CoCo104

Colour corrector and legaliser

USER MANUAL

Crystal Vision

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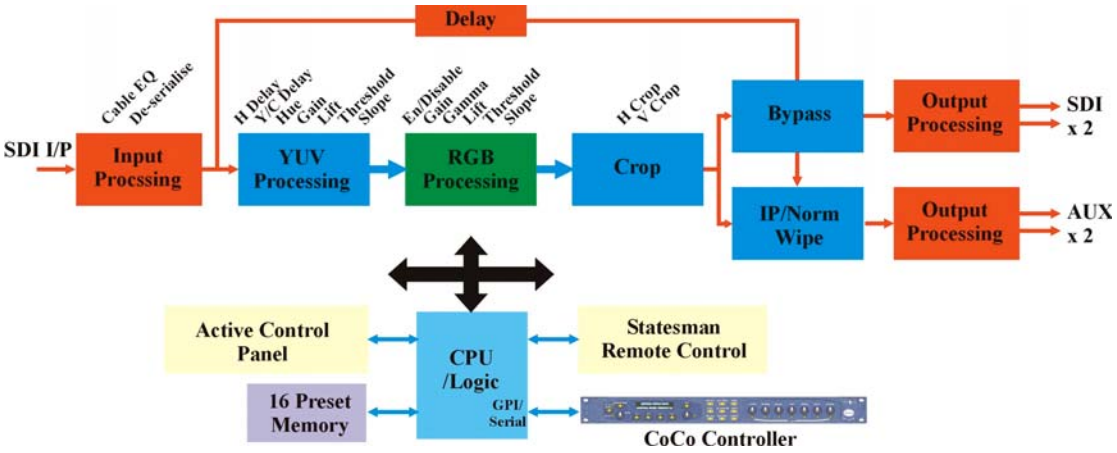
Contents

1 Introduction

CoCo104 is a 10 bit digital colour corrector and legaliser, which allows independent digital image adjustments in YUV and RGB domains, essential for maintaining colour fidelity. CoCo104 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.



CoCo104 colour corrector and legaliser

The main features are as follows:

- Digital colour corrector and legaliser
- Independent digital image adjustments in YUV and RGB domains
- Tools to adjust level, gain, soft clipping and timing
- All limiting has adjustable softness
- 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 – AUX out only
- Bypass control
- Passes ancillary information
- 16 user memories
- EDH generation
- Control from dedicated 1U CoCo Controller, Statesman or active panel

CoCo104 is a 100mm x 266mm module, which fits in all of the standard frames and can be integrated with any boards from the company's full product range. It uses the RM01 rear connector.

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

The 2U Indigo 2 or FR2AV frame will house up to 12 modules and dual power supplies.

The 1U Indigo 1 or FR1AV frame will house six modules and a single power supply.

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

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

Processing modes

Advance/retard Y/C offset delay

Advance/retard overall horizontal delay (74ns increments)

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

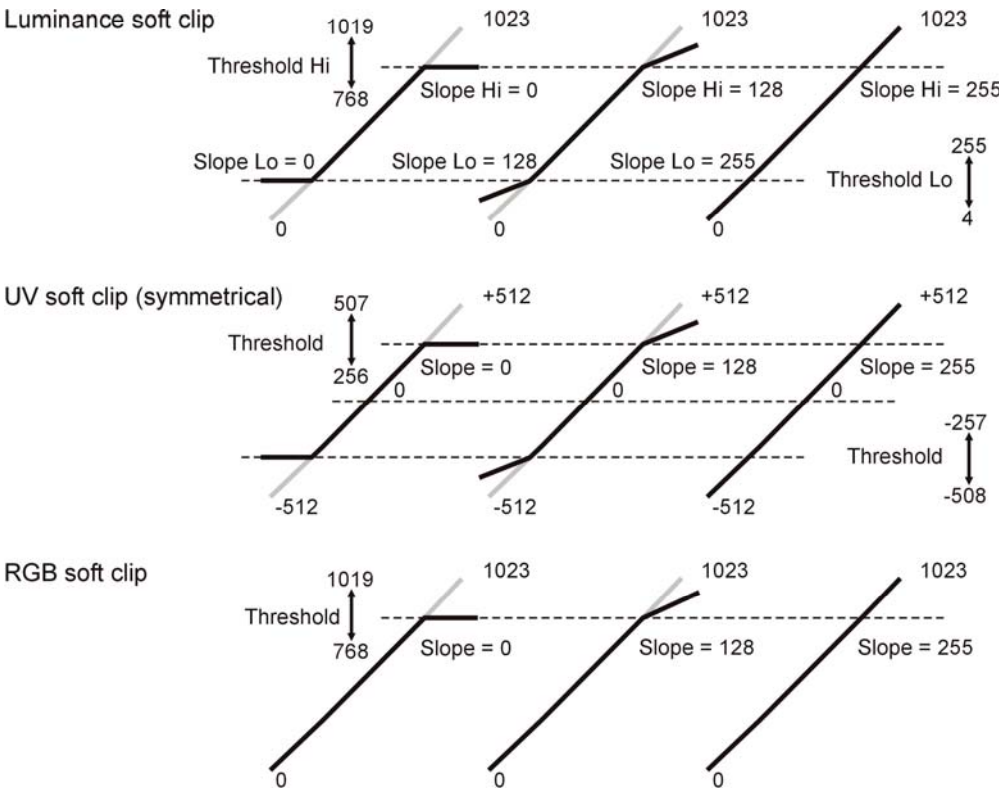
Increase/decrease RGB gamma independently and together

Set and soft limit RGB channel positive excursions independently

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

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 and RGB channels have one clipping control for each colour component. UV clipping operates symmetrically about black level and RGB clipping is adjustable at the high level only.



CoCo104 soft limiting

Note: Although there is no provision for an RGB lower clip adjustment, when RGB clipping is enabled, excessive negative RGB excursions are automatically prevented.

2 Hardware installation

The CoCo104 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.

2.1 Rear modules and signal I/O

The CoCo104 module fits into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

CoCo104 is used with the RM01 single slot rear connector in all Crystal Vision frames.

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

The 2U Indigo 2 or FR2AV frame will house up to 12 modules and dual power supplies.

The 1U Indigo 1 or FR1AV 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.

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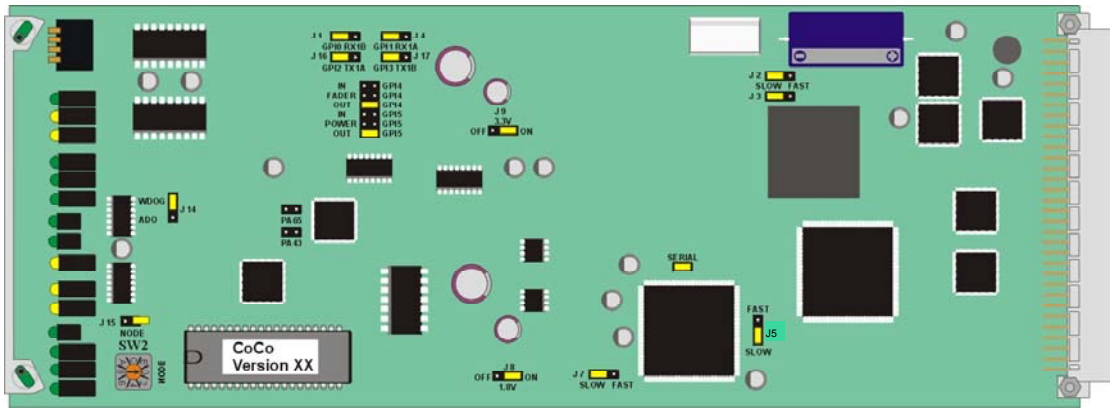
RM01 rear module connections:

RM01 fits in all current frames	Description
	**RM01 (ZLA00227 artwork)** • 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
AUX (2)	Second auxiliary input
SDI IN	SDI input
N/C	Not used
MAIN(1)	SDI output 1
MAIN(2)	SDI output 2
AUX (1)	First auxiliary input

2.2 CoCo104 configuration

The jumper links on the board are set correctly when CoCo104 is tested before despatch and should be left as set at the factory. The following information is for jumper position confirmation only.



CoCo104 showing default factory jumpers

Link positions - board viewed as above

Link	Required position
J8 & J9	Must be in the ON position
J2, J3, J5, J7	Must be in the SLOW position
J6	Leave jumper in place
J14	Leave in WDOG position
J1, J4, J16, J17	Leave all four jumpers in the right hand position to enable the CoCo Controller panel. Leave in the left-hand position for GPI outputs
PL7	Selects GPI 'e' (IN/FADER/OUT) and GPI 'f' (IN/POWER/OUT) function – default is OUT
PA43/PA65	Not used

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. GPI lines ‘e’ and ‘f’ are reserved for an optional remote fader.

To enable GPI preset selection, ensure that the four jumpers J1, J4, J16 and J17 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’	No action	IN/FADER/OUT – depends on JP7
‘f’	No action	IN/POWER/OUT – depends on JP7

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 330Ω series resistors fitted to drive LEDs and 10k Ω pull-up to +5V (to drive a remote input).

Note: Jumpers PL 1, 4, 16 and 17 should be left in the left hand GPI position to enable normal GPI operation and in the right hand position to enable RS485 comms for a CoCo Controller.

GPI connections

4U frame GPI Connections

GPI lines 'a' to 'f' of each card connect to 1 of 8 rear remote connectors as follows:

Slot no.		'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	Upper	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	Lower	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)

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 connect 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 connect 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.

DTB-AV 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	1	2	3	4	5	6
2	9	10	11	12	13	14

Note: Remote connector is 15-way normal density D-Type socket. Frame ground 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.

The AADA416FR is used with the RM17 single slot rear connector which allows up to 12 such modules, in any mix in a 2U frame.

Other Crystal Vision rear modules and interface cards can be mixed in any quantity with AADA416FR cards, up to a maximum of 12 cards, providing the other cards do not exceed the power rating of the PSU chosen (normally 150W).

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.

Note: The node switch SW2 should be set to ZERO and jumper J15 should not be fitted in all current frames.

Node addresses in older frames are set as follows:

Frame	Node address setting
FR1-6 **FR2-12** **FR2-8**	Set the remote node address in conjunction with link J15 as follows: J15 pins 1 & 2 open – SW2 sets node addresses from 0 to 15 J15 across pins 1 & 2 – SW2 sets node addresses from 16 to 31 (16 is added to switch setting) The node address setting is only read on power up

3 The CoCo Controller panel

The CoCo Controller panel is designed to control the CoCo104 10 bit digital colour corrector using a RS422 serial link. The controller can handle up to 12 CoCo104s 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

3.1 Installing the Controller

The CoCo104 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 section 5.2. 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:

CoCo104 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	-	-	-	-	-	-	-	-	-	-	-	-

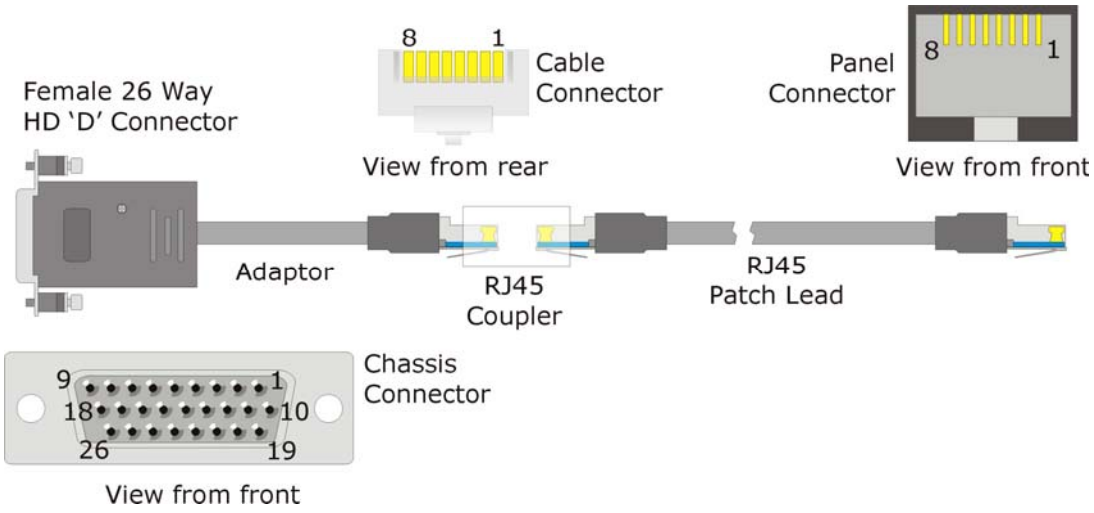
The appropriate remote connector(s) should be connected to the 422 Bus connector at the rear of the panel using an adapter as explained in the next section.

Note: The second serial port on CoCo104 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** 	**8**	**7**	**5**	**4**	**3**	**10**
W/Brown	**7**	**9**	**16**	**6**	**14**	**12**	**11**
Blue	**4** 	**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.

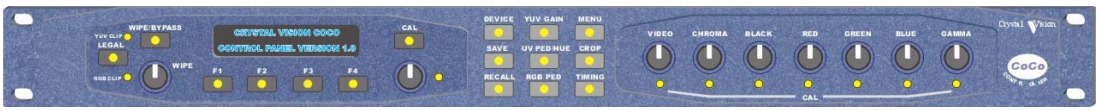
For the panel to work jumper links PL4-PL7 need to be fitted towards the rear of the CoCo104 board as explained in section 6.5 This will disable GPI preset control for the CoCo104 module.

3.2 Using the CoCo 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 CoCo104 module installed as explained in the previous section

Power the controller panel - the panel will automatically search for a CoCo module



CoCo 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 CoCo104 board. If communication is lost, it will return to searching mode.

Selecting a CoCo104

The available CoCo104s 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 boards (up to 12). Use the function key below the desired CoCo board to establish control.

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

Using direct action rotary controls

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

CoCo 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 'vv' 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 -512 to +512.

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	-512 - +512	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 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.

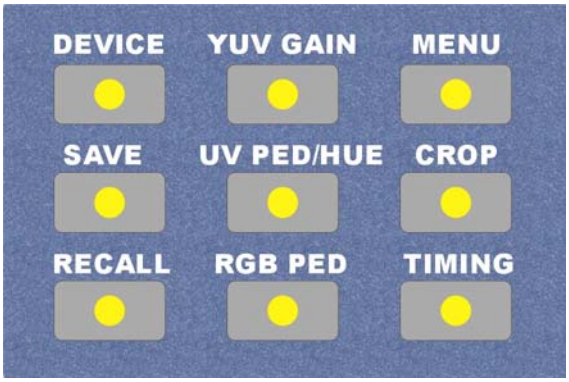
The Y gain can now be adjusted over its available range. If necessary the CAL button can be pressed to return quickly to its default value.

The following control menus are supported:

Control	Description
DEVICE	Show and/or search for connected CoCos
YUV GAIN	Adjust individual YUV gains/gain ratios
MENU	Accesses GPI On/Off, EDH On/Off, Device Label, Copy/Paste, ENG and Lock-Panel sub-menus
SAVE	Save selected CoCo setup into temporary memory
RECALL	Recall panel setup from temporary memory to connected CoCo
UV PED/HUE	Adjust UV lift/pedestal and/or hue
CROP	Adjust vertical and horizontal crop
RGB PED	Adjust RGB lift/pedestal and/or hue
TIMING	Adjust horizontal delay and Y/C offset
WIPE/BYPASS	Set horizontal/vertical preview wipe and/or board bypass
LEGAL	Set RGB clipping On/Off and adjust RGB/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:



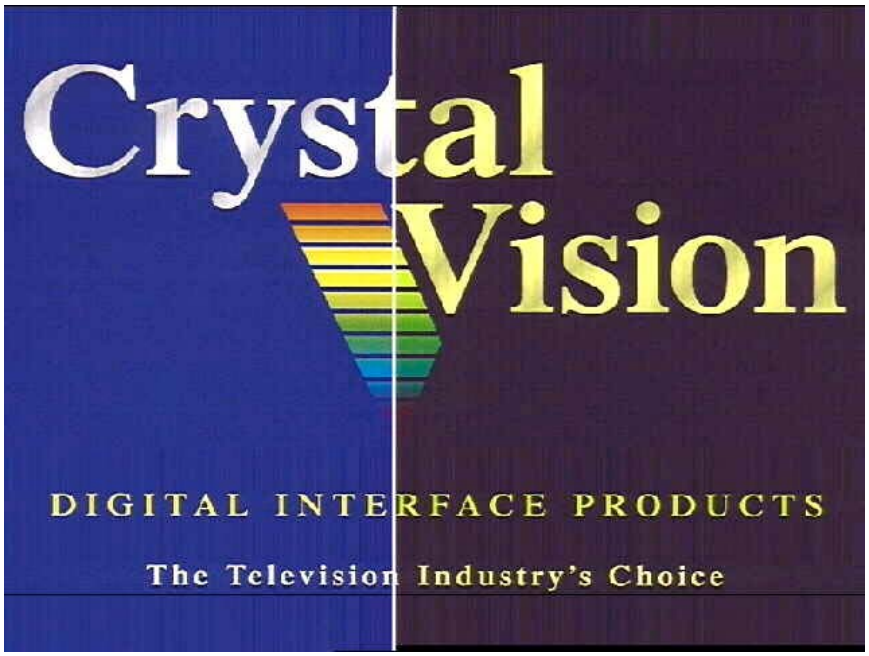
CoCo Controller panel – advanced control buttons

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 CoCo104.

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 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 CoCo104 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.

To turn RGB clipping on press the LEGAL button. The soft clipping menu will be displayed:

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

Press the F4 button to turn RGB clipping on. The output should now be legal despite RGB gamut errors in the input video.

CoCo 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.

Note: RGB clipping must be enabled to function. An unlit RGB LED does not necessarily indicate that the RGB gamut of the input signal is correct, unless RGB clipping has been enabled. YUV clipping cannot be 'turned off', but the adjustment range is sufficient to disable it.

3.3 Controller operation

Selecting a CoCo board to control

The DEVICE button provides access to the following functions:

Selecting/polling CoCo boards

Device = more		CAL = poll	
CoCo1	CoCo2	CoCo3	CoCo4
F1	**F2**	**F3**	**F4**

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 CoCos

The Menu functions

Transferring CoCo settings, locking the panel and CoCo status

Menu for more			CoCo4
Copy	Paste	Eng	Lock-pan
F1	**F2**	**F3**	**F4**

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

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

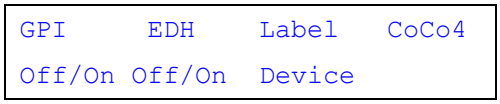
Press F2 to transfer settings in the clipboard to the currently selected CoCo

Press F3 to display status info and the CoCo 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 names



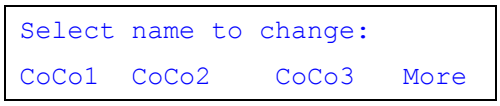
Press F1 to turn the CoCo board GPI function on or off

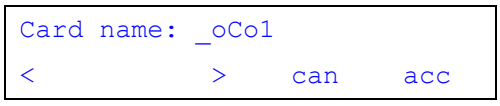
Press F2 to turn EDH generation on or off

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.





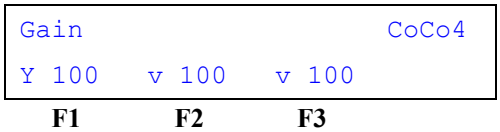
Rotate the shaft encoder to change the first character in the name

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

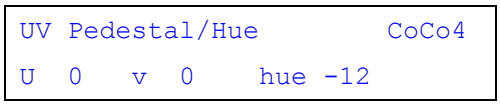
Press F3 to let the assignable shaft encoder control V gain

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

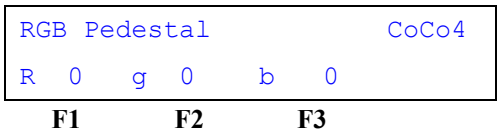
Press F2 to let the assignable shaft encoder control V lift

Press F3 to let the assignable shaft encoder control chroma hue

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

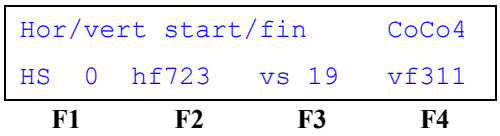
Press F2 to let the assignable shaft encoder control G lift

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

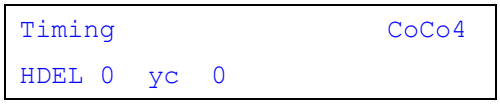
Press F3 to let the assignable shaft encoder control the vertical crop start

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.

Changing delay and Y/C offset

Press the TIMING button to display the HDEL and Y/C menu:



F1 **F2**

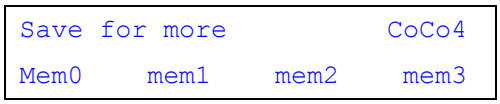
Press F1 to let the assignable shaft encoder control the horizontal delay

Press F2 to let the assignable shaft encoder control the Y/C offset

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

Saving presets

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

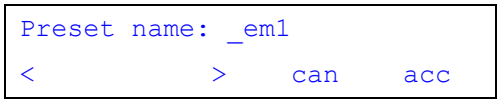


F1 **F2** **F3** **F4**

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



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

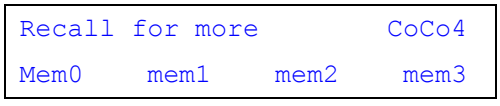
Rotate the shaft encoder to change the first character in the name

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:

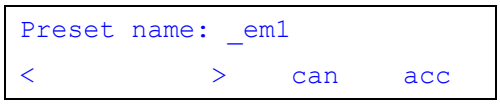


F1 **F2** **F3** **F4**

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

Press appropriate function button to recall the stored CoCo 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

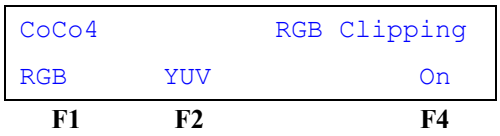
Press F4 to accept the changes or F3 to cancel

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.

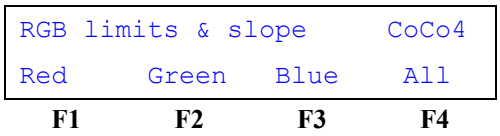
The LEGAL button provides access to the following functions:

Turn RGB clipping on/off, adjust RGB and/or YUV clipping



RGB clipping

Press F4 to turn RGB clipping on. Press F1, with RGB clipping on to display the RGB clipping menu:



Press F1 to display the RED limits/slope menu

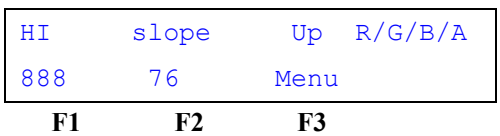
Press F2 to display the GREEN limits/slope menu

Press F3 to display the BLUE limits/slope menu

Press F4 to display the ALL (RED+GREEN+BLUE) limits/slope menu

Changing slope and limits options

The RGB/All slope/limits functions share the same menu structure:



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 move back up the menu structure

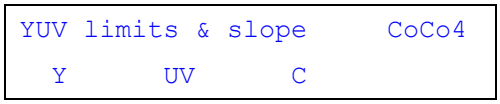
The text of the selected function name will be capitalised, press CAL to return the selected variable to its default value.

Note: There is no provision for an RGB lower clip adjustment. When RGB clipping is enabled the unit automatically prevents excessive negative excursions of RGB values.

The RGB clip LED will illuminate if the RGB clipping is enabled and the input signal RGB gamut exceeds the RGB clip threshold.

YUV clipping

Press F2 to display the YUV clipping menu:

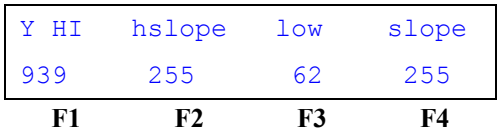


Press F1 to display the Y limits/slope menu

Press F2 to display the U limits/slope menu

Press F3 to display the V limits/slope menu

Changing Y slope and limits options



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

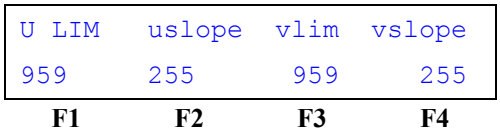
Press F3 to let the assignable shaft encoder control the lower clip threshold

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 UV slope and limits options



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

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

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

Press F4 to let the assignable shaft encoder control the V 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 U and V slope/limits values are applied symetrically about the black value.

The YUV clip LED will illuminate if the input signal YUV gamut exceeds the YUV clip threshold.

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

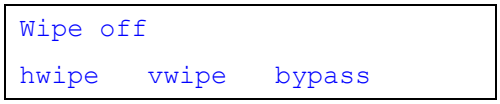
The text of the selected function name will be capitalised, press CAL to return the selected variable to its default value.

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 symetrically 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 CoCo104. 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.

4 The CoCo Controller-48V

The CoCo Controller-48V panel is designed to control the CoCo104 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

4.1 Installing the CoCo Controller-48V

The CoCo104 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 CoCo104 is used for Controller communications allowing front panel and Statesman control at the same time as Controller access.

Connecting supply cables

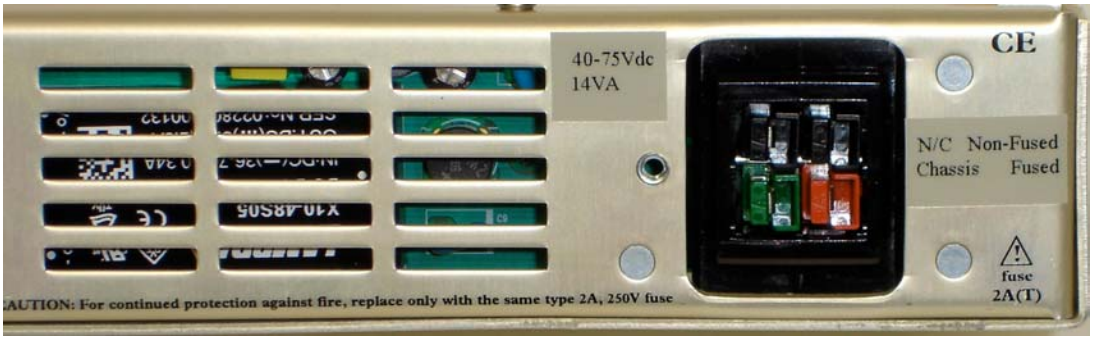
To connect the CoCo Controller-48V to a DC supply proceed as follows:

The 48Vdc range of Indigo controllers are 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.

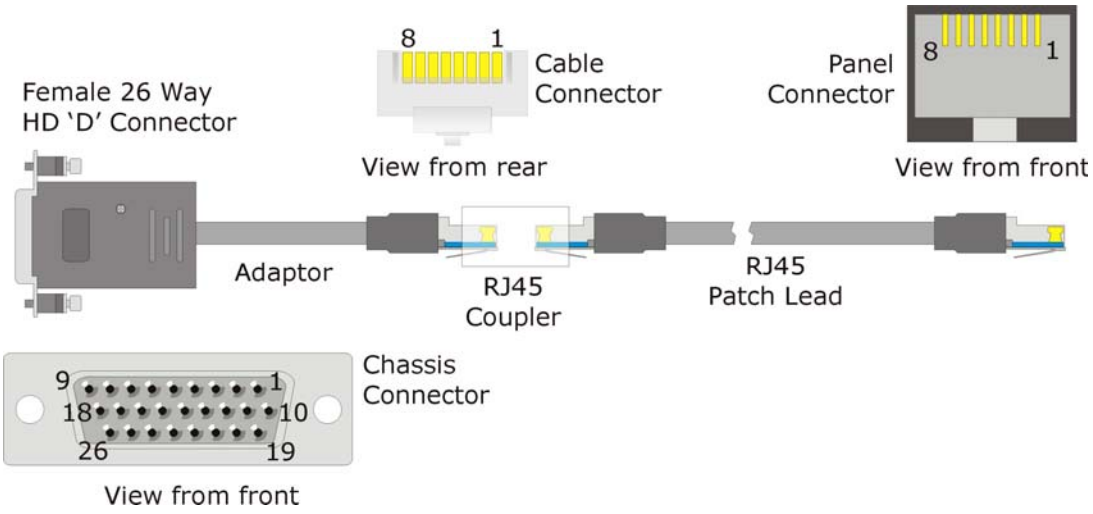


CoCo Controller-48V panel supply connector view

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		S2/R1 S4/R3	S6/R1 S8/R3	S10/R1 S12/R3
	Shell (GND)		**6/Shell**	**6/Shell**	**6/Shell**
Brown	**8**	Twisted Pair	**7**	**4**	**10**
W/Brown	**7**		**16**	**14**	**11**
Blue	**4**	Twisted Pair	**17**	**13**	**19**
W/Blue	**5**		**25**	**23**	**20**

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

Indigo 2U frame Remote 1

RJ45	Slot 2	Slot 6	Slot 10
Pin 8	Pin 7	Pin 4	Pin 10
Pin 7	Pin 16	Pin 14	Pin 11
Pin 4	Pin 17	Pin 13	Pin 19
Pin 5	Pin 25	Pin 23	Pin 20

Indigo 2U frame Remote 3

RJ45	Slot 4	Slot 8	Slot 12
Pin 8	Pin 7	Pin 4	Pin 10
Pin 7	Pin 16	Pin 14	Pin 11
Pin 4	Pin 17	Pin 13	Pin 19

Pin 5	Pin 25	Pin 23	Pin 20

Indigo 1U frame Remote 1

RJ45	Slot 2	Slot 4	Slot 6
Pin 8	Pin 7	Pin 4	Pin 10
Pin 7	Pin 16	Pin 14	Pin 11
Pin 4	Pin 17	Pin 13	Pin 19
Pin 5	Pin 25	Pin 23	Pin 20

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.
For the panel to work, jumper links PL4-PL7 need to be fitted towards the rear ot the board as explained in section 6.5. This will disable GPI control of the CoCo104 module, but Controller GPIs will be available.

Using Controller GPIs

The Controller GPIs are provided to allow remote control of the first two destinations with optional tally outputs.

There are 18 GPI lines, which can be configured as inputs or outputs. When used as inputs they control source selection for destinations 1 and 2. They may also be used as tallies when configured as outputs.

GPIs 1 – 8 control destination 1 and are enabled by GPI 17.

GPIs 9 – 16 control destination 2 and are enabled by GPI 18.

With GPIs 1 – 8 enabled, selecting GPI 1 will set destination 1 to source 1, pressing GPI 2 will set destination 1 to source 2 etc. The same applies for destination 2 with GPIs 9 – 16.

The GPIs will also give a tally output so that when destination 1 is connected to source 4, GPI 4 will be low. This tally will follow destinations 1 and 2, no matter from where the routing is updated.

The pinout for the 26 way D-Type connector at the rear of the CoCo Controller-48V panel is as follows:

26-way D-Type pin connections

Pin No.	Description	Pin No.	Description	Pin No.	Description
1	+5V	10	GPI_6	19	GPI_14
2	0V	11	GPI_7	20	GPI_15
3	GPI_1	12	GPI_8	21	GPI_16
4	GPI_2	13	GPI_9	22	GPI_17
5	0V	14	0V	23	GPI_18
6	GPI_3	15	GPI_10	24	GPI_19
7	GPI_4	16	GPI_11	25	GPI_20
8	GPI_5	17	GPI_12	26	0V
9	+5V	18	GPI_13		

Note: GPIs 19 and 20 are currently unassigned.

4.2 CoCo Controller-48V operation

To use the CoCo Controller-48V proceed as follows:

Connect the CoCo Controller-48V panel to a Crystal Vision frame with a CoCo104 module installed as explained in the previous section

Power the Controller panel - the panel will automatically search for a CoCo104 module

CoCo Controller-48V panel

Searching Mode

The panel indicates that it is in searching mode by flashing the source and destination buttons and LEDs in a back and forth pattern. Button presses will have no effect whilst searching.

The panel will remain in searching mode until it has established communications with a CoCo104 board. If communication with a CoCo104 is lost, it will return to searching mode.

Panel LEDs

LED	Meaning when lit	Comment
Ref	Reference present	Composite/SDI reference selection cannot be made from the panel
Comms	Comms OK	Illuminates to indicate communication with CoCo104
Panel lock	Panel locked	All buttons are locked out - to toggle panel lock on and off hold down source 1 button and destination 8 button for approximately three seconds
Input present	Shows which paths have signals	The eight LEDs under the source buttons show video in to CoCo104, and the eight LEDs under the destination buttons show video out of CoCo104 and are therefore routing dependent

Changing crosspoint assignments

To change routing first press the destination button and then the new source button. The new source button will flash and the TAKE button will light. Then press the TAKE button and the new routing will be updated on CoCo104.

Tip: First select a destination followed by a source to route to that destination.

To undo routing that hasn't been 'taken', press the destination and then the original source. This will be the source button that is lit and not flashing.

Viewing crosspoint assignments

To see which source is connected to which destination, press the destination button and the source connected to it will light. One source can go to more than one destination.

Multiple routing

Multiple routing can be performed by creating the required destination-source pairs before pressing the TAKE button. The destination buttons will flash to show that they have routing waiting for a take. To confirm the routing press the TAKE button and the selected routing assignments will all be updated simultaneously.

This is similar to establishing a single crosspoint except that instead of pressing TAKE immediately, further destination-source pairs are created first.

Note: The last destination button pressed does not flash.

Setting up multiple routing:

Press the destination and then the source for each crosspoint assignment required in turn – destination buttons flash

Press TAKE to confirm the routing

Using salvos

Up to sixteen salvos may be recorded and recalled from CoCo104, Statesman, the card edge control or by external GPIs. Like macros, salvos do not store board setup data, switching mode or reference selection.

Salvos can be created from the controller panel by setting up multiple routing and pressing SAVE instead of TAKE. All the source and destination buttons will flash to indicate that a memory location needs to be selected. The source buttons 1 – 8 represent Salvos 1 – 8, and the destination buttons represent salvos 9 – 16. Select a memory location and then press SAVE to confirm.

Creating a salvo:

Set up the required routing

Press SAVE – all source and destination buttons flash

Choose a source/destination button for the salvo - SAVE will flash

Press SAVE to confirm the choice

To recall a salvo press RECALL, select a memory location and then press RECALL again to confirm, or any other button to cancel.

Recalling a salvo:

Press RECALL – all source and destination buttons flash

Choose a source/destination button with a previously saved salvo - RECALL will flash

Press RECALL to confirm the choice

Notes: Salvos are similar to macros in that only those crosspoints in the salvo are changed. All other crosspoints will remain as they were before the salvo was recalled.

The operation of the panel described here is based on panel software version 4.01.

5 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, the two line 20-character screen will display 'Crystal Vision' followed by the firmware version number for the control panel. All eight control panel key LEDs will illuminate.

The Crystal Vision control panel start up display

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

If the control panel firmware has been updated for Statesman control, Statesman Mode will be entered and the message, 'Press Cal to Exit' will be displayed and the CAL LED will light.

Statesman mode is entered by default

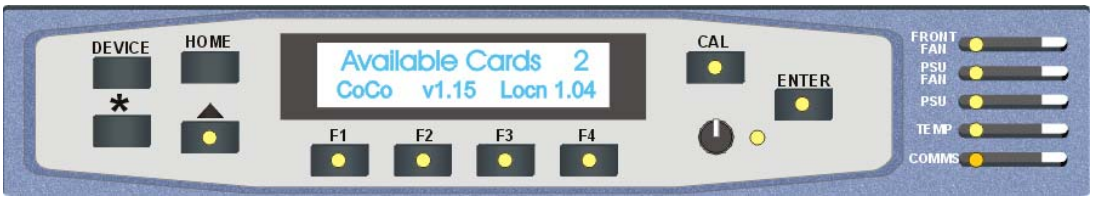
To continue with control panel operation or configuration, press the CAL key once. A second press of the CAL key will return to Statesman control.

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

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

Selecting CoCo104

To select a particular card in a frame, press the DEVICE key to go to the Device menu. 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 first frame in slot number 2.

When the desired card is selected press the ENTER key to access that card's Home menu.

CoCo104 home menu

Note: In all current Crystal Vision frames the node address is coded into the backplane giving a unique node address for each slot. The node address is typically one less than the location number. Refer to the frame manual for further information on using node addresses.

Enabling active panel control

Card edge switch lever 2 must be in the ON (DOWN) position to enable an active control panel. If this lever is in the default local or UP position, card edge control will be enabled.

Note:

In the 2U frame 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
Two ranges allow one control panel to control two frames.
1U frame address range is 0-5 OR 16-21.
Please refer to the frame manual for further information on node addresses.

5.1 Navigating the display

The functions assigned to control panel keys are dependent on the card selected for control, and the panel mode. The following list illustrates the functions when controlling CoCo104:

- DEVICE – enters Device menu to select a card or cards to control / enter panel setup when held down during power up / shows frame status when pressed from Statesman mode
- CAL – enter or leave Statesman mode / enter panel diagnostics mode when held down during power up

- * – 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 – enters selected card home menu from device list
- 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 change assigned data values

Note: Please refer to the Crystal Vision control panel manual for details of the Panel Setup, Lock Panel and Diagnostic menus.

Sub-menus and data entry

The shaft encoder is used to scroll through available sub-menus and the ENTER key acts as a guard key.

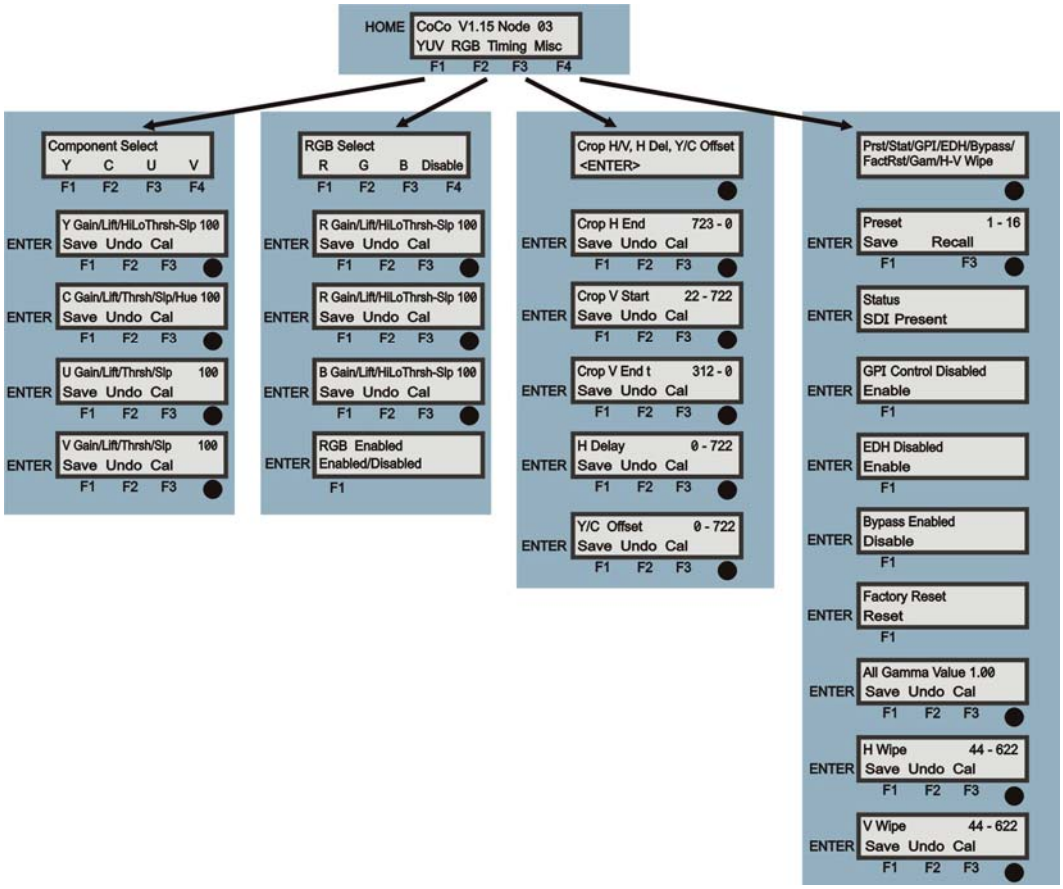
Menus with an illuminated shaft encoder LED and <ENTER> shown in the bottom line of the display can be used to select multiple sub-menus by rotating the shaft encoder.

Press the ENTER key to make a selected sub-menu active and enter data entry mode, press it again to leave data entry mode and continue navigating through the menu system.

5.2 The CoCo104 active panel menu structure

The main top-level menus for the CoCo104 module are obtained by pressing the F1 to F4 keys from the HOME menu. Menu keys are illuminated when active and when further menus are available.

The following chart shows the available menus.



The CoCo104 menu tree

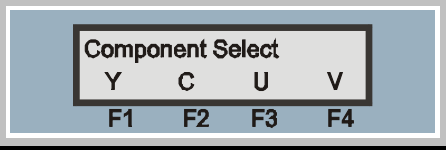
Updating the display

The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If changes occur via Statesman 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.

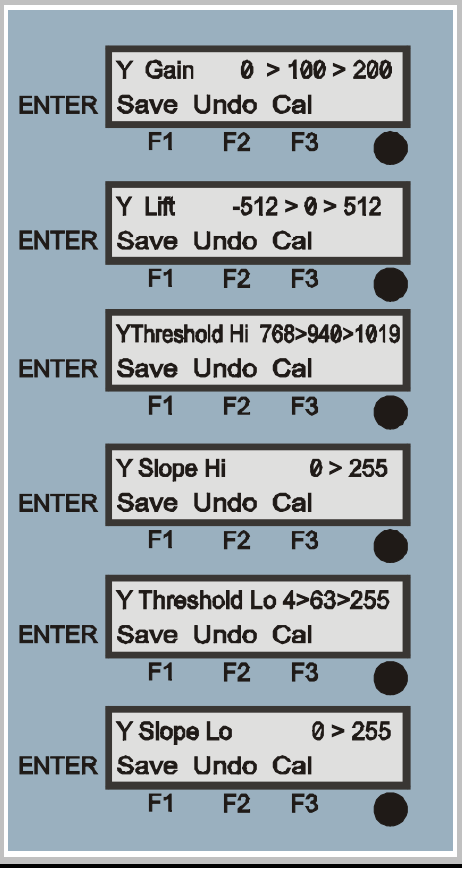
Note: Function keys and shaft encoder LEDs are illuminated when active.
Menus or function keys associated with the shaft encoder for changing assigned values are shown with a black circle.

5.3 Configuring YUV processing

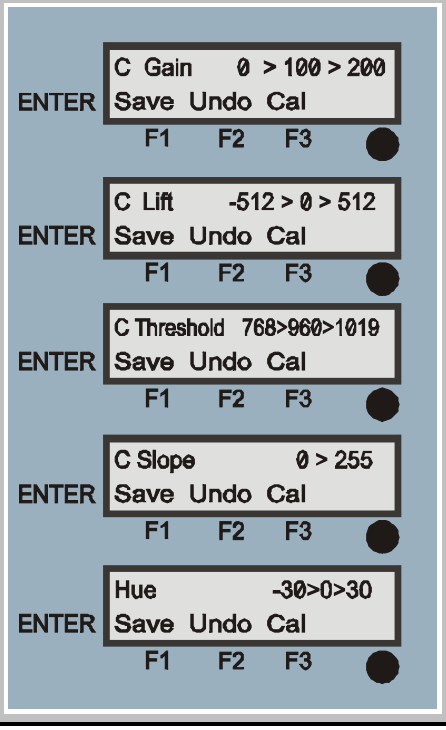
Pressing F1 from the home menu will bring up the top YUV menu. The YUV menu provides access to gain, lift, threshold and slope parameters for Luminance (Y), Chrominance (C), and the Pb (U) and Pr(V) colour difference components of the incoming SDI signal.

CoCo top YUV menu	Provides access to the following sub-menus:
	Y (Luminance) menu – press F1 C (Chrominance) menu – press F2 U (Pb) Menu – press F3 V (Pr) Menu – press F4

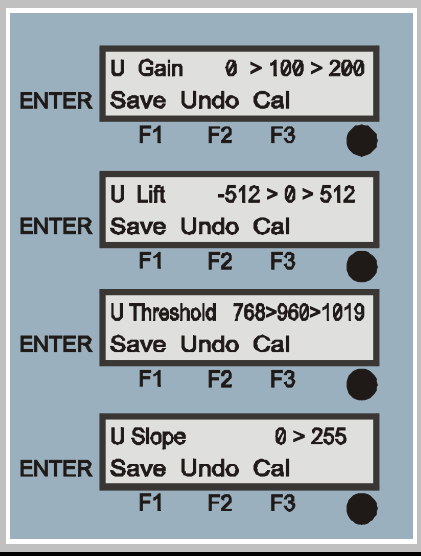
Press F1 from YUV menu 1.1 and then rotate the shaft encoder to access the Y processing menus. Press the ENTER key when the chosen menu is displayed to enter data entry mode. Press ENTER again to leave the data entry mode and continue navigating the available menus.

CoCo Y menu	Description
	Set Y gain from 0 to 200 – default/unity gain: 100 F1:Save, F2: Undo, F3: Cal (default value) Set Y Lift from -512 to 512 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value) Set Y Threshold Hi from 768 to 1019 – default is: 940 F1:Save, F2: Undo, F3: Cal (default value) Set Y Slope Hi from 255 to 0 – default is: 255 F1:Save, F2: Undo, F3: Cal (default value) Set Y Threshold Lo from 4 to 255 – default is: 63 F1:Save, F2: Undo, F3: Cal (default value) Set Y Slope Lo from 255 to 0 – default is: 255 F1:Save, F2: Undo, F3: Cal (default value)

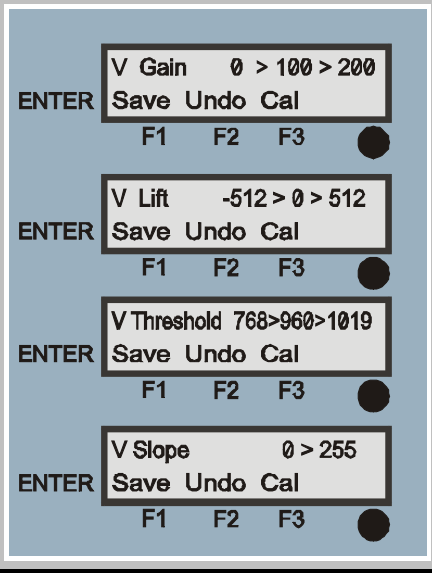
Press F2 from YUV menu 1.1 and then rotate the shaft encoder to access the C processing menus. Press the ENTER key when the chosen menu is displayed to enter data entry mode. Press ENTER again to leave the data entry mode and continue navigating the available menus.

CoCo C menu	Description
	Set C gain from 0 to 200 – default/unity gain: 100 F1:Save, F2: Undo, F3: Cal (default value) Set C Lift from -512 to 512 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value) Set C Threshold from 768 to 1019 – default is: 960 F1:Save, F2: Undo, F3: Cal (default value) Set C Slope from 255 to 0 – default is: 255 F1:Save, F2: Undo, F3: Cal (default value) Set C Hue from -30 to 30 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value)

Press F3 from YUV menu 1.1 and then rotate the shaft encoder to access the U processing menus. Press the ENTER key when the chosen menu is displayed to enter data entry mode. Press ENTER again to leave the data entry mode and continue navigating the available menus.

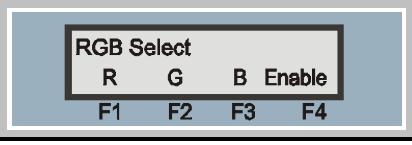
CoCo U menu	Description
	Set U Gain from 0 to 200 – default/unity gain: 100 F1:Save, F2: Undo, F3: Cal (default value) Set U Lift from -512 to 512 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value) Set U Threshold from 768 to 1019 – default is: 960 F1:Save, F2: Undo, F3: Cal (default value) Set U Slope from 255 to 0 – default is: 255 F1:Save, F2: Undo, F3: Cal (default value)

Press F4 from YUV menu 1.1 and then rotate the shaft encoder to access the V processing menus. Press the ENTER key when the chosen menu is displayed to enter data entry mode. Press ENTER again to leave the data entry mode and continue navigating the available menus.

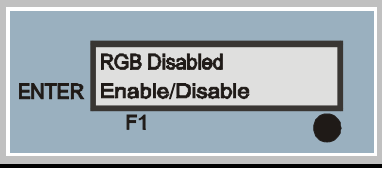
CoCo V menu	Description
	Set V Gain from 0 to 200 – default/unity gain: 100 F1:Save, F2: Undo, F3: Cal (default value) Set V Lift from -512 to 512 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value) Set V Threshold from 768 to 1019 – default is: 960 F1:Save, F2: Undo, F3: Cal (default value) Set V Slope from 255 to 0 – default is: 255 F1:Save, F2: Undo, F3: Cal (default value)

5.4 Configuring RGB processing

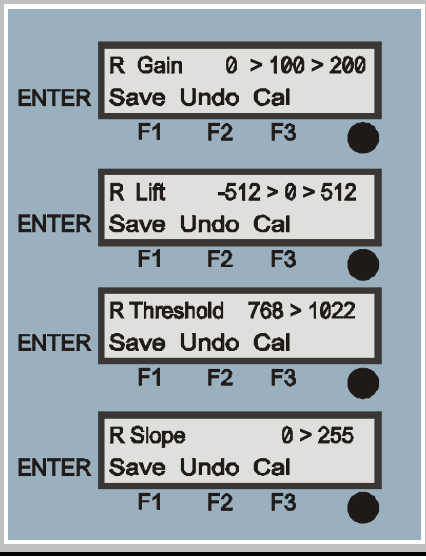
Legalising works in the RGB domain to correct YUV values, which could be illegal in RGB colour space. RGB processing is automatically bypassed in areas of the picture where RGB legalising and/or colour correction is not required. RGB processing can also be disabled if not required.

CoCo top RGB menu	Provides access to the following sub-menus:
	R (Red) menu – press F1 G (Green) menu – press F2 B (Blue) menu – press F3 RGB Enable/Disable menu – press F4

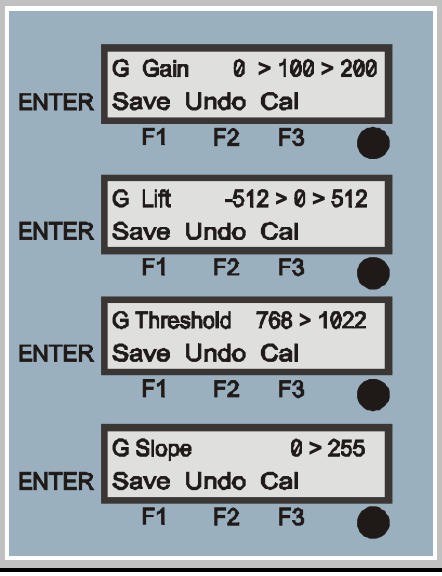
Press F4 from the main RGB menu to bring up the RGB Enable/Disable menu. Press ENTER to enter data entry mode. F1 will now toggle between enable and disable. Press the ENTER key to leave the data entry mode and continue navigating the menu system.

CoCo RGB Enable/Disable menu	Description
	Enable RGB processing before configuring RGB parameters.

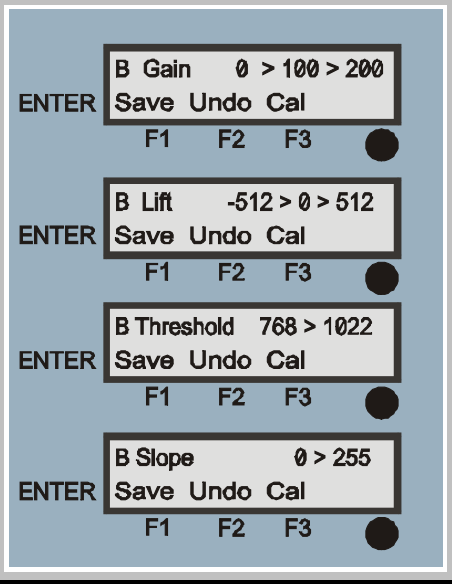
Press F1 from the main RGB menu and then rotate the shaft encoder to access the R(ed) processing menus. Press the ENTER key when the chosen menu is displayed to enter data entry mode. Press ENTER again to leave the data entry mode and continue navigating the available menus.

CoCo R menu	Description
	Set R Gain from 0 to 200 – default/unity gain: 100 F1:Save, F2: Undo, F3: Cal (default value) Set R Lift from -512 to 512 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value) Set R Threshold from 768 to 1022 – default is: 1022 F1:Save, F2: Undo, F3: Cal (default value) Set R Slope from 255 to 0 – default is: 255 F1:Save, F2: Undo, F3: Cal (default value)

Press F2 from the main RGB menu and then rotate the shaft encoder to access the G(reen) processing menus. Press the ENTER key when the chosen menu is displayed to enter data entry mode. Press ENTER again to leave the data entry mode and continue navigating the available menus.

CoCo G menu	Description
	Set G Gain from 0 to 200 – default/unity gain: 100 F1:Save, F2: Undo, F3: Cal (default value) Set G Lift from -512 to 512 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value) Set G Threshold from 768 to 1022 – default is: 1022 F1:Save, F2: Undo, F3: Cal (default value) Set G Slope from 255 to 0 – default is: 255 F1:Save, F2: Undo, F3: Cal (default value)

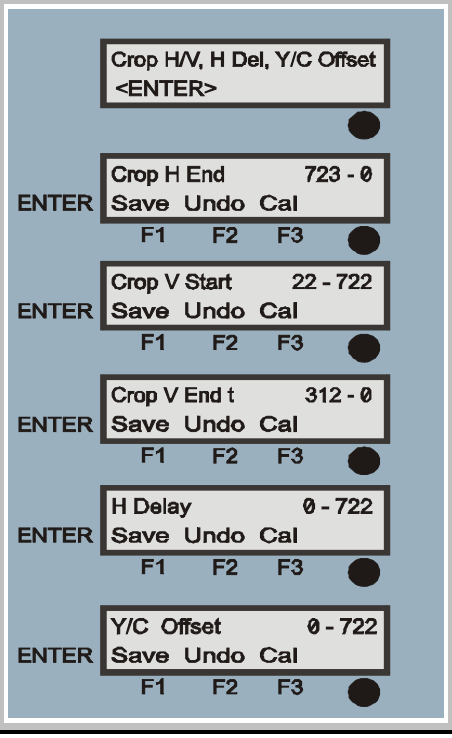
Press F3 from the main RGB menu and then rotate the shaft encoder to access the B(lue) processing menus. Press the ENTER key when the chosen menu is displayed to enter data entry mode. Press ENTER again to leave the data entry mode and continue navigating the available menus.

CoCo B menu	Description
	Set B Gain from 0 to 200 – default/unity gain: 100 F1:Save, F2: Undo, F3: Cal (default value) Set B Lift from -512 to 512 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value) Set B Threshold from 768 to 1022 – default is: 1022 F1:Save, F2: Undo, F3: Cal (default value) Set B Slope from 255 to 0 – default is: 255 F1:Save, F2: Undo, F3: Cal (default value)

5.5 Timing

Pressing F3 from the home menu will bring up the Timing menu. The Timing menu provides access to crop, horizontal delay and Y/C offset controls.

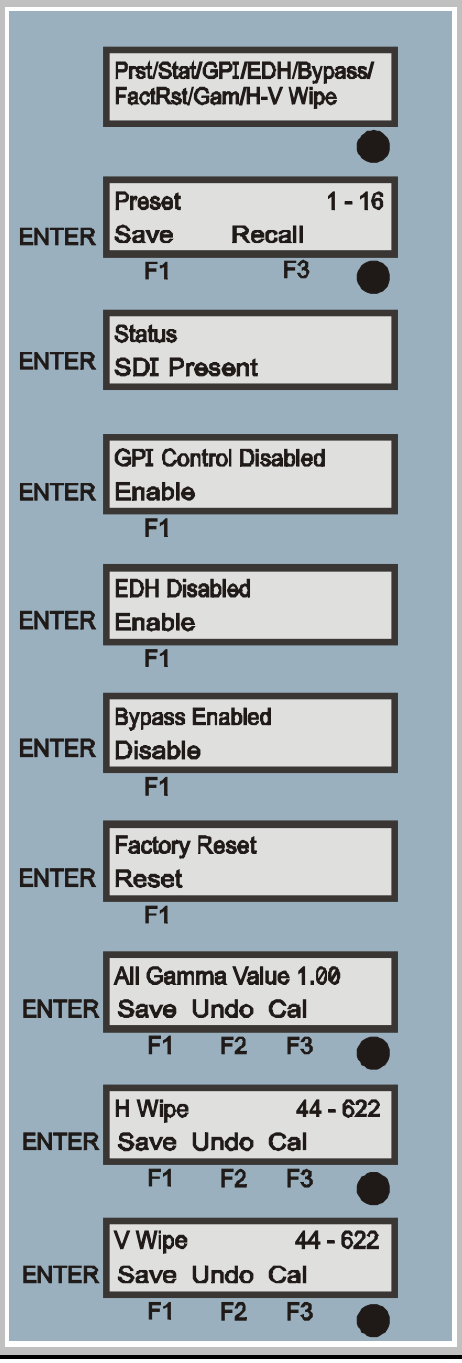
Rotate the shaft encoder to access the timing menus. Press the ENTER key when the chosen menu is displayed to enter data entry mode. Press ENTER again to leave the dataentry mode and continue navigating the available menus.

CoCo Timing menu	Description
	Set Crop H Start from 0 to 723 – default: 0 F1:Save, F2: Undo, F3: Cal (default value) Set Crop H End from 723 to 0 – default is: 723 F1:Save, F2: Undo, F3: Cal (default value) Set Crop V Start from 22 to 312 – default is: 22 F1:Save, F2: Undo, F3: Cal (default value) Set Crop V End from 312 to 22 – default is: 312 F1:Save, F2: Undo, F3: Cal (default value) Set H delay from -128 to 128 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value) Set Y/C Offset from -128 to 128 – default is: 0 F1:Save, F2: Undo, F3: Cal (default value)

5.6 Miscellaneous

Pressing F4 from the home menu will bring up the Miscellaneous menu. The Miscellaneous menu provides access to Preset, Status, GPI, EDH, Bypass and Factory Reset controls.

Rotate the shaft encoder to access the timing menus. Press the ENTER key when the chosen menu is displayed to enter data entry mode. Press ENTER again to leave the data entry mode and continue navigating the available menus.

CoCo Miscellaneous menu	Description
	Select sub-menu with shaft encoder

6 Statesman

The Crystal Vision Statesman PC Control software is designed to control a range of Crystal Vision modules via serial control from a PC.

The main Statesman application communicates with each module in a frame through an active control panel with or without a LCD display. Statesman will not be able to detect modules used in a frame with only a passive front panel.

Minimum pre-requisites:

A PC running either Windows 2000 or Windows XP is recommended

A parallel port dongle for Statesman PCs with attached Crystal Vision frames

An RS422 serial connection from the host PC to the Control/422 RJ45 or Remote/RMT 2 connector on Crystal Vision frames

An active or Statesman enabled control panel MUST be fitted to an FR-AV frame with version 1.63 or above firmware and an Indigo frame with firmware V1.04 or above

An optional RS422 to RS232 converter if the PC has no RS422 ports

Installation procedure

Refer to the readme and/or Help file on the CD before proceeding

To view all application windows, set graphics resolution to at least 1024 x 768

Remove any previous version of the Statesman software using the Add/Remove Programs application in the Windows control panel

Ensure that the Statesman dongle is fitted to the parallel port of the host PC

Insert the Statesman CD and the installation should start immediately – if it does not, run the setup.exe file on the CD

Obey any installation program prompts and restart the PC when asked

Running Statesman for the first time

The Statesman PC Control System may be run from the Crystal Vision programs folder via the Start menu or by double-clicking on the Crystal Vision.exe file in the installed program directory.

When the program runs it will require licence information and an administrator name and password. It will also need to know which computer port is being used to connect to a Crystal Vision frame(s).

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

6.1 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.

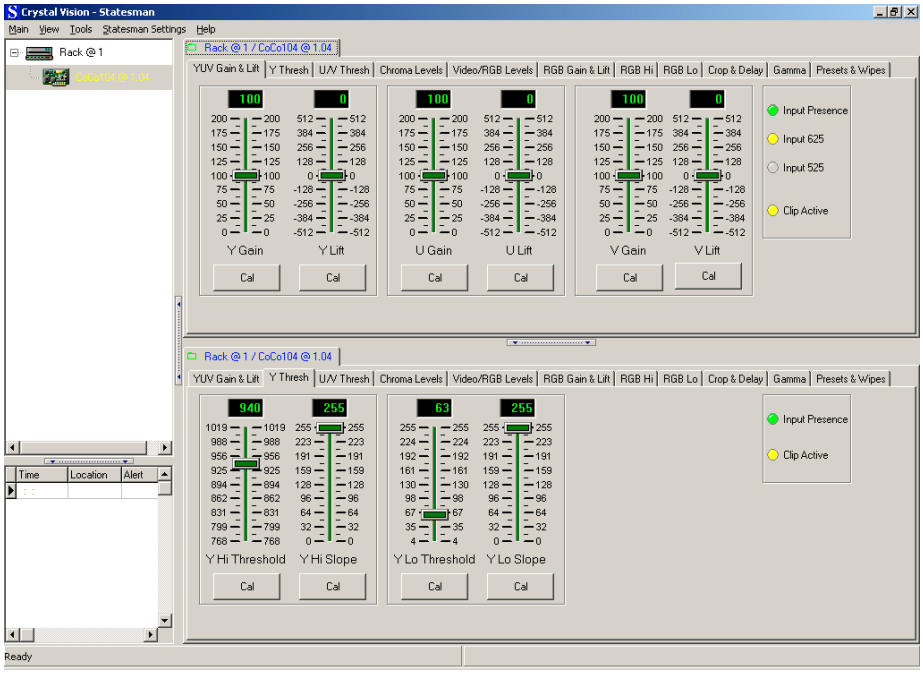
To aid user recognition of module and frame status quickly, the following colour and size coding is used:

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.

Using colour space controls

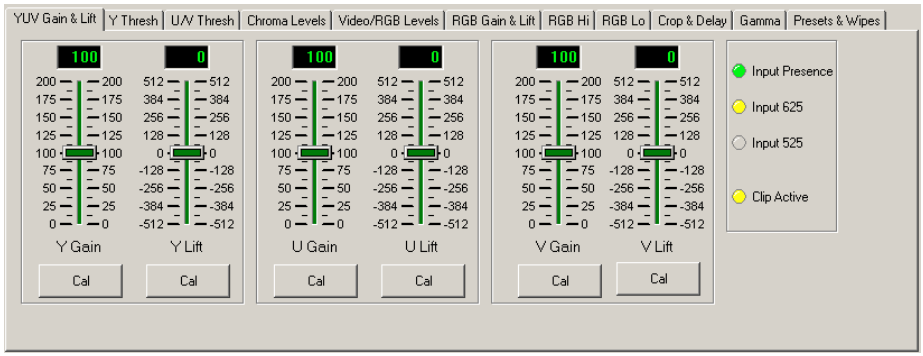
Unless the CoCo104 board is in the bypass mode, the YUV processing will always be active. RGB processing is only active, when RGB functions are enabled, and selected RGB processing is applicable to the signal passing through the corrector/legaliser.

RGB processing prevents YUV signals from developing illegal values when transcoded into RGB colour space.

Enabling RGB processing does not disable YUV processing.

Controlling YUV gain and lift

The YUV Gain & Lift menu provides access to Y Gain, Y Lift, U Gain, U Lift, V Gain, V Lift.



YUV Gain & Lift controls

The YUV Gain & Lift control ranges and default values are as follows:

Y controls	Min	Default	Max
Y Gain	0	100	200
Y Lift (Black Level)	-512	0	512
U Gain	0	100	200
V Gain	0	100	200
U Lift	-512	0	512
V Lift	-512	0	512

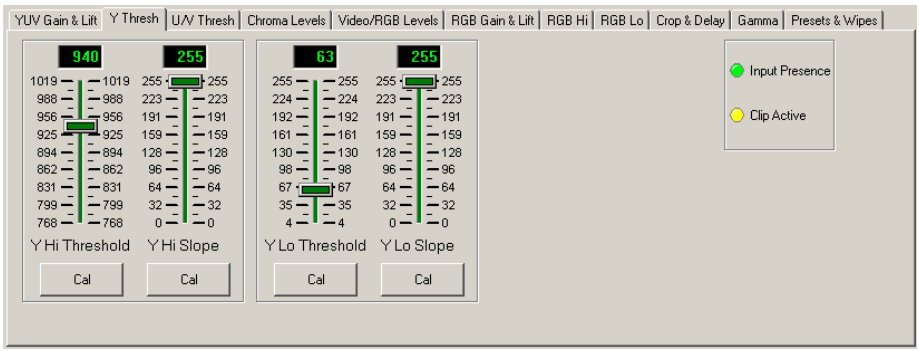
Default values can easily be entered by clicking on individual Cal buttons.

The Input Presence, standard and Clip Active indicators are shown on the right of the menu.

Note: The YUV gain controls DO NOT reflect changes in overall YUV gain (video gain) applied from the CoCo Controller panel. However, the Controller Video Gain control will attempt to maintain the RATIO of YUV gains that are shown or selected in this menu.

Controlling luminance clip threshold and slope

The Y threshold menu provides access to the upper luminance clipping threshold and slope controls and the lower luminance clipping threshold and slope controls.



Y clip upper and lower threshold and slope controls

The luminance clipping threshold and slope ranges and default values are as follows:

Y controls	Min	Default	Max
Y Hi Threshold	768	940	1019
Y Hi Slope	0	255	255
Y Lo Threshold	4	63	255
Y Lo Slope	0	255	255

Default values can easily be entered by clicking on individual Cal buttons.

The Input Presence and Clip Active indicators are shown on the right of the menu.

Note: If the chrominance or luminance amplitudes of the current video meet or exceed the current clip settings, the yellow Clip Active indicator will illuminate.

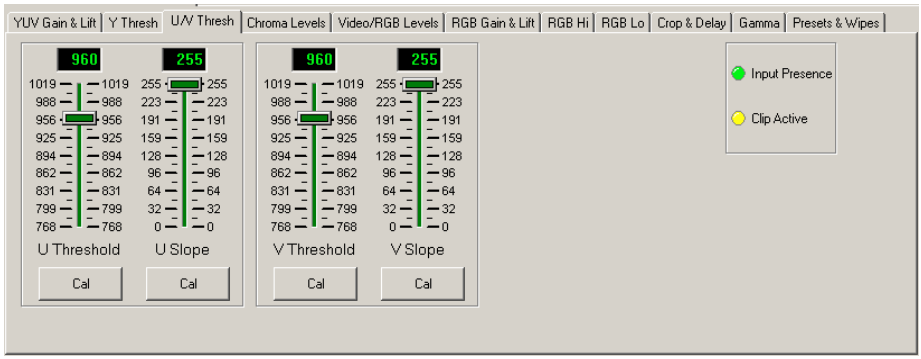
Warning: Take care when adjusting threshold levels. Clip values outside default values may result in illegal video if incoming video contains excessive luminance or chrominance amplitudes.

An unlit Clip Active indicator does not necessarily mean that clipping is not enabled; it is either not enabled or not active (video levels inside current clip settings).

To enable YUV/RGB clipping check the Clip Enabled check box under the Presets and Wipes tab.

Controlling U/V threshold

The U/V threshold menu provides access to the upper U/V clipping threshold and slope controls.



UV clip threshold and slope controls

The U/V clipping threshold and slope ranges and default values are as follows:

Y controls	Min	Default	Max
U Threshold	768	960	1019
U Slope	0	255	255
V Threshold	768	960	1019
V Slope	0	255	255

Default values can easily be entered by clicking on individual Cal buttons.

The Input Presence and Clip Active indicators are shown on the right of the menu.

Note: If the chrominance or luminance amplitudes of the current video meet or exceed the current clip settings, the yellow Clip Active indicator will illuminate.

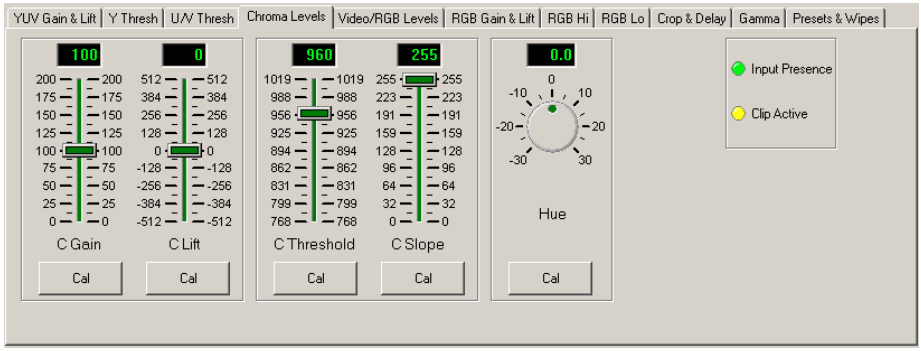
Warning: Take care when adjusting threshold levels. Clip values outside default values may result in illegal video if incoming video contains excessive luminance or chrominance amplitudes.

An unlit Clip Active indicator does not necessarily mean that clipping is not enabled; it is either not enabled or not active (video levels inside current clip settings).

To enable YUV/RGB clipping check the Clip Enabled check box under the Presets and Wipes tab.

Controlling chrominance levels

The Chroma Levels menu provides access to C Gain, C Lift, C Threshold, C Slope and Hue controls.



Chroma level controls

The Chroma Level control ranges and default values are as follows:

C controls	Min	Default	Max
C Gain	0	100	200
C Lift	-512	0	512
C Threshold	768	960	1019
C Slope	0	255	255
Hue	-30	0	30

Default values can easily be entered by clicking on individual Cal buttons.

The Input Presence and Clip Active indicators are shown on the right of the menu.

Note: If the chrominance or luminance amplitudes of the current video meet or exceed the current clip settings, the yellow Clip Active indicator will illuminate.

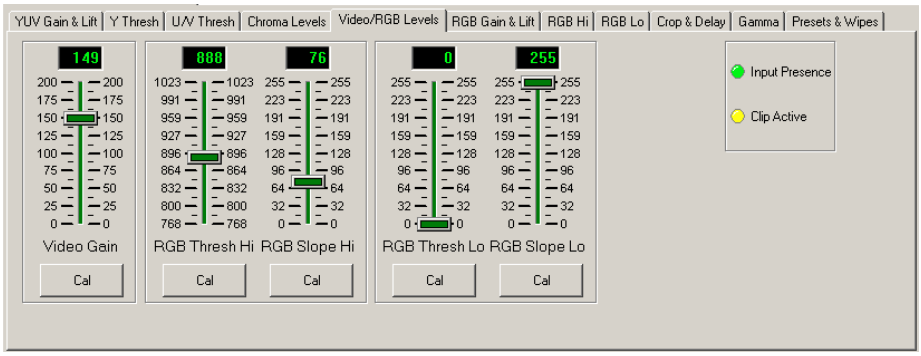
Warning: Take care when adjusting threshold levels. Clip values outside default values may result in illegal video if incoming video contains excessive luminance or chrominance amplitudes.

An unlit Clip Active indicator does not necessarily mean that clipping is not enabled; it is either not enabled or not active (video levels inside current clip settings).

To enable YUV/RGB clipping check the 'Clip Enabled' check box under the 'Presets and Wipes' tab.

Controlling Video/RGB levels

The Video/RGB Levels menu provides access to Video Gain and the overall RGB upper and lower clipping threshold and slope controls.



Overall RGB level, clipping threshold and slope controls

The RGB level control ranges and default values are as follows:

Video/RGB controls	Min	Default	Max
Video (R+G+B) Gain	0	100	200
RGB Threshold Hi	768	879	1023
RGB Slope Hi	0	76	255
RGB Threshold Lo	0	0	255
RGB Slope Lo	0	255	255

Default values can easily be entered by clicking on individual Cal buttons.

The Input Presence and Clip Active indicators are shown on the right of the menu.

Note: If the chrominance or luminance amplitudes of the current video meet or exceed the current clip settings, the yellow Clip Active indicator will illuminate.

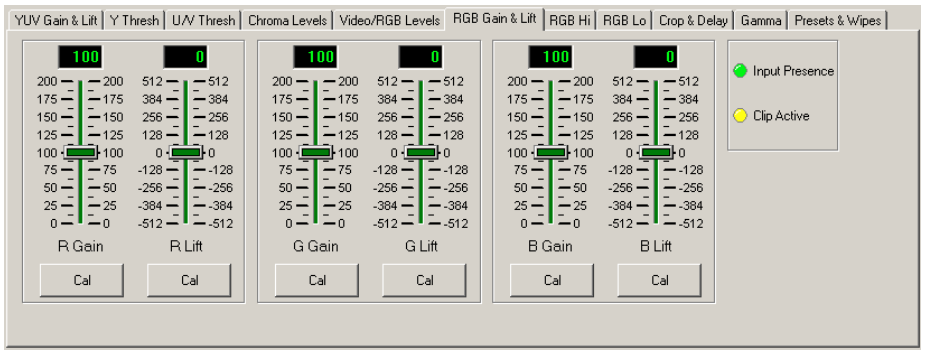
Warning: Take care when adjusting threshold levels. Clip values outside default values may result in illegal video if incoming video contains excessive luminance or chrominance amplitudes.

An unlit Clip Active indicator does not necessarily mean that clipping is not enabled; it is either not enabled or not active (video levels inside current clip settings).

To enable YUV/RGB clipping check the 'Clip Enabled' check box under the 'Presets and Wipes' tab.

Controlling RGB gain and lift

The RGB gain and lift menu provides access to R Gain, R Lift, G Gain, G Lift and B Gain, B Lift controls.



RGB gain and lift controls

The R level control ranges and default values are as follows:

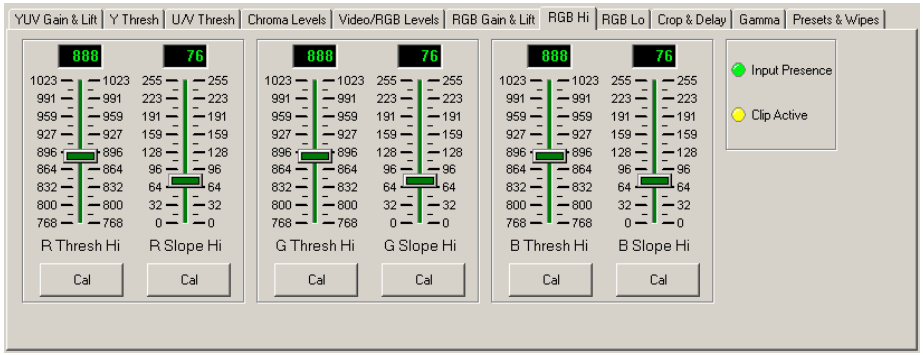
R controls	Min	Default	Max
R Gain	0	100	200
R Lift	-512	0	512
G Gain	0	100	200
G Lift	-512	0	512
B Gain	0	100	200
B Lift	-512	0	512

Default values can easily be entered by clicking on individual Cal buttons.

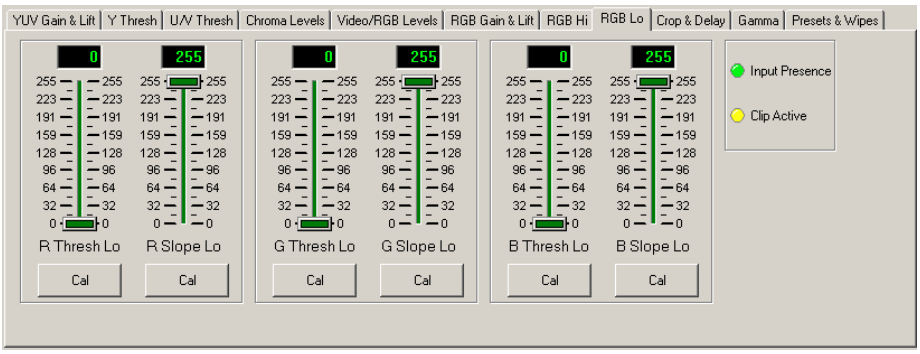
The Input Presence and Clip Active indicators are shown on the right of the menu.

Controlling RGB clip threshold and slope

The RGB Hi/Lo threshold menus provide access to the upper RGB clipping threshold and slope controls and the lower RGB clipping threshold and slope controls.



RGB upper clipping threshold and slope controls



RGB lower clipping threshold and slope controls

The luminance clipping threshold, slope ranges and default values are as follows:

RGB controls	Min	Default	Max
R, G, B (Hi) Threshold	768	879	1019
R, G, B (Hi) Slope	0	76	255
R, G, B (Lo) Threshold	0	0	255
R, G, B (Lo) Slope	0	255	255

Default values can easily be entered by clicking on individual Cal buttons.

The Input Presence and Clip Active indicators are shown on the right of the menu.

Note: If the chrominance or luminance amplitudes of the current video meet or exceed the current clip settings, the yellow Clip Active indicator will illuminate.

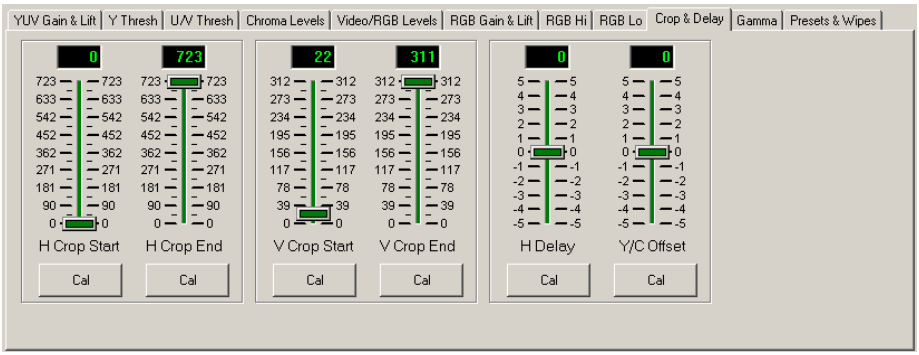
Warning: Take care when adjusting threshold levels. Clip values outside default values may result in illegal video if incoming video contains excessive luminance or chrominance amplitudes.

An unlit Clip Active indicator does not necessarily mean that clipping is not enabled; it is either not enabled or not active (video levels inside current clip settings).

To enable YUV/RGB clipping check the 'Clip Enabled' check box under the 'Presets and Wipes' tab.

Adjusting picture crop

The Crop and Delay menu provides access to the horizontal and vertical crop controls; the horizontal delay and the Y/C offset controls.



Picture crop, delay and Y/C offset controls

The picture crop control ranges and default values are as follows:

Crop controls	Min	Default	Max
H Crop Start	0	0	723
H Crop End	0	723	723
V Crop Start	22	22	312
V Crop End	22	312	312

Setting Y/C offset and H delay

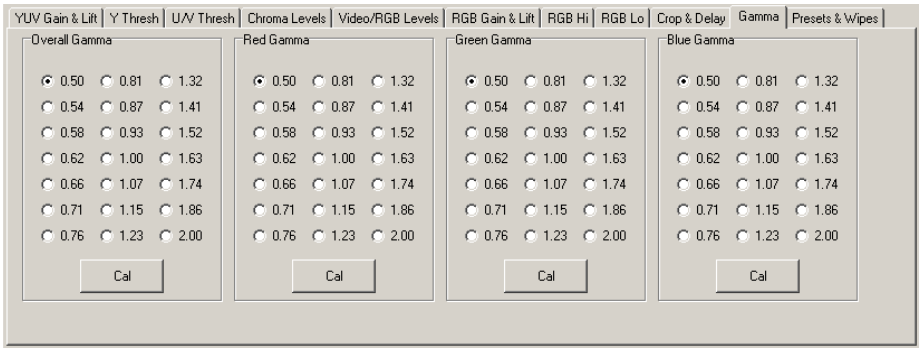
The delay control ranges and default values are as follows:

Delay controls	Min	Default	Max
H Delay	-5	0	5
Y/C Delay	-5	0	5

Default values can easily be entered by clicking on individual Cal buttons.

Changing video gamma

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.

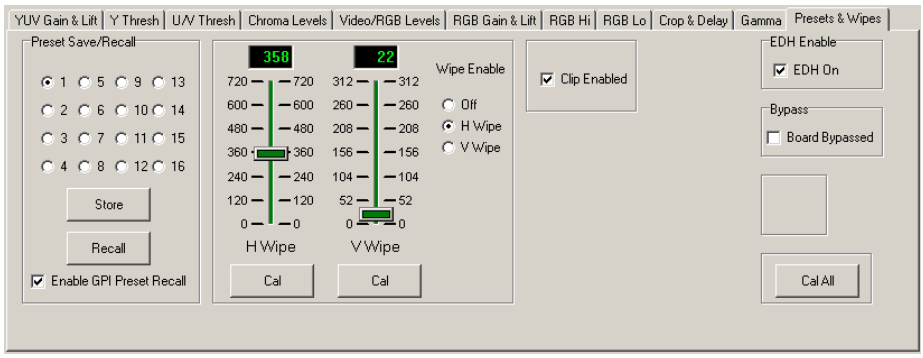


Overall and individual RGB gamma controls

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.

Using presets

The Presets menu allows up to 16 preset memories of the control state of the entire CoCo104 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.

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.

Enable YUV/RGB clipping

To enable YUV/RGB clipping check the ‘Clip Enabled’ box. This will help ensure that the output always contains legal chrominance and luminance amplitude excursions, provided the clip settings are not outside default values.

EDH generation

To enable EDH generation place a tick in the EDH On check box.

Board bypass

The entire YUV/RGB processing may be bypassed, creating in effect a simple 1-in, 4-out SDI distribution amplifier, by clicking in the Board Bypassed check box.

Recalling setup default values

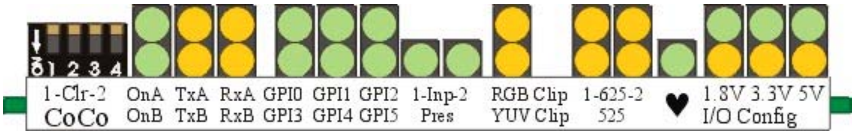
The Cal All button may be used to recall default values for all setup controls. This is a convenient way to re-initialise the board in the unlikely event of any suspected malfunction.

	Select preset memory from 1 to 16 F1:Save, F2: Undo, F3: Cal (default value)
	Show current status - e.g. SDI present/missing, board serial number It is not necessary to press ENTER
	Enable or disable GPI control F1: Enable/Disable
	Enable or disable EDH checking F1: Enable/Disable
	Enable or disable automatic RGB bypass F1: Enable/Disable
	Apply factory reset F1: Reset
	Apply gamma value selected with shaft encoder F1: Save, F2: Undo, F3: Cal
	Use horizontal wipe between input and output Select value with shaft encoder F1: Save, F2: Undo, F3: Cal (default value)
	Use vertical wipe between input and output Select value with shaft encoder F1: Save, F2: Undo, F3: Cal (default value)

7 Trouble shooting

Once the start-up initialisation procedure is complete, CoCo104 can be controlled or configured from active control panel or the Statesman PC interface. Although operation from the card edge is not possible status information is supplied from a number of LEDs.

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



CoCo104 front edge view

Note:

The 4-way DIL switch has no function on CoCo104.
Both input LEDs illuminate when an input signal is present.

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:

Status	Led Colour	Description
OnA	Green - flashing	Communications OK
TxA	Amber - flashing	Serial communication data transmission
RxA	Amber - flashing	Serial communication data reception
OnB, TxB, RxB	Not used	Not used
GPI 0 to 5	Green	GPI preset selection
Inp - Pres	Green	Input present - both LEDs will light
RGB Clip	Amber	RGB clip indication
YUV Clip	Amber	YUV clip indication
625/525	Amber	Indicates 625 (upper LED) or 525 (lower LED)
♥ - flashing	Green	Heartbeat – CPU OK
1.3V	Green	1.3V supply rail OK
3.3V	Green	3.3V supply rail OK
5 V	Green	5V supply rail OK
I/O Config	Amber	Not used

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

Check that SDI OUT(5) is not used, as this is not connected

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 ONA, RXA and TXA lights – flashing indicates successful communications with panel

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

Check ONB, RXB and TXB lights – flashing indicates successful communications with panel

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

Check that jumpers J1, J4, J16, J17 are set for serial communication (right 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).

8 Specification

General

Dimensions	100mm x 266mm module with DIN 41612 connector
Weight	200g
Power consumption	10 W

Inputs

Video	270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M
	Cable equalisation >200m Belden 8281 or equivalent
	Auto 525/625 selection

Outputs

Number and type:	4 reclocked SDI outputs to EBU Tech 3267-E and SMPTE-259M
	Will drive >200m Belden 8281 or equivalent

Processing

Vertical data	Passes entire SDI stream, including HANC and VANC
Delay	Typical input to output delay approx 2 µs, minimum delay 1 µs

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 9-way Remote 2 connector on FR2AV and FR1AV 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

CoCo Controller

Dimensions	482mm wide (19 inches), 44.5mm high (1U), 90mm deep
Weight	1.5 kg
Power Supply	110V/220V auto sensing – built in

Ordering information

CoCo104	Colour correction and legaliser
CoCo Controller	Dedicated 1U control panel
RM01	Single slot frame rear module
Statesman	PC Control System
Indigo 4	4U frame with passive front panel for up to 24 modules
Indigo 2	2U frame with passive front panel for up to 12 modules
Indigo 1	1U frame with passive front panel for up to 6 modules
Indigo DT	Desk top box with passive front panel for up to 2 modules
Indigo 2A	2U frame, Statesman enabled with active control panel for up 12 modules
Indigo 1A	1U frame, Statesman enabled with active control panel for up 6 modules
Indigo DTA	Desk top box, Statesman enabled with active control panel for up 2 modules
Indigo 4S	4U frame with passive front panel fitted with Statesman CPU for up to 24 modules
Indigo 2S	2U frame with passive front panel fitted with Statesman CPU for up to 12 modules
Indigo 1S	1U frame with passive front panel fitted with Statesman CPU for up to 6 modules
Indigo DTS	Desk top box with passive front panel fitted with Statesman CPU for up to 2 modules
Indigo 2-48V	48V 2U frame with passive front panel for up to 12 modules
Indigo 1-48V	48V 1U frame with passive front panel for up to 6 modules
Indigo 2A-48V	48V 2U frame, Statesman enabled, with active control panel for up 12 modules
Indigo 1A-48V	48V 1U frame, Statesman enabled, with active control panel for up 6 modules
Indigo 2S-48V	48V 2U frame with passive front panel fitted with Statesman CPU for up to 12 modules
Indigo 1S-48V	48V 1U frame with passive front panel fitted with Statesman CPU for up to 6 modules
Indigo 2	2U frame without active control panel for up to 12 modules
Indigo 1	1U frame without active control panel for up to 6 modules
Indigo DT	1U Desk top box without active control panel for up to 2 modules
Indigo 2A	2U frame with active control panel for up to 12 modules
Indigo 1A	1U frame with active control panel for up to 6 modules
Indigo DTA	1U Desk top box with active control panel for up to 2 modules
Indigo 2S	Statesman enabled only 2U frame for up to 12 modules
Indigo 1S	Statesman enabled only 1U frame for up to 6 modules
Indigo DTS	Statesman enabled only 1U desk top box for up to 2 modules