CALIBRE
CREATING TECHNOLOGY

HQView-500 Series
Operating Instructions

This manual explains how to operate your HQView-500 Series (HQView-5xx) image scaler. The HQView-500 Series comes in three versions HQView-500S, HQView-510 and HQView-520. HQView-5xx 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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For technical support please e-mail techsupport@calibreuk.com ***or send your queries by fax to (44) 1274 730960, for the attention of our Technical Support Department.***

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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-5xx is a very flexible image scaler developed specifically for driving large screen displays and multiple screen applications from video or graphics sources.

HQView-5xx 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-5xx features excellent image processing algorithms for the very best scaling, film and video noise reduction and MPEG artefact reduction.

HQView-5xx uses a very flexible high performance video input front end including true component video support in analog YPbPr and RGBS formats and 3GSDI/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. The output format can also be set to lock to an externally provided synchronization signal.

Outputs are available in VGA analog and DVI digital formats as well as 3GSDI serial digital formats which are useable simultaneously so that one output can drive the screen while the other runs a local monitor. Note that not all PC output formats are supported by 3GSDI standards in which case the 3GSDI output is disabled. Also note that if an HDCP encrypted signal is connected to the HDMI or DVI input, the DVI output signal will be similarly HDCP encrypted and the VGA analog output as well as the 3GSDI output will be disabled.

Interlaced outputs are supported and can be run through a vertical temporal filter greatly reducing interlace flicker.

HQView-5xx supports Pan, Zoom and Tilt to select a part of the input image, fill the screen and pan within it.

HQView-5xx can be operated with different firmware. At time of issuing this document three firmware options are available. Each firmware provides different feature sets controlled through the OSD. Thus, the OSD menu systems of the firmware options may deviate from each other. Special emphasize is given in the discussion of the OSD menu system in the corresponding chapters.

In the basic configuration HQView-500S used for single display installations Picture in Picture functionality is provided.

The next stage is the HQView-510 for multi screen or multi projector installations. Picture in Picture is replaced by Auto Zoom and Edge Blend with elaborate Black Level Uplift. Edge Blend allows to electronically reduce the brightness level of certain image regions to match the brightness of overlapping areas. Auto Zoom automatically crops and zooms the input video image to display the section of the total image on the corresponding projector or screen. Also embedded warp allowing to adjust the image in a projection scenario to match a rotated, tilted or curved screen is provided. For 9:16 portrait mode signage special predefined warp maps are available to rotate and stretch a video image to fill a +/-90° rotated display panel.

HQView-520 adds free form warp capability for certain non-flat screens in a multi projector installation. Warp maps created with the PC tool “Warp Generator” can be uploaded into HQView-520 and processed accordingly.

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

1.2. Packing List

HQView-5xx is supplied with the following:

1) This manual

2) 3 pin plug IEC mains cable

3) DVI-D output cable

4) CD

HQVIEW-5XX SYSTEM DESCRIPTION

2.1. Product Overview

HQView-5xx 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 SD/ED/HD component video via 3/4xBNC
- 3G-SDI/HD-SDI/SDI (Serial Digital Interface) via BNC
- VGA analog (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 may be applicable to certain output modes.

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, YPbPrS, RGB 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

2.2.4. 3G-SDI Input

Format:	SD-SDI, HD-SDI and 3G-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, 1080i and 1080p single link formats at 270Mb, 1.485Gb or 2.97Gb 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 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-5xx 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 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 and the VGA and 3G-SDI connector may 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.***

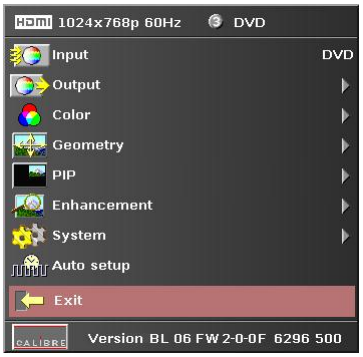
One is a DVI-D output and the other is a VGA style output. Both conform to normal VESA standards for connectors and pin outs for these signal types. The DVI-D connector will support HDMI 1.3 with 36-bit video and HD audio formats when connected to a suitable HDMI 1.3 receiver.

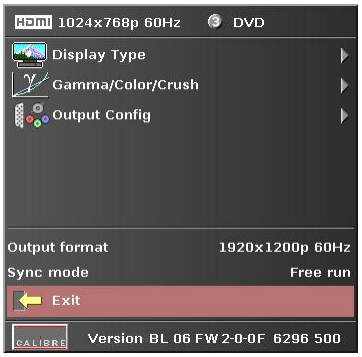
The 3G-SDI BNC output is supporting the same formats as accepted by the 3G-SDI input (see section 2.4.4.).

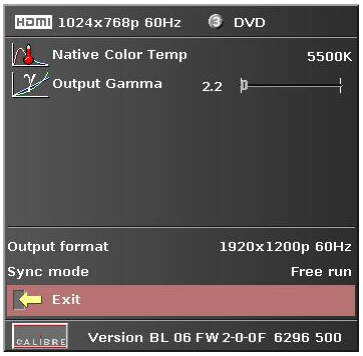
3.1. Menu Tree

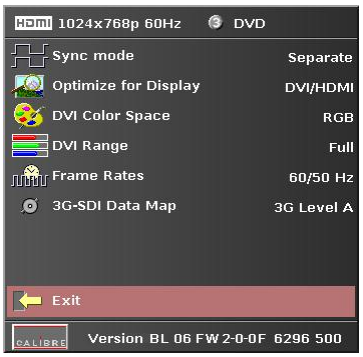
HQView-500S Menu Tree

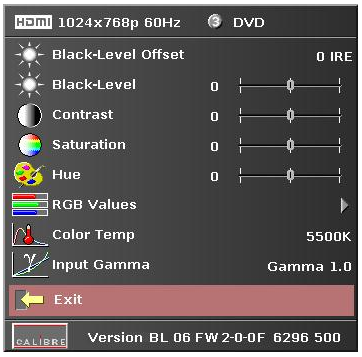
1st Level **2nd Level** **3rd Level** **4th Level**



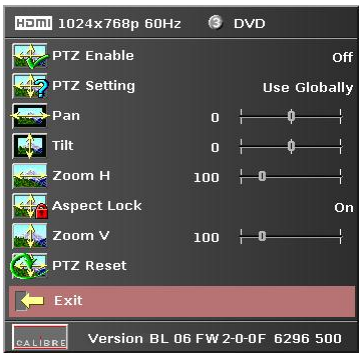




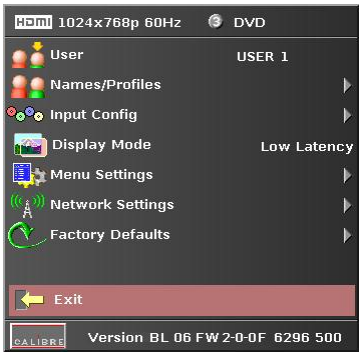


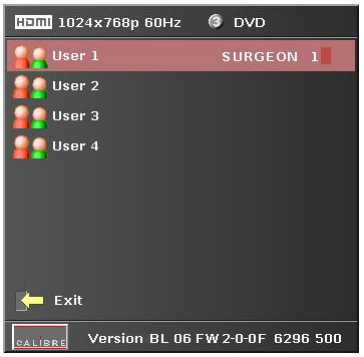


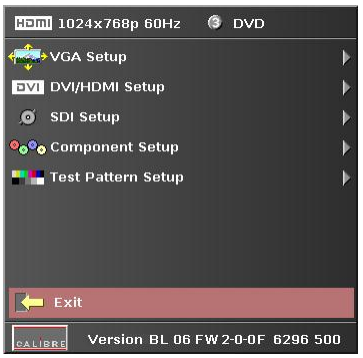
1st Level	2nd Level	3rd Level	4th Level

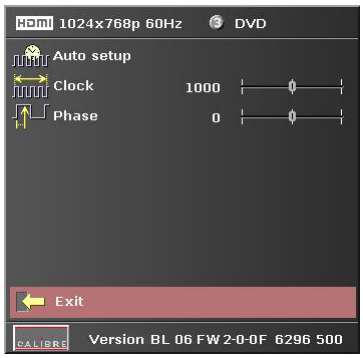


1st Level	2nd Level	3rd Level	4th Level

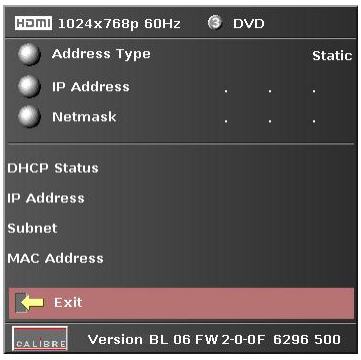






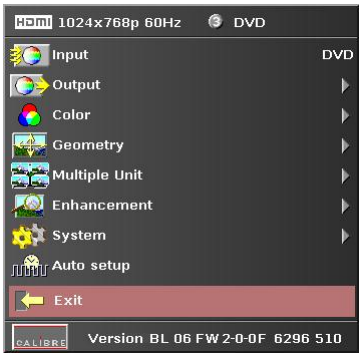


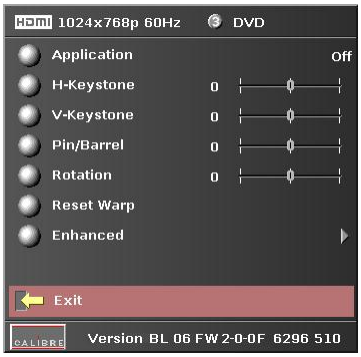
1st Level **2nd Level** **3rd Level** **4th Level**

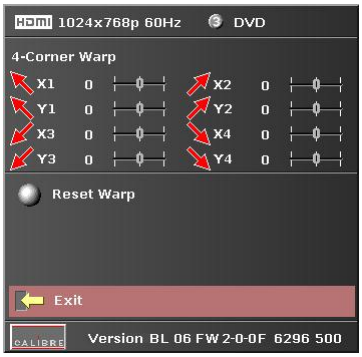


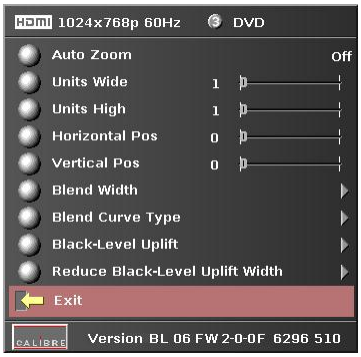
HQView-510 as well as HQView-520 have a Multiple Unit Menu instead of the HQView-500S PiP Menu and they feature embedded Warp.
HQView-510/520 can be rebooted in HQView-500S mode with PiP instead of Multiple Unit capability.

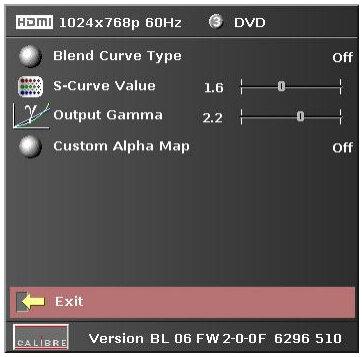
1st Level | **2nd Level** | **3rd Level** | **4th Level**



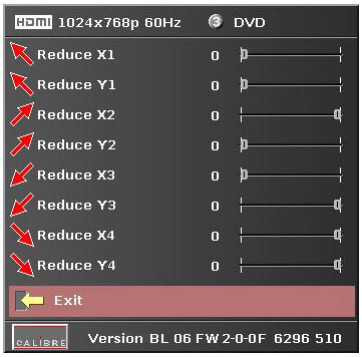


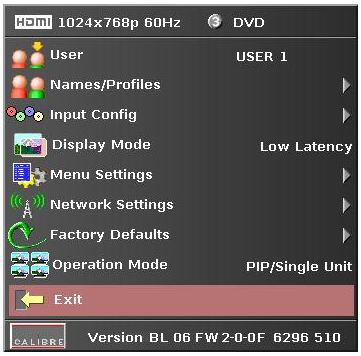






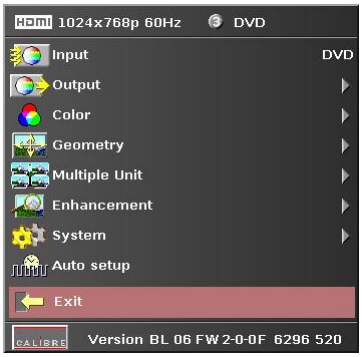
1st Level **2nd Level** **3rd Level** **4th Level**

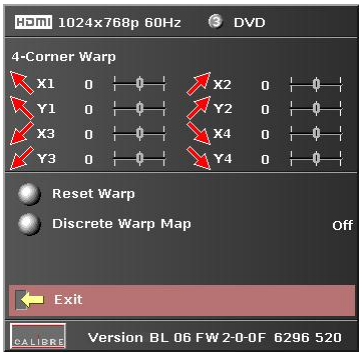




HQView-520 has an additional Discrete Warp Map Item compared to HQView-510.

1st Level **2nd Level** **3r Level** **4th Level**





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 Test Pattern key: A HQView-500 has a key to directly activate the PiP mode. The LED is switched on when in PiP mode. HQView-510 and 520 have a key to directly activate a Test Pattern. Use the up/down keys to toggle trough the available test patterns. The LED is switched on when in Test Pattern 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 **Mode reset:** Menu/Black up/Black down

Factory reset: Colour up/Colour down/Hue up/Hue down (in live operation or at power up)

Set output mode to VGA (or 480i): Menu/Contrast up/Contrast down for VGA. Press this combination again to set the output mode to 480i. The 3GSDI output only features video modes.

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

1 – SD/HD-SDI/3G-SDI input 2 – Composite Video 1 (RCA) and S-Video input

3 – Composite Video 2 (BNC) and Genlock input (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 – 3G-SDI output

10 – USB port 11 – TCP/IP port

12 – RS232 port 13 – 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, Color, Geometry, PiP (HQView-500S) or Multiple Unit (HQView-510 and 520), Enhancement and System.

On each menu page an Exit menu item is available to leave the menu or submenu. Some adjustments are not applicable to all signal types or operating modes, in which case those non-applicable functions will be ghosted and are not accessible via the menus.

All menus have a top status line and a bottom line indicating the firmware revision number. In the status line the currently selected input channel is indicated and the detected mode is identified. The firmware revision number displays the revision number of the bootloader behind BL, the revision number of the firmware behind FW and whether it is a 500S, 510, 520 type HQView unit.

To set up your HQView-5xx 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: All Input parameters are specific to your chosen input channel and input signal type, they are not global to the unit. All Output parameters are 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, 3G-SDI, DVI, HDMI and Test Pattern.

Test patterns can be generated by HQView-5xx 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 three sub menus, Display Type, Gamma/Color/Crush and Output Config. Use the up and down keys to scroll to the required item and press the Menu key.

3.5.1. Display Type

Settings: LCD/Plasma, Projector

The Display Type setting defaults to Projector. Select Projector if you drive a projector and need the warp function and edge blend capability. Set to LCD/Plasma if you do not need warp (including Location). Multiple unit configurations with auto zoom are available, but without edge blend. The real value of this mode is that the Flicker Filter becomes available. Note: For HQView-500S leave the setting to Projector mode, since there is no difference to LCD/Plasma mode.

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 3GSDI output does not feature the PC mode resolutions, only 480i/p, 576i/p, 720p and 1080i/p output modes are supported. Available SDI output modes are indicated by an SDI connector symbol in the output mode selection list box of the OSD. SDI output modes not supported are indicated with this symbol crossed out red.

The default output resolution as set by the factory or after a user issued factory reset is 640x480. If only a SDI capable monitor is connected no image is displayed and consequently the output resolution cannot by changes through the OSD. Pressing the Menu/Contrast up/Contrast down key combination will switch the output resolution from 640x480 to 480i which SDI monitors should be capable to display. 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, 25H, 48Hz, 50Hz (plus margin) 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: Off, Source, Genlock, Auto

If I/O Lock is switched off the output is run with a fixed refresh rate determined by the frame rate setting, which deviates 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 locking is possible. If I/O Lock is set to Genlock the output refresh rate is following the vertical sync of an externally provided signal (GENLOCK BNC) if locking is 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. When Frame Rate is set to Auto the matiching frame rate is chosen.

When I/O lock is set to Auto and a Genlock source is present to the GENLOCK BNC. If genlocking is not achievable, locking to the video source frame rate is tried. If that is not possible the output is running in free-run mode.

The status line of the OSD window under Sync Mode indicates if the output signal is locked to the input signal (I/O Locked or Genlocked) or in free run mode (Free Run) .

3.5.6. Native Color Temp

Settings: 5500, 6500, 7500, 9300, 10000

Native Color Temp allows the user to select from pre-configured color temperatures to match the display. If both Native Color Temp set here in the Output menu and Color Temp set in the Color 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) Color Temp in the Color menu, or a lower number for the Native Color Temp in the Output menu.

3.5.8. Output Config

This Menu provides items to configure the output port.

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. A resolution of ten bits per

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 full or limited range (8 Bit: 0x01 .. 0xFE, 10 Bit: 0x004 .. 0x03FB).

Frame Rates

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

Limits the possible output frame rates for the Auto refresh rate configuration discussed in paragraph 3.5.3.

3G-SDI Data Map

720p and 1080i HD-SDI data can be output in YCbCr 4:2:2, YCbCr 4:4:4 or RGB 4:4:4 mode.

3GSDI data can be output as Level A or B data.

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. Should always be set to 7.5 IRE for HDMI video inputs and should usually be off for 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 colour 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 color 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. RGB values

This is a user-defined colour 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.

3.6.9. 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 boarders.

3.7.2. Edge Control

Submenu for changing the position of the image edges, effectively scaling the image in horizontal and vertical direction. If Pan Tilt Zoom is activated Edge Control is disabled. It does effectively the same, but has greater range.

3.7.3. Warp

Note: Warp is only available for HQView-510 and HQView-520.

Submenu for warping the image and defining projection condition. The projection condition can be Front Tabletop, Front Ceiling, Rear Tabletop or Rear Ceiling. The corresponding image flip is applied on top of the following warp applications.

The warp applications are Keystone, 4-Corner, Rotation, and PC (only HQView-520). Special portrait warp applications for clockwise (90°) and counter-clockwise (270°) rotation with scaling are provided as well.

Under 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 is calculated to fit into the given trapezoid.

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

Predefined warp maps for portrait mode applications are provided. A 9:16 input image area is rotated and scaled such that is fills a 16:9 screen.

With PC application activated the HQView-520 communicates with the PC tool Warp Generator. 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 at variance with 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 switching 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. 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-500S has a PiP menu. It contains adjustments associated with setting up source, position and size of a picture in picture video image. HQView-510 and HQView-520 have a Multiple Unit menu instead. HQView-510 and HQView-520 can be booted as HQView-500S 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.

3.8.3. PiP Size

Settings: Small, Medium, Large

Selects the size of the PiP image.

Note: The larger PiP sizes are not available for certain main and PiP source combinations.

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-510 and HQView-520 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 extend 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. When changing the slider value from within the OSD the blend area is not update immediately. An update is forced when pressing the menu button, thus the slider is replaced by the menu. This is not ideal, but excessive blend area write time suggested this approach.

The overlap is set up in output pixels with a range of up to a quarter of the output resolution. For a configuration with two projectors in horizontal direction the overlap can be higher to allow 16:9 images to fit on two combined projectors with an aspect ratio of 4:3 or 5:4.

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 total pixels of blend area and offset region is limited by the same amount of pixels as for an offset of zero.

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. For convenience in this Blend Curve menu a duplicate of the Output Gamma slider can be found to match the grey scale of the images.

When a custom alpha map was loaded into the file system of the unit it is recognized at boot time and the Custom Alpha Map menu item becomes available. Custom alpha maps can be uploaded through the web or remote control API interface of HQView. The map can be switched on and off. The map is combined with the Align or S-curve map internally generated. If that is not wanted Blend Curve Type has to be set to off.

3.9.6. Black-Level Uplift

This enables the user to provide a black level uplift to compensate for the additional light leakage from multiple projectors in overlap regions. The black level uplift can be set for the 9 possible regions of the image. Setting the black level uplift for the middle of an edge also sets the black level uplift for the two adjacent corners, and if needed the corners can then be set individually. The sliders for all regions which are not involved in edge blending for a given multiple unit configuration are greyed out, and the black level uplift for all these regions can be set together using the Non-Blend Region parameter.

3.9.7. Reduce Black-Level Uplift Width

The Black Level Uplift field may need to be adjusted to achieve a perfect result. There may be an area of light leakage beyond the edge of the active image from the projector. With these controls the edges of the black uplift region can be moved so they can be aligned with the edges of the area of light leakage. In the case of projection under non-rectangular conditions the projection fields of adjacent projectors are not aligned with the blend region. The corners of the non-blend region can be moved to allow tracking of the edge of the projection field of adjacent projectors.

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.

3.10.4. Flicker Filter

The Flicker Filter reduces interlace horizontal line edge bounce or flicker when scan converting from a computer progressive input format to an interlaced output signal. By choosing the filter strength and recursion mode it is possible to choose between higher levels of flicker reduction or better motion reproduction. By default the filters are off.

The Flicker Filter when turned on is applied to the computer input ports DVI and HDMI. It is not applied to inputs which are video (Composite, S-Video, Component and 3G-SDI) or to interlaced modes on DVI and HDMI. The filter strength slider is always available and the strength can be changed but it has no effect to a currently displayed interlace mode or video input port.

Filter Strength controls the filter weighting of prior field versus current field. Recursion chooses between vertical filtering of current and prior input fields, or current field and recursive data output from filter during prior field.

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-5xx can be stored under a user name. Thus, different users can store their preferred HQView-5xx 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.

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-5xx 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 DVI-I connector will accept either DVI-D or VGA analogue inputs. The DVI-I channel can be configured accordingly.

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

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.

SDI Setup:

For 3GSDI Level B type input modes the stream can be chosen.

SDI audio input is routed to the HDMI and 3GSDI output connector by default. HQView-5xx can also be set to monitor audio on the SPDIF connector. SDI Audio on the HDMI/3GSDI connector and SPDIF connector are mutually exclusive.

Two consecutive SDI audio channels can be output on the HDMI/3GSDI output interface. The group can be chosen. Or all eight SDI audio channels can be transmitted.

Component Setup:

The component interface of the HQView-5xx 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-5xx 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. Custom test patterns loaded into the file system of the unit through the web interface, can be accessed through the same means.

The speed of the moving test pattern can be changed. Also, the foreground and background colour and the line width of the moving cross test pattern can be changed in this menu.

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 latter setting. Thus it has the disadvantage of conventional CRT TVs, but also their advantage of almost no delay in response, which is important for applications such as gaming, simulation or imaging in medical treatment.

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 with no user interaction. OSD Messages can be activated and deactivated.

The menu language can be altered and the keypad can be locked. To unlock the keypad a combination of keys has to be pressed at the same time. 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 to configure the HQView-5xx TCP/IP address. 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-5xx. 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-5xx 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-5xx, thus, provide a means to get back to a known (good) system state. A requestor will come up and ask to confirm prior to actual restore.

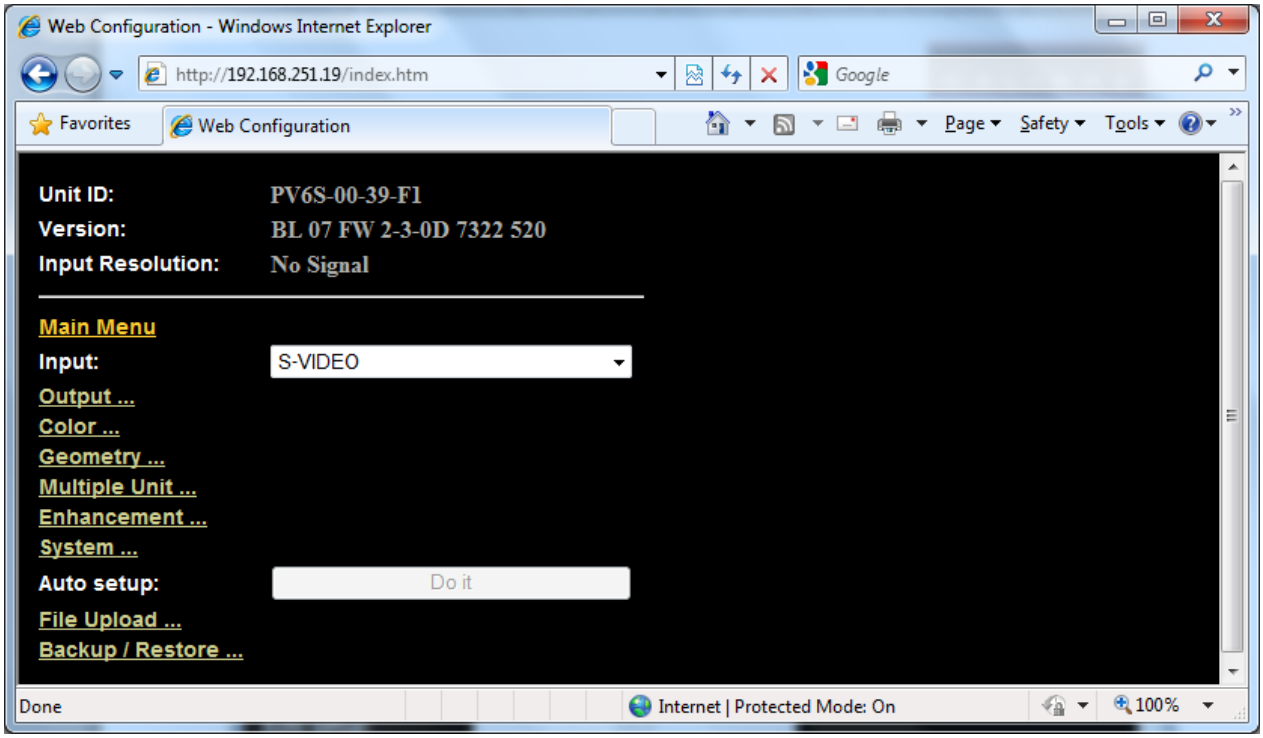
3.11.8. Operation Mode

This menu item is only available on a HQView-510/520. It allows to chose between the regular multiple unit mode with blend and warp and a PiP mode. Selecting the PiP mode will effectively boot the HQView-510/520 to emulate a HQView-500. A HQView-500 has PiP/PaP/PoP capability but no edge blend. In HQView-500 mode the Operation Mode can be switched back to Multiple Unit.

REMOTE CONTROL WEB SERVER

4.1. Introduction

HQView-5xx features a web server which connects to a PC web browser via TCP/IP. The menu system of HQView-5xx is mirrored into the web browser and all menu items can be accessed and controlled through the keyboard or mouse of the PC.



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-5xx 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-5xx 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. 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-5xx 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.

4.4. Software Operation

Once the address has been entered into the web browser starts to load pages from the HQView-5xx 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-5xx 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 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-5xx has an USB port which allows a PC connection. With the Calibre PC Updater tool new firmware can be installed on HQView-5xx for feature upgrades and bug fixes.

5.2. Updating Firmware

HQView-5xx accepts firmware downloads 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-5xx is in Updater mode. Otherwise, HQView-5xx 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. Now the USB connection between PC and HQView-5xx needs to be established and the Calibre PC Updater tool to be started. The PC Updater tool allows to browse and select a firmware file in BREC format. Once a BREC is selected the Update Firmware button has to be pressed and the firmware download to the HQView-5xx into non volatile flash RAM starts. After completion of the download HQView-5xx 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^{O}C to 40^{O}C
Humidity (non condensing)	0% to 95%

6.2. Storage

Temperature	-25^{O}C to $+85^{O}$C
Humidity	

6.3. CE and FCC Compliance

CE: This product complies with the requirements of 89/336/EEC Electromagnetic Compatibility Directive amended by 92/31/EEC and 93/68/EEC, and 73/23/EEC 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.