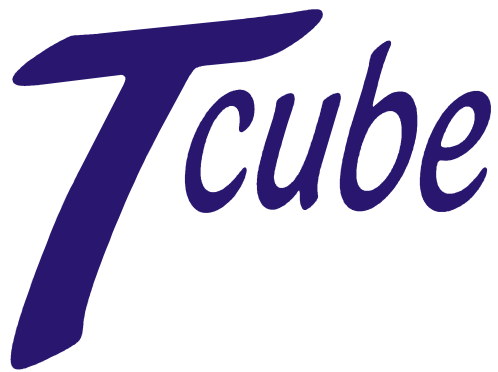




Operation Manual

RC CO Color Correction Remote Control

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RC CO : product description

RC CO is a companion product for KIWI, FIG and CHERRY the powerful OS free computers for video and audio signal processing developed by Tcube.

RC CO provides direct real time access to RGB color correctors features and more generally intuitive access to all set ups of Color correction

Current section will

- detail RC CO100 functionalities,*
- explain how to connect RC CO to KIWI, FIG and CHERRY*



Functionalities

- Direct access to RGB and YUV amplitude controls
- Crops, Clips (legalizing) and advanced YUV controls through menus
- Large graphics screen for easy reading
- 10base T Ethernet connection
- Camera control style mechanics
- Supports all color correction applications in KIWI and FIG

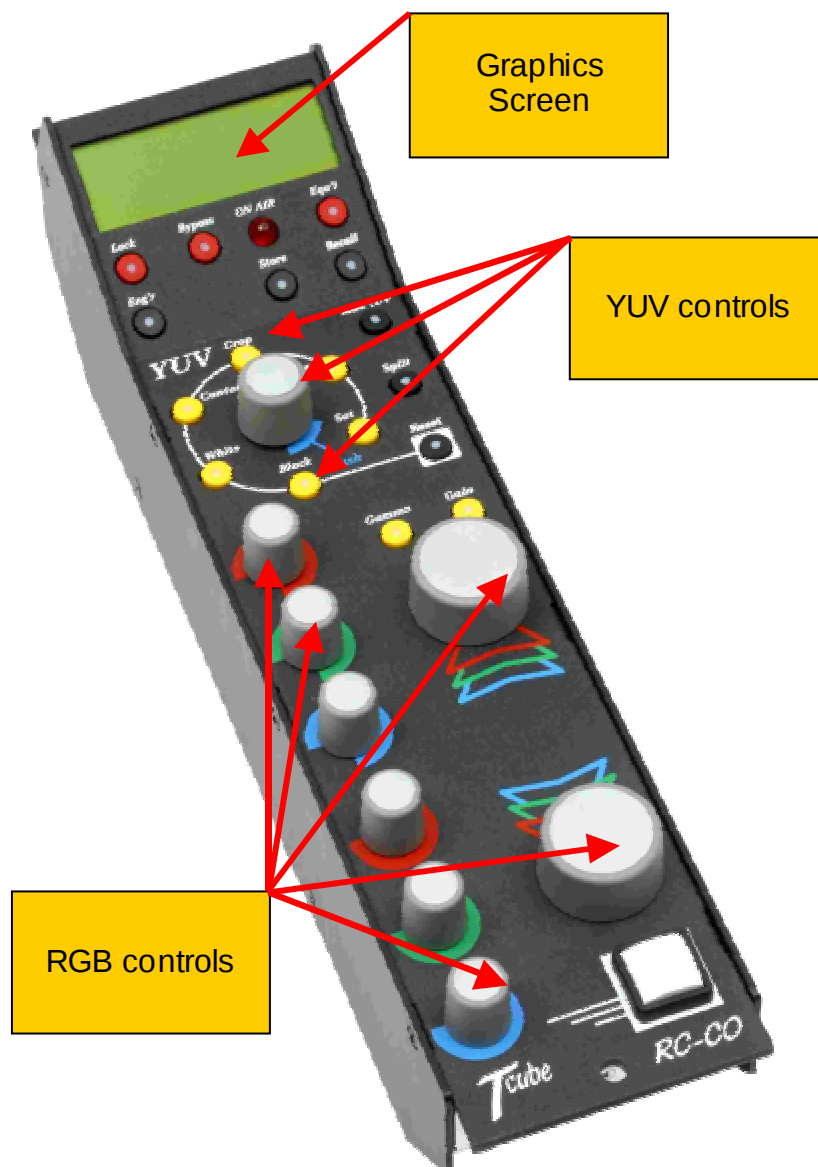


Figure 1 RC CO

Connecting RC CO to KIWI, FIG or CHERRY

RC CO is connected to KIWI over a 10 base T Ethernet network and to FIG or CHERRY over a 100base T Ethernet network

RC CO integrates a 4 port 10/100 Ethernet switch making it easy to control multiple devices from a single RC CO.

Extension of this switch to get more inputs is possible with external hubs or switches. More generally as connection is made over a normalized network, all methods that respect the rules for connecting devices on an Ethernet network apply. However we recommend to isolate the RC CO- CO100(s) network of other networks to avoid congestion and potential mistakes or complexity.

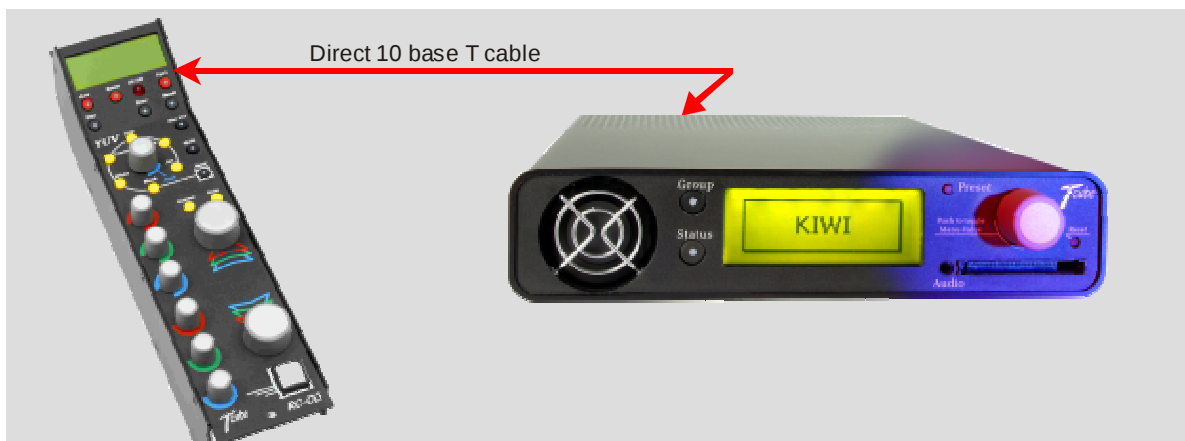


Figure 2 Solution 1 using 1 direct cable in a 1 to 1 connection

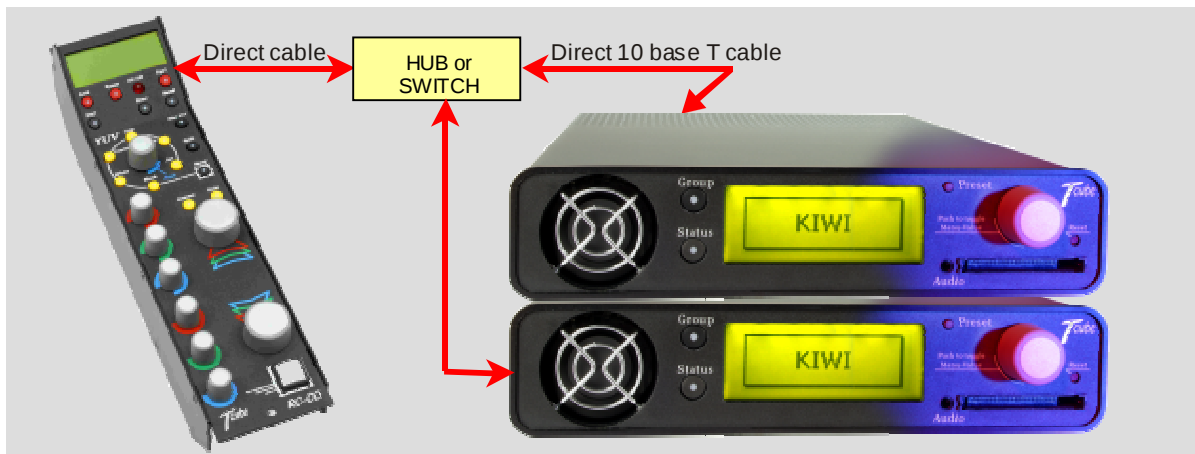


Figure 3 Solution 2 external Hub or switcher

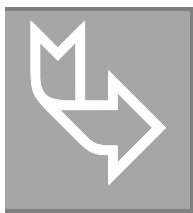


Figure 4 is given as an example when using an external hub.

As RC CO provides multi port controls, the same result is achievable connecting 2 direct 10 base T cables to 2 different ports of RC CO.

See [NETWORK](#) section for more details

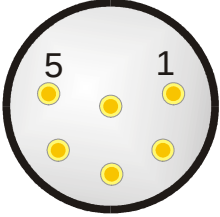
RC CO I/O connections

All connectors are located on the back of RC CO.

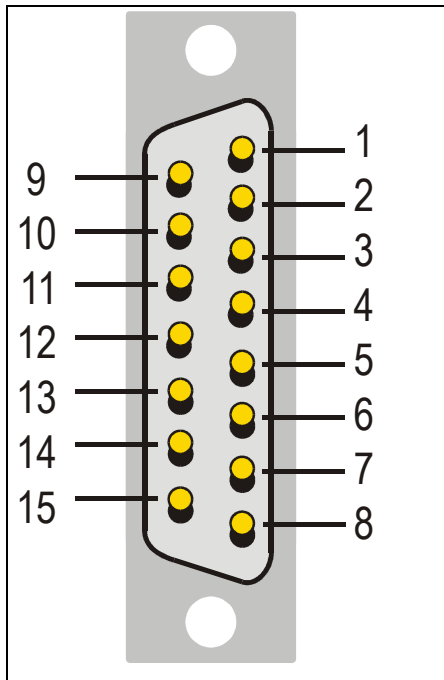
To operate, simply connect POWER to the XLR connector (bottom of device) and Ethernet cable on the RJ45 connector (top of device).

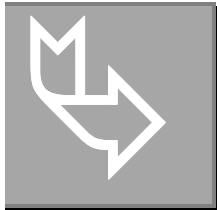
Connectors details

POWER (XLR 6 pin male type)

	+5V	5
	GND	1
	OPEN (UNUSED)	2, 3, 4, 6

GPI (DB15 female type)

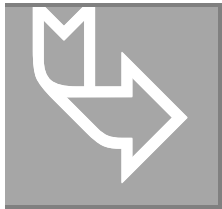
	GPI In 1	7	Direct access to Device 1 Device 1 is ON AIR
	GPI In 2	5	Direct access to Device 2 Device 2 is ON AIR
	GPI In 3	3	Direct access to Device 3 Device 3 is ON AIR
	GPI In 4	1	Direct access to Device 4 Device 4 is ON AIR
	PRESELECT BUTTON	9, 10	
	To be left unconnected	12, 14	
	GND	2, 4, 6, 8 11, 13, 15	



GPI inputs 1 to 4 are

- active by making a short between GPI In and GND
- inactive by leaving GPI In unconnected

GPI Ins must never be connected to an external Power supply.



Selection of the GPI action is done with Group Engineer/ Menu
GPI Mode

Operating RC CO

Current section will

- introduce the functionalities of RC CO*
- introduce the menu organization of Color Corrector function*
- explain how to set up Color Corrector parameters from RC CO*

RC CO Front panel presentation

RC CO panel can be split in 4 sections:

- graphics screen
- miscellaneous functions
- YUV controls
- RGB controls

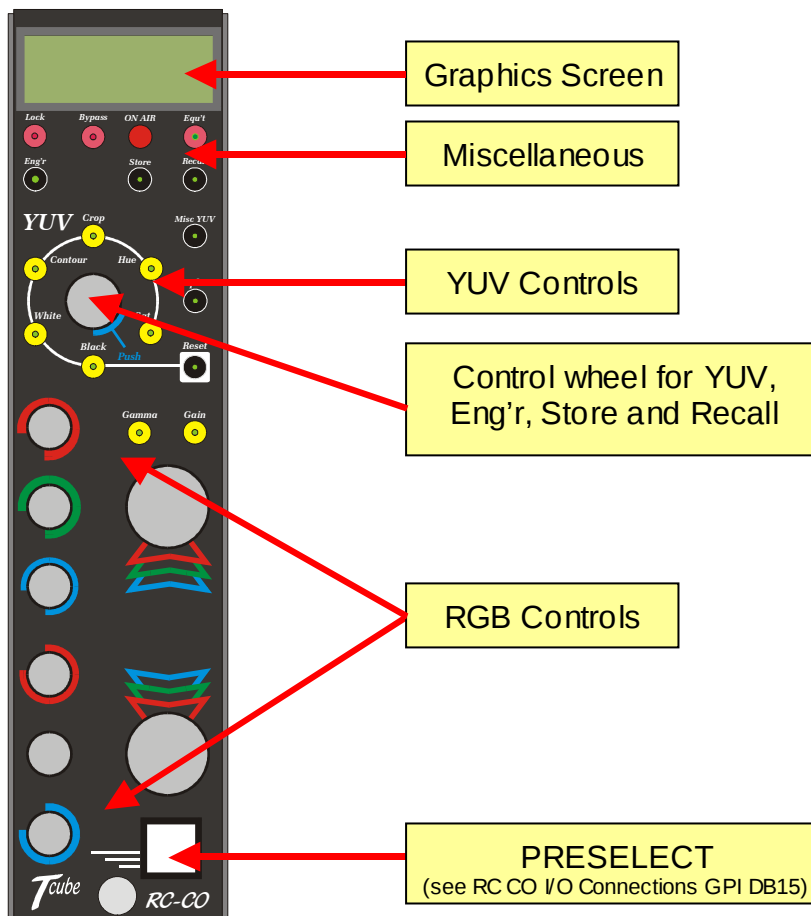
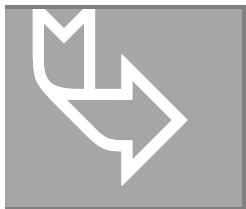


Figure 4 RC CO front panel



Because the different embedded color corrector functions do not have the same levels of functionality, access to some RC CO functions may result with message 'Not supported' on screen.

E. g. : The legalizer only application (CO479 on FIG does not allow access to RGB wheels)

Direct access and Groups

Terminology

RC CO gives access to the different **parameters** of Color Correctors either through **direct access** buttons or through Group **menus**.

A **group** consists of a set of menus related to a single function of the device (example the group **Eng'r** consists of RGB clip, YUV clip, ...)

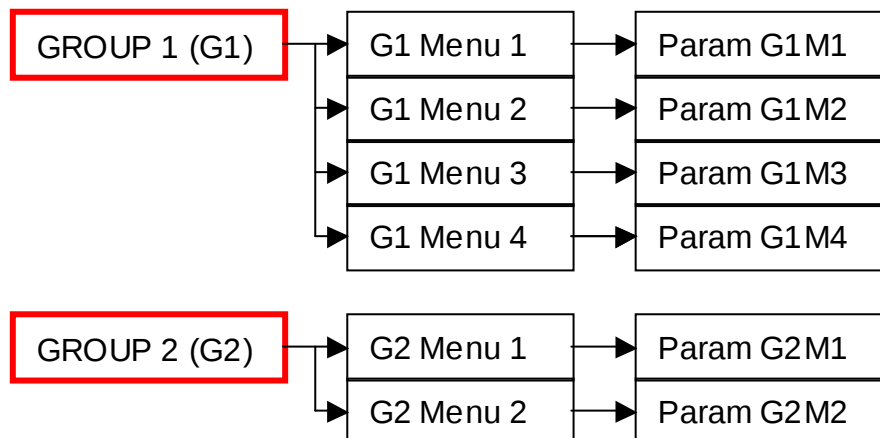


Figure 5 Groups and menus hierarchy

A **direct access** button goes directly to the parameter (example **White** for adjusting *white level* of YUV Proc Amp)

RGB black, peak and gamma levels are also in direct access modes using the **8 bottom wheels** and the 2 exclusive **Gamma/Peak buttons**

Accessing a parameter in group oriented functions and adjusting it

1. Push on a group oriented button (e.g. Eng'r)
2. Turn **YUV CONTROL WHEEL** to scroll the different menus (menu title is on top with a frame around)
3. When framed menu shows desired menu, press **YUV CONTROL WHEEL PUSH**,
4. use **YUV CONTROL WHEEL ROTATE** to adjust the parameter.

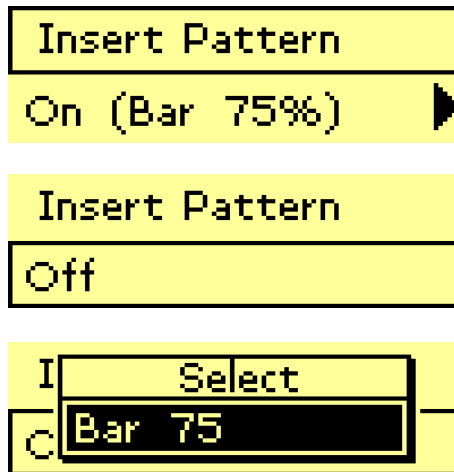


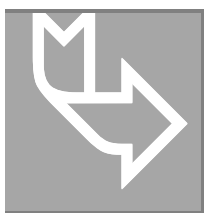
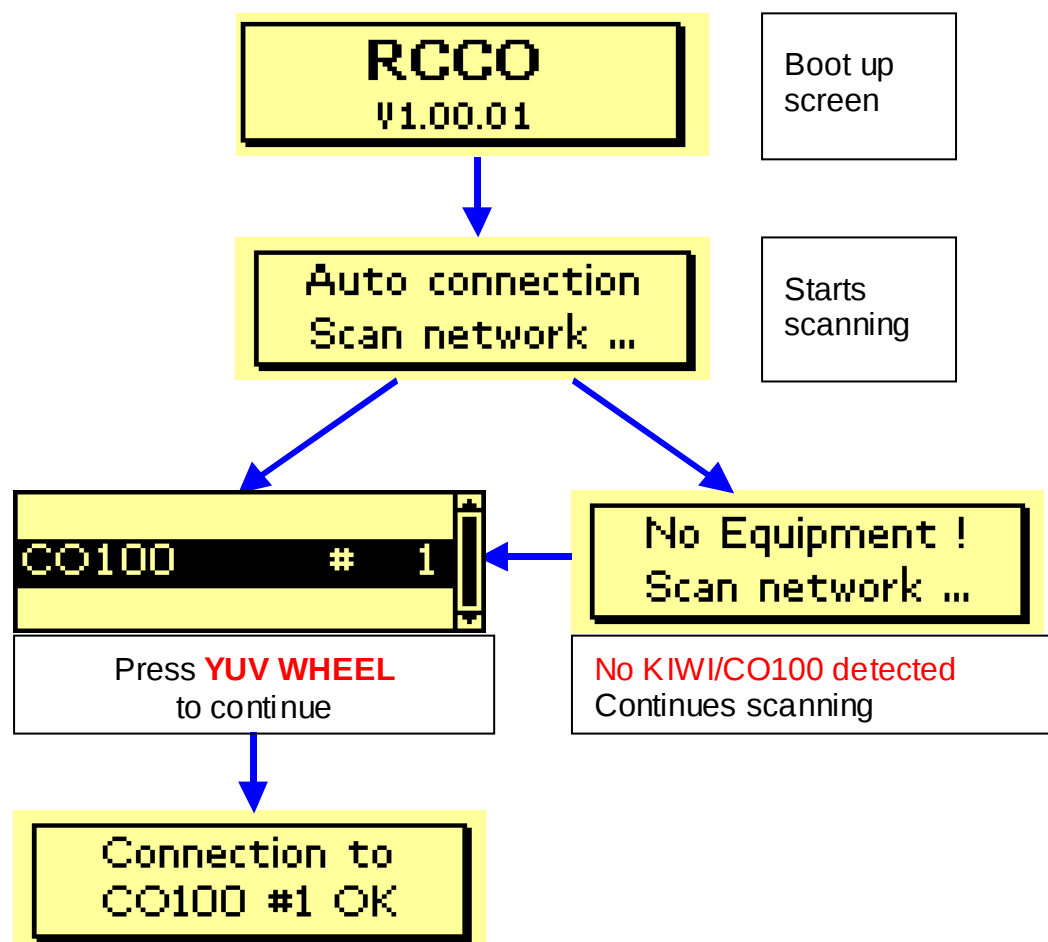
Figure 6 Different examples of Insert Pattern menus

Setting up an Ethernet connection with KIWI and FIG

The following assumes that an Ethernet cable is properly connected between RC CO and a color correction function running either on KIWI or FIG. (see [section 1 Connecting RC CO to KIWI](#))

Before operating, RC CO must take control of CO100/KIWI.. This procedure is automatic at power up and can also be triggered at will with [Equ't](#) button.

When connection is properly established, screen will display the list of available embedded color correction functions (shown as application name; e.g. the embedded color corrector of VB609 will be shown as VB609) present on the network. (see example)

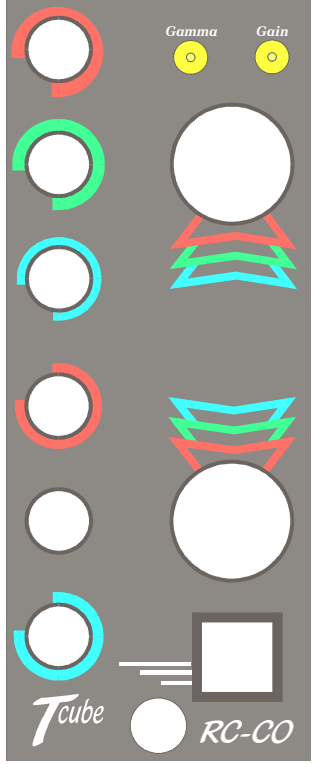
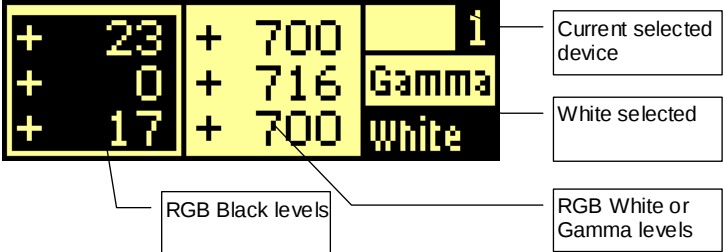


Operation limitation introduced by the embedded Ethernet switch

The internal Ethernet switch of RC CO requires a learning period to acquire the address on its different ports. In the first minute or less of connection, this acquisition period generates some blockings of controls for one to 10 seconds. After this acquisition period, the controls are fluid.

List of parameters and how to access

RGB

	Button	
	Gamma Gain	Exclusive buttons. Assigns the 4 top wheels either to Gamma or Peak RGB values
	RGB and Master wheels (Top)	Controls either Peak or Gamma values of RGB signals, independently (small wheels) or together (large wheel)
	RGB and Master wheels (Bottom)	Controls either Black values of RGB signals, independently (small wheels) or together (large wheel)
 Graphics screen display in RGB mode (here Master or RGB peak level is selected)		



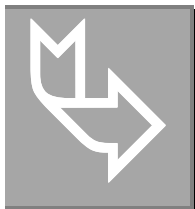
Resetting a RGB parameter

Pushing the **RESET** button will preset the RGB parameter(s) that is (are) displayed in inverted video on the graphics screen.

To reset a parameter which is not currently displayed in inverted video, **either** turn its associated wheel and press **RESET** or use the central **YUV WHEEL** to scroll through the different parameters and press **RESET**.

Priority to RGB adjustments

Action on one of the RGB wheels will cancel any other adjustment like YUV Proc Amp, Misc or Engineer (Eng'r)

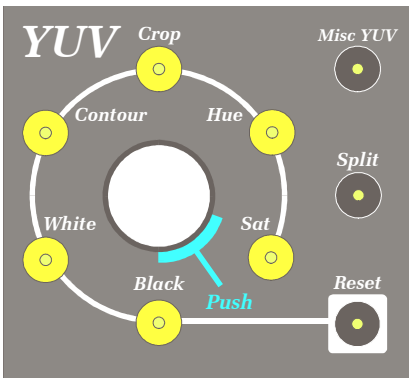


DO NOT MISINTERPRET GAMMA VALUE DISPLAY.

A value of 0 for Gamma corresponds to nominal gamma (or more exactly input gamma is not changed, theoretically 0.45)

Positive value increase gamma upto approx. 0.80, negative value decrease gamma downto approx. 0.25.

YUV and Split

	Button	
	Black	changes Y black level
	White	changes Y peak level
	Contour	Adjusts Y Horizontal contour
	Crop (group) Top Bottom Left Right	Adjusts picture cropping (active area only)
	Hue	Rotates Cb/Cr
	SAT	changes simultaneously Cb and Cr gains
	Misc YUV (group) Cb Gain Cr Gain Cb Offset Cr Offset Y-C Timing Pattern	Corresponds to YUV advanced group of CO100/AP200 front panel
	Split (group) Off H V	Defines position of the split screen.

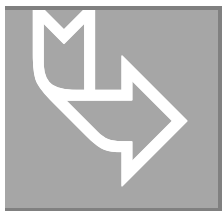


Contour process is simply adding or subtracting High frequency portion of Y signal to the incoming Y.

A value of 0.00 will pass Y unchanged

Appropriate negative values of contour with a center freq of 5.5M provide absolute cancellation of PAL or NTSC sub carriers.

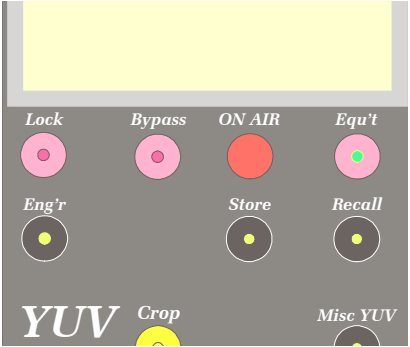
Excessive contour may lead to ringing effects on sharp pictures.



Use of Hue with saturated colors will force the legalizer to limit saturation.

Though definitely not a problem in itself but a real protection, it might confuse the user.

Miscellaneous functions keys

	Button	
	Lock	Locks RC CO control panel Lock is manual or automatic after a few minutes without action on RC CO Configure with menu Lock mode under Engineer
	Bypass (group) Off Full RGB Bypass	Defines bypassing of Color Corrector off : normal operation, recommended, Full : transparent mode RGB bypass : YUV proc amp only Central led of button is lit if Bypass mode is Full or RGB
	Equ't	Select the Color corrector channel to control Direct access is also possible using GPI (see section NETWORK)
	Eng'r (group) Blanking FC Display Screen FC Display Mode FC Filter Clip Black RGB Stretch Black RGB Clip White RGB Stretch White RGB Clip Black YUV Stretch Black YUV Clip White YUV Stretch White YUV SAT Clip SAT Clip Setup RGB Wheel X'er 525L unit Operation Lock Mode GPI Mode	Sets up blanking (off, H only, V only, H and V) mode Controls Illegal color display mode Sets up thresholds for RGB and YUV clippings. Defines RGB wheels quantum multiplier, ... See descriptions in Application manual. For network installation, see section NETWORK
	Store	See STORE RECALL section description
	Recall	



Even if YUV clipping provides some form of legalization, **absolute legalization** is only achieved by **proper settings of RGB Clip menus**.

Store - Recall group

This group is used to store and recall configurations of the device. A maximum of 3 configurations plus Preset is available.

When entering the Group select (WHEEL.PUSH from Group or GROUP BUTTON.PUSH), comes the list:

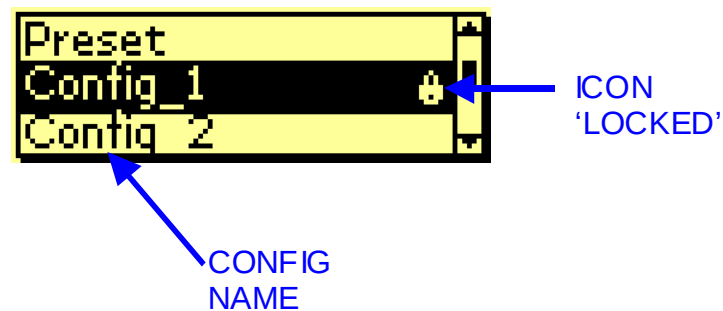


Figure 7 List of Configurations

Using WHEEL.PUSH will display a pop up menu. Available options of the pop up depend on the status of the configuration (see examples and table below)

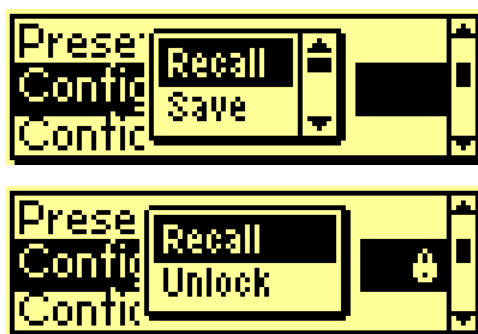


Figure 8 Different examples of Pop up menus

	Save	Recall	Lock Unlock	Erase
PRESET		✓		
CONFIGx (not locked)	✓	✓	✓	✓
CONFIGx (locked)		✓	✓	
EMPTY	✓			

Saving on an EMPTY configuration will create CONFIGx (x=1 to 3, first not used index)

Maintenance

Current section will

- explain how to make an update from a compact flash,

Update from a compact flash

RC CO is a programmable device taking data from a compact flash.

Once content of compact flash is transferred into the RC CO, compact flash becomes useless and RC CO will boot up and operate from internal flash memory until user decides to update software.

Transfer of files on the compact flash

Unless you received an already programmed compact flash, this is the first step of the procedure.

A software update consists of 1 file (rcco.ini) and one directory (RCCO). It will come to you all compressed in a single rar file. **Before proceeding, you need to decompress this file.**

Step 1.1: format compact flash.

Compact flash must be formatted as FAT.

Step 1.2: copy file on compact flash.

Using drag and drop or any other means like cut and paste, copy the **rcco.ini** file and the **RCCO** directory on the compact flash (at root level).

Make sure that the files are effectively copied (experience has shown that computer cache may fool user) by closing compact flash explorer and reopening it.

Then remove compact flash from reader.

Updating RC CO from compact flash

Step 2.1: Insert Compact flash into slot located at the rear side close to the PSU XLR of the RC CO,

Step 2.2: turn RC CO power supply off and on

Step 2.3: Wait until graphics shows

Download completed

Then

Remove compact flash

Step 2.4: After removing compact flash, RC CO will reboot and update is finished;

Network configuration

Current section will explain

- *how to configure 10 base T Ethernet network,*
- *how to define Ethernet address of KIWI/CO100*

Control network: generalities

RC CO is connected to KIWI and FIG over a 10/100 base T Ethernet network.

RC CO integrates a multi port 10/100 Ethernet switch making it easy to control multiple color correction functions from a single RC CO.

Use of internal RC CO switch is recommended, however, cabling implementations of the Ethernet network might involve an external Hub or switch. More generally as connection is made over a normalized network, all methods that respect the rules for connecting devices on a 10/100 base T network apply. However we recommend to isolate the RC CO- KIWI-FIG network of other networks to avoid congestion and potential mistakes or complexity.



Figure 9 Solution 1 using 1 direct cable in a 1 o 1 connection

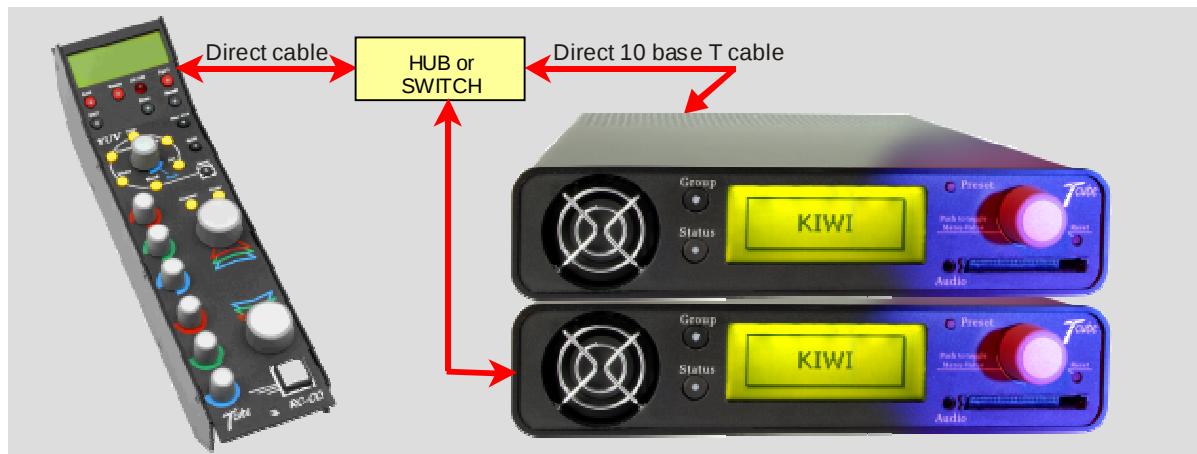
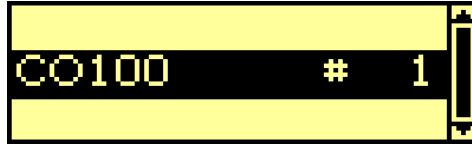


Figure 10 Solution 2 external Hub or switcher

RC CO functions related to the control network

Equip't

Button labeled **Equip't** displays the list of available devices (list size is defined in **Eq't List size** menu)

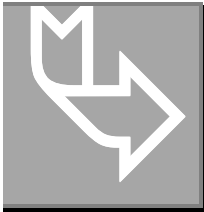


Example with List size = 1

GPI In 1 to 4

When a short to Gnd is applied to GPI Inx (x 1 to 4) RC CO will

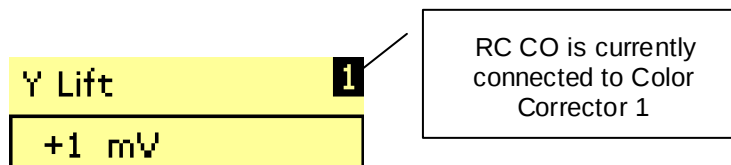
- Either (**GPI Mode = Select Equipment**) directly connect to the corresponding color correction channel found on network
- Or (**GPI Mode = ON AIR Control**) turn on the **ON AIR** led if it corresponds to currently selected CO100 channel



Selection of the GPI action is done with Group Engineer/ Menu
GPI Mode

Permanent display of connected equipment

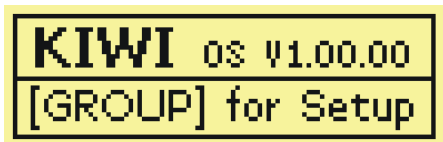
All menus except SAVE RECALL display in inverted video the currently connected equipment



Setting up the IP Address in KIWI

1/ Power On the KIWI

2/ When the application has started, do a **RESET** on the front panel (hidden button on the right of panel), then graphics screen will display during 2 or 3 seconds:



3/ While bottom line is flashing, press GROUP, then use WHEEL to select **TCP IP SETUP**, press WHEEL again and turn until you get



Where X is the IP address. **MUST BE 1, 2, 3 or 4**

TURN THE WHEEL TO ADJUST (SET X TO 1),

THEN PRESS WHEEL AGAIN (to get a frame around **KIWI ID**)

THEN TURN WHEEL TO SEE **TCP/IP STATUS**

CHECK THAT BOTTOM LINE SHOWS 176.23.1.X

PRESS GROUP, SELECT RUN APPLICATION and PRESS WHEEL

Setting up the IP Address in FIG

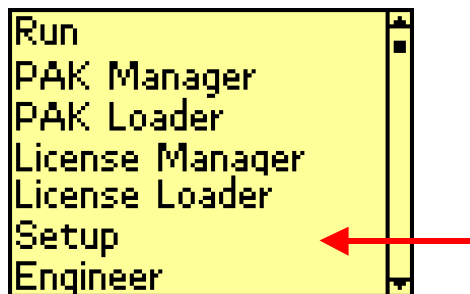
The Setup menu is made of 3 sub menus: Workgroup Setup, TCP/IP Setup and Date/Time.

Workgroup Setup

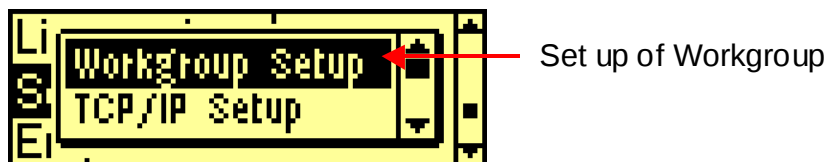
Workgroup Setup consists of defining FIG Id and Group Id.

To proceed, press **RESET** button (or turn power off and on)

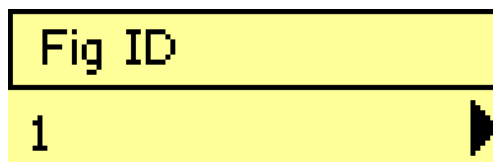
During boot, press **GROUP** in order to get the OS operation screen



Turn **WHEEL** until you get **Setup** in inverted video, then push **WHEEL**. Graphics screen will show :



Turn **WHEEL** until you get **WorkGroup Setup** in inverted video, then push **WHEEL**. Graphics screen shows:



If you want to change FIG Id, push **WHEEL** and turn it until you see desired **Id number**

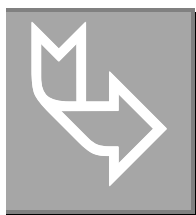
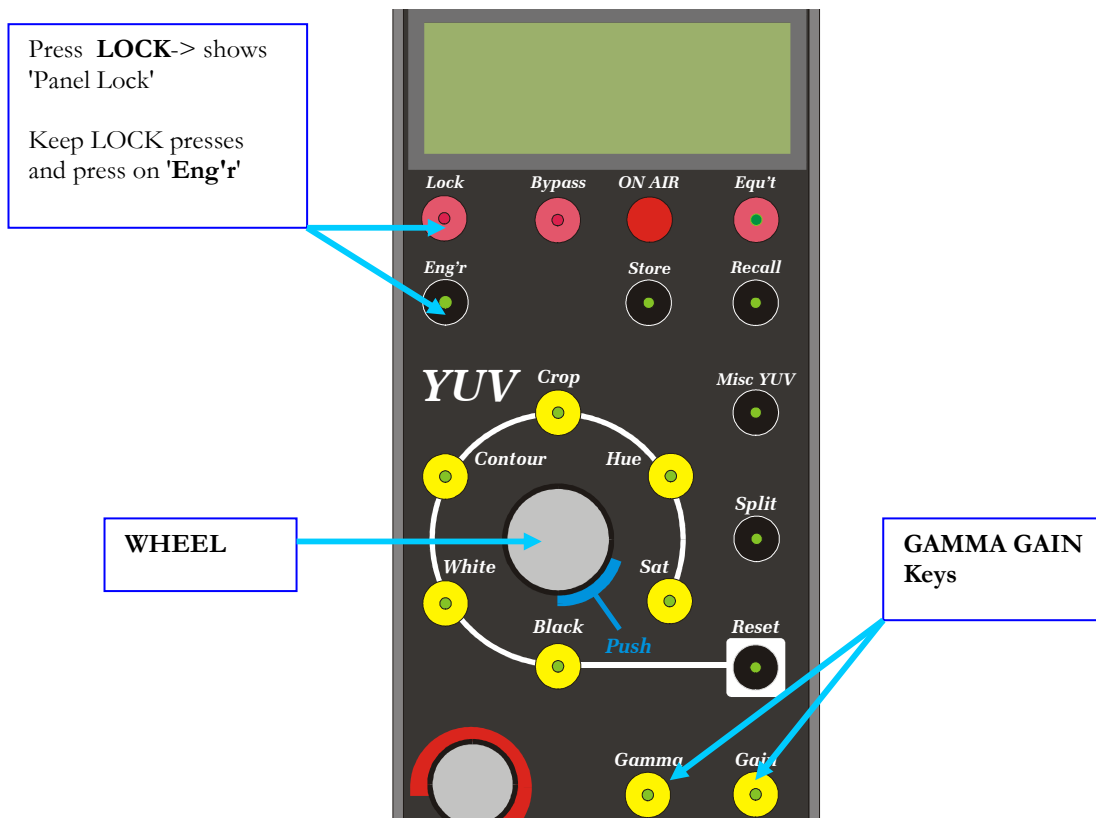


FIG Id range is limited between 1 and 254

IP Address Set up in RC CO

A/Press LOCK-> shows 'Panel Lock'

B/ While keeping LOCK presses, press on 'Eng'r'



C/ You get a list of menus (selection by turning WHEEL)

Menu Name	Parameters
TCP/IP Mode	Tcube Net Basic (automatic Address 176.23.x.y) Tcube Net Advanced (2 first fields of IP Address are editable) Static IP (all fields of IP Address are editable)
IP Address (requires TCP/IP mode as TcubeNet Adv or Static IP)	IP address definiton
Mask Address (requires TCP/IP mode as Static IP)	Mask address definiton
Reboot	

IP address or Mask Address Editing

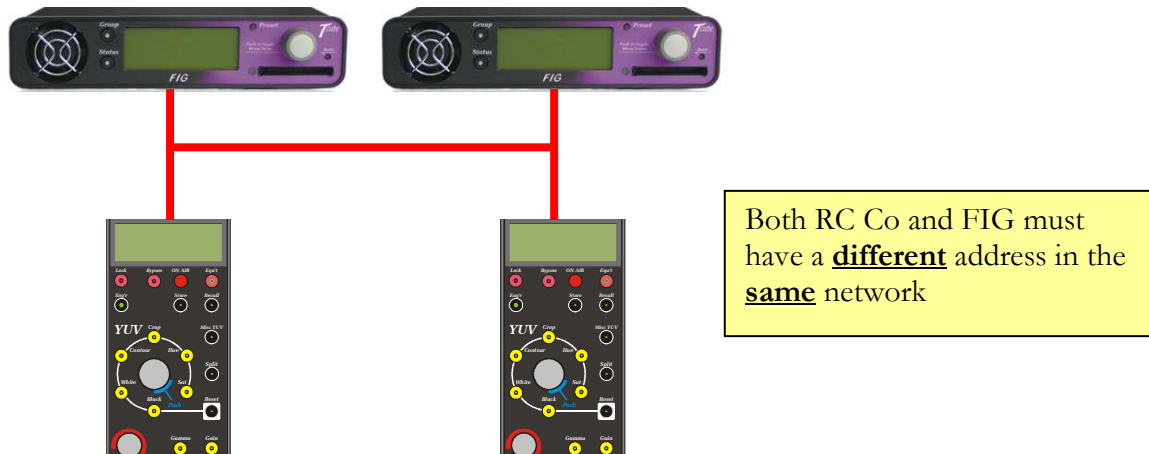
NETWORK CONFIGURATION

Turn **WHEEL** to edit first digit, then push on **GAIN** key to scroll digit. Use **GAMMA** Key for reverse scrolling

When over, push on **WHEEL** to exit menu.

Always end operation by selecting Reboot and push on WHEEL

MULTIPLE RC-CO in the same Network



Solution

- 1/ use **Tcubenet Basic** for FIG and allocate last digit of address using FIG ID menu
- 2/ use **Static IP** address for RC CO and define RC CO1 as 176.23.2.1 and RC CO2 as 176.23.2.2 (last digit of address may be changed)