USER
MANUAL

Indigo
SYSTEM

CoolFlow

Q-Down

Broadcast down converter and distribution amplifier

Crystal Vision

Contents

Revision 1	RM45 information added	16-04-08
Revision 2.	Centre cut aspect ratio and selectable processing delay added. Software level 2.30.	06-04-09
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1 Introduction

The Q-Down is a broadcast down converter and distribution amplifier with a short processing delay of 16 lines. Two reclocked input loop-throughs (eight with optional sub PCB fitted) are available along with three Standard Definition link selectable SDI/analogue outputs. The analogue outputs can be selected to give CVBS, Y/C, YUV or RGB. The output line rate at all times will be the same as the input line rate.

There are three video delay settings available, minimum (processing delay), fixed (52 SD lines) and frame.

Q-Down's processing delay is determined by several factors such as input format, aspect ratio selection and reclocker status. With a High Definition input the minimum processing delay will be 16 SD lines with a full screen output. Selecting Letterbox will increase this delay to 52 SD lines. For a Standard Definition input the delay will be as little as 1µs with the reclocker bypassed.
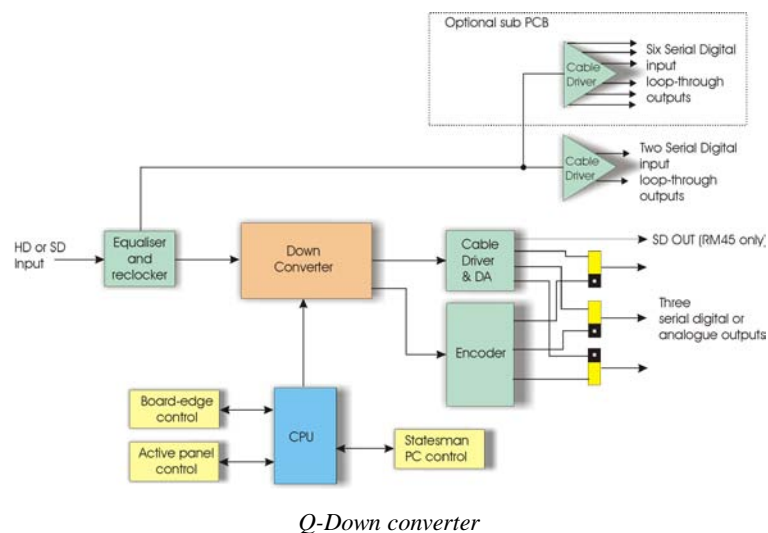
Q-Down converter

The main features are as follows:

- Selectable output aspect ratio (centre-cut, letterbox and anamorphic)

- High quality down conversion with a minimum of 16 lines of processing delay (dependent on conversion selected) - selectable fixed delay also available

- Aspect ratio and vertical filter selection with a High Definition input

- Two input loop-throughs (Q-Down123 with RM34 rear module)

- Link selectable output formats - Standard Definition analogue and digital

- Six extra input loop throughs with optional sub PCB (Q-Down183)

Q-Down is a 100mm x 266mm module, which fits in the four standard frames and can be integrated with any boards from the company's full product range. Q-Down uses the RM34 and RM45 rear modules, two rear modules are required for extended loop throughs (Q-Down183).

2 Hardware installation

2.1 Module configuration

There are six user settable links on the Q-Down - PL9, PL10 and PL11 on the PCB top side and PL6, 7 and 8 on the bottom side. PL9 and PL10 are used for selective NTSC pedestal and Betacam levels. PL11 sets the selectable processing delays. PL6-8 are used to select the range of output formats.

The four potentiometers have been factory set and should not require further adjustments.
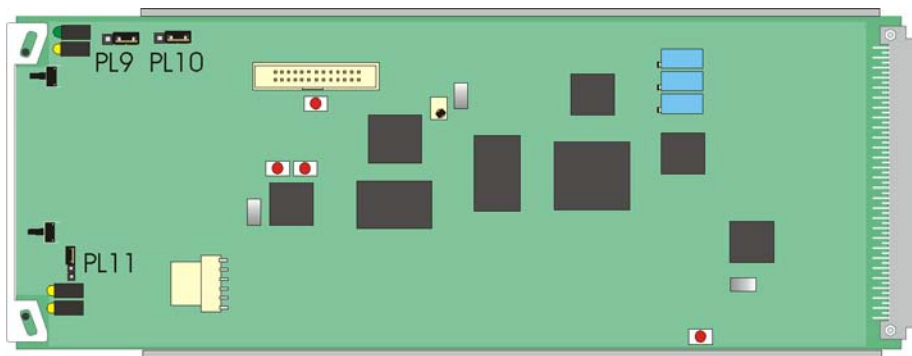
Q-Down top side

The surface-mounted LEDs on the top side of the PCB are not visible from the front of the frame and are included for diagnostic purposes only.
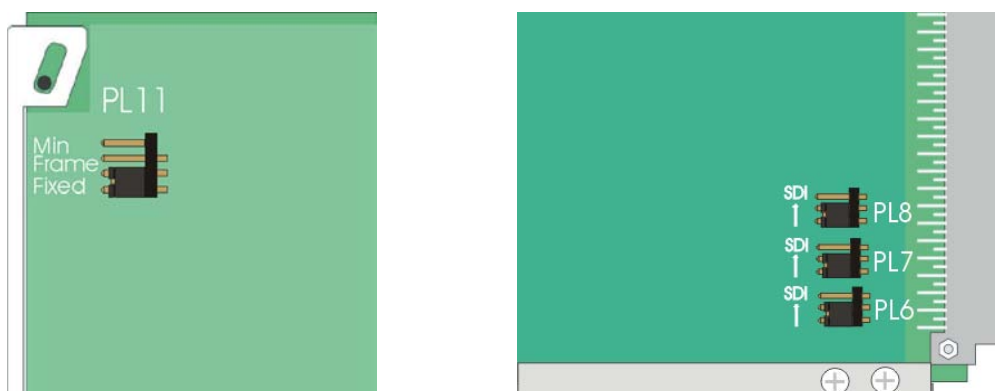
Q-Down bottom side

Link configurations

PCB top side

Link	Function	Towards front 1-2	Towards rear 2-3
PL9	Betacam	Betacam levels	Normal levels
PL10	Pedestal (NTSC)	Pedestal applied (NTSC M)	No pedestal applied (NTSC J)

PCB bottom side

Link	Towards board edge 1-2	Away from board edge 2-3
PL6	CVBS / Y / G output	Standard Definition serial digital output
PL7	CVBS / U / B / YC-Y output	Standard Definition serial digital output
PL8	CVBS / V / R / YC-C output	Standard Definition serial digital output

Link	Function	Towards top 1-2	Middle 2-3	Towards bottom 3-4
PL11	Processing delay	Minimum	Frame	Fixed

With an HD video input the minimum processing delay will be 16 or 52 SD lines depending on the selected conversion. The fixed delay will always be 52 SD lines and frame will be one full video frame.

With an SD video input the minimum processing delay will become as little as 1µs. Fixed and frame will remain 52 SD lines and one frame respectively.

Note: Analogue video output formats are selected via the board edge or remotely.
When the Y/C output format is selected the third output will give CVBS.

Engineering LEDs

These LEDs are included for diagnostic purposes and are not visible from the front of the frame.

LED	Illuminated	Not Illuminated
LED3	Input present	
LED4	Board configuring	Board configured
LED5	Data	
LED6	Link	

2.2 Rear modules and signal I/O

The 4U Indigo 4 frame will house up to 24 single height modules with up to three power supplies. The 2U Indigo 2 frame will house up to 12 single height modules and dual power supplies. The 1U Indigo 1 frame will house six single height modules and a single or dual power supply. The Indigo DT desk top boxes have a built-in power supply and will house up to two single height modules. All modules can be plugged in and removed while the frame is powered without damage.

Note: For details of fitting rear connectors please refer to the appropriate frame manual.

Rear module connections with RM34

The RM34 being a single height module will allow maximum packing density with the maximum number of outputs available.

RM34 rear module connector	Description
	RM34 • 24 Q-Down modules per Indigo 4 frame • 12 per Indigo 2 frame • Six per Indigo 1 frame • 2 per Indigo DT • All frame slots can be used

BNC	I/O assignment
SD/CVBS/Y/G OUT	Standard Definition SDI/CVBS, Y, G output
SD/CVBS/U/B/YCY OUT	Standard Definition SDI/CVBS, U, B, YC-Y output
SD/CVBS/V/R/YCC OUT	Standard Definition SDI/CVBS, V, R, YC-C output
HD/SD IN LOOP OUT	High Definition/Standard Definition serial digital input reclocked loop-through
HD/SD IN LOOP OUT	High Definition/Standard Definition serial digital input reclocked loop-through
HD/SD IN	High Definition/Standard Definition serial digital input

Rear module connections with RM45

The RM45 is similar to the RM34 but an input loop-through has been replaced by a further SD output giving up to four available outputs.

RM45 rear module connector	Description
	RM45 • 24 Q-Down modules per Indigo 4 frame • 12 per Indigo 2 frame • Six per Indigo 1 frame • 2 per Indigo DT • All frame slots can be used

BNC	I/O assignment
SD/CVBS/Y/G OUT	Standard Definition SDI/CVBS, Y, G output
SD OUT	Standard Definition SDI output
SD/CVBS/U/B/YCY OUT	Standard Definition SDI/CVBS, U, B, YC-Y output
SD/CVBS/V/R/YCC OUT	Standard Definition SDI/CVBS, V, R, YC-C output
HD/SD IN LOOP OUT	High Definition/Standard Definition serial digital input reclocked loop-through
HD/SD IN	High Definition/Standard Definition serial digital input

Note: The Q-Down183 with seven/eight input loop-throughs requires two RM34 or an RM45 plus RM34 rear module, thus requiring two frame slots compared to the Q-Down123. The upper RM34 position will supply the six extended loop-though connections.

2.3 General Purpose Interface (GPI)

Each frame slot has up to six connections 'a-f' for GPI control and monitoring. These connections are available at the rear of the frame on the 26-way D-Type remote connectors.

GPI		Low (<1V)	High (+5V)
0	**'a'**		No function at present
1	**'b'**		No function at present
2	**'c'**		No function at present
3	**'d'**		No function at present
4	**'e'**	Input missing or not valid	Input present
5	**'f'**		No function at present

As supplied, each GPI output has a 270Ω resistor in series with its output. This allows for an external LED to be driven, connected to a DC voltage of +5V.

Each General Purpose Input (GPI) is fitted with a 10kΩ resistor connected to the internal +5V.

4U frame GPI connections

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

Slot no.		'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1		8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2		7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3		8 (3)	9 (3)	18 (3)	26 (3)	19 (4)	20 (4)
4		7 (3)	16 (3)	17 (3)	25 (3)	10 (4)	11 (4)
5		5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
6	Upper	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
7		5 (3)	6 (3)	15 (3)	24 (3)	1 (4)	2 (4)
8		4 (3)	14 (3)	13 (3)	23 (3)	3 (4)	4 (4)
9		3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
10		10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)
11		3 (3)	12 (3)	22 (3)	21 (3)	12 (4)	13 (4)
12		10 (3)	11 (3)	19 (3)	20 (3)	21 (4)	22 (4)

Table shows pin number (remote number)

Slot no.		'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1		8 (5)	9 (5)	18 (5)	26 (5)	19 (6)	20 (6)
2		7 (5)	16 (5)	17 (5)	25 (5)	10 (6)	11 (6)
3		8 (7)	9 (7)	18 (7)	26 (7)	19 (8)	20 (8)
4		7 (7)	16 (7)	17 (7)	25 (7)	10 (8)	11 (8)
5		5 (5)	6 (5)	15 (5)	24 (5)	1 (6)	2 (6)
6	Lower	4 (5)	14 (5)	13 (5)	23 (5)	3 (6)	4 (6)
7		5 (7)	6 (7)	15 (7)	24 (7)	1 (8)	2 (8)
8		4 (7)	14 (7)	13 (7)	23 (7)	3 (8)	4 (8)
9		3 (5)	12 (5)	22 (5)	21 (5)	12 (6)	13 (6)
10		10 (5)	11 (5)	19 (5)	20 (5)	21 (6)	22 (6)
11		3 (7)	12 (7)	22 (7)	21 (7)	12 (8)	13 (8)
12		10 (7)	11 (7)	19 (7)	20 (7)	21 (8)	22 (8)

Table shows pin number (remote number)

Note: Remote 1, Remote 3, Remote 5 and Remote 7 are 26-way high-density D-Type female sockets. Frame ground is pin 2 and +5V @500mA is pin 1 in each case.

Remote 2, Remote 4, Remote 6 and Remote 8 are 26-way high-density D-Type male plugs and frame ground is pin 6 in each case and +5V @500mA is pin 15 on Remote 2 and Remote 6.

The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A. Remotes 5-8 are similarly protected.

2U frame GPI connections

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

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	8 (3)	9 (3)	18 (3)	26 (3)	19 (4)	20 (4)
4	7 (3)	16 (3)	17 (3)	25 (3)	10 (4)	11 (4)
5	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
6	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
7	5 (3)	6 (3)	15 (3)	24 (3)	1 (4)	2 (4)
8	4 (3)	14 (3)	13 (3)	23 (3)	3 (4)	4 (4)
9	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
10	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)
11	3 (3)	12 (3)	22 (3)	21 (3)	12 (4)	13 (4)
12	10 (3)	11 (3)	19 (3)	20 (3)	21 (4)	22 (4)

Table shows pin number (remote number)

Note: Remote 1 and Remote 3 are 26-way high-density D-Type female sockets. Frame ground is pin 2 and +5V @500mA is pin 1 in each case.

Remote 2 and Remote 4 are 26-way high-density D-Type male plugs and frame ground is pin 6 in each case and +5V @500mA is pin 15 on Remote 2.

The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A.

1U frame GPI connections

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

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
4	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
5	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
6	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)

Table shows pin number (remote number)

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

Remote 2: 26-way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15.

Note. The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

Indigo DT desk top box GPI connections

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

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)

Table shows pin number (remote number)

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

Remote 2: 26-way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15.

The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

3 Card edge operation

3.1 Card edge controls

Q-Down board edge

3.2 Card edge buttons

The two tactile push button switches allow the operator to navigate within the menu structure.

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Button	Function	
ARC	Aspect ratio selection and output format.	Press to change aspect ratio (action on release).
		Hold to enable output format selection.
Filter Format	Filter selection and output format.	Press to select filter type.
		Press to select output formats (Hold ARC)

3.3 Reading card edge LEDs

Card edge LEDs may be used in conjunction with status information from any connected remote status panel display or from Statesman if available.

Refer also to the trouble shooting chapter for more help with solving problems and monitoring status information.

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

Name	LED Colour	Function when ON	Function when Off
PSU	Green	Good power supply (PSU) rails	One or more of the monitor supplies is out of specification
ARC	Yellow	Aspect ratio conversion selected	Full screen (anamorphic) selected
HD	Yellow	Video input standard is HD (High Definition)	Input not present
SD	Yellow	Video input standard is SD (Standard Definition)	Input not present
1	Yellow	Softest filter / CVBS	Hold ARC Select for output format
2	Yellow	Soft filter / YUV	Hold ARC Select for output format
3	Yellow	Sharp / RGB	Hold ARC Select for output format
4	Yellow	Sharpest / Y/C	Hold ARC Select for output format

Navigating card edge menus

To access the card edge menu system proceed as follows:

- Repeatedly pressing ARC will toggle the aspect ratio in the order between Letterbox (16:9) centre-cut and Full screen (anamorphic). Note: the change is actioned on the button release and the aspect ratio is only selective with a High Definition input.

- Repeatedly press Filter Format to select in turn the vertical filter response. (softest, soft, sharp, sharpest). Note: the change is actioned on pressing the button.

- Hold ARC and repeatedly press Filter Format to select in turn the output format (CVBS, YUV, RGB, Y/C). The LED indication will revert to showing the filter selection after a short delay from releasing the ARC button.

Note: When a selection has been made release ARC before Filter Format to prevent an unwanted aspect ratio change. Pressing ARC at any time will - along with changing the aspect ratio - cause the filter format LEDs to show the current output format for a brief time.

4 Using the front control panel

4.1 Module selected

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

Note: It is **ESSENTIAL** that the panel setup procedure is followed and any old or unknown passwords cleared prior to using the panel for the first time.

At power up all eight control panel keys LEDs will illuminate briefly. Once the panel has completed its power up and configuration sequence the panel will enter Statesman mode and the message 'Press Cal to Exit' will be displayed.

The Crystal Vision control panel start up display

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

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

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

Navigating the display

The functions assigned to control panel keys are:

- DEVICE – enters Device menu to select a card or show cards available / enters Panel Setup when held down during power up / shows frame status when pressed from Statesman mode
- CAL – enters or leaves Statesman mode / enters Panel Diagnostics mode when held down during power up / updates the display
- Asterisk – enters Board Rename menu from the Device menu
- F1 to F4 – soft keys, function assigned within each menu
- HOME – moves the display to the Home menu

- ENTER – accept current selection
- Upward arrow – used to move up the menu structure / enter Lock Panel menu from the Device menu
- Rotary control – shaft encoder used to select options or variable data

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

Selecting Q-Down

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

Note: There may be a delay whilst the frame is interrogated during which time the 'No cards found' could be displayed.

The top line of the display will show 'Available cards X', where X is the number of cards that have responded so far to the polling request.


Control panel showing available cards

Rotate the shaft encoder and the bottom row will display the successfully polled cards by name and location or slot number.

In the example above, the card displayed is located in the second frame in slot number 1.

When the desired card is selected press the ENTER key to access that card's Home menu. The message shows that a Q-Down has been selected.
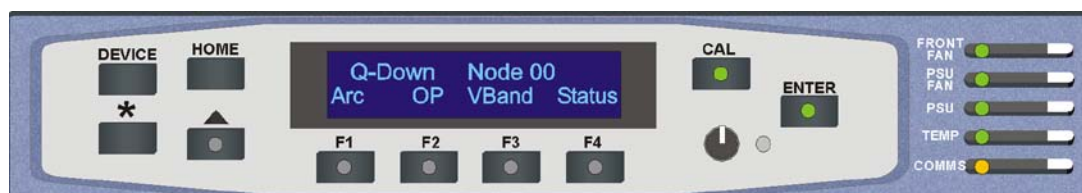
The Q-Down Home menu

Updating the display

The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If changes occur through the use of card edge controls or other remote control, the text displayed on the active front panel will not be updated immediately. If necessary, use the upward arrow to leave and then re-enter a menu to update the display.

4.2 The Q-Down active panel menu structure

At any time the main top-level menu (Home) is obtained by pressing the HOME key. From the Home menu further selections can be made. Active function keys are indicated by illuminated, integrated LEDs.

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

- The top-level menus are:
- Arc (aspect ratio) – Press F1
- OP (output format) – Press F2
- VBand (bandwidth filters) – Press F3
- Status – Press F4

When a sub menu has been selected, further options may be obtained by using the Shaft control to scroll through them. Once the desired option has been located a selection or value change can be made by either toggling the appropriate function key or by selecting and using the Shaft control to alter a numerical value. A configuration change or value will be activated as the Shaft control is rotated or function button is toggled. The variable being adjusted will appear in brackets. Pressing ENTER will fix the new value.

The following chart shows the available Q-Down menus. The actual menus available may vary slightly as software is updated.

The Q-Down menu tree
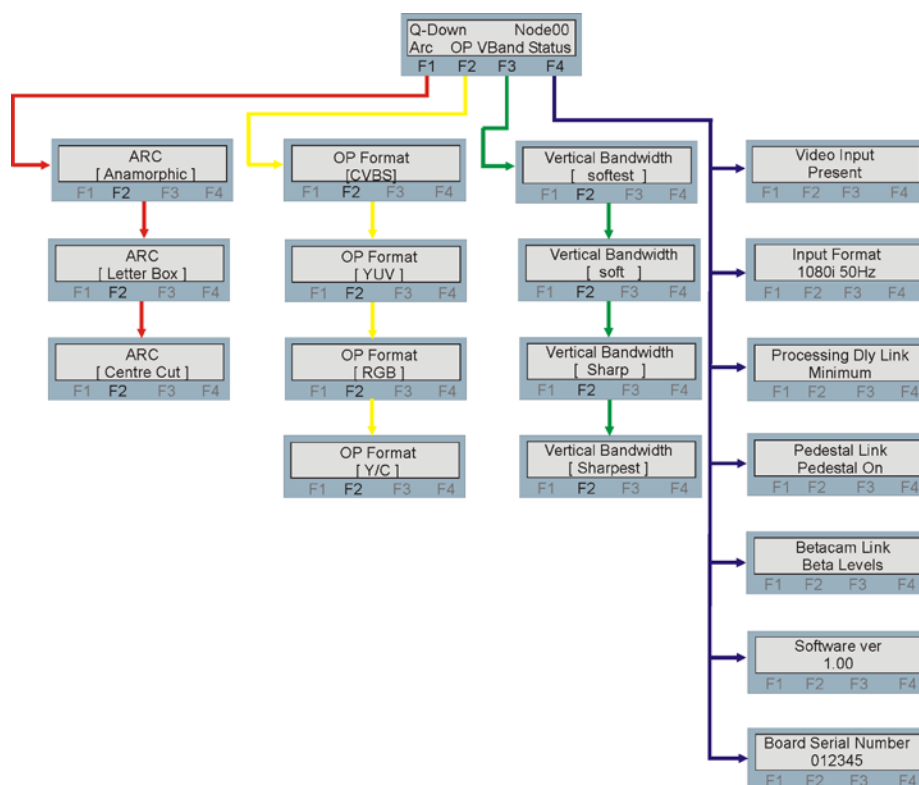
Note: Function key LEDs are illuminated when active.

Output aspect ratio

Pressing button F1 from the Home menu will allow the output aspect ratio to be selected.

Note: Only functional with an HD input.

Aspect ratio menu	Description
	From the Home menu, press F1 to select the Aspect ratio menu.
	Press F2 to select and rotate the shaft control to view the options. Press ENTER to action a change.

Analogue video output format

From the Home menu press F2 to make an output format selection.

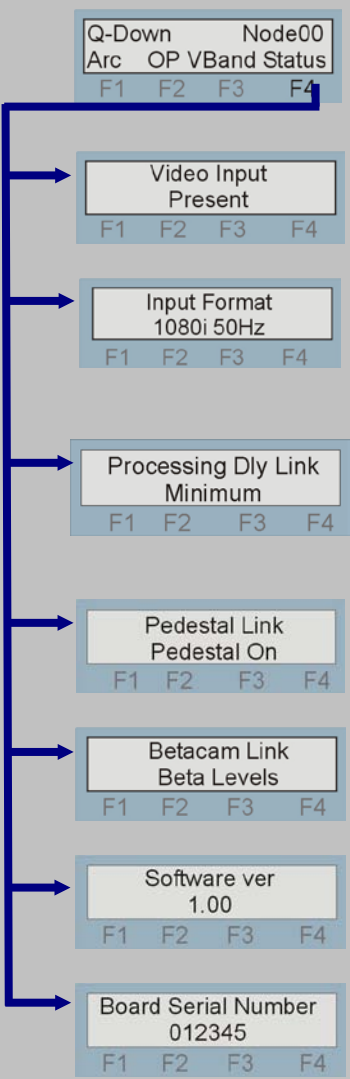| Output format menu	Description
Q-Down Node00 Arc OP VBand Status F1 F2 F3 F4 OP Format [CVBS] F1 F2 F3 F4 OP Format [YUV] F1 F2 F3 F4 OP Format [RGB] F1 F2 F3 F4 OP Format [Y/C] F1 F2 F3 F4	From the Home menu, press F2 to select the output format menu. Press F2 to select and rotate the shaft control to view the options. Press ENTER to action a change

Vertical bandwidth filters

From the Home menu press F3 to select the desired vertical filter.

Vertical bandwidth menu	Description
Q-Down Node00 Arc OP VBand Status F1 F2 F3 F4 Vertical Bandwidth [softest] F1 F2 F3 F4 Vertical Bandwidth [soft] F1 F2 F3 F4 Vertical Bandwidth [Sharp] F1 F2 F3 F4 Vertical Bandwidth [Sharpest] F1 F2 F3 F4	From the Home menu, press F3 to select the appropriate vertical filter. Press F2 to select and rotate the shaft control to view the options. Press ENTER to action a change

The Status menu

From the Home menu press F4 to view the Status menu.

Status menu	Description
Q-Down Node00 Arc OP VBand Status F1 F2 F3 F4	From the Home menu, press F4 to select the status menu. Rotate the shaft control to view the status information.
Video Input Present F1 F2 F3 F4	Video input *Present, Missing.*
Input Format 1080i 50Hz F1 F2 F3 F4	The current input video format. *PAL, NTSC, 720p 50, 720p 59.94, 1080i 50, 1080i 59.94.*
Processing Dly Link Minimum F1 F2 F3 F4	The processor delay link PL11 is set to apply the required video delay. *Minimum, Fixed, Frame.*
Pedestal Link Pedestal On F1 F2 F3 F4	The pedestal link PL10 is set to apply setup to 525-line outputs. *Pedestal On, Pedestal Off.*
Betacam Link Beta Levels F1 F2 F3 F4	The betacam link PL9 is set to apply betacam levels to the component output. *Beta Levels, Normal Levels.*
Software ver 1.00 F1 F2 F3 F4	Fitted software level.
Board Serial Number 012345 F1 F2 F3 F4	Electronically stored board serial number.

5 Statesman

The Crystal Vision Statesman PC control software is designed to control a range of Crystal Vision modules via serial control from a PC. Statesman provides a user friendly means of configuring and operating Crystal Vision modules with the benefit of "see-at-a-glance" status monitoring.

The main Statesman application communicates with each module in a frame through a Statesman capable or active control panel. An active panel or REMIND remote control panel must be fitted to allow for Statesman control.

5.1 Statesman operation

The initial view will show an Explorer style view of the connected frames and modules. Double clicking on a module will enable the display of the main application menus.


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 pane or drag the button to vary the size of the panes.

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

5.2 Video properties

The Q-Down has only one tab. This tab which is divided into four group boxes shows the video properties and board status.
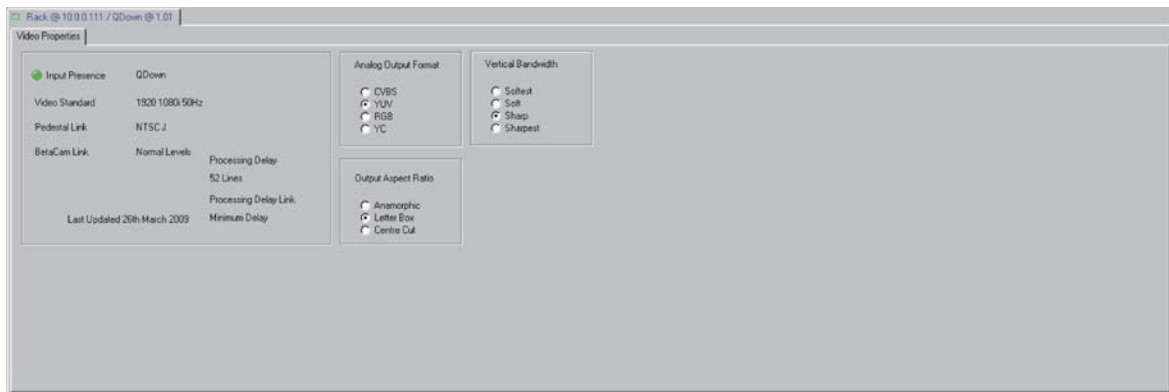
Video properties and status monitoring

Board status

Input presence is shown with a simulated LED which will show green when a valid input is present and red when the input is missing.

Text is used to show the video input format, processing delay and the onboard link positions.

Analogue output format

The analogue output format is selected by checking the appropriate radio button.

Note: The final output configuration will depend on the settings of links PL6, 7 and 8.

Output aspect ratio

With a High Definition input a choice of output aspect ratio can be made. The three choices are: 16:9 letterbox, centre cut and full screen anamorphic. Check the radio button to select.

Vertical bandwidth

When down converting, the vertical bandwidth can be optimised for a given application by selecting the most appropriate vertical bandwidth filter. There are four filters to select from ranging from the highest (sharpest) to the lowest (softest). Check the radio button to select the chosen filter.

6 Trouble shooting

Card edge monitoring

The front edge of the card provides useful power rail monitoring, input status, vertical filter and analogue output format.

Q-Down front edge view

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

Name	LED Colour	Function when ON	Function when Off
PSU	Green	Good power supply (PSU) rails	One or more of the monitor supplies is out of specification
ARC	Yellow	Aspect ratio conversion selected	Full screen (anamorphic) selected
HD	Yellow	Video input standard is HD (High Definition)	Input not present
SD	Yellow	Video input standard is SD (Standard Definition)	
1	Yellow	Softest filter / CVBS	
2	Yellow	Soft filter / YUV	Hold ARC Select for output format
3	Yellow	Sharp / RGB	
4	Yellow	Sharpest / Y/C	

Card edge LEDs may be used in conjunction with status information from any connected remote status panel display or from Statesman if available.

Basic fault finding guide

The Power OK LEDs are not illuminated

Check that the frame PSU is functioning – refer to the appropriate frame manual for detailed information

There is no video output

Check that a valid SDI is present and that any cabling is intact

The video output is SDI when an analogue video output is expected

Check that the link jumper settings are correct for the rear connector in use as explained in the Installation chapter

The video output exhibits jitter

Check that the input SDI stability is within normal limits

The card no longer responds to card edge or front panel control

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

Check any active control panel cabling

Check if the control panel can control another card in the same rack

If necessary re-set the card or apply a factory reset as explained in the Operation chapter

Re-setting the card

It is possible to recall factory default settings from any control interface used to operated Q-Down – please refer to the appropriate section for your control interface

If required, the card may be reset 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

7 Specification

General

Dimensions	100mm x 266mm module with DIN 41612 connector
Weight	180g
Power consumption	10 W

Inputs

Video	HD or SD SDI 270Mb/s or 1.485Gb/s serial digital compliant to SMPTE 259M and SMPTE 292M
	HD. Up to 140m with Belden 1694 or equivalent (Belden 8281 or equivalent up to 100m)
	SD (270Mb/s) >250 metres
Input formats	625 50, 525 59.94, 720p 50, 720p 59.94, 1080i 50, 1080i 59.94

Outputs

RM34	The Q-Down123 has two input loop-throughs and three video outputs
RM34 + RM34	The Q-Down183 has eight input loop-throughs and three video outputs. The video outputs can be a selection of analogue or SDI. The final configuration will depend on the selected rear module.
RM45	The Q-Down123 has one input loop-through, one SD and three video outputs.
RM45 + RM34	The Q-Down183 has seven input loop-throughs, one SD and three video outputs. The video outputs can be a selection of analogue or SDI. The final configuration will depend on the selected rear module.
Serial digital	Three or four reclocked SDI outputs 270Mb/s or SMPTE 259M
Jitter	Typically SDI 0.2UI @ 1kHz
Processing delay	Selectable
Component:	YUV and GBR 1 Volt ± 2% into 75ohm. Sync on G, B & R
	(Betacam levels selectable)
Composite:	1V ± 2% with sync into 75ohm
Auxillary data	Blanked

Component performance

Processing:	Video input is 10 bit processed for 12 bit output DACs
Frequency response:	Luminance: +/- 0.3dB to 5.5 MHz.
	Chrominance: +/- 0.4dB to 2.5 MHz
Noise:	<-67dB weighted luminance or chrominance
Gain error:	< 1%

Composite performance

Processing:	Video input is 10 bit processed for 12 bit output DACs
Frequency response:	Luminance: +/- 0.3dB to 5 MHz
	Chrominance: +/- 0.4dB to 2.5 MHz
Noise:	< -67dB weighted luminance or chrominance
Differential gain:	< 2% typ
Differential phase:	± 1° typ

Status monitoring

LEDs	Front of card edge LED indicators to indicate:
	PSU rails present
	SDI input HD/SD
	Aspect ratio selection
	Vertical filter / Output format selected

GPI inputs

Number and type:	4 x GPI inputs. No function at present

GPI outputs

Number and type:	2 x GPI outputs, Loss of input and no function

Input fail output

Type:	Blue