



Q-Ball

Operation Manual



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General

The camera system is based around four main components: The main Q-Ball head, the interface unit, the joystick control and the Universal RCP.

The joystick control and the Universal RCP have their own instructions so will not be described in detail here. Appendix 'A' shows the interconnection details of the units.

Main Q-Ball Head Unit

The Q-Ball head unit is sealed against moisture and dirt ingress. However, it should not be installed long term in an outdoor location without additional rain protection. Always use the lens adapter with the clear glass when outdoors.

The mounting is by means of a standard ¼" UNC thread, or special mount adapter.

Although the pan and tilt axes can be moved manually, this is not recommended as it can cause excessive play in the gearboxes. Under no circumstances should the axes be moved manually while the unit is powered.

A single cable connects the head unit to the interface box. The cables have six pin male Lemo connectors at each end for connecting the Q-Ball head to the interface box. Various length cables can be used without loss of performance. 5m, 10m, 20m and 30m cables are currently available.

Interface Unit

The interface unit takes power from a standard XLR4 socket and will accept any voltage from 9 to 18v DC.

The data input on the XLR3 is for data which conforms to the standard Camera Corps data system. This is in the form of a balanced audio signal which can be sent over virtually unlimited distances down a normal microphone or CAT5 cable. No DC continuity is necessary. The joystick controller has output level adjustment to handle long cable lengths if necessary.

The rotary switch should be set to the required ID number being used by this camera. Normally this will be in range 1-6 to agree with the channel selected on the RCP and PTZF controller.

The LED beneath this switch is Green when data is present on the XLR input, and changes to Red if a Cue/Tally is sent from the RCP or PTZF controller. The Cue/Tally can be used to test the data system and ID are set and working correctly even if the Q-Ball head unit is not attached to the interface unit.

The four DIP switches have various functions. The left hand two switches are used to set a 'Group' number. This is only effective when using the Multi-Camera Control System.





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The right hand two DIP switches are used to compensate for the length of cable used between the Q-Ball head and the Interface Unit. For cable lengths less than 10m both switches should be OFF. For a 10m cable SW3 should be ON and SW4 OFF. For a 20m cable SW3 should be OFF and SW4 ON. If a 30m cable is used then both switches should ON.

The LED below the DIP Switches indicates that power is present.

Note that the head unit can be plugged in and out of the interface while power is on without damage. However, if the camera is plugged into an interface unit which is already switched on, then initial data which is sent to the camera during switch on will be missed and the camera may be in a non standard condition.

Changing the Camera Format

The Q-Ball can operate in both SD and HD modes at 50hz or 59.94 hz. Both 720p and 1080i formats are available in HD. In SD modes both 4x3 and 16x9 aspect ratios can be selected.

The required format is set using the rotary channel select switch together with the four DIP switches. The following procedure must be followed to set or change the format:-

(Note that the Q-Ball camera head unit must be connected during this procedure)

- Remove power from the Interface Unit.
- Set the rotary channel select switch to channel 0.
- Set the four DIP switches to the required format using the table below.
- Apply power to the Interface Unit and wait until the LED below the channel select switch flashes RED/GREEN. (Approx 10secs).
- Remove power from the unit and set the rotary channel select switch and DIP switches to their normal required settings.
- Next time power is applied to the Interface unit the camera will have the new format.
- The DIP switches on the top of the interface unit must also be changed for SD or HD modes. (Visible through the slot in the top panel) SW1, 2 and 7 must OFF for HD and ON for SD.

DIP SWITCH >		1	2	3	4
HD	1080i /50	OFF	OFF	OFF	OFF
HD	1080i /59.94	ON	OFF	OFF	OFF
HD	720p/50	OFF	ON	OFF	OFF
HD	720p/59.94	ON	ON	OFF	OFF
SD	PAL(50) 16x9	OFF	OFF	ON	OFF
SD	PAL(50) 4x3	OFF	OFF	ON	ON
SD	NTSC(59.94) 16x9	ON	ON	ON	OFF
SD	NTSC(59.94) 4x3	ON	ON	ON	ON



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Wide Angle Adapter

The standard 10:1 lens provides a zoom range from 51deg to 5.1deg angle of view. To provide a wider shot it is possible to remove the standard lens adapter and replace it with the wide angle adapter unit. This widens the shot by 0.7x.

As with most wide angle adapters there will be a slight loss of quality particularly in the corners, and also if the zoom is used while the wide angle adapter is fitted.

The adapters simply unscrew by turning the knurled ring. When screwing in the adapter take care to ensure the thread is correctly engaged before tightening the unit.

Use Vaseline on the lens unit thread and around the rubber sealing ring to maintain a good seal.

Embedded Audio

The Interface box has a 9 way 'D' connector on the side (Female) which allows up to four audio channels to be embedded into the output SDI data stream.

The DIP switches on the top of the Interface Unit are used to turn the embedding on or off and set the audio levels.

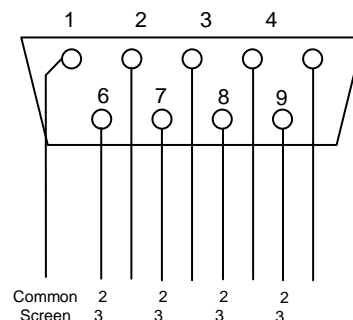
DIP switch 6 turns the audio embedding on or off.

The audio levels are set using DIP switches 4 & 5 as shown in the table below:-

Input Level Range	Full Scale (0dBFS)	DIP Switch 4	DIP Switch 5
Professional US	+24dBu	LEFT (Off)	LEFT (Off)
Professional European	+18dBu	LEFT (Off)	RIGHT (On)
Consumer High (IHF)	+12dBu	RIGHT (On)	LEFT (Off)
Consumer Low	+15dBu	RIGHT (On)	RIGHT (On)

Audio 9 w 'D' Connections – Male 'D' connector on cable

- | | | | |
|----|---------------|-------|-----------|
| 1. | Common Screen | | |
| 2. | Channel 1 | LEFT | XLR pin 3 |
| 3. | Channel 1 | RIGHT | XLR pin 3 |
| 4. | Channel 2 | LEFT | XLR pin 3 |
| 5. | Channel 2 | RIGHT | XLR pin 3 |
| 6. | Channel 1 | LEFT | XLR pin 2 |
| 7. | Channel 1 | RIGHT | XLR pin 2 |
| 8. | Channel 2 | LEFT | XLR pin 2 |
| 9. | Channel 2 | RIGHT | XLR pin 2 |





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Component Video Output

Version 6 Interfaces have an additional 9 way 'D' Male connector on the side of the box.

This provides a component video output when HD modes are selected, or an S-Video and output when SD modes are selected.

Version 6 also includes a Composite monitoring output (low quality) on pin 4 of the connector.

Serial Data input

An alternative to the audio data input is available in the form of serial RS232 or RS422 data. This is connected to the 9 way 'D' male as shown in the connection listing below.

Links inside the interface box must be changed to allow serial rather than the audio data input to be used.

Link 2 is connected to allow serial data inputs. (In the unconnected mode it is left on just one of the link pins). Link 3 is moved to set either RS232 or RS422 style data inputs. Both of these links are labelled showing their function on the PCB. Note that serial baud rate is not selectable and must be 9600.

See Appendix 'C' for lid removal instructions.

Video Output 9 way 'D' Connections – Female connector on cable

HD Modes

1. Y output
2. Pr output
3. Pb output
4. NC
5. RS422 +ve or RS232 input
6. 0v
7. 0v
8. 0v
9. RS422 -ve

SD Modes

1. Y output (Luminance)
2. Unused
3. C output (Chrominance)
4. Composite Video (PAL or NTSC depending on mode selected). (V5 and later only).
5. RS422 +ve or RS232 input
6. 0v
7. 0v
8. 0v
9. RS422 -ve



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Appendix ‘A’ – CCU panel and Joystick panel settings

Note that the RCP panel should be selected to ‘Sony’ camera make, and ‘Q-Ball’ or ‘Q-Ball IR’ camera type to control the Q-Ball. (Note that all Q-Balls are now IR capable).

For the older style CCU’s select ‘CC HDZ’ as the camera type.

The Joystick panel should be set to ‘Q-Ball’ in the setup menu. Although not essential, set the baud rate of the RCP to 2400 and the baud rate of the Joystick to 4800.

Appendix ‘B’ – Internal link settings.

There are three links on the inside of the V6 Interface boxes.

LK1 is used to change the group channel number setting when using the multi-camera control system. With the link ‘open’ (default) the group numbers 0 – 3 are selected using DIP switches 1 & 2 on the front panel.

DIP 1	DIP2	GROUP(LK1 open)	GROUP(LK1 closed)
off	off	0	4
on	off	1	5
off	on	2	6
on	on	3	7

With link LK1 closed the group selection then provides groups 4 – 7 instead of 0 – 3.

LK2 is used to change the data input from the standard audio data to either RS232 or RS422 data.

LK3 selects between RS232 and RS422 data.

Note that only 9600 baud is available for these inputs.

Appendix ‘C’ – Removing the Interface Box lid.

To access the links, the lid of the interface box must be removed to access the PCB. First, remove the power from the unit. Then remove the three nuts holding the BNC connectors on the rear of the unit. Now remove the four cross head screws holding the rear plate and remove the rear plate with plastic surround.

Now loosen the two upper cross head screws on the front panel on the unit.

Now slide the lid of the box towards the rear until the two links become visible on the PCB.

To replace the lid simply reverse the above procedure.

Diagrams

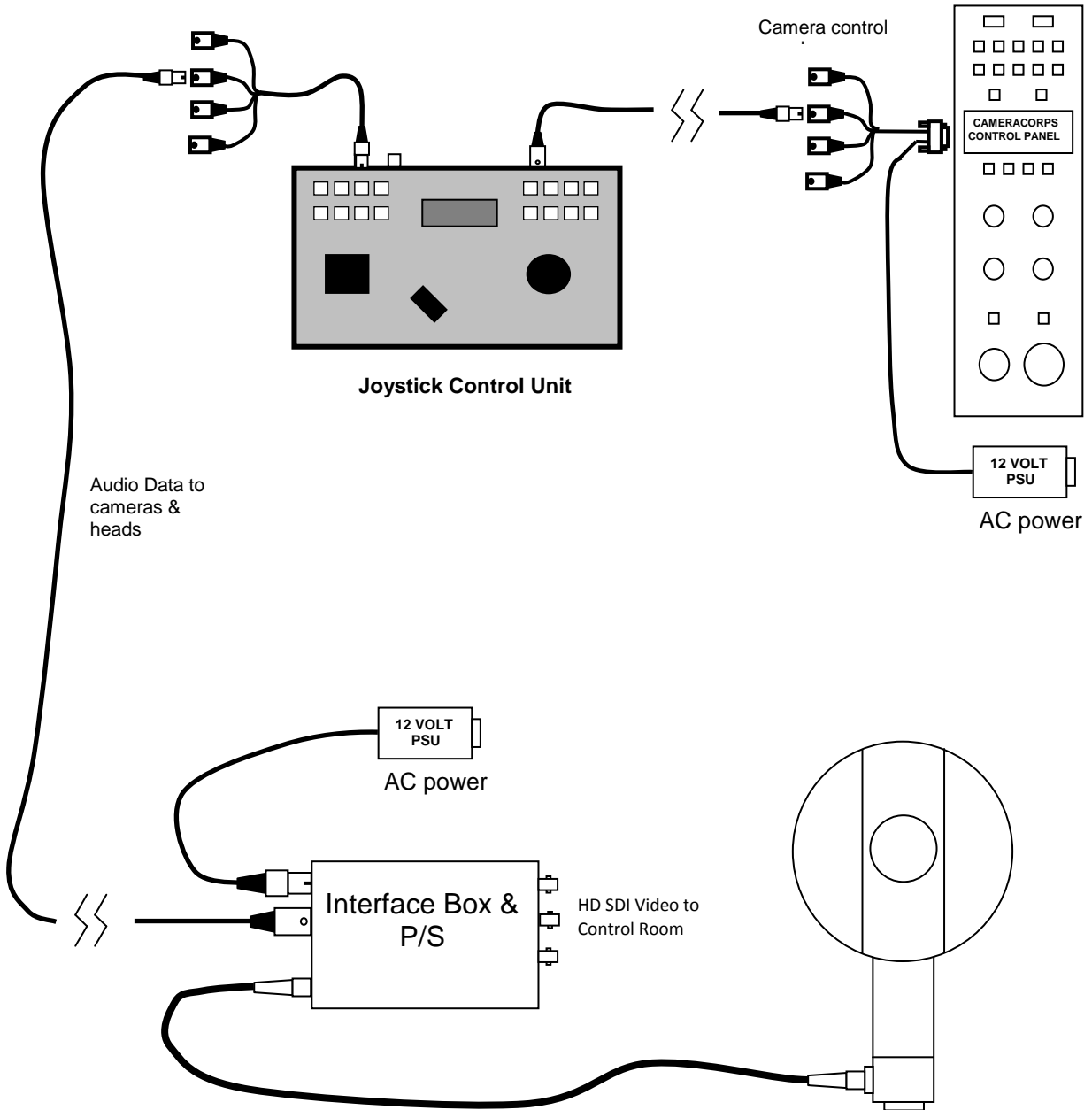
The diagrams on the following pages show the overall wiring of the Q-Ball system and the setup menus for the new style Universal RCP and the older RCP panel.

For full details of the operation of the RCP or Interface Box please see the relevant handbooks.

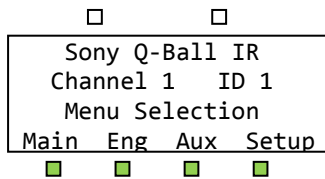


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System Wiring Details

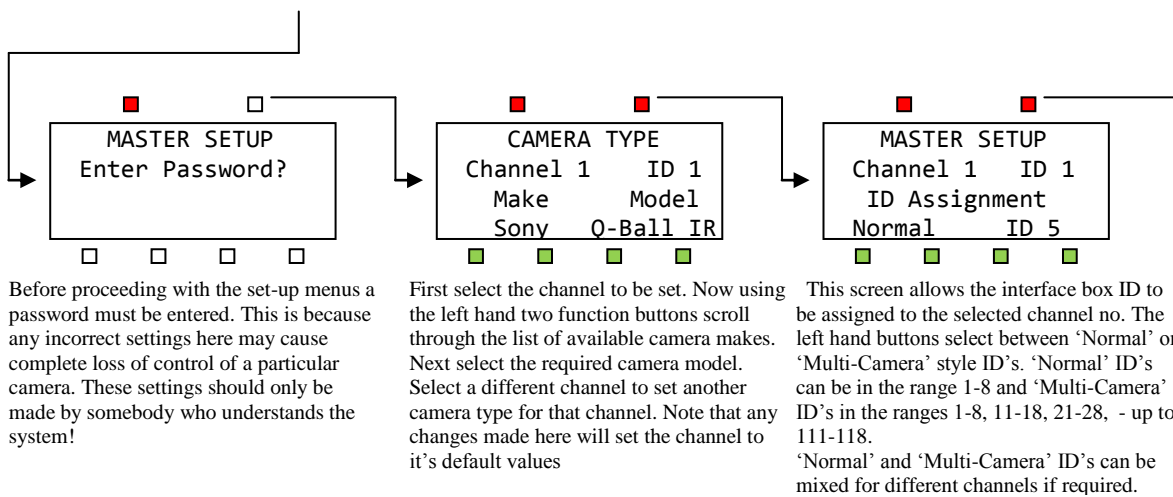


RCP Panel - Master Set-up Menus



This main menu select screen can be reached at any time by repeated presses of the top left menu button.

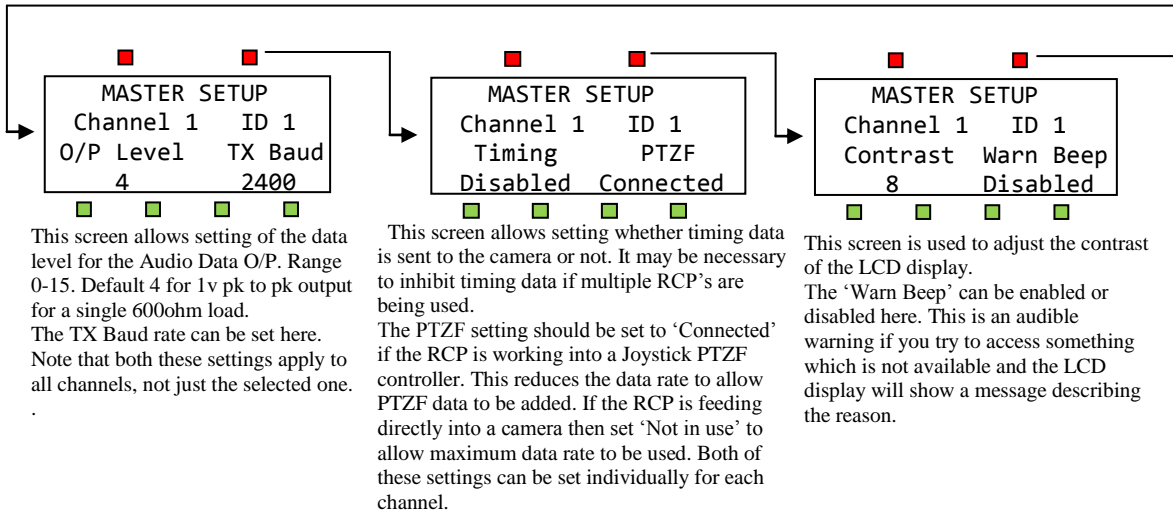
Note that if a 'menu' or 'function' button is illuminated it will perform some action. If unlit it will have no effect.



Before proceeding with the set-up menus a password must be entered. This is because any incorrect settings here may cause complete loss of control of a particular camera. These settings should only be made by somebody who understands the system!

First select the channel to be set. Now using the left hand two function buttons scroll through the list of available camera makes. Next select the required camera model. Select a different channel to set another camera type for that channel. Note that any changes made here will set the channel to it's default values

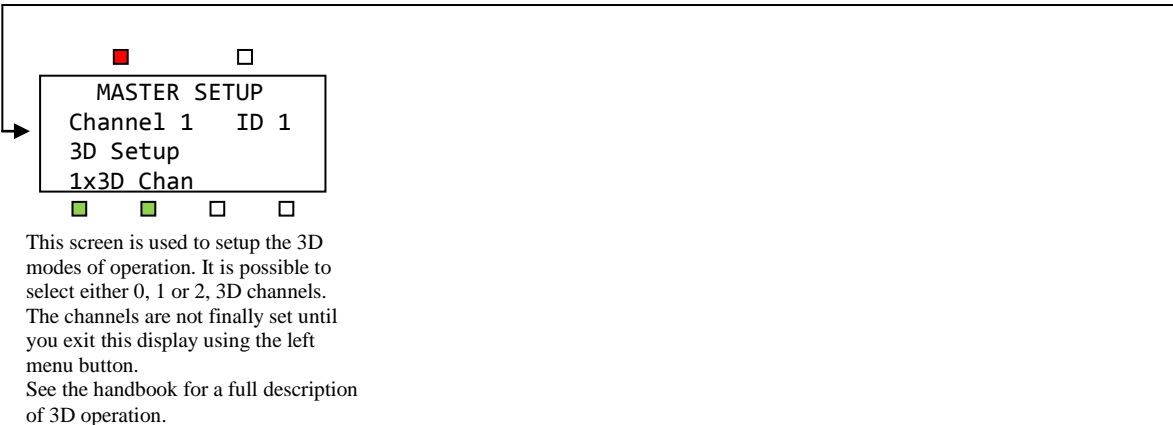
This screen allows the interface box ID to be assigned to the selected channel no. The left hand buttons select between 'Normal' or 'Multi-Camera' style ID's. 'Normal' ID's can be in the range 1-8 and 'Multi-Camera' ID's in the ranges 1-8, 11-18, 21-28, - up to 111-118. 'Normal' and 'Multi-Camera' ID's can be mixed for different channels if required.



This screen allows setting of the data level for the Audio Data O/P. Range 0-15. Default 4 for 1v pk to pk output for a single 600ohm load. The TX Baud rate can be set here. Note that both these settings apply to all channels, not just the selected one.

This screen allows setting whether timing data is sent to the camera or not. It may be necessary to inhibit timing data if multiple RCP's are being used. The PTZF setting should be set to 'Connected' if the RCP is working into a Joystick PTZF controller. This reduces the data rate to allow PTZF data to be added. If the RCP is feeding directly into a camera then set 'Not in use' to allow maximum data rate to be used. Both of these settings can be set individually for each channel.

This screen is used to adjust the contrast of the LCD display. The 'Warn Beep' can be enabled or disabled here. This is an audible warning if you try to access something which is not available and the LCD display will show a message describing the reason.

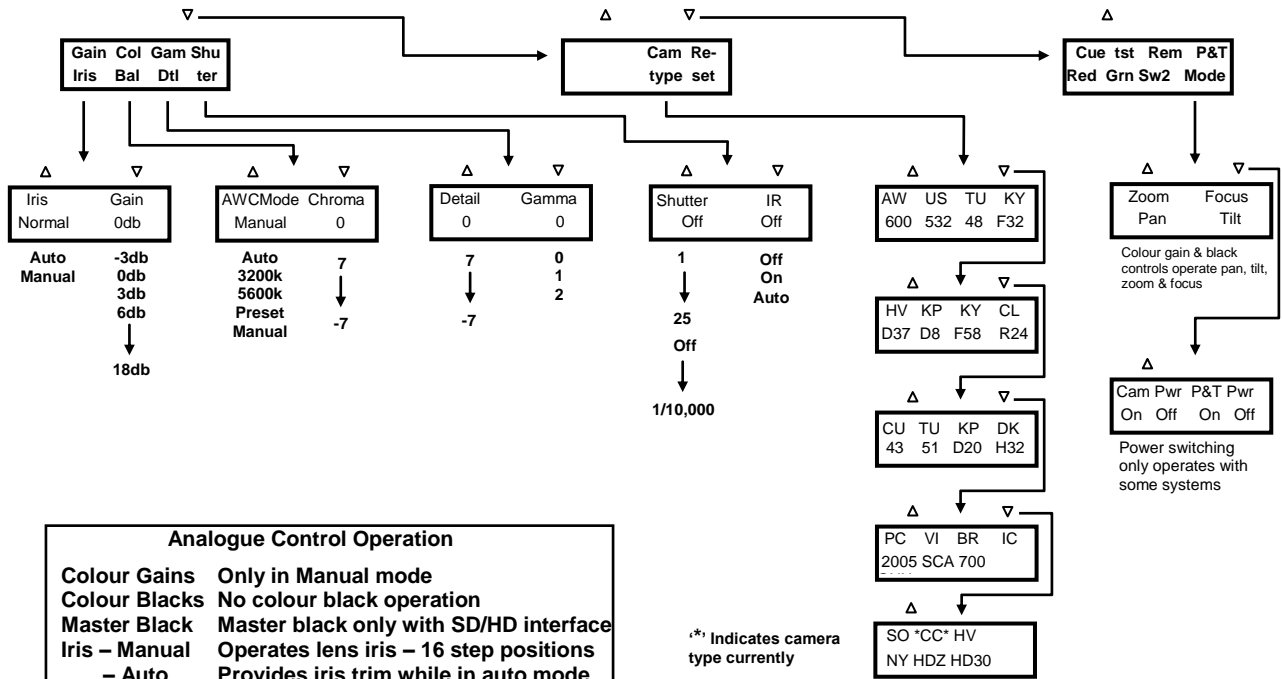


This screen is used to setup the 3D modes of operation. It is possible to select either 0, 1 or 2, 3D channels. The channels are not finally set until you exit this display using the left menu button. See the handbook for a full description of 3D operation.



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Camera Corps HD MiniZoom & Q-Ball Camera RCP Panel (older style) Menus



Analogue Control Operation

Colour Gains Only in Manual mode
Colour Blacks No colour black operation
Master Black Master black only with SD/HD interface
Iris – Manual Operates lens iris – 16 step positions
– Auto Provides iris trim while in auto mode

Notes

Shutter modes from 1 to 25 increase sensitivity but produce high levels of 'flicker'. Camera power switching is available with all camera models.

*: Indicates camera type currently

Switch Functions

White Balance 'One Push' operation in AWC
Black Balance Preset
Bars On for B/W, Off for Colour