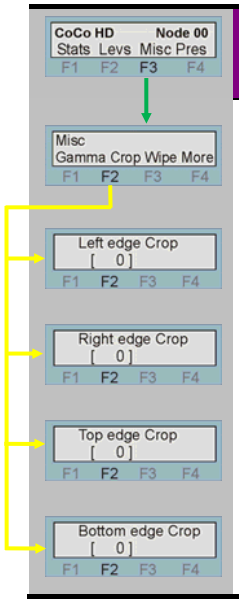
Press the function key F1-4 to enter the selected menu and rotate the shaft control to display the chosen menu.

Gamma controls



Menu	Description
Miscellaneous menu	Press F3 from the home menu to view the levels menus. Press F1 from the misc menu to view the gamma controls.
Overall gamma	Rotate the shaft control to view the overall gamma correction. Press F2 to select and rotate the shaft control to set the level. ***0.5-2.0.***
Red gamma	Rotate the shaft control to view the red gamma correction. Press F2 to select and rotate the shaft control to set the level. ***0.5-2.0.***
Green gamma	Rotate the shaft control to view the green gamma correction. Press F2 to select and rotate the shaft control to set the level. ***0.5-2.0.***
Blue gamma	Rotate the shaft control to view the blue gamma correction. Press F2 to select and rotate the shaft control to set the level. ***0.5-2.0.***

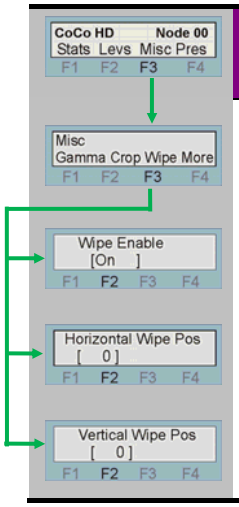
Crop controls



Menu	Description
Miscellaneous menu	Press F3 from the home menu to view the levels menus. Press F2 from the misc menu to view the crop controls.
Left edge crop	Rotate the shaft control to view the left edge crop control. Press F2 to select and rotate the shaft control to set the level. ***0-1920 pixels.***
Right edge crop	Rotate the shaft control to view the right edge crop control. Press F2 to select and rotate the shaft control to set the level. ***0-1920 pixels.***
Top edge crop	Rotate the shaft control to view the top edge crop control. Press F2 to select and rotate the shaft control to set the level. ***0-1080 lines.***
Bottom edge crop	Rotate the shaft control to view the bottom edge crop control. Press F2 to select and rotate the shaft control to set the level. ***0-1080 lines.***

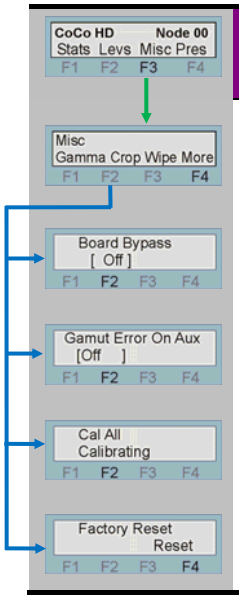
Note: The crop controls are a global control which will allow them to be set beyond the maximum number of lines or pixels for any given input format. This can result in a severely cropped or black screen when the input format is changed.

Wipe controls



Menu	Description
Miscellaneous menu	Press F3 from the home menu to view the levels menus. Press F3 from the misc menu to view the wipe controls.
Wipe enable	Rotate the shaft control to view the wipe enable control. Press F2 to select and rotate the shaft control to set the level. Press ENTER to select***. Off, Hor, Ver.***
Horizontal wipe position	Rotate the shaft control to view the horizontal wipe control. Press F2 to select and rotate the shaft control to set the position. ***0-1920 samples.***
Vertical wipe position	Rotate the shaft control to view the vertical wipe control. Press F2 to select and rotate the shaft control to set the level. ***0-1080 lines.***

More controls



Menu	Description
Miscellaneous menu	Press F3 from the home menu to view the levels menus. Press F4 from the misc menu to view further controls.
Board bypass	Rotate the shaft control to view the board bypass control. Press F2 to select and rotate the shaft control to toggle. ***On, Off.***
Gamut error indication on aux output	Rotate the shaft control to view the gamut error on aux control. Press F2 to select and rotate the shaft control to toggle. ***On, Off.***
Cal All	Rotate the shaft control to view the Cal All control. Press F2 to select and press F4 to action**.**
Factory reset	Rotate the shaft control to view the Factory Reset control. Press F2 to select and press F4 to action**.**

Note: Cal All will return all values to their factory default values but leave stored presets unaffected. Factory reset will erase all user stored presets.

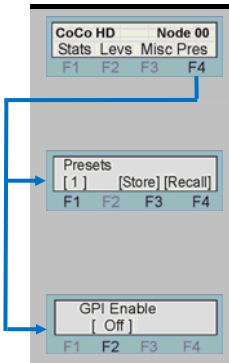
Factory reset default settings

Parameter	Default value
Board Bypass	Unchecked
Display Gamut Errors	Unchecked
Quick setup	All controls to cal
RGB clips lifts and gains	0 and 100 as appropriate
Y Hi threshold	104.9
Y Lo threshold	-10
C threshold	108.3
Black cleanup	0
YUV lifts and gains	0 and 100 as appropriate
Video and Chroma levels	0 and 100 as appropriate
Gamma controls	1.0
Crop and wipe	0 and Off
Presets	Set to Preset 1 and all contents erased
Enable GPI Preset Recall	Not enabled

Preset menu

Up to sixteen setups 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 option card status. The presets are numbered 1-16.

See chapter 2.3 Installation general purpose interface for the GPI connection information.



Menu	Description
Save and recall Presets 1-16	Press F4 from the home menu to view the presets menu. Press F1 and rotate the shaft control to find the required preset location. Press F3 the save the current board set up. Press F4 to recall a previously save board set up.
Enable GPI control of presets	Selecting Enable allows the recall of previously saved user configurations via GPI inputs 0-3. To enable GPI control press F2 rotate the shaft control to toggle between On and Off. Press ENTER to select.

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 Statesman control.

Statesman operation

Once Statesman is configured it should automatically detect any Statesman compatible modules in the connected frame or frames and display them in the main application left hand Explorer-style window.

Open any frame by clicking on the '+' sign or by double clicking on a frame. Installed modules should be shown with module icons. Frame and module icons can be named as desired by right-clicking or using the edit menu and choosing rename.

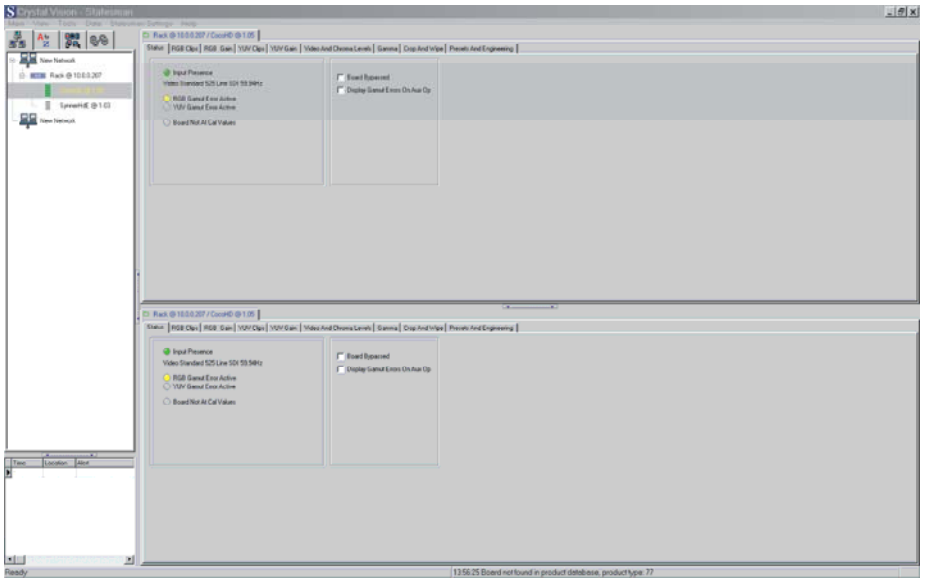
To aid user recognition of module and frame status quickly, the following colour and size coding is used:

A module is shown present by full colour and absent by greyed colour

A module is shown open by large icon size and closed by small icon

A module is the source of an active alarm if red and not alarmed if green

Double-clicking on a module will enable the display of the main application menus.



Statesman main application window

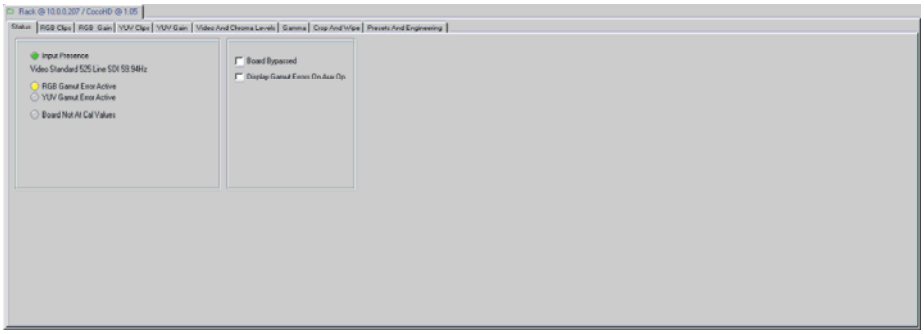
The two large control panes shown in the upper and lower halves of the window may display different menus for the same card, or controls for different cards. Click on the

horizontal button-bar between the two panes to close the lower plane or drag the button to vary the size of the panes.

Associated controls such as U and V may be ganged together by clicking on them with the SHIFT key held down to associate them. Moving the first selected control should then move all associated controls. Ganged controls may be cleared by selecting 'Clear Ganged Controls' from the Tools menu.

Note: For further details of Statesman configuration and operation please refer to the Statesman manual.

Status



Statesman status window

Board status, quick setup, board bypass and gamut error display enable are all found in the status tab.

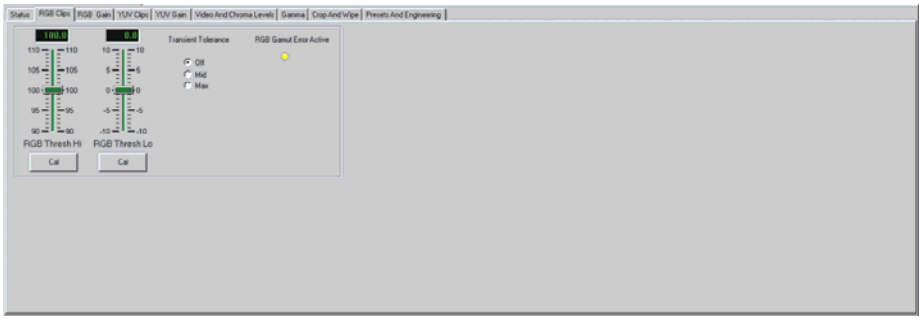
Status

Input present is indicated along with its video standard. The supported standards are 525 line 59.94Hz, 625 line 50Hz, 720p 50, 720p 59.94, 1080i 50, 1080i 59.94. Gamut error detection is given for both RGB and YUV, these error signals are also mirrored by GPI outputs 5 and 6. See chapter 2.3 for further information regarding GPIs. Finally an indication is given to show if any of the settings controls are not at their default setting.

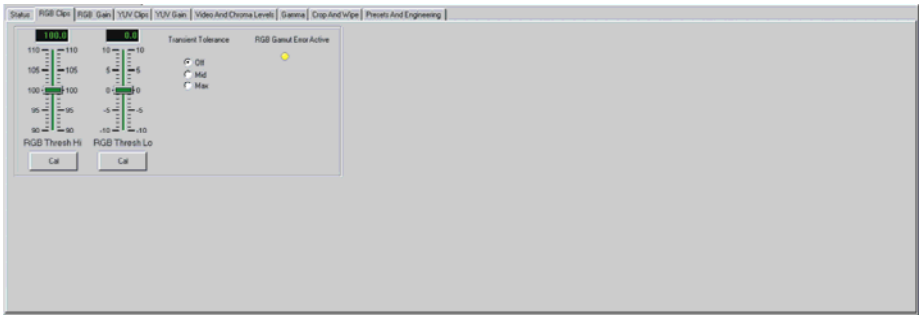
Note: All inactive controls will appear grayed out.

Controlling RGB clips and gain

The RGB clips and gain menu provides access to RGB threshold Hi and Lo controls along with the RGB lift and gain controls. The controls can be moved by both clicking and dragging the slider bars or by over typing the numerical values.



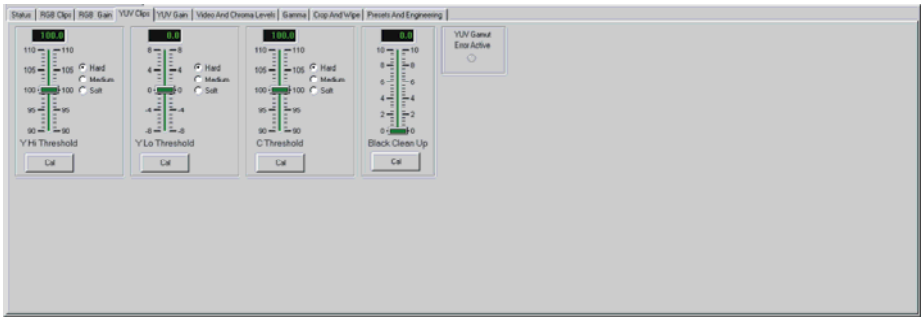
RGB clips window



RGB gain window

YUV clip controls

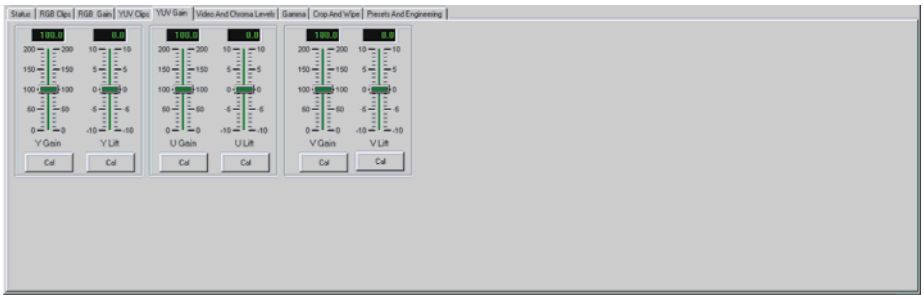
The YUV clips and gain menu provides access to YUV threshold Hi and Lo controls along with UV (C) threshold and black cleanup. The controls can be moved by both clicking and dragging the slider bars or by over typing the numerical values.



YUV clips and threshold window

YUV lift and gain

The YUV lift and gain menu provides access to the YUV lift and gain controls. The controls can be moved by both clicking and dragging the slider bars or by over typing the numerical values.



YUV lift and gain window

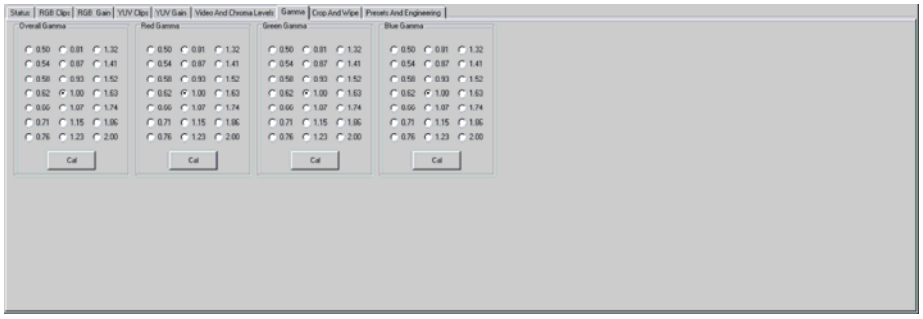
Video and Chroma levels

The video and Chroma levels menu provides access to the video and Chroma gain, brightness and hue controls. The controls can be moved by both clicking and dragging the slider bars/rotary control or by over typing the numerical values.

Video and Chroma levels window

Gamma correction

The overall gamma of the video path can be selected from 0.5 to 2.0 by clicking in the appropriate Overall Gamma radio button.

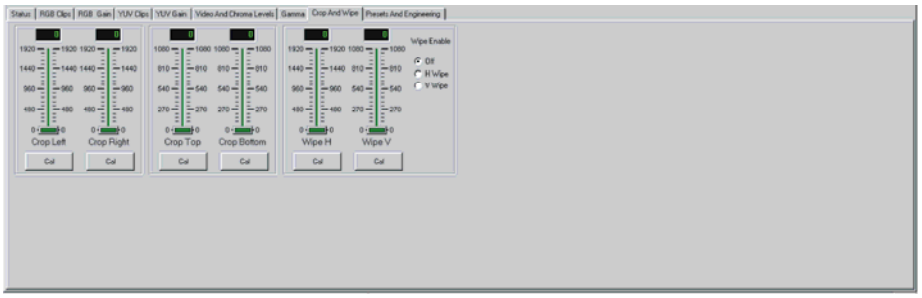


Gamma correction window

The individual gamma applied to each of the RGB channels can be adjusted in the same way by clicking in the Red, Green or Blue Gamma radio buttons. Adjusting overall gamma overrides individual settings.

Crop and wipe

The crop and wipe menu provides access to the four axis crop controls and the horizontal/vertical wipe controls. The controls can be moved by both clicking and dragging the slider bars or by over typing the numerical values. Wipe enable can also be selected.



Crop and wipe window

Using preview (wipe) mode

The preview mode allows the input and output to be seen side by side to facilitate adjustments using either a vertical or horizontal wipe. The split-screen preview is only available via the two AUX outputs. The MAIN output is not affected.

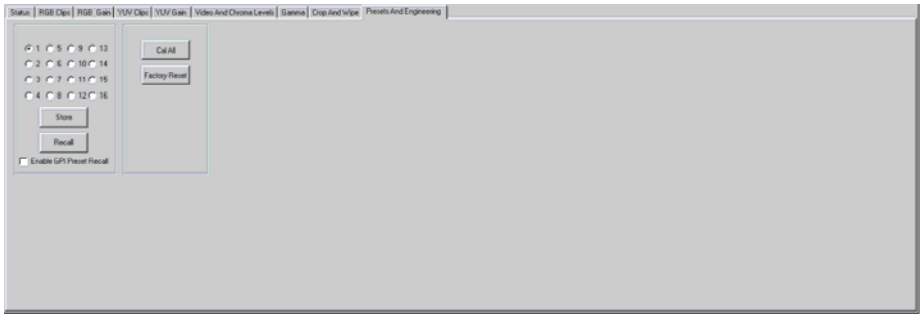
Enable the preview mode by checking either the H Wipe or V Wipe radio buttons. To return the AUX output to normal, check the Off button (Wipe Disabled).

The input/output preview may be adjusted by using the H Wipe or V Wipe slider.

Note: The crop controls are a global control which will allow them to be set beyond the maximum number of lines or pixels for any given input format. This can result in a severely cropped or black screen when the input format is changed.

Presets and Engineering

The Presets menu allows up to 16 preset memories of the control state of the entire CoCo HD module to be saved and recalled.



Presets and engineering controls

To store a preset:

Ensure ‘Enable GPI Preset Recall’ is unchecked

Select an appropriate preset by checking a radio button

Click on ‘Store’ to save the preset

To recall a preset:

Ensure ‘Enable GPI Preset Recall is unchecked

Select an appropriate preset by checking a radio button

Click on ‘Recall’ to recall setup data from the selected preset

‘Enable GPI Preset Recall’ should not be checked whilst presets are being created or recalled by this menu to prevent inadvertent GPI operation. Check ‘Enable GPI Preset Recall’ when finished if required.

Note: Other interfaces such as the CoCo Controller or an active control panel may also interfere with saving or recalling presets.

Recalling factory default values

The reset button may be used to recall default values for all setup controls. This is a convenient way to re-initialise the board in the unlikely event of any suspected malfunction.

Factory reset default settings

Parameter	Default value
Board Bypass	Unchecked
Display Gamut Errors	Unchecked
Quick setup	All controls to cal
RGB clips lifts and gains	0 and 100 as appropriate
Transient Tolerance	Off
Y Hi threshold	104.9
Y Lo threshold	-10
C threshold	108.3
Black cleanup	0
YUV lifts and gains	0 and 100 as appropriate
Video and Chroma levels	0 and 100 as appropriate
Gamma controls	1.0
Crop and wipe	0 and Off
Presets	Set to Preset 1 and all contents erased
Enable GPI Preset Recall	Not enabled

Note: Factory reset will erase all user stored presets.

6 The CoCo HD Controller panel

The CoCo Controller panel is designed to control the CoCo HD 10 bit digital colour corrector using a RS422 serial link. The controller can handle up to 12 CoCo HDs and has dedicated shaft encoders for main adjustments such as video gain, Chroma gain, black level, RGB gain and gamma. There are also dedicated buttons for common menus and a built-in display.

The CoCo Controller panel

Installing the Controller

The CoCo HD has a number of external control lines that can be configured for GPI or RS485 control. These control lines MUST be configured for RS485 to enable Controller communication as explained in Chapter 2. It is NOT possible to retain GPI preset control when the controller panel is enabled.

The panel communicates with Crystal Vision frames via a serial communication link using the 422 Bus port at the rear of the panel. Standard UTP patch cables may be used with an appropriate adapter for the Crystal Vision frame remote connector.

Controller panel – rear view

The RJ45 422 BUS port is next to the GPI I/O connector. Other RJ45 connectors and the four-way DIP switch are NOT used.

Each card slot in a frame has its control lines brought out to different 26-way D-Type frame remote connectors on the rear of the frame. The following tables show which remote connectors to use for different frames and frame slots:

CoCoHD card slots and frame remote connectors

Slot No.:-	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
Indigo 4U frame	R1	R1	R3	R3	R1	R1	R3	R3	R1	R1	R3	R3
Indigo 2U frame	R1	R1	R3	R3	R1	R1	R3	R3	R1	R1	R3	R3
Indigo 1U frame	R1	R1	R1	R1	R1	R1	-	-	-	-	-	-
Indigo DT desk top box	R1	R1	-	-	-	-	-	-	-	-	-	-
Slot No.:-	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**	**S21**	**S22**	**S23**	**S24**
Indigo 4U frame	R5	R5	R7	R7	R5	R5	R7	R7	R5	R5	R7	R7
Indigo 2U frame	-	-	-	-	-	-	-	-	-	-	-	-
Indigo 1U frame	-	-	-	-	-	-	-	-	-	-	-	-
Indigo DT desk top box	-	-	-	-	-	-	-	-	-	-	-	-

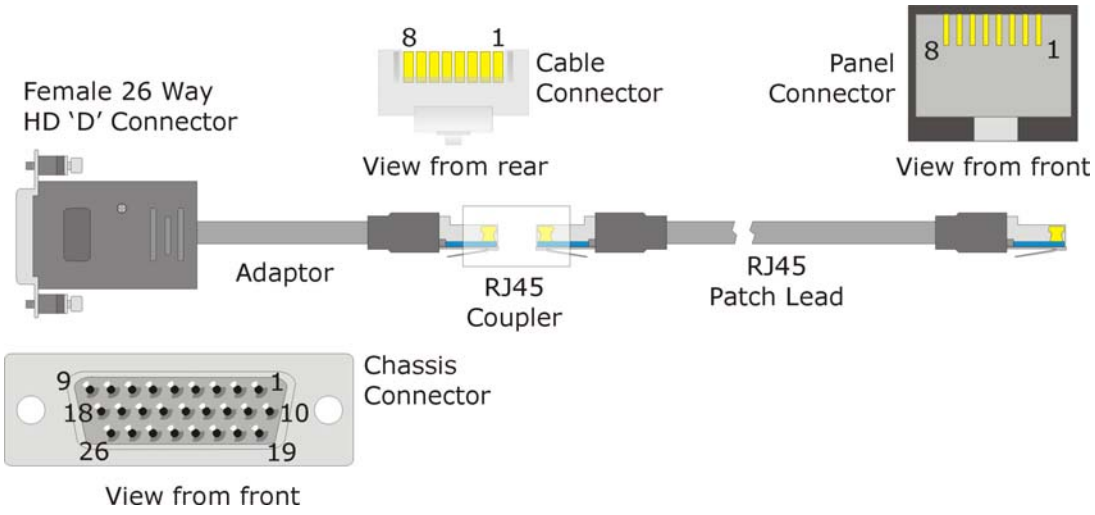
The appropriate remote connector(s) should be connected to the 422 Bus connector at the rear of the panel using an adapter as explained in the next section.

Note: The second serial port on CoCo HD is used for Controller communications allowing front panel and Statesman control at the same time as Controller access.
Panel GPI I/O is not yet assigned.

Controller to frame remote wiring

The connection from the control panel to the appropriate frame remote connector has a cable with a D-Type plug at one end and an RJ45 connector at the other.

It is suggested that a short adaptor cable be made with a standard RJ45 patch lead and an in-line coupler used to make the required overall cable length.



Controller panel to frame adaptor and CAT5 patch lead

CAT5 Colour	RJ45 plug		S1/R1 S3/R3	S2/R1 S4/R3	S5/R1 S7/R3	S6/R1 S8/R3	S9/R1 S11/R3	S10/R1 S12/R3
	Shell (GND)		**6/Shell**	**6/Shell**	**6/Shell**	**6/Shell**	**6/Shell**	**6/Shell**
Brown	**8**	Twisted Pair	**8**	**7**	**5**	**4**	**3**	**10**
W/Brown	**7**		**9**	**16**	**6**	**14**	**12**	**11**
Blue	**4**	Twisted Pair	**18**	**17**	**15**	**13**	**22**	**19**
W/Blue	**5**		**26**	**25**	**24**	**23**	**21**	**20**

The following tables show how the required panel to frame adapters should be wired.

Indigo 4U frame Remote 1

RJ45	Slot 1	Slot 2	Slot 5	Slot 6	Slot 9	Slot 10
Pin 8	Pin 8	Pin 7	Pin 5	Pin 4	Pin 3	Pin 10
Pin 7	Pin 9	Pin 16	Pin 6	Pin 14	Pin 12	Pin 11
Pin 4	Pin 18	Pin 17	Pin 15	Pin 13	Pin 22	Pin 19
Pin 5	Pin 26	Pin 25	Pin 24	Pin 23	Pin 21	Pin 20

Indigo 4U frame Remote 3

RJ45	Slot 3	Slot 4	Slot 7	Slot 8	Slot 11	Slot 12
Pin 8	Pin 8	Pin 7	Pin 5	Pin 4	Pin 3	Pin 10
Pin 7	Pin 9	Pin 16	Pin 6	Pin 14	Pin 12	Pin 11
Pin 4	Pin 18	Pin 17	Pin 15	Pin 13	Pin 22	Pin 19
Pin 5	Pin 26	Pin 25	Pin 24	Pin 23	Pin 21	Pin 20

Indigo 4U frame Remote 5

RJ45	Slot 13	Slot 14	Slot 17	Slot 18	Slot 21	Slot 22
Pin 8	Pin 8	Pin 7	Pin 5	Pin 4	Pin 3	Pin 10
Pin 7	Pin 9	Pin 16	Pin 6	Pin 14	Pin 12	Pin 11
Pin 4	Pin 18	Pin 17	Pin 15	Pin 13	Pin 22	Pin 19
Pin 5	Pin 26	Pin 25	Pin 24	Pin 23	Pin 21	Pin 20

Indigo 4U frame Remote 7

RJ45	Slot 15	Slot 16	Slot 19	Slot 20	Slot 23	Slot 24
Pin 8	Pin 8	Pin 7	Pin 5	Pin 4	Pin 3	Pin 10
Pin 7	Pin 9	Pin 16	Pin 6	Pin 14	Pin 12	Pin 11
Pin 4	Pin 18	Pin 17	Pin 15	Pin 13	Pin 22	Pin 19
Pin 5	Pin 26	Pin 25	Pin 24	Pin 23	Pin 21	Pin 20

Indigo 2U frame Remote 1

RJ45	Slot 1	Slot 2	Slot 5	Slot 6	Slot 9	Slot 10
Pin 8	Pin 8	Pin 7	Pin 5	Pin 4	Pin 3	Pin 10
Pin 7	Pin 9	Pin 16	Pin 6	Pin 14	Pin 12	Pin 11
Pin 4	Pin 18	Pin 17	Pin 15	Pin 13	Pin 22	Pin 19
Pin 5	Pin 26	Pin 25	Pin 24	Pin 23	Pin 21	Pin 20

Indigo 2U frame Remote 3

RJ45	Slot 3	Slot 4	Slot 7	Slot 8	Slot 11	Slot 12
Pin 8	Pin 8	Pin 7	Pin 5	Pin 4	Pin 3	Pin 10
Pin 7	Pin 9	Pin 16	Pin 6	Pin 14	Pin 12	Pin 11
Pin 4	Pin 18	Pin 17	Pin 15	Pin 13	Pin 22	Pin 19
Pin 5	Pin 26	Pin 25	Pin 24	Pin 23	Pin 21	Pin 20

Indigo 1U frame Remote 1

RJ45	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
Pin 8	Pin 8	Pin 7	Pin 5	Pin 4	Pin 3	Pin 10
Pin 7	Pin 9	Pin 16	Pin 6	Pin 14	Pin 12	Pin 11
Pin 4	Pin 18	Pin 17	Pin 15	Pin 13	Pin 22	Pin 19
Pin 5	Pin 26	Pin 25	Pin 24	Pin 23	Pin 21	Pin 20

Indigo DT desk top box Remote 1

RJ45	Slot 1	Slot 2
Pin 8	Pin 8	Pin 7
Pin 7	Pin 9	Pin 16
Pin 4	Pin 18	Pin 17
Pin 5	Pin 26	Pin 25

Note: The RJ45 connector at the rear of Indigo frames should not be used to connect controller panels.

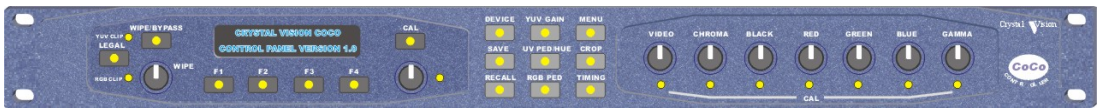
To ensure continued EMC compliance it is recommended to use high quality shielded twin pair cable for RS422 cabling.

For the panel to work jumper links PL3-PL6 need to be fitted towards the rear of the CoCo HD board as explained in section 6.5 This will disable GPI preset control for the CoCo HD module.

Using the CoCo HD Controller for the first time

To use the CoCo Controller proceed as follows:

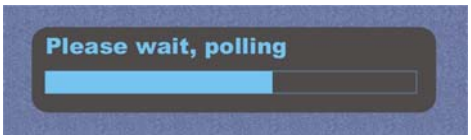
- Connect the CoCo Controller panel to a Crystal Vision frame with a CoCo HD module installed as explained in the previous section
- Power the controller panel - the panel will automatically search for a CoCo HD module



CoCo HD Controller panel

Searching mode

The panel indicates that it is in searching mode by displaying a search progress bar in the display below a text message: 'No reply – retrying (nn)', where 'nn' is the number of tries. Button presses will have no effect whilst searching.



The panel will remain in searching mode until it has established communications with a CoCo HD board. If communication is lost, it will return to searching mode.

Selecting a CoCo HD

The available CoCo HDs that have responded are shown on the lower line of the display together with their slot numbers in the connected frame. If necessary press the DEVICE key to display more CoCo HD boards (up to 12). Use the function key below the desired CoCo HD board to establish control.

The DEVICE key can be pressed at any time to display the connected CoCo HD boards, press again to show more CoCo HD boards.

Using direct action rotary controls

The seven rotary controls on the right hand side of the controller panel each have dedicated functions.

CoCo HD Controller panel – dedicated video controls

Each control or group of controls is also associated with a menu display that will automatically follow the last control used.

For example, if the VIDEO knob is altered, the menu will show:

CoCo Controller panel – display menu

Where ‘xx’ is the overall video gain from 0 to 200, ‘yy’ is the Chroma gain from 0 to 200 and ‘zz’ is the black level from -10 to +10.

If the CHROMA or BLACK knobs are altered, the control name text in the menu will be highlighted by changing to capital letters.

To quickly return the highlighted variable to its default value, press the CAL button.

The following functions have dedicated rotary controls:

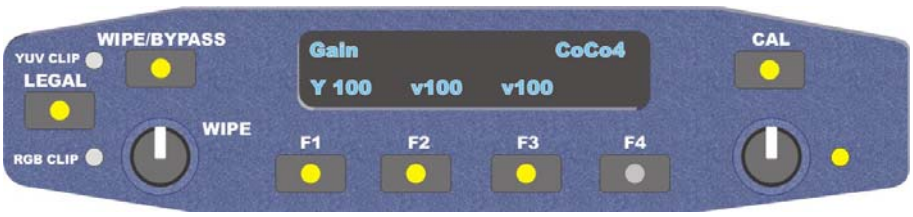
Control	Range	Description
VIDEO	0 - 200	Overall YUV gain – retains individual YUV gain offsets in proportion
CHROMA	0 - 200	Overall UV gain – retains individual UV gain offsets in proportion
BLACK	-10 - +10	Black level or lift
RED, GREEN, BLUE	0 - 200	Individual RGB component gain
Gamma	0.5 – 2.0	Overall RGB gamma
Wipe	Continuous	Variable split screen between input and output (Aux out only when enabled)

Note: Overall video and Chroma control range may be less than 0-200 if any YUV component gains have been altered.

Using panel menus

The menu display is associated with four assignable buttons and an assignable rotary control under the CAL button. When active, their associated LED will be lit.

For example, if the YUV GAIN button is pressed the following menu is displayed:



CoCo HD Controller panel – YUV GAIN display menu

In the example above, the programmable rotary control is assigned to control Y gain as indicated by the fact that 'Y' is capitalised.

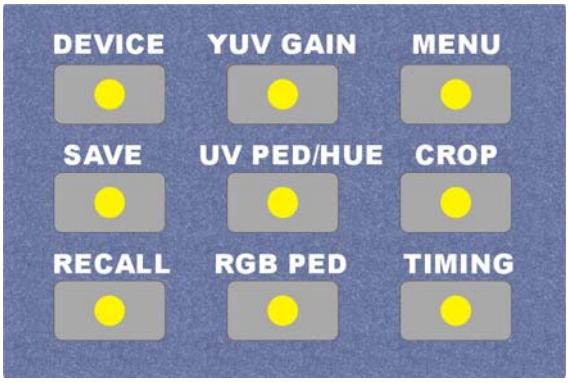
The Y gain can now be adjusted over its available range. If necessary the CAL button can be pressed to return quickly to its default value.

The following control menus are supported:

Control	Description
DEVICE	Show and/or search for connected CoCo-HD's
YUV GAIN	Adjust individual YUV gains/gain ratios
MENU	Access GPI On/Off, Error On Aux On/Off, Device Label, Copy/Paste, ENG and Lock- Panel sub-menus
SAVE	Save selected CoCo-HD setup into temporary memory
RECALL	Recall panel setup from temporary memory to connected CoCo-HD
UV PED/HUE	Adjust UV lift, pedestal and or hue, Black clean-up
CROP	Adjust vertical and horizontal crop
RGB PED	Adjust RGB lift/pedestal and/or hue
TIMING	Gamma controls
WIPE/BYPASS	Set horizontal/vertical preview wipe and/or board bypass
LEGAL	Set RGB clipping and YUV clipping threshold and slope

Note: Yellow LEDs indicate when function buttons (F1 to F4) and the menu assignable shaft encoder (under the CAL button) are active. The display always follows the last button or menu accessed.

The following buttons are associated with panel menus and more advanced functions:



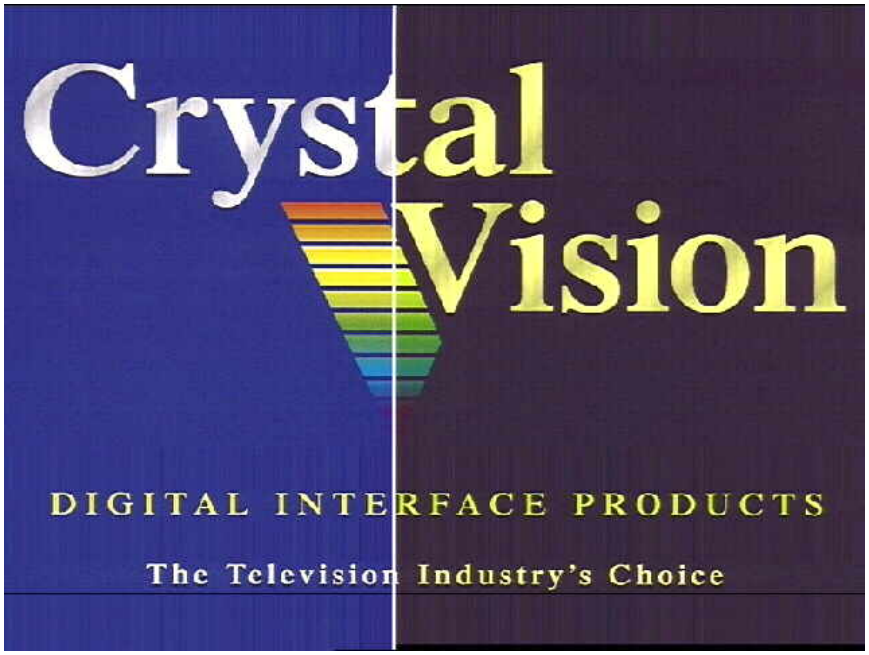
CoCo HD Controller panel – advanced control buttons

Each of these functions is discussed in detail in the controller operation section.

Using the split-screen (wipe) preview

The two AUX outputs are provided with the facility to perform a 'before/after' comparison of the corrections applied by CoCo HD.

To use this facility, connect one of the AUX outputs to a monitor and press the WIPE/BYPASS button.



Horizontal input/output wipe showing 'before/after' comparison

The display will then show the available options related to that function, which are:

CoCo HD Controller panel – wipe/bypass menu

The menu defined F buttons below the display act as function select and status toggles. For example, to select a horizontal wipe press the F1 button, HWIPE will be capitalised and the WIPE knob will control the wipe.

To turn the wipe off press F1 again, Wipe off will be displayed and the AUX outputs will return to displaying only the CoCo HD output. This menu also contains the bypass control. Pressing F3 will toggle between the processed output, and bypass (output = input).

Using the legaliser (soft clipping)

The LEGAL button at the left of the panel provides access to the soft clipping functions, which have been provided, to ensure that the gamut (maximum and minimum excursions) of the colour components remain within correct values.

The most important function is RGB clipping. This arises since the RGB colour space is smaller than the YUV space.

Although most material recorded today is unlikely to offend, turning RGB clipping on at its default settings should be sufficient to ensure a legal output.

The RGB legaliser is always present. To adjust the high and low clip levels press the LEGAL button. The soft clipping menu will be displayed:

CoCo HD Controller panel – LEGAL (RGB/YUV Clip) menu

Press the F1 button to access the RGB clipping menu. Press F1 again from ALL to access the Hi and Lo clip controls. Adjusting the shaft control will set the clip thresholds. The output should now be legal despite RGB gamut errors in the input video.

CoCo HD Controller menus and functions are dealt with in greater detail in the controller panel section.

Clip warning LEDs

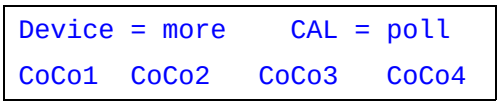
There are two clip warning LEDs at the left of the controller panel, YUV clip and RGB clip. These LEDs are only lit when video excursions are large enough to hit the clip thresholds.

Controller operation

Selecting a CoCo HD board to control

The DEVICE button provides access to the following functions:

Selecting/polling CoCo HD boards



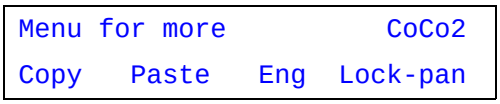
Press the appropriate function button F1-4 to select the desired CoCo board

Press DEVICE to show more (up to 12 boards)

Press CAL to poll for newly attached CoCo HDs

The Menu functions

Transferring CoCo HD settings, locking the panel and CoCo status



The clipboard copy/paste function is provided to allow an easy way of transferring the settings of one CoCo HD board to another. Clipboard memory is in the Controller, unlike preset memories, which are held in the CoCo HD boards themselves.

Press F1 to capture the settings of the currently selected CoCo HD to the clipboard

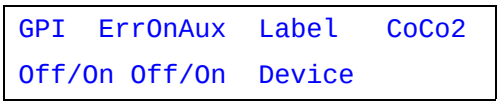
Press F2 to transfer settings in the clipboard to the currently selected CoCo HD

Press F3 to display status info and the CoCo HD serial number

Press F4 to lock the panel (unlock the panel by pressing MENU and CAL)

Press MENU again for the following further functions:

Enable GPI, EDH and change CoCo HD names



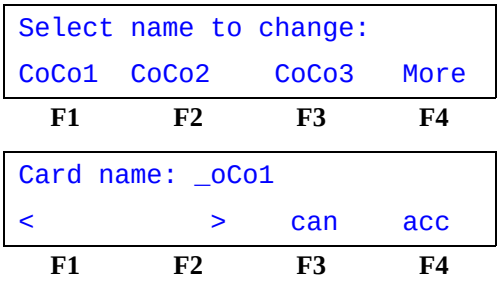
Press F1 to turn the CoCo board GPI function on or off

Press F2 to add gamut error highlighter to aux outputs

Press F3 to change the CoCo name

Changing the device name

By default, the device names are of the form CoCo1 – CoCo12. To apply a custom name press the menu key twice and choose Label Device (F3). Then select the name to change.



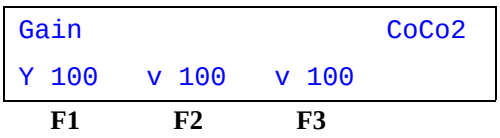
Rotate the shaft encoder to change the first character in the name

Press F1 to change the next character, press F2 to return to previous characters

Press F4 to accept the changes or F3 to cancel

Changing YUV gains

Press the YUV GAIN button to display the component gains menu:



Press F1 to let the assignable shaft encoder control Y gain

Press F2 to let the assignable shaft encoder control U gain

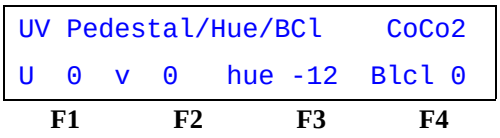
Press F3 to let the assignable shaft encoder control V gain

The text of the selected function name will be capitalised, press CAL to return the selected variable to its default value.

Note: This menu is NOT updated by changes in overall video gain made by the video gain knob; however, the ratios between the YUV components set in this menu are always retained.

Changing UV pedestal and Chroma hue

Press the UV PED/HUE button to display the component gains menu:



Press F1 to let the assignable shaft encoder control U lift

Press F2 to let the assignable shaft encoder control V lift

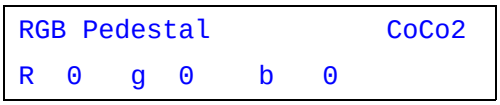
Press F3 to let the assignable shaft encoder control Chroma hue

Press F4 to add black cleanup

The text of the selected function name will be capitalised, press CAL to return the selected variable to its default value.

Changing RGB pedestal

Press the RGB PED button to display the component gains menu:



Press F1 to let the assignable shaft encoder control R lift

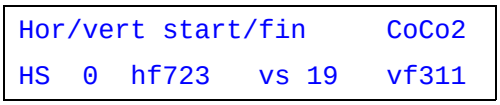
Press F2 to let the assignable shaft encoder control G lift

Press F3 to let the assignable shaft encoder control B lift

The text of the selected function name will be capitalised, press CAL to return the selected variable to its default value.

Changing picture crop

Press the CROP button to display the crop menu:



Press F1 to let the assignable shaft encoder control the horizontal crop start

Press F2 to let the assignable shaft encoder control the horizontal crop end

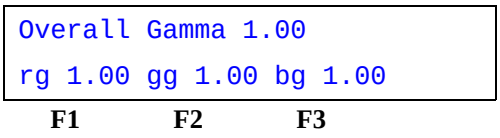
Press F3 to let the assignable shaft encoder control the vertical crop start

Press F4 to let the assignable shaft encoder control the vertical crop end

The text of the selected function name will be capitalised, press CAL to return the selected variable to its default value.

Timing (Gamma controls)

Press the TIMING button to display the input Gamma controls:

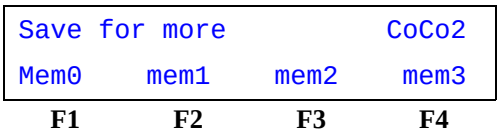


- Initially the assignable shaft control will adjust the overall gamma level
- Press F1 to let the assignable shaft encoder control the red gamma level
- Press F2 to let the assignable shaft encoder control the green gamma level.
- Press F3 to let the assignable shaft encoder control the blue gamma level.

Press Timing to return to overall gamma level.

Saving presets

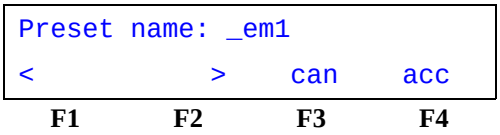
Press the SAVE button to display the save preset memory menu:



Press the SAVE button to gain access to all 16 memory locations (0 to F)

Press appropriate function button to save the current CoCo's settings

Press F1 to change the memory location name if required



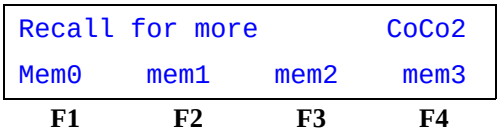
Rotate the shaft encoder to change the first character in the name

Press F1 to change the next character, press F2 to return to previous characters

Press F4 to accept the changes or F3 to cancel

Recalling presets

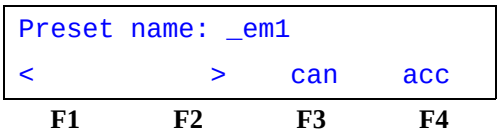
Press the RECALL button to display the recall preset memory menu:



Press the RECALL button to gain access to all 16 memory locations (0 to F)

Press appropriate function button to recall the stored CoCo-HD settings

Press F1 to change the memory location name if required



Rotate the shaft encoder to change the first character in the name

Press F1 to change the next character, press F2 to return to previous characters

Press F4 to accept the changes or F3 to cancel

Set soft clipping and legal colour options

The LEGAL button at the left of the panel provides access to the soft clipping functions, which have been provided, to ensure that the gamut (maximum and minimum excursions) of the colour components remains within correct values.

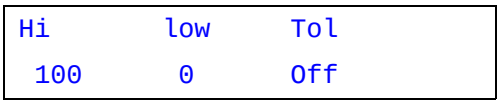
The LEGAL button provides access to the following functions:

Adjust RGB and/or YUV clipping

F1 **F2**

RGB clipping

Press F1 display the Hi/Lo clipping menu:



F1 **F2** **F3**

Press F1 to let the assignable shaft encoder control the upper clip threshold

Press F2 to let the assignable shaft encoder control the lower clip threshold

Press F3 to let the assignable shaft encoder control the Transient tolerance

The text of the selected function name will be capitalised, press CAL to return the selected variable to its default value.

YUV clipping and slope

Press F2 from the clip menu to display the YUV clipping menu:

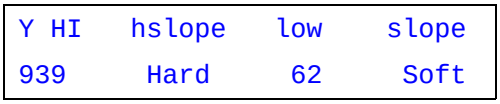
F1 **F2**

Press F1 to display the Y limits/slope menu

Press F2 to display the U limits/slope menu

Press F3 to display the V limits/slope menu

Changing Y slope and limits options



F1 **F2** **F3** **F4**

Press F1 to let the assignable shaft encoder control the upper clip threshold

Press F2 to let the assignable shaft encoder control the upper clip slope

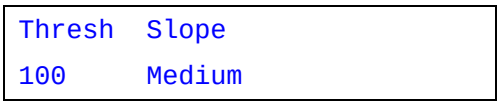
Press F3 to let the assignable shaft encoder control the lower clip threshold

Press F4 to let the assignable shaft encoder control the lower clip slope

The text of the selected function name will be capitalised, press CAL to return the selected variable to its default value.

Note: Only the Y slope/limits menu has provision for upper and lower clip adjustment.

Changing C (U&V) slope and limits options



Press F1 to let the assignable shaft encoder control the C clip threshold

Press F2 to let the assignable shaft encoder control the C clip slope

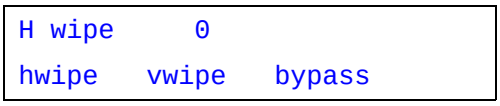
The text of the selected function name will be capitalised, press CAL to return the selected variable to its default value.

Note: Only the Y slope/limits menu has provision for upper and lower clip adjustment. The C slope/limits values are applied to both U and V symmetrically about the black value.

Set wipe/bypass options

The two AUX outputs are provided with the facility to perform a 'before/after' comparison of the corrections applied by CoCo-HD. To use this facility, connect one of the AUX outputs to a monitor and press the WIPE/BYPASS button.

Turn bypass/wipe on/off, select horizontal or vertical wipe



F1 **F2** **F3**

Press F1 to turn the horizontal wipe on/off and enable the WIPE knob

Press F2 to turn the vertical wipe on/off and enable the WIPE knob

Press F3 to set the board bypass on/off

The text of the selected function name will be capitalised. The position value indicates the position of the wipe transition in lines or pixels. The default wipe positions are at an edge of the active picture area.

Note: Both the AUX and MAIN outputs are affected by the bypass function, only the AUX outputs are affected by the wipe preview.

When bypass is de-selected the wipe function is always turned off. It can be turned on again using the appropriate 'F' button.

7 The CoCo Controller-48V

The CoCo Controller-48V panel is designed to control the CoCo-HD Colour Corrector and Legaliser using a RS422 serial link. The controller has dedicated buttons for each of the eight sources and eight destinations together with a TAKE button and Salvo SAVE and RECALL buttons.

CoCo Controller-48V panel

Installing the CoCo Controller-48V

CoCo HD has a number of external control lines that can be configured for GPI or RS485 control. These control lines MUST be configured for RS485 to enable CoCo Controller-48V communication as explained in section 6.5. It is NOT possible to retain GPI control when the controller panel is enabled. However, the CoCo Controller-48V panel has its own GPI control built in, which is explained later in this chapter.

The panel communicates with Crystal Vision frames via a serial communication link using the 422 BUS port at the rear of the panel. Standard UTP patch cables may be used with an appropriate adapter for the Crystal Vision frame remote connector.

CoCo Controller-48V panel – rear view

The RJ45 422 BUS port is next to the GPI I/O connector. Other RJ45 connectors and the four-way DIP switch are NOT used.

Each card slot in a frame has its control lines brought out to different 26 way ‘D’ type frame remote connectors on the rear of the frame. The following tables show which remote connectors to use for different frames and frame slots:

CoCo104 card slots and frame remote connectors

RJ45	Slot 2	Slot 4	Slot 6	Slot 8	Slot 10	Slot 12
Indigo 2U frame	Rem 1	Rem 2	Rem 1	Rem 2	Rem 1	Rem 2
Indigo 1U frame	Rem 1	Rem 1	Rem 1	N/A	N/A	N/A
Desk top box	Rem 1	N/A	N/A	N/A	N/A	N/A

The appropriate remote connector(s) should be connected to the 422 Bus connector at the rear of the panel using an adapter as explained in the next section.

Note: The second serial port on the CoCo-HD is used for Controller communications allowing front panel and Statesman control at the same time as Controller access.

Connecting supply cables

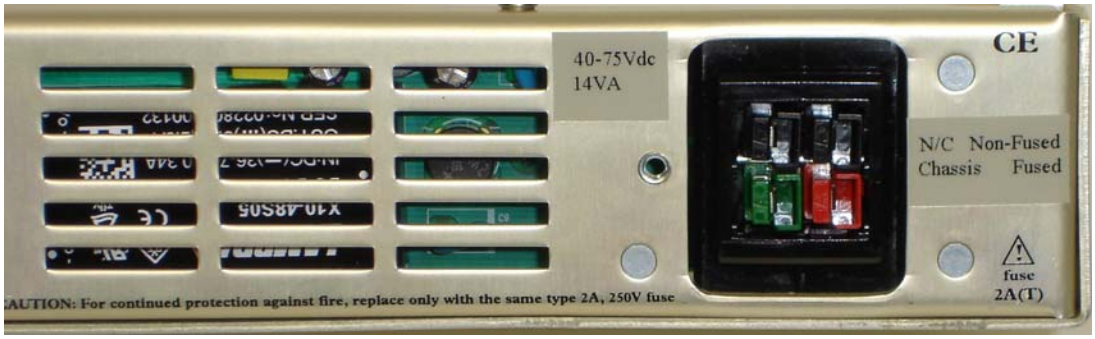
To connect the CoCo Controller-48V to a DC supply proceed as follows:

The 48V DC range of Indigo controllers is designed to be able to run in both positive and negative earth situations. This has been achieved by designing the PSU module to be insensitive to supply polarity. The only precaution to be taken is that the fused line is always the non-earth connection.

For a positive earth installation the supply –ve would be connected to the Red Fused inlet. And the supply +ve would be connected to the Black Non-Fused inlet. In this case the Chassis connection would be connected to a ‘clean earth’ which would be of the +ve polarity.

For a negative earth installation the supply +ve would be connected to the Red Fused inlet and the supply -ve would be connected to the Black Non-Fused inlet. In this case the Chassis connection would be connected to a ‘clean earth’ which would be of the -ve polarity.

Note: The fuse holder is part of the PSU module. Replace the fuse only with one of the same type and rating. Refer to the maintenance section of the trouble shooting guide for more information.

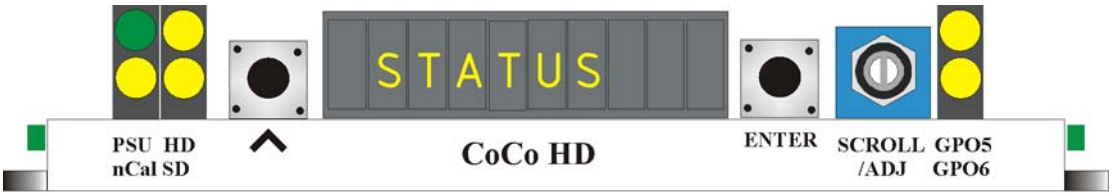


CoCo Controller-48V panel supply connector view

8 Trouble shooting

Once the start-up initialisation procedure is complete, CoCo HD can be controlled or configured from the active control panel, the Statesman PC interface or from the card edge.

The front edge of the card provides status LEDs for serial control, input presence, GPI status of RGB/YUV clip indication. There is also a 10 digit display and power rail monitoring.



CoCo HD front edge view

Trouble shooting may be performed by using the card edge, remote status panel display or from Statesman.

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

Name	LED Colour	Function when ON	Function when Off
PSU	Green	Good power supply (PSU) rails	One or more of the monitor supplies is out of specification
nCal	Yellow	Gains or levels not at default values	All controls at their default settings
HD	Yellow	Video input standard is HD (High Definition)	Input not present
SD	Yellow	Video input standard is SD (Standard Definition)	
GPO5	Yellow	GPO5 active / low (RGB clip error)	GPO5 inactive / high
GPO6	Yellow	GPO6 active / low (YUV clip error)	GPO6 inactive / high

The card edge LEDs and 10-digit display may be used in conjunction with status information from any connected remote status panel display or from Statesman if available.

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 SDI is present and that any cabling is intact

The video output exhibits jitter

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

The card no longer responds to Statesman or front panel control

Check that the card is seated correctly and that the Power OK LEDs are 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 the rack power and re-applying power after a few seconds or by removing the card from the rack and then re-inserting it

It is safe to re-insert the card whilst the rack is powered

The card does not work with a CoCo Controller panel

Check that the card is seated correctly and that the Power OK LEDs are lit

Check any active control panel cabling

(Also check that polling status at the CoCo Controller Panel display)

Check that jumpers PL3, PL4, PL5, PL6 are set for serial communication (left hand position)

If necessary re-set the card by simply removing the frame power and re-applying it after a few seconds, or by removing the card from the frame and then re-inserting it

It is safe to re-insert the card whilst the rack is powered

How do I know if the CoCo output only contains legal colours and luminance levels?

Check that YUV and RGB clipping has been enabled and that the clipping thresholds are at least at their default values.

NOTE: The absence of a lit Clip Active indicator does not necessarily mean that clipping has not been enabled, only that it is either not enabled or not active (video excursions inside current clip settings).

9 Specification

General

Dimensions	100mm x 266mm module with DIN 41612 connector
Weight	200g
Power consumption	6.6 W

Inputs

Video	HD or SD SDI 270Mb/s or 1.485Gb/s serial digital compliant to EBU 3267-E, 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 Belden 8281 or equivalent
Input formats	625/50, 525/59.94, 720p50, 720p59.94, 1080i50, 1080i59.94. Auto selected
Input return loss	-15dB for 5MHz to 1.5GHz

Outputs

Number and type:	Two main and two auxiliary outputs HD or SD SDI 270Mb/s to 1.485Gb/s serial digital compliant to SMPTE 259M and SMPTE 292M

Processing

Vertical data	Passes entire SDI stream, including HANC and VANC
Delay through board	15us (SD) 5us (HD)

Control

Local/remote control panel	Multi-drop 19200 Baud, 8 bits, no parity – control from local frame active front panel / remote panel
Statesman	RS422 control via Cat-5 or 26-way Remote 2 connector on rare of frame
	Ethernet with Ethernet ready frames

GPI Inputs

Type	Memory recall
Active	Connect to ground
Inactive	High impedance, or 5 volts
Input current	Input current <50µA

GPI Outputs

Type	YUV clip status / RGB clip status