

HQView-400 Series Operating Instructions



Version 2.30

This manual explains how to operate your HQView-400 Series (HQView-4xx) image scaler. The HQView-400 Series comes in three versions HQView-400S, HQView-410 and HQView-420. HQView-4xx is designed to provide users with a powerful and flexible method of driving large display devices, and multiple screen applications including flexible geometry correction functions.

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SAFETY WARNING:

1. THERE ARE NO USER SERVICEABLE PARTS WITHIN THE UNIT. REMOVAL OF THE TOP COVER WILL EXPOSE DANGEROUS VOLTAGES. DO NOT OPERATE THE UNIT WITHOUT THE TOP COVER INSTALLED.
2. ENSURE THAT ALL ELECTRICAL CONNECTIONS (INCLUDING THE MAINS PLUG AND ANY EXTENSION LEADS) ARE PROPERLY MADE AND COMPLY WITH ELECTRICAL SAFETY REGULATIONS.
3. ENSURE THAT THE INTEGRITY OF THE EQUIPMENT ISOLATION BARRIER IS MAINTAINED WHEN CONNECTING TO OTHER EQUIPMENT. THIS MEANS THAT ONLY LOW VOLTAGE ISOLATED CIRCUITS MAY BE CONNECTED TO THE SIGNAL INPUTS AND OUTPUTS. IF ANY DOUBT EXISTS CONSULT QUALIFIED SERVICE PERSONNEL.
4. TO PREVENT SHOCK OR FIRE HAZARD DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE. IF SUCH EXPOSURE OCCURS, REMOVE THE PLUG FROM THE MAINS OUTLET AND HAVE THE EXPOSED UNIT CHECKED BY QUALIFIED SERVICE PERSONNEL.
5. DO NOT CONTINUE TO OPERATE THE EQUIPMENT IF YOU HAVE ANY DOUBT ABOUT IT WORKING NORMALLY, OR IF IT IS DAMAGED IN ANY WAY. WITHDRAW THE MAINS PLUG FROM THE MAINS OUTLET AND CONSULT QUALIFIED SERVICE PERSONNEL.
6. DO NOT REMOVE ANY FIXED COVERS UNLESS YOU ARE QUALIFIED TO DO SO AND EVEN THEN WITHDRAW THE MAINS PLUG FROM THE MAINS OUTLET BEFORE YOU START.
7. THIS EQUIPMENT CONTAINS NO USER SERVICEABLE PARTS. REFER ALL SERVICING AND MAINTENANCE TO QUALIFIED SERVICE PERSONNEL.
8. TO AVOID EXPLOSION, DO NOT OPERATE THIS EQUIPMENT IN AN EXPLOSIVE ATMOSPHERE

INTRODUCTION

1.1. General Introduction

HQView-4xx is a very flexible image scaler developed specifically for driving large screen displays and multiple screen applications from video or graphics sources.

HQView-4xx features state of the art digital image processor which provides market leading HD & SD per-pixel multiple low-angle motion-adaptive de-interlacing and automatic film pull-down correction for 3:2 and 2:2, significantly outperforming the capabilities of benchmark competitor products. HQView-4xx features excellent image processing algorithms for the very best scaling, film and video noise reduction and MPEG artefact reduction.

HQView-4xx uses a very flexible high performance video input front end including true component video support in analogue YPbPr and RGBS formats and HDSDI/SDI digital formats as well as composite (CVBS) and YC/S-Video inputs. A very high performance video decoder is utilised with 4x oversampling and 3D Y/C separation for outstanding video image clarity. HDMI and DVI video with HDCP encryption is also supported, as are computer graphics inputs in SVGA analogue and HDMI/DVI digital formats.

The output format can be set to I/O Lock mode where it locks the output frame rate to the input frame rate dynamically without frame rate conversion so as to reduce system latency, or it can be set to a fixed output frame rate for driving basic screens which are not 50Hz-compatible. A Low latency mode with non-motion adaptive reduced processing is available to further reduce latency.

Outputs are available in VGA analogue and DVI digital formats which are useable simultaneously so that one output can drive the screen while the other runs a local monitor.

Note: If an HDCP encrypted signal is connected to the HDMI or DVI input, the DVI output signal will be HDCP encrypted and the output that cannot be encrypted (VGA analogue output) will be disabled.

Interlaced outputs are supported, there is a vertical temporal filter facility which greatly reduces interlace flicker.

HQView-4xx supports Pan, Tilt and Zoom to select a 'region of interest' portion of the input image, fill the screen and pan/tilt within it.

HQView-4xx can be operated with different firmware. At time of issuing this document four firmware versions are available. Each firmware version provides different feature sets controlled through the menu. Special emphasize is given in the discussion of the OSD (On Screen Display) menu system in the corresponding chapters.

In the basic configuration HQView-400S used for single display installations Picture in Picture functionality is provided.

The next version is the HQView-410 for multi screen or multi projector installations such as geometry correction, Auto Zoom and Edge Blend.

Edge Blend electronically reduces the brightness level of certain image regions to seamlessly match the brightness of overlapping areas. Auto Zoom automatically crops and zooms the input video image to display a section of the total image on the corresponding projector or screen. Embedded warp allows adjustment of the image in a projection scenario to match a rotated, tilted or curved screen. For 9:16 portrait mode signage special predefined portrait modes are available to rotate and stretch a video image to fill a +/-90° rotated display panel.

HQView-420 adds free form warp capability for non-flat screens in single or multi projector installation. Warp maps created with the PC tool "Warp Generator" can be uploaded into HQView-420 and processed accordingly.

System control is via an OSD controlled by keys on the front panel or through the inbuilt TCP/IP web server.

Additionally a free API manual is published on our website at the link given below to allow the use of the LAN or RS232 remote control ports.

http://www.calibreuk.com/documents/hqview/HQView_LEDView%20API%20Protocol_v2.02%20Generic.pdf

1.2. Packing List

HQView-4xx is supplied with the following:

- 1) This manual
- 2) 3 pin plug IEC mains cable
- 3) DVI-D output cable
- 4) CD containing manuals and useful applications

HQVIEW-4XX SYSTEM DESCRIPTION

2.1. Product Overview

HQView-4xx is designed to accept the following input signals:

- Composite video via BNC
- Composite video via RCA
- S-Video via 4-way miniDIN
- YPbPr or RGBS or RGsB SD/ED/HD component video via 3 or 4 BNC connectors
- HD-SDI/SDI (Serial Digital Interface) via BNC
- VGA/SVGA analogue (computer interface) via 15HDD
- DVI (Digital Visual Interface) via DVI-I (supporting a digital and 2nd analogue VGA input)
- HDMI via HDMI connector

2.2. Product Specification

This section provides technical details for all possible inputs.

Please note that not all possible input options are applicable to all output formats.

2.2.1. Power Supply Requirement

100V-264VAC 50/60Hz connected via a standard IEC connector located on the rear panel.

2.2.2. Video Inputs

Composite via BNC and RCA connector, S-Video via 4-way mini DIN socket

Signal formats	Composite (CVBS), S-Video (Y/C)
Standards	NTSC, PAL, SECAM
Composite (CVBS) input level	1V p-p nominal incl. sync
Luminance (Y) input level	1V p-p nominal incl. sync
Chrominance (C) input level	0.6V p-p nominal
Input Impedance (all inputs)	75 Ohms

2.2.3. Component Video Inputs

Via 3 or 4 BNC connectors

YPbPr (YUV), YPbPrS, RGsB and RGBS component video, menu selectable.

Signal formats 484i (480i) and 576i (SD), 480p, 576p (ED), 720p, 1080i at 50, 59.94 and 60Hz and 1080p at 23.98, 24, 25, 29.97 and 30Hz.

Please note this input does not support Computer SVGA signals which should be connected via the Computer SVGA input, The SVGA input supports the separate H & V syncs.

2.2.4. SDI Input

Format: SD-SDI and HD-SDI YCbCr 4:2:2 serial digital component video
Input impedance: 75 ohms.

SMPTE 292M, SMPTE 259M-C and SMPTE 424M compliant, accepts 484i, 576i, 720 and 1080i single link formats at 270Mb and 1.485Gb rates.

2.2.5. Computer (SVGA) Inputs VESA formats

Signal formats:	DOS, VGA – WUXGA up to 165MHz pixel clock
RGB video level	0.7V - 1.0V
RGB input impedance	75 Ohms
Sync format	Separate H & V sync at TTL/5V levels.

2.2.6. HDMI & DVI Inputs

HDMI 1.3 with or without HDCP, 36-bit Deep Colour video compatible.

DVI-D input with or without HDCP

Signal formats -video

484i and 576i (SD) in double-rate formats (1440 pixels per line), 480p, 576p (ED), 720p, 1080i at 50, 59.94 & 60Hz, 1080p at 24, 25, 30, 50, 59.94 & 60Hz.

Signal formats – computer

DOS, VGA – WUXGA up to 165 MHz pixel clock

2.2.7. Audio Output

HQView-4xx features an S/PDIF coaxial digital audio outputting HDMI audio.

2.2.8. Display Output

Three output connectors are provided which are useable simultaneously, provided that the input signal is not HDCP encrypted.

When the input signal has HDCP encryption, the DVI-D output connector will carry a similarly HDCP encrypted signal, the VGA and 3G-SDI connectors will be disabled.

When an HDCP encrypted signal is input, but the display device does not support HDCP, the output image will turn black and a message indicating HDCP Signal will come up to indicate this.

There is a DVI-D output and a VGA style output. Both conform to normal VESA standards for connectors and pin outs for these signal types.

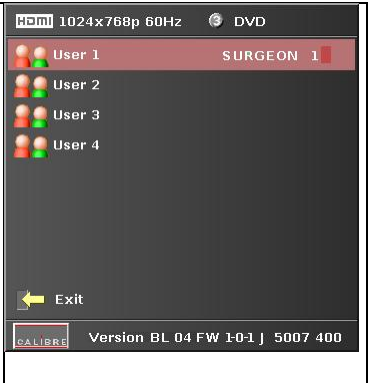

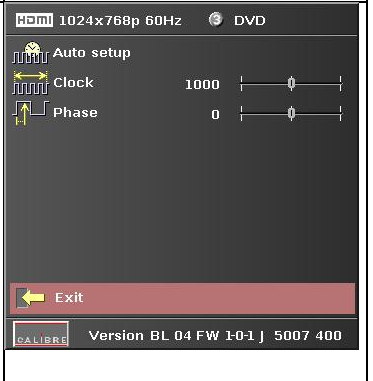
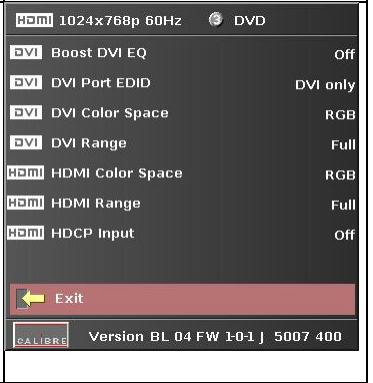

The DVI-D connector will support HDMI 1.3 with 36-bit video and HD audio formats when connected to a suitable HDMI 1.3 receiver.




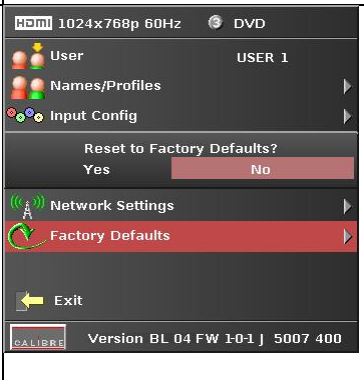
HQVIEW-4XX CONTROL

3.1. Menu Tree

HQView-400S Menu Tree

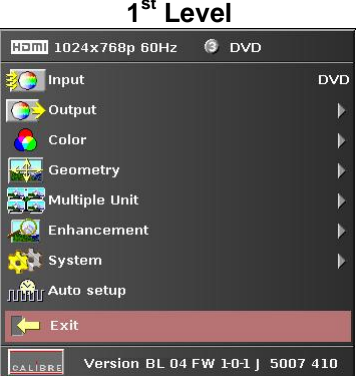

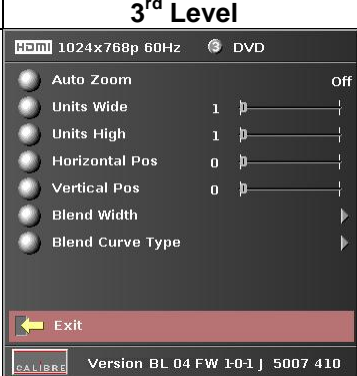
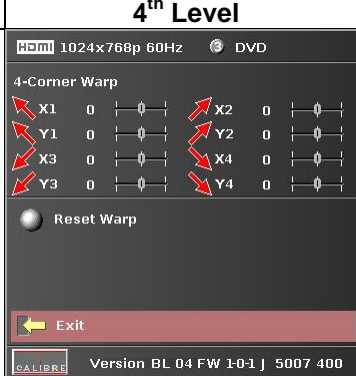


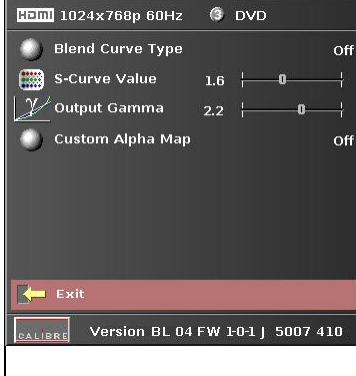
1 st Level	2 nd Level	3 rd Level	4 th Level

			 <p>HDMI 1024x768p 60Hz DVD</p> <p>User 1 SURGEON 1</p> <p>User 2</p> <p>User 3</p> <p>User 4</p> <p>Exit</p> <p>Version BL 04 FW 1-0-1 J 5007 400</p>
		 <p>HDMI 1024x768p 60Hz DVD</p> <p>VGA Setup</p> <p>DVI/HDMI Setup</p> <p>Component Setup</p> <p>Test Pattern Setup</p> <p>Switching Transition Freeze</p> <p>Exit</p> <p>Version BL 04 FW 1-0-1 J 5007 400</p>	 <p>HDMI 1024x768p 60Hz DVD</p> <p>Auto setup</p> <p>Clock 1000</p> <p>Phase 0</p> <p>Exit</p> <p>Version BL 04 FW 1-0-1 J 5007 400</p>
			 <p>HDMI 1024x768p 60Hz DVD</p> <p>DVI Boost DVI EQ Off</p> <p>DVI DVI Part EDID DVI only</p> <p>DVI DVI Color Space RGB</p> <p>DVI DVI Range Full</p> <p>HDMI HDMI Color Space RGB</p> <p>HDMI HDMI Range Full</p> <p>HDMI HDCP Input Off</p> <p>Exit</p> <p>Version BL 04 FW 1-0-1 J 5007 400</p>
			 <p>HDMI 1024x768p 60Hz DVD</p> <p>Component Color Space RGB</p> <p>Component Sync 3 Wire</p> <p>Exit</p> <p>Version BL 04 FW 1-0-1 J 5007 400</p>

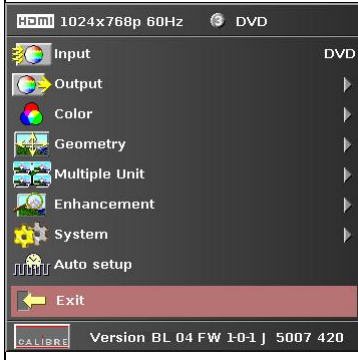
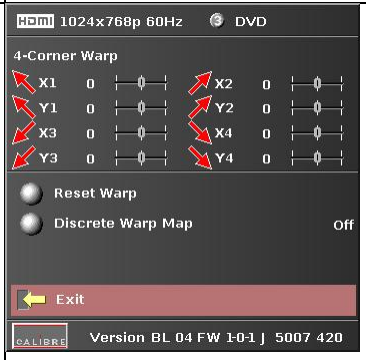
			
			
			
			

HQView-410 as well as HQView-420 have a Multiple Unit Menu instead of the HQView-400 PiP Menu and they feature embedded Warp.

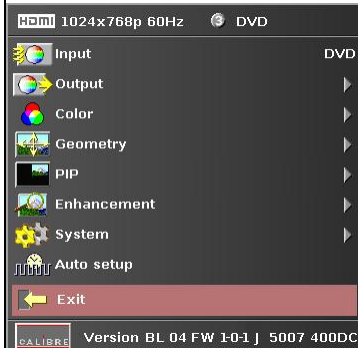


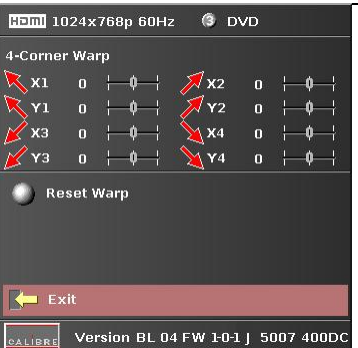
HQView-410/420 can be rebooted in HQView-400S mode with PiP instead of Multiple Unit capability.

1 st Level	2 nd Level	3 rd Level	4 th Level
 <p>1024x768p 60Hz DVD</p> <ul style="list-style-type: none"> Input DVD Output Color Geometry Multiple Unit Enhancement System Auto setup Exit <p>Version BL 04 FW 1-0-1 J 5007 410</p>	 <p>1024x768p 60Hz DVD</p> <ul style="list-style-type: none"> Horizontal Pos 0 Vertical Pos 0 Edge Control Picture Format Standard Overscan 0 Pan/Tilt/Zoom Warp Exit <p>Version BL 04 FW 1-0-1 J 5007 410</p>	 <p>1024x768p 60Hz DVD</p> <ul style="list-style-type: none"> Auto Zoom Off Units Wide 1 Units High 1 Horizontal Pos 0 Vertical Pos 0 Blend Width Blend Curve Type Exit <p>Version BL 04 FW 1-0-1 J 5007 410</p>	 <p>1024x768p 60Hz DVD</p> <ul style="list-style-type: none"> 4-Corner Warp <ul style="list-style-type: none"> X1 0 Y1 0 X3 0 Y3 0 X2 0 Y2 0 X4 0 Y4 0 Reset Warp Exit <p>Version BL 04 FW 1-0-1 J 5007 400</p>
	 <p>1024x768p 60Hz DVD</p> <ul style="list-style-type: none"> Auto Zoom Off Units Wide 1 Units High 1 Horizontal Pos 0 Vertical Pos 0 Blend Width Blend Curve Type Exit <p>Version BL 04 FW 1-0-1 J 5007 410</p>	 <p>1024x768p 60Hz DVD</p> <ul style="list-style-type: none"> Left Blend Region 100 Right Blend Region 100 Top Blend Region 100 Bottom Blend Region 100 Left Blend Offset 0 Right Blend Offset 0 Top Blend Offset 0 Bottom Blend Offset 0 Exit <p>Version BL 04 FW 1-0-1 J 5007 410</p>	 <p>1024x768p 60Hz DVD</p> <ul style="list-style-type: none"> Blend Curve Type Off S-Curve Value 1.6 Output Gamma 2.2 Custom Alpha Map Off Exit <p>Version BL 04 FW 1-0-1 J 5007 410</p>
	 <p>1024x768p 60Hz DVD</p> <ul style="list-style-type: none"> User USER 1 Names/Profiles Input Config Display Mode Low Latency Menu Settings Network Settings Factory Defaults Operation Mode PIP/Single Unit Exit <p>Version BL 04 FW 1-0-1 J 5007 410</p>		

HQView-420 has an additional Discrete Warp Map Item compared to HQView-410

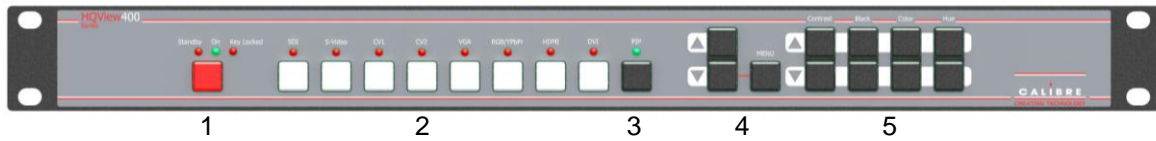
1 st Level	2 nd Level	3 rd Level	4 th Level
 <p>1st Level menu showing options: Input, Output, Color, Geometry, Multiple Unit, Enhancement, System, Auto setup, Exit. Version BL 04 FW 1-0-1 J 5007 420.</p>			 <p>4th Level menu showing 4-Corner Warp settings (X1, Y1, X2, Y2, X3, Y3, X4, Y4), Reset Warp, Discrete Warp Map (Off), Exit. Version BL 04 FW 1-0-1 J 5007 420.</p>

HQView-400DC is a specialized version of HQView-400S targeted for the digital cinema market. It includes embedded 4-Corner warp.

1 st Level	2 nd Level	3 rd Level	4 th Level
 <p>1st Level menu showing options: Input, Output, Color, Geometry, PIP, Enhancement, System, Auto setup, Exit. Version BL 04 FW 1-0-1 J 5007 400DC.</p>	 <p>2nd Level menu showing options: Horizontal Pos, Vertical Pos, Edge Control, Picture Format (Standard), Overscan, Pan/Tilt/Zoom, Warp, Exit. Version BL 04 FW 1-0-1 J 5007 400DC.</p>	 <p>3rd Level menu showing options: Application (Off), H-Keystone, V-Keystone, Pin/Barrel, Rotation, Reset Warp, Enhanced, Exit. Version BL 04 FW 1-0-1 J 5007 400DC.</p>	 <p>4th Level menu showing 4-Corner Warp settings, Reset Warp, Exit. Version BL 04 FW 1-0-1 J 5007 400DC.</p>

3.2. Introduction

The front panel has keys for OSD menu navigation, input channel selection and often used functions. OSD navigation is through two direction keys and a Menu/Enter key.



1 – Standby key: When applying power to the unit it starts up. This is indicated by the green On LED flashing. Once the unit is operational, the On LED is permanently on. By pressing the Standby Key, the unit is put into standby mode. This is indicated by the red Standby LED being permanently on. The red Keylocked LED indicates a keypad locking condition issued through the OSD menu. If a key on the front panel is now pressed an OSD message comes up and displays the multiple key press to be applied to unlock the front panel keys.

2 – Input channel selection keys: All input channels can be directly selected. The active channel is indicated by the red LED above the corresponding channel key being on.

3 – PiP or AutoZoom key: A HQView-400 has a key to directly activate the PiP mode. The green LED is switched on when in PiP mode. HQView-410 and 420 have a key to directly activate the AutoZoom mode instead. The green LED is switched on when in AutoZoom mode.

4 – OSD navigational keys: With the Menu key the OSD menu is activated.

The up/down keys are used for OSD menu navigation. To exit the OSD menu or any submenu press the up and down key simultaneously or navigate to the Exit item and press the menu key. To access a submenu navigate to it and press the menu key. To apply a change go to the menu item, press the menu key and make a parameter change with the up/down key. Confirm the change by pressing the Menu key. This will also bring you back to the submenu.

5 – Direct function keys: Contrast (gain), Black (offset/brightness), Colour (saturation) and Hue can be altered directly from the front panel.

With the following multiple key presses further functions can be applied:

Keypad unlock: Menu/Up/Down

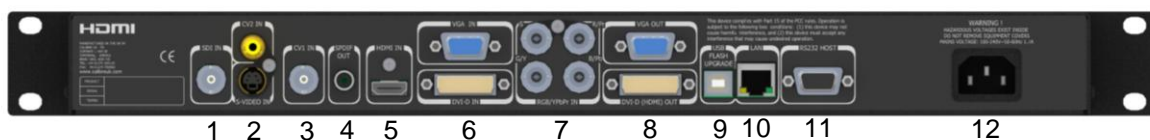
Set output mode to VGA: Menu/Contrast up/Contrast down

Mode reset: Menu/Black up/Black down

Factory reset: Colour up/Colour down/Hue up/Hue down

A factory reset can also be applied when pressing the factory reset key combination at power up.

The back panel features all input and output connectors, communication ports and the power supply connector.



1 – SD/HD-SDI input

2 – Composite Video 1 (RCA) and S-Video input

3 – Composite Video 2 (BNC)

4 – Digital audio output

5 – HDMI input

6 – DVI-D and VGA input

7 – YPbPr / RGB(S) video input

8 – DVI-D and VGA output

9 – USB port

10 – TCP/IP port

11 – RS232 port

12 – Power supply connector

3.3. Main Menu

The main menu lists the input channel select item, 6 sub menus, and a menu item for automatic setup of VGA modes. The 6 sub menus are Output, Colour, Geometry, PiP (HQView-400S) or Multiple Unit (HQView-410 and 420), Enhancement and System.

On each menu page an Exit menu item is available to leave the menu or submenu. Alternatively press up and down buttons together, this will also exit that level of menu.

Some adjustments are not applicable to all signal types or operating modes, in which case those non-applicable functions will be greyed out (ghosted).

All menus have a top status line and a bottom firmware revision information line.

In the status line the currently selected input channel is indicated and the detected mode is identified. The bottom line shows the revision number of the boot-loader behind BL, the revision number of the firmware behind FW and whether it is a 400S, 410, 420 type HQView unit.

To set up your HQView-4xx it is recommended that you follow this procedure:

Choose the correct output mode and parameters to suit your screen or projector.

Select the correct input signal.

Set the input levels and features appropriately to optimize the appearance of your image.

Set any other parameters to suit your application.

Note: The processor is designed to have separate memories for all the settings in each section. All Input parameters are specific to your chosen input channel and input signal type, they are not global to the unit. If you change the settings in for example the composite video channel you will not affect the settings you may have made in for example the DVI channel.

All Output parameters only affect the output, they do not affect any of the inputs but please note that the appearance on the screen because it is the output these adjustments will appear to be global.

3.4. Input

The list of available inputs can be scrolled through using the Up and Down keys. The new input is not selected until the Menu key is pressed.

The list of inputs are: CVBS 1, CVBS 2, S-Video, Component, VGA, HD-SDI, HDMI and Test Pattern.

Test patterns can be generated by HQView-4xx without needing an input connected. When Test Pattern is selected as the input, the required test pattern can be chosen with the menu navigation up/down keys when the OSD menu is off.

3.5. Output

This menu contains adjustments associated with setting up outputs from the unit. The items are organized in two sub menus, Display Type and Gamma/Colour/Crush. Use the up and down keys to scroll to the required item and press the Menu key.

3.5.1. Display Type

Settings: Projector, LCD/Plasma

Select Projector if you need the blend and warp function.

Set to LCD/Plasma if you do not need these functions to be shown in the menu system.

3.5.2. Output Mode

Settings: 640x480, 800x600, 1024x768, 1280x768, 1280x800, 1280x1024, 1360x768, 1366x768, 1400x1050, 1440x900, 1600x1200, 1680x1050, 1920x1200, 480i, 576i, 480p, 576p, 1080i, 720p, 1080p

Set up the desired output resolution with output mode. The output mode setting should match the native resolution of the imaging device to avoid double scaling.

The default output resolution as set by the factory or after a user issued factory reset is 640x480.

Pressing the Menu/Contrast up/Contrast down key combination will switch the output resolution from 640x480 to 480i which some monitors may prefer.

If a DVI or VGA monitor has issues to display this 480i mode, by pressing the key combination again the 640x480 output mode is set-up which all DVI and VGA monitors should be capable to display.

3.5.3. Location

Settings: Front Tabletop, Front Ceiling, Rear Tabletop, Rear Ceiling

The image can be flipped to accommodate different projection scenarios as well as screens mounted upside down.

3.5.4. Frame Rate

Settings: 60 Hz, 50 Hz, 48 Hz, 24 Hz, Auto

In auto mode the output frame rate follows the input frame rate as configured in the Output Config menu. Signals with 24Hz, 25Hz, 48Hz, 50Hz input modes get special treatment, modes with other refresh rates are displayed at 60Hz.

24Hz input modes will be output at 24Hz if the output resolution is set to either 720p or 1080p and the Frame Rate setting in the Output Config menu includes 24Hz, otherwise it is displayed at twice the rate if the Frame Rate setting in the Output Config menu includes 48Hz. Otherwise a 24Hz input mode is displayed at 60Hz.

48Hz input modes will be output at 48Hz if the Frame Rate setting in the Output Config menu includes 48Hz. Otherwise it is displayed at 50Hz.

A 25Hz input mode is output at twice the frame rate 50Hz.

An exception to the 24/25Hz input mode treatment is if the output resolution is set to 480i or 480p. 480i and 480p are always run at 60Hz output rate.

50Hz input modes are displayed at 50Hz output rate.

The output frame rate can also manually set to 24Hz, 48Hz, 50Hz or 60Hz if possible, i.e. such output modes are available.

Only 720p and 1080p output modes are available with 24Hz refresh rate.

480i and 480p output modes are only available at 60Hz refresh rate.

For all other modes 48Hz, 50Hz and 60Hz refresh rate is available.

3.5.5. I/O Lock

Settings: On, Off

If I/O Lock is switched off the output is run with a fixed refresh rate determined by the frame rate setting. This setting will result in the output vertical refresh rate deviating from the input refresh rate, even if both are nominally at the same rate. This causes occasional frame dropping or repeat.

If I/O Lock is set to Source the output refresh rate is following the input video refresh rate if possible.

Locking is achieved by modulating the output clock and works if input and output refresh rate are nominally at the same rate, e.g. when frame rate is set to 60Hz and the video input is also 60Hz. If e.g. the video input rate is 50 Hz and the Frame rate is set to 60Hz, the output will enter free run mode.

3.5.6. Native Colour Temp

Settings: 5500, 6500, 7500, 9300, 10000

Native Colour Temp allows the user to select from pre-configured color temperatures to match the display. If both Native Colour Temp set here in the Output menu and Colour Temp set in the Colour menu are set to the same value, no conversion is performed.

3.5.7. Output Gamma

Settings: 1.0 to 3.0 in steps of 0.1

Output gamma allows to re-gamma video signals with pre-configured gamma values to match the display. Input gamma and output gamma both default to 2.2. If they are both set to the same value, there is no effect on the image.

Note: If e.g. an adjustment to reduce the level of red in the image is required, select a higher number for the (input) Colour Temp in the Colour menu, or a lower number for the Native Colour Temp in the Output menu.

3.5.8. Output Config

This Menu provides items to configure the output ports.

Sync Mode

The VGA output port can be operated with separate syncs, composite syncs and Sync-On-Green.

Internally, the display interface processes data at a full ten bits per colour.

Optimize for Display

Settings: DVI forced, Optimized, DVI/HDMI

Internally, the display interface processes data at a full ten bits per colour. A resolution of ten bits per colour is provided for the VGA output. The colour depth on the DVI-D output is determined by the supported standard of the attached monitor or device when set to DVI/HDMI.

For DVI 1.0 and HDMI 1.1/1.2 devices it is 24 bit, for HDMI 1.3 compliant devices it is up to 36 bit.

DVI forced will output with 24 bit colour depth irrespective of the supported standard of the attached monitor.

When the Optimized setting is enabled the output resolution is automatically set to the native screen resolution of the attached display. The colour depth is determined in the same way as when set to DVI/HDMI.

DVI Colour Space and DVI Range

The colour space of the DVI output port can be set to RGB or YPbPr, the range can be set to Expand, Normal, Compress and Auto.

A limited video range is only using the following greyscale for video information - 8 Bit System: 0x01 .. 0xFE, 10 Bit System: 0x004 .. 0x03FB.

Auto makes the best choice for the range for the DVI and 3G-SDI output. If the HDMI/DVI output does not behave as expected, e.g. because the HDMI display is not evaluating AVInfoFrames properly, the range can be changed manually.

Frame Rates

Settings: 60/50 Hz, 60/50/24 Hz, 60/50/48, 60/50/24/48

Limits the possible output frame rates that can be selected. It is primarily to be able to limit the choices available for the Auto refresh rate configuration discussed in paragraph 3.5.3.

3.6. Colour

This menu contains adjustments associated with setting up inputs to the unit. Use the Up and Down keys to scroll to the required item and press the Menu key.

3.6.1. Black-Level Offset

Settings: 0 IRE, 7.5 IRE

Used to select 7.5 IRE black level set-up adjustment. Used for NTSC type video signals. Should always be set to 7.5 IRE for HDMI video inputs and should usually be off for PAL type analog video inputs.

3.6.2. Black-Level

Settings: -50 to 50 in steps of 1

Black level controls the offset applied to the video signal.

3.6.3. Contrast

Settings: -50 to 50 in steps of 1

Contrast controls the gain applied to the video signal.

3.6.4. Saturation

Settings: -50 to 50 in steps of 1

Control of video saturation, applies to all video inputs but not computer input signals or formats.

3.6.5. Hue

Settings: -50 to 50 in steps of 1

Control of video hue, applies to all video inputs but not computer input signals or formats.

3.6.6. RGB values

This is a user-defined color temperature setting whereby individual R,G,B gain and offset (bias) can be set so as to accurately calibrate a particular input to the display device.

3.6.7. Colour Temp

Settings: 5500, 6500, 7500, 9300

Colour Temp allows the user to select from pre-configured colour temperatures to match the colour temperature of the incoming signal. If both Colour Temp set here in the Colour menu and Native Colour Temp set in the Output menu are set to the same value, no conversion is performed.

3.6.8. Input Gamma

Settings: Gamma 1.0, Gamma 1.5, Gamma 2.2, Gamma 2.8

Set this value to match the native gamma of the input signal. Input gamma and output gamma both default to 2.2. If they are both set to the same value, there is no effect on the image.

3.7. Geometry

This menu contains adjustments associated with setting up position, aspect ratio and scale of the input signal. Scale can be as simple as an overscan up to arbitrarily warping the image.

3.7.1. Horizontal/Vertical Position

Settings: in steps of 1 pixel/line

Change the positional values to match the display borders.

3.7.2. Edge Control

Submenu for changing the position of the image edges, effectively scaling the image in horizontal and vertical direction.

3.7.3. Warp

Note: Warp is only available for HQView-410 and 420. PC Warp is only available on HQView420

Details of the submenu for warping the image and defining projection condition.

The projection condition can be Front Table-top, Front Ceiling, Rear Tabletop or Rear Ceiling. The corresponding image flip is applied in addition to the following warp applications.

The warp applications are **Keystone, 4-Corner, Rotation, Portrait and PC**.

In the **Keystone** application the image can be adjusted to match a horizontally and vertically tilted screen. Also, Pin/Barrel distortion of the lens or screen can be adjusted simultaneously.

Under the **4-Corner** application all corners can be moved and the image linearity is calculated to fit into the given trapezoid. Please note that this function is designed to be used on Flat rectangular screens only. For more complex shapes please use the PC mode.

The **Rotation** application rotates the image from -180 to 180 degree (one full circle) one degree at a time.. At the same time Pin/Barrel distortion of the lens or screen can be adjusted again.

Special **Portrait** warp applications for clockwise (90°) and counter-clockwise (270°) rotation with scaling are provided. These functions cut out the centre of a normal landscape video signal, rotate it by 90 degrees and then scales that centre portion of the signal to fit a portrait mounted screen. Predefined warp maps for portrait mode act on a 16:9 input image. The area is rotated and scaled such that it fills a 9:16 screen.

With **PC** application activated the HQView-520 and 530 communicate with the PC tool Warp Generator.

<http://www.calibreuk.com/downloads/pvphd/CUK%20Warp%20Generator%20Installer%20V2-50-8337.msi>

Warp Generator allows you to define an arbitrary screen in live operation by projecting a grid on the surface and move the grid points to get a rectangular output. This grid information can then be downloaded in one of eight slots used for real-time processing of image data which make the image appear rectangular on a curved screen.

For convenience all settings can be reset with one button provided in the submenus.

3.7.4. Picture Format

Settings: **Standard, Full Screen, Crop, Anamorphic**

Picture Format allows a user to select the displayed aspect ratio where the signal input is different to the display panel's natural aspect ratio.

Note that some aspect ratios may not be applicable to all signal types, in which case selecting a non-applicable aspect ratio conversion will have no effect on the displayed image. E.g. when a 16:9 image is displayed on a 16:9 panel all settings give an identical full screen image.

Standard preserves the aspect ratio of the incoming image and scales the image to fit into the size of the panel. Dependant on the aspect ratio of the panel the image is either bordered by the right/left side or bottom/top of the panel. Non-used areas of the panel are displayed black (letterboxed).

Full Screen scales the image to the size of the panel without preservation of the aspect ratio.

Crop preserves the aspect ratio and scales the image to fit the screen. Dependant on the aspect ratio of the panel either the top/bottom or right/left areas of the image are cropped.

Anamorphic scales the input image such that it is displayed with a 16:9 aspect ratio when displayed on the screen. The image is further scaled to fit into the size of the panel. Dependant on the aspect ratio of the panel the image is then either bordered by the right/left side or bottom/top of the panel. Non-used areas of the panel are displayed black (letterboxed).

3.7.5. Overscan

Settings: 0 to 10 in steps of 1

Overscan is used to slightly zoom into the image. Thus, the border area of an image is no longer displayed on the screen. This cuts off unwanted features at the top or bottom from e.g. video images.

3.7.6. Pan Tilt Zoom

This menu provided settings to zoom and shrink the image, as well as panning within the image.

Pan Tilt Zoom (PTZ) can be switched on or off.

When switched on the latency of the system is increased by one frame. Thus, there is a difference of a PTZ setting off or on with no zoom.

PTZ settings can be saved per mode or globally, i.e. if applied globally the same PTZ settings are applied when switching input channels or changing the input mode.

The Zoom slider allows to zoom into the image or shrink it.

When Aspect Lock is set to On the separate slider for zooming vertically is greyed out and the horizontal zoom or shrink factor is used as vertical factor as well. The aspect ratio is preserved.

When Aspect Lock is Off horizontal and vertical scaling factors can be chosen separately.

With the Pan and Tilt sliders panning within the image in horizontal and vertical direction is possible. Off raster panning is allowed, i.e. the image can be shifted outside the active area of the display.

For convenience the PTZ settings can be reset with one button.

3.8. PiP

The HQView-400S has a PiP menu. It contains adjustments associated with setting up source, position and size of a picture in picture video image. HQView-410 and HQView-420 have a Multiple Unit menu instead. HQView-410 and HQView-420 can be booted as HQView-400S through the menu system though.

3.8.1. PiP Input

Selects the video source for the PiP window.

The available PiP video sources depend on the currently displayed (main) video source.

If the main video source is HDMI, DVI, DVI-A, VGA or COMPONENT the available PiP sources are CVBS1, CVBS2, S-VIDEO and HD-SDI.

If the main video source is CVBS1, CVBS2, S-VIDEO or HD-SDI the available PiP sources are HDMI, DVI, DVI-A, VGA and COMPONENT.

3.8.2. PiP Mode

Settings: Off, PIP, PAP, POP

Three picture in picture modes can be invoked.

PIP displays a second channel within the main image.

PAP displays both pictures side by side scaled to the vertical size of the panel.

POP displays both images side by side preserving the aspect ratio of each source. The unused areas of the panel are displayed black.

Note: PaP is not available with test pattern and also not available with PTZ activated. PoP has the same limitation and the output resolution needs to have greater or equal to 768 lines.

3.8.3. PiP Size

Settings: Small, Medium, Large

Selects the size of the PiP image.

Note: Large is always available. Small and Medium are only available if the output resolution is greater or equal to 768 lines and the PiP mode has less than 1920 horizontal active pixels.

3.8.4. PiP Position

Settings: Top Left, Top Right, Bottom Left, Bottom Right, Free H/V

Selects the quadrant where to show the PiP image. When Free H/V is selected the horizontal and vertical PiP positioning sliders become available and the PiP can be moved over the screen.

3.9. Multiple Unit

The HQView-410 and HQView-420 have a Multiple Unit menu to set up each unit for use in a multi screen application.

Multiple screens are stitched together to provide a bigger display with higher resolution than a single display. Each display is driven by a separate HQView unit. Each HQView unit gets the same graphics or video input signal through a distribution amplifier. The HQView unit cuts out and resizes the image to display the part of the image assigned to the corresponding screen. In a multi projection display the individual projections typically are chosen to overlap to give seamless transitions. Overlapping regions are illuminated by multiple projectors and are brighter than non-overlapping regions. For a uniform brightness over the total display the brightness in the overlapping regions has to be reduced electronically. PiP functionality is not supported due to higher bandwidth requirements of the video processing.

Important: When using multiple HQView units to drive one single large screen, it is essential that all HQView units are I/O locked, otherwise motion tear will be observed at the boundaries of the image processed by each HQView unit. It is also essential that all HQView units are setup for the same processing latency (either all units are in Best Picture mode or all units are in Low Latency mode).

3.9.1. Auto Zoom

Settings: On, Off

Switches on the auto zoom resizing the video image to display the assigned part of the total image.

AutoZoom is switched off automatically when the on-screen menu is activated and that menu cannot be properly displayed. The menu is scaled to a certain extent by the warp engine and may exceed the size of the screen. Also, only the active video area can be used for the on-screen menu. This would crop the menu and make it impossible to navigate. A message will indicate such situations. After having done the change AutoZoom can be reactivated.

3.9.2. Units Wide/Units High

Settings: 1, 2, 3, 4/ 1, 2, 3, 4

Provides the HQView unit information of the multi screen installation. The number of horizontally and vertically installed screens or projectors is entered.

3.9.3. Horizontal Pos/Vertical Pos

Settings: 0 to (Units Wide – 1) in steps of 1/ 0 to (Units High – 1) in steps of 1

Provides the HQView unit information which window of the total image it is assigned to and has to process (cut out and resize).

3.9.4. Blend Width

The blend width menu provides sliders to set up the overlap region for left, right, top and bottom blend region.

An offset for the blend region can be set-up as well. The region between the edge and the start of the blend area is black.

The overlap is set up in output pixels with a range of up to two third of the output resolution. That is for the sum of all blend and offset. When setting up one parameter the remaining range for the other sliders is calculated. An alternative way to describe the blend limit is that one third of the image in horizontal and vertical direction cannot be blended. This on third image window can be placed anywhere on the screen.

Note: Each HQView unit needs to be provided with the exact same value for left and right blend region. Top and bottom blend region have to be identical as well, but don't need to have the same value as left and right. The HQView units do not communicate between each other and thus they have to make an assumption for auto zoom calculations and that is overlap of the neighbouring (and those beyond) projectors is identical.

3.9.5. Blend Curve Type

The blend curve type menu allows to set the blending characteristics. For setting up the overlap the Align Pattern should be used. Align Patter reduces the image intensity of each pixel in the blend area by half.

When the blend region set up through the blend width menu and the physical blend match the S-Curve characteristics can be switched on. The image intensity is gradually reduced from the start of the blend to the edge of the respective projector image. The S-Curve Value slider allows to control the steepness of the S-Curve.

A Custom Alpha Map can be layed over the former blend as well. Such custom alpha map has to be created on a PC and loaded into the file system of HQView (see paragraph 4.5).

3.10. Enhancement

The enhancement menu provide image enhancement functions. Note that the enhancement settings apply to video input signals only, not computer graphics signals.

3.10.1. Sharpness

Settings: -50 to 50 in steps of 1

Control of the sharpening enhancement filters' levels. These are peaking filters to improve high-frequency response. Note that setting this control too high on a signal which already has good high frequency response will cause ringing or ghosting.

3.10.2. Detail

Settings: 0, 1, 2, 3

This filter provides powerful 2D image enhancement which can be used to greatly improve detail definition and clarity without causing image ringing or ghosting. It improves both horizontal and vertical detail. Correct setting of the detail enhance filter can make SD signals look virtually indistinguishable from true HD. At setting 0 the filter is switched off, with setting 3 providing the highest effect.

3.10.3. Video Filters

The video filters menu provides LTI/CTI filters, TRNR/MNR noise reduction filters and a CCS cross color suppression filter.

The LTI filter enhances the sharpness of the luminance component. The CTI filter enhances the color sharpness of the chrominance signal by increasing the steepness of color edges.

TRNR (Temporal Recursive Noise Reduction) and MNR (Mosquito Noise Reduction) are available for SD input signals only. These filters reduce spatial and temporal noise as well as block artifacts.

CCS is a filter to reduce luminance to chrominance cross talk of composite video signals (only) which appears as a coarse rainbow pattern or random colors in regions of fine details.

3.11. System

This selection contains functions which are more applicable to system operation than to picture adjustment.

3.11.1. User

Settings: USER 1, 2, 3, 4

A predefined setting stored under a user name can be selected. Several settings of the HQView-4xx can be stored under a user name. Thus, different users can store their preferred HQView-4xx settings and recall these profiles by picking up their user name from this menu.

Note: Using the Web interface, (any number of) settings can also be stored/restored to/from a PC disc drive. This feature is only available on V2 hardware.

3.11.2. Names/Profiles

The Names/Profiles menu provides input masks to rename the generic input channels and user names. User names and input channel names can be changed to any word with a maximum of 12 alpha numeric characters with a value range of 0-9, A-Z and blank.

The Names/Profiles menu allows the user to store profiles under a certain user name. It also allows to copy user profiles by loading a profile stored under one user name and save it under another user name. Reset Profile allows to restore default HQView-4xx settings for the currently selected user.

3.11.3. Input Config

Inputs can be configured through the following sub-menus:

VGA Setup:

Submenu for adjusting analogue computer video. A button for automatic setup of frequency and phase of the sampling clock is provided. This automatic adjustment is strongly recommended. Frequency (Clock) and phase can also be altered manually.

DVI/HDMI Setup:

The equalisation of the DVI interface can be boosted to allow for extended cable length.

The DVI port EDID can be changed from an EDID supporting DVI sources to an EDID more appropriate for HDMI sources.

The automatic HDMI and DVI Color Space and Range settings can be overwritten in this menu. Range can be set to limited video mode or full range. The color space can be set to RGB or YCbCr.

The DDC can be taken off line. When setting HDCP Input to off HQView pretends to be non HDCP compliant forcing the source to not encrypt data which is not copy protected.

Component Setup:

The component interface of the HQView is configured through this submenu. The Colour Space can be set to YPbPr or RGB. The sync signal can be stripped from the Green or Y channel with the setting 3 Wire or from the separate sync line with the setting 4 Wire. The Auto setting will automatically detect a sync signal and set-up the HQView accordingly. This is set in under Synchronisation.

Test Pattern:

When the OSD menu is off the test pattern can be toggled through by pressing the up and down keys of the keypad. For unit control through a web browser or to set up a certain default test pattern a list box to choose the pattern from is provided.

Switching Transition:

When switching input channels by default the HQView4xx is set to freeze mode, the last frame of the prior displayed image is frozen and displayed until a stable image of the new input channel can be shown.

The switchover process is supposed to be as seamless as possible. The source and monitor add switching noise due to unforeseeable activity of the firmware in said devices.

By default HQView is in auto frame rate switching and I/O lock mode. In order to get a best smooth switching result with the source and monitor I/O lock and auto frame rate switching have to be switched off in the Output/Display Type menu.

The switching transition of HQView can be set to Freeze, Blank, Fast Fade and Slow Fade.

Freeze halts the prior channel image until the new channel image is stable.

Blank switches the output to show a black screen instead of the last channel image.

Fast and slow fade have the prior channel image faded out and fade into the new channel video image once it is stable.

3.11.4. Display Mode

The "Display Mode" can be set to either Low Latency or Best Picture.

In Best Picture optimum image processing is applied, whereas in Low Latency mode the lowest latency is achieved.

The flicker of interlaced video is not suppressed totally for the low latency setting, but has the advantage of almost no delay in response, which is important for applications such as gaming, simulation or imaging in medical treatment.

The latency of the system is $\frac{1}{4}$ of a frame for progressive input and progressive output when I/O locked. If the output is free running the latency is oscillating between $\frac{1}{4}$ of a frame and 1 frame. Switching on PTZ adds one frame of latency. Switching on warp adds another frame of latency. If an interlaced video signal is processed in Best Picture mode, this will add one more field of latency. In Low Latency mode this extra field of latency is avoided.

3.11.5. Menu Settings

This menu provides items to change the menu position and menu display time, i.e. the time after which the OSD is switched off again when there is no user interaction.

OSD Messages can be deactivated if on screen menus are not required.

The menu language can be altered and the keypad can be locked.

Either all keys can be locked or the menu and menu navigational keys only.

The locking of the keyboard is accompanied by the message: Keypad is locked. Press Menu/Up/Down to unlock. When successfully unlocking the keypad the message shows up: Keypad unlocked.

3.11.6. Network Settings

The Network Settings menu allows the HQView-4xx TCP/IP address to be configured. Under Address Type a Static or DHCP leased address can be chosen. The static address and Netmask need to be entered manually.

The Network Settings menu has a section with information on the DHCP Status and IP address assigned to the board, as well as the fixed MAC Address programmed into the HQView-4xx. The DHCP status is Off when static assignment is used or it displays an address when DHCP has leased an address accordingly or it is None assigned if the lease was not successful.

Note: When changing from DHCP to Static mode or vice versa it is strongly recommended that HQView-4xx is powered down after such a change, then powered back up, so that it is properly recognised by other devices on the network.

3.11.7. Factory Defaults

This button let you restore all settings to the default values of the HQView-4xx, thus, provide a means to get back to a known (good) system state.

3.11.8. Operation Mode

This menu item is only available on a HQView-410/420. It allows the choice between the regular multiple unit mode with blend and warp and a PiP mode.

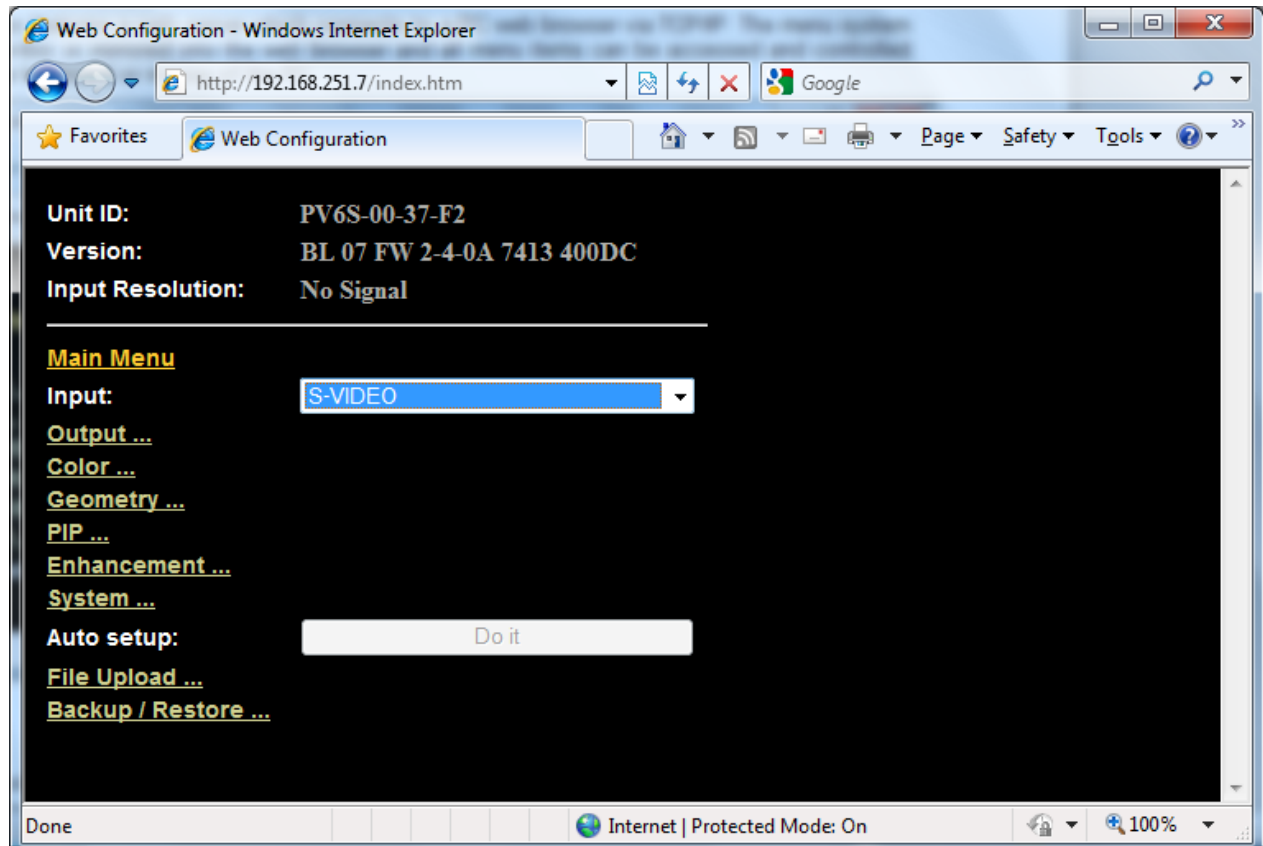
Selecting the PiP mode will effectively re-boot the HQView-410/420 to emulate a HQView-400. The PiP/PaP/PoP mode has no edge blend.

In HQView-400 mode the Operation Mode can be switched back to Multiple Unit.

REMOTE CONTROL WEB SERVER

4.1. Introduction

HQView-4xx features a web server which connects to a PC web browser via TCP/IP. The menu system of HQView-4xx is mirrored into the web browser and all menu items can be accessed and controlled through the keyboard or mouse of the PC.



Note: File Upload and Backup/Restore is only available for V2 hardware.

4.2. Installing the Software

No extra software needs to be installed on a PC. The PC web browser is used as the graphical user interface for all control items. To connect to the HQView-4xx the TCP/IP address of the unit has to be entered into the address list box of the web browser in the following format <http://xxx.xxx.xxx.xxx>. The TCP/IP address assigned to HQView-4xx can be found in the System/Network Settings menu.

4.3. Discovery Tool

Calibre provides a DiscoveryTool.exe Windows application to identify Calibre boxes in the network.

http://www.calibreuk.com/downloads/LEDView/DiscoveryTool_V1.0.exe

Clicking on the link of the recognized box will open a browser and make a connection to the corresponding box. The box identifier is made up of "PV6S" in the case of HQView-4xx followed by the 6 least significant digits of the MAC address. The MAC address of the box can be found in the System/Network Settings menu.

Note: This is for use on a network not on a single wire connection.

4.4. Software Operation

Once the address has been entered into the web browser, the browser starts to load pages from the HQView-4xx mirroring the menu system of the unit.

All menu items are shown as their respective buttons, sliders and list boxes and can be accessed and altered with the PC mouse or corresponding navigational key presses. When changes within a submenu make other menu items available immediately when using the on-screen menu of the HQView this has to be either done manually by clicking on the refresh button of the web browser or is done with the next periodic auto refresh.

Various values are set by sliders. For fine increment of a slider value click on the slider and use the mouse wheel to change the value in steps of 1. Click again and the value is applied.

4.5. File Upload

A page for 4 file uploads is provided.

Test patterns can be created and stored on the PC. Four such custom test patterns can be uploaded to and stored by the HQView unit. Each of the test patterns in the four slots can be deleted and replaced by another test pattern. The test patterns need to be in RGB 24bit .PNG format as e.g. supported by MS Paint®.

For best detail the test patterns should be created with the output resolution HQView will be operated at. Non matching resolution test patterns will be scaled to the output resolution.

A single alpha map can be uploaded to the HQView unit.

The alpha map format is B/W 16bit .PNG as e.g. supported by Adobe Paintshop®. Only the most significant 10 bits are used.

Also a Calibre proprietary format without compression is supported. This format is intended for uploads in proprietary calibration systems directly controlling the HQView unit. Thus, a .PNG encoder does not have to be implemented on the host side. If the alpha map size exceeds the available storage space on the HQView unit the .PNG (lossless compression) has to be used. The Calibre format is as follows:

```
// Custom Alpha Map File Format
//
// Offset Size Purpose
// 00 4 Header field used to identify custom alpha map file ('AM30')
// 04 2 Horizontal resolution in pixels (big endian)
// 06 2 Vertical resolution in pixels (big endian)
// 08 s Image data
//
// Each line of image data is built like this:
// One 32-bit unsigned (four bytes, big endian) for every three pixels of image data
// Bits[31..30] - unused
// Bits[20..20] - leftmost pixel of three
// Bits[19..10] - middle pixel of three
// Bits[09..00] - rightmost pixel of three
// Each line has to be zero-padded to make up an integer number of 32-bit unsigned values
//
// e.g. 1280 pixels horizontally needs 427 values (1024/3 = 426.67, rounded up)
//
// So the size (s) of the image data is calculated like this:
// s = CEILING(ImageWidth / 3 ) * 4 * ImageHeight
//
// Example of a 1920x1200 custom alpha map (all alpha values set to 1):
//
// 000000 41 4D 33 30 07 80 04 B0 (header)
// 000008 3F FF FF FF 3F FF FF FF (beginning of first line)
// ...
// 000A08 3F FF FF FF 3F FF FF FF (beginning of second line)
// ...
// 2ED608 3F FF FF FF 3F FF FF FF (beginning of last line)
//
// s = CEILING(1920 / 3 ) * 4 * 1200 = 3072000 bytes
```

FIRMWARE UPDATE

5.1. Introduction

HQView-4xx has an USB port which allows a PC connection. With the Calibre PC Updater tool new firmware can be installed on HQView-4xx for feature upgrades and bug fixes.

5.2. Updating Firmware

HQView-4xx accepts firmware uploads only in a dedicated Updater mode.

The unit is put in Updater mode by pressing and keeping the Menu key pressed at power up. If the Menu key is released within 10 seconds after power up HQView-4xx is in Updater mode. Otherwise, HQView-4xx is started normally.

Whilst the Menu key is still pressed the On LED is flashing. When in Updater mode the On LED is flashing two times, then switched off, then flashing two times again, then switched off and so forth.

When the unit is successfully in up-date mode the USB connection between PC and HQView-4xx can be established and the Calibre PC Updater tool to be started.

The PC Updater tool allows browsing to select a firmware file location. Once a BREC is selected the Update Firmware button has to be pressed and the firmware download to the HQView-4xx into non volatile flash RAM starts.

After completion of the download HQView-4xx needs to be restarted normally (without pressing the Menu key) for the change to take effect.

ENVIRONMENTAL AND EMC

6.1. Recommended Operating Conditions

Temperature	0°C to 40°C
Humidity (non condensing)	5% to 95%

6.2. Storage

Temperature	-25°C to +85°C
Humidity (non condensing)	0% to 95%

6.3. CE and FCC Compliance

CE: This product complies with the requirements of 2004/108/EC Electromagnetic Compatibility Directive, and 2006/95/EC Low Voltage Directive. Compliance is to EN55022 Class A.

FCC: **WARNING:** This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at their own expense.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

It is suggested that the user use only shielded and grounded signal cables to ensure compliance with FCC rules.

6.4. PAT Testing

Earth continuity testing under PAT regulations shall be done to the HQView/LEDView with 8A or 10A only. A test with 25A may damage the unit.

In fact, HQView/LEDView is IT equipment and the IEE Code of Practise to check earth continuity suggests an alternative 20-200mA test. If the PAT tester does not provide this method and a high current test is to be used instead a 8A or 10A test will be acceptable under the same IEE Code of Practise (a minimum of 1.5 times of the HQView/LEDView internal 5A fuse).

You have to be careful where you connect the earth bond test lead when using 8A or 10A. It is to the metal chassis that you must connect the test lead (mains earth). DO NOT CONNECT to the connectors of the rear panel (signal earth). The HQView/LEDView may never work again.