RGB SPECTRUM

MediaWall®

4K/UHD Display Processor User's Guide

Models 500-2K, 500-4K, 500AP-4K, 550-2K, 550-4K, and 550AP-4K

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CHAPTER 1

INTRODUCTION

This User's Guide describes how to use the RGB Spectrum *MediaWall V* family of 4K/UHD display processors to configure and control video display walls and/or auxiliary display devices. It assumes that you have already completed the physical installation of the *MediaWall V*, as described in the *MediaWall V 4K/UHD Display Processor Technical Reference Guide*.

1.1 Product Overview

The *MediaWall V* is the world's first true Ultra-High Definition (UHD)/4K video wall processor, offering up to 4K resolution I/O, single-wire connectivity and fully scalable windows.

The *MediaWall V* 500-series models support up to a six-screen array at 4K/UHD output resolution or to a 12-screen array at 2K/HD output resolution, with up to 18 video/graphic inputs. The *MediaWall V* 550-series models support up to a 12-screen array at 4K/UHD output resolution or to a 24-screen array at 2K/HD output resolution, with up to 36 video/graphic inputs.

You can define, administer, and use multiple walls from a single *MediaWall V 4K/UHD Display Processor*. You are limited only by the display processor output count and wall display resolution. For example, from a *MediaWall V* 550-series chassis with 24 Wall Outputs, you can drive up to three (3) walls consisting of up to 24 (2K/HD) displays in total.

The *MediaWall V 4K/UHD Display Processor* features an architecture that combines the real-time processing and reliability of a hardware-based processor with the flexibility of a separate, dedicated Application Processor (AP, optional) to run Microsoft® Windows® applications and decode IP streams. Add enhanced security and an intuitive, easy-to-use control interface, and the result is a 4K wall processing system with enough power and versatility to drive either HD or UHD video wall systems.

A true video wall is not simply a wall of monitors; rather, it is a continuous multi-screen surface upon which to display a combination of graphics and video. Not all systems that claim to be 4K wall processors provide video synchronization, required for the seamless display of high-motion graphics, or fully scalable windows, which allow imagery to be displayed anywhere, including across monitor bezels. The *MediaWall V 4K/UHD Display Processor* delivers all of these capabilities.

With a *MediaWall V*, you can display ultra high-resolution 4K video and graphics together with HD sources on a wall array of 4K/UHD display devices. A 4K/UHD video wall offers dramatically higher pixel density, with up to four times the total resolution of a conventional HD video wall of similar size. With fewer bezels to interfere with displayed imagery, a video wall made of large 4K monitors further enhances the overall viewing experience. The *MediaWall V* processor's 4K capabilities enable the display of more data and visuals in greater detail than ever before – improving situational awareness, assessment and response.

The *MediaWall V* also supports standard-resolution display devices, while still delivering the benefits of ultra-high resolution when 4K input signals are spread across multiple displays.

1.2 System Configurations

To suit varying wall sizes and other application requirements, the *MediaWall V 4K/UHD Display Processor* is available in a variety of system configurations. Table 1-1 describes these.

Table 1-1 *MediaWall V* System Configuration Options

Model Number	Maximum Input Count (Note 1)		Maximum Output Count (Notes 1, 2, and 3)		Application Processor	Max. Windows per Output Card/Row
	2K/HD	4K/UHD	2K/HD	4K/UHD		
MW V 500-2K	18	–	12	6	No	4, 8, 12, or 16
MW V 500-4K	18	18	12	6	No	
MW V 500AP-4K (Note 4)	16	16	12	6	Yes	
MW V 550-2K	36	–	24	12	No	4, 8, 12, or 16
MW V 550-4K	36	36	24	12	No	
MW V 550AP-4K (Note 4)	34	34	24	12	Yes	

Notes:

1. The number of installed Input cards (1 to 6) determines the input count. The number and type of installed Output cards (1 to 4, HDMI and/or DisplayPort) determines the output count.
2. All Model 500-Series configurations provide two (2) Auxiliary Outputs in addition to the listed number of Outputs. All Model 550-Series configurations provide four (4) Auxiliary Outputs in addition to the listed number of Outputs.
3. Maximum output counts include both Wall and optional, Switched outputs. Each installed, Switched Output card reduces the Wall Output count by six. A system must always have at least one Wall Output card.
4. Two (2) inputs are dedicated to the Application Processor.

1.3 Key Features

The *MediaWall V 4K/UHD Display Processor* provides these key features and functions:

1.3.1 System Features

- Displays up to 64 windows (total) on up to three (3) walls simultaneously.
- Uses full, 24-bit color processing throughout.
- Provides mullion adjustment and output overlap controls.
- Supports independently-configurable labels for the wall, inputs (sources) and windows, with options for size, position, color, and background color.
- Supports up to 50 label fonts, including select international fonts.
- Lets you choose the wall background color.
- Supports up to six (6), independently-configurable, on-screen clocks.
- Stores and recalls up to 60 user-defined wall presets. Each preset contains information about window size and position, image quality settings, clock display settings, and label display settings.
- Provides the ability to export and import system settings.

OPTIONAL SYSTEM FEATURES

- Redundant, hot-swappable power supplies.
- Models 500AP-4K and 550AP-4K include an embedded Application Processor for running Windows applications and decoding H.264 IP streams.

1.3.2 Inputs

- Supports input resolutions up to 3840 × 2160 @ 30 Hz.
- Scales input signals for output to a 4K/UHD or standard, 2K/HD video wall.
- Automatically detects and locks to computer input and output sync signals. Industry-standard and custom video timings are supported.

1.3.3 Outputs

- Up to 24, 2K/HD or 12, 4K/UHD wall outputs.
- Up to four (4) auxiliary outputs and 18 switched outputs, for connection to *MultiPoint*™ Control Room Management System or *VIEW*™ Controller control station displays, or other downstream HDMI devices such as a digital video recorder.
- Supports output resolutions up to 3840 × 2160 @ 60 Hz. (Auxiliary and switched output resolution is equal to the source input resolution.)
- Supports High-definition Digital Content Protection (HDCP) to allow the display of protected content.

1.3.4 Windows

- Lets you position windows anywhere and scale them to any size or aspect ratio.
- Supports independently-configurable borders for each window, with options for border color and width.
- Supports window "clipping" (by positioning it partially out of the display space).
- Lets you zoom and pan within a window.

1.3.5 Control Options

- *MediaWall V* Web Interface (standard; included with the *MediaWall V*).
- *MultiPoint* Enterprise v3.2 or later, or *MultiPoint* Express.
- *VIEW* Controller v3.2 or later.
- Command-line Interface (CLI) via RS-232 serial or Telnet connection.
- Support for third-party control systems.

1.4 System Control

System control for the *MediaWall V 4K/UHD Display Processor* is provided via the RS-232 serial port and the 100/1000Base-T Ethernet port.

- The **RS-232** serial port connects to an ASCII terminal, any computer with a serial port, or a third-party control system. Commands are sent from the terminal or computer to the *MediaWall V*.

Note	USB-to-Serial converters are inexpensive and widely available. If necessary, use one to connect your USB-equipped computer to the *MediaWall V* serial port.

Refer to the *MediaWall V 4K/UHD Display Processor Technical Reference Guide* for a complete description of the command set.

- The **Ethernet** port (100/1000Base-T) allows a *MediaWall V 4K/UHD Display Processor* to be connected to a local area network (LAN) or directly to a PC. Using this connection, you can control the system from a Telnet command-line session, the *MediaWall V* Web Interface, *MultiPoint* Enterprise, *MultiPoint* Express, or *VIEW* Controller.

1.5 EDID Management

Extended Display Identification Data (EDID) is information that enables a graphics adapter source to output a graphics signal best suited for the connected display processor. This information includes the display resolution and frame rate.

1.5.1 EDID Management

The *MediaWall V* provides the following EDID management functions:

- Loading an EDID from the EDID list to an input register.
- Capturing a display's EDID to the EDID list.
- Naming an EDID list entry.
- Viewing an entry in the EDID list.
- Deleting an EDID list entry.
- Exporting and importing an EDID list entry.

1.5.2 EDID List

The EDID list is used to apply parameters to the fixed EDID registers. User entries in the list are numbered 11 to 60 with an additional **Factory Default** of 1920 × 1200 at 59.95 Hz. Data contained in the list include:

- List index number
- Name
- Display device manufacturer’s ID
- Display device product ID and name
- Resolution and frame rate
- Scan type (interlaced or progressive)

Advanced users can view and modify additional timing parameters with third-party software such as Phoenix EDID Designer freeware, available at **http://www.tucows.com/preview/329441**.

CHAPTER 2 GETTING STARTED

This chapter guides you through the initial *MediaWall V 4K/UHD Display Processor* setup and configuration process. The following topics are discussed:

- **MediaWall V Web Interface Connection**
- **Using the MediaWall V Web Interface**
- **Initial Setup**
- **Using the Application Processor (AP) (Model 500AP-4K and 550AP-4K only)**

2.1 *MediaWall V* Web Interface Connection

The *MediaWall V* Web Interface interface provides a graphical alternative to command-line setup and control over a serial or Telnet connection.

2.1.1 IP Address

The *MediaWall V 4K/UHD Display Processor* is configured at the factory to have the default IP address **192.168.1.200**. Before connecting the *MediaWall V* to a network, ensure that this IP address is valid for use on your network. Consult your network manager if you are not sure. To change the *MediaWall V* IP address before connecting it to a network, use the **IPADDR**ess command from the serial port (refer to the *MediaWall V 4K/UHD Display Processor Technical Reference Guide*).

Computers that are set up to communicate on a network are typically configured to have a dynamic IP address. In this configuration, the computer is provided with a suitable IP address by a DHCP server connected to the network.

If you connect directly to the *MediaWall V*, a DHCP server is not available and you must set the IP address on your computer manually. This is known as a static IP address. Refer to the network settings help section of your computer operating system (OS) for assistance with setting a static IP address on your computer.

An IP address is composed of two parts known as the network ID and the host ID. The default network ID for *MediaWall V 4K/UHD Display Processor* is 192.168.1 and the default host ID is 200 (192.168.1.200). The control computer should be assigned an IP address with the same network ID as the *MediaWall V 4K/UHD Display Processor*, but a different host ID (for example, 192.168.1.199).

2.1.2 Connecting to the *MediaWall V*

You can connect to the *MediaWall V* in one of two ways:

- **Direct connection** — connect the Ethernet port on a computer equipped with a standard web browser to the *MediaWall V 4K/UHD Display Processor*'s 100/1000Base-T Ethernet port.

  When using a direct connection, you must manually set the control computer's IP address, subnet mask and gateway. Make sure that different IP addresses are assigned to the control computer and the *MediaWall V*.

- **LAN connection** — connect the *MediaWall V* 100/1000Base-T Ethernet port to a local area network (LAN).

2.2 Using the *MediaWall V* Web Interface

The *MediaWall V* Web Interface is accessible from any network-connected computer. It is best viewed using the **Mozilla® Firefox®** or **Google Chrome™** web browser, on a display with a resolution of 1920 × 1080 or higher.

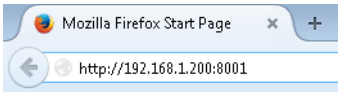
To begin using the *MediaWall V* Web Interface, launch your web browser. Then, enter the following URL into the address bar:

```
http://<nnn.nnn.nnn.nnn>:8001
```

where `<nnn.nnn.nnn.nnn>` is the *MediaWall V* IP address.

Example

If the *MediaWall V* IP address is 192.168.1.200, enter:



You must enter the entire URL, including the `http://` protocol prefix and port number, as shown here.

If the *MediaWall V* is powered on and ready to accept HTTP connections, and your PC network settings are correct, you will see the *MediaWall V* Web Interface – **System** tab, shown in **Figure 2-1**.

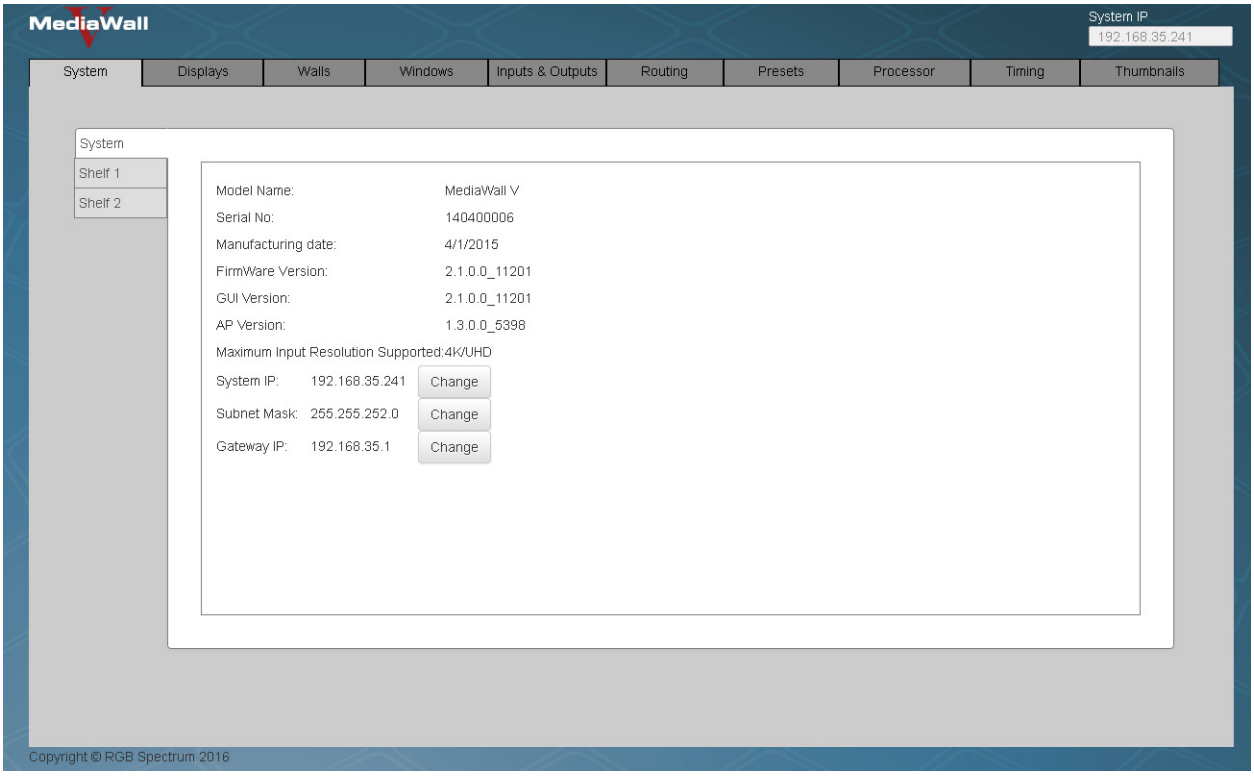


Figure 2-1 MediaWall V Web Interface

Tip	When using the *MediaWall V* Web Interface, maximize the browser window or press F11 to switch to full-screen mode. This will minimize the amount of scrolling needed to see all of the information and controls on each screen.

2.3 Initial Setup

Setting up a *MediaWall V 4K/UHD Display Processor* for the first time involves the following tasks:

1. **Defining Your Wall Display**
2. **Setting Wall Attributes**
3. **Creating an Initial Window Layout**
4. **Routing Inputs to Windows**
5. **Routing Inputs to Auxiliary or Switched Outputs**
6. **Positioning and Sizing Windows**
7. **Saving Window, Wall, and Switched Output Settings as a Preset**

2.3.1 Defining Your Wall Display

To define the characteristics of the display devices in your wall, click the **Displays** tab (**Figure 2-2**).

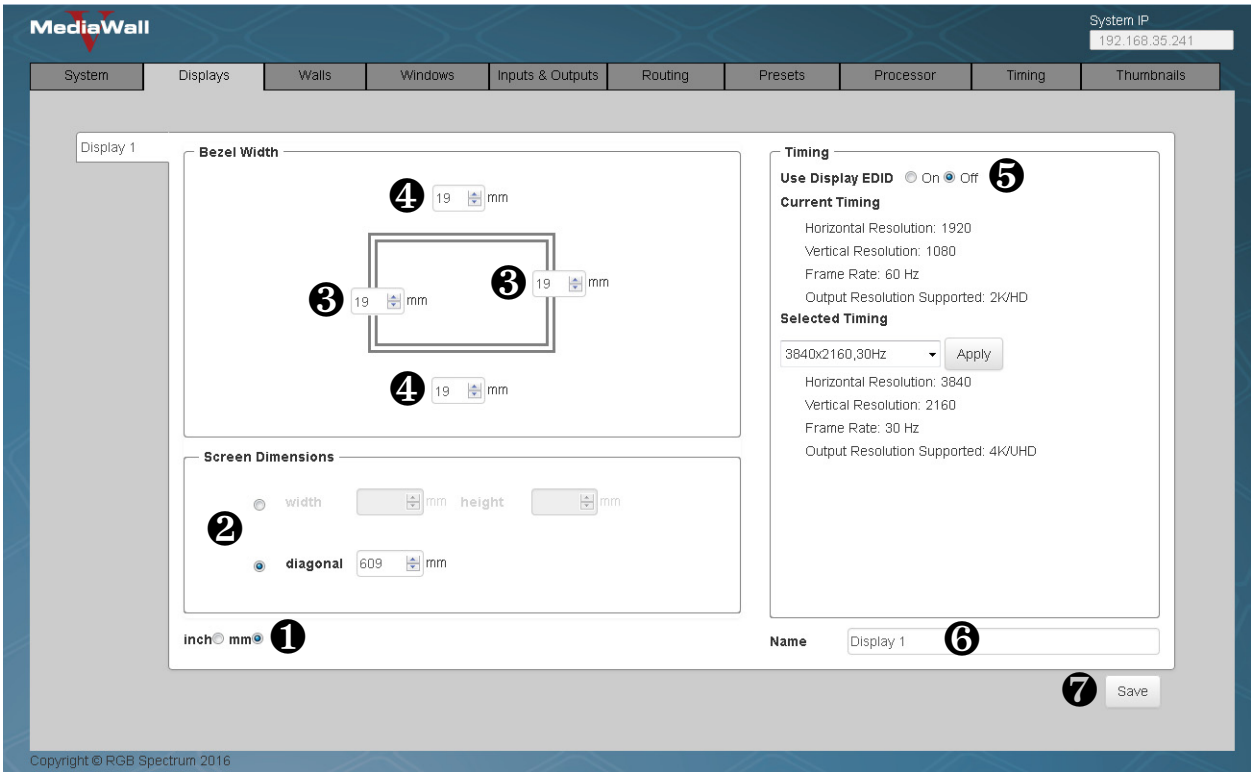
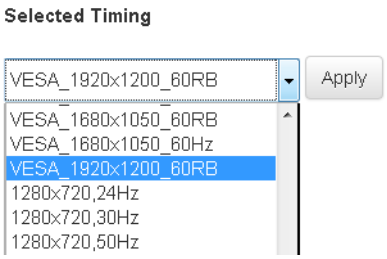


Figure 2-2 Displays Tab

1. In the lower-left corner of this screen, choose a unit of measure (inches or millimeters) for specifying screen and bezel dimensions.
2. In the **Screen Dimensions** group, measure either the width and height or diagonal length of the display area and enter your measurements here. Do not include the bezel dimensions. You can type values directly, or use the spin controls.
3. In the **Bezel Width** group, measure the left and right bezel widths and enter your measurements here. Type a value directly, or use the spin controls.
4. In the **Bezel Width** group, measure the top and bottom bezel widths and enter your measurements here.
5. In the **Timing** group, choose a source of the information the *MediaWall V* needs to tailor its output signal to match the capabilities of the display:
   - Set **Use Display EDID** to **On** to have the *MediaWall V* use Extended Display Identification Data (EDID) from the display as its output timing reference;

     – OR –

   - Set **Use Display EDID** to **Off**. Then, under **Selected Timing**, choose an output timing setting that most closely matches the native resolution and refresh rate of your wall displays. Click **Apply** to confirm your choice.



Important	If your *MediaWall V* system contains DisplayPort outputs, use the second method above. (The output timing reference in this case is always the *MediaWall V* internal timing generator.)

6. Optionally, enter a descriptive name for the display you just defined. Or, use the default display definition name.
7. Click **Save**.

2.3.2 Setting Wall Attributes

To select a wall display definition and specify a wall layout, click the **Walls** tab (**Figure 2-3**).

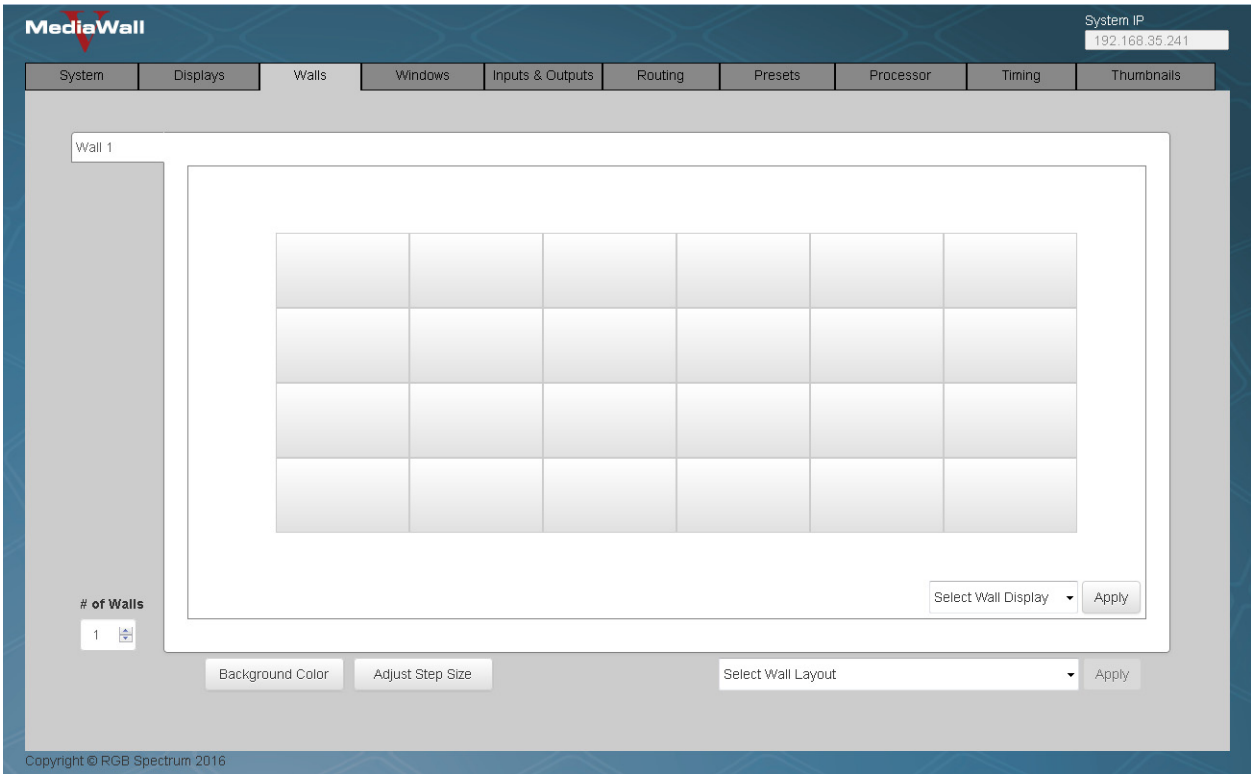
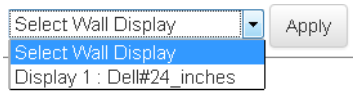
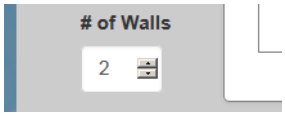


Figure 2-3 Walls Tab

1. Select the wall display definition that matches your wall displays. To define a display, follow the steps given in the **Defining Your Wall Display** section.

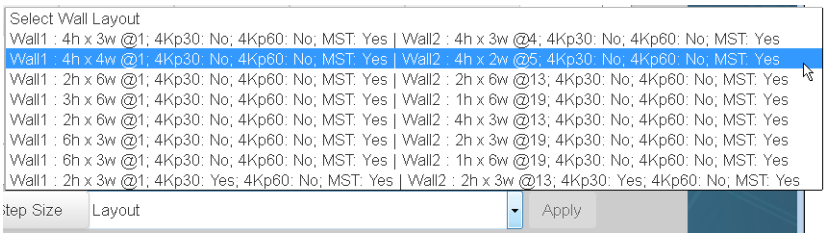


2. Click **Apply**.
3. Select the **# of Walls** you want to control with this *MediaWall V* system.



4. Select the wall layout from the list that matches the physical layout of your wall(s). The available choices depend on these factors:
   - The wall output count of your *MediaWall V* system;
   - The output timing you select when **Defining Your Wall Display**; and
   - The # **of Walls** you selected in Step 3.

   For example, if your *MediaWall V* system has 24 wall outputs and you set the output timing to 1920 × 1080 @60Hz, the available two-wall layouts are:



   Each entry in the wall layout list defines the number of walls, as well as the geometry, anchor output (the one connected to the top-left display) of each wall, and whether or not the layout is available with 4K/UHD output timings.

5. Click **Apply**.

6. Click **OK** to confirm that you want to load the new wall layout. (If you do not, click **Cancel**.) **The *MediaWall V* will reboot.**

7. When the reboot completes, refresh the browser window to re-establish communication with the *MediaWall V* web interface.

2.3.3 Creating an Initial Window Layout

After you set your wall attributes, you must create an initial window layout. A window layout defines the number of windows, along with the size, position, and resolution (UHD or HD) of each.

You can either start from an empty wall with no windows, or load a layout from a predefined layout **template**. You can then customize this layout as needed and save it in a preset for later recall. (The sections that follow this one describe those tasks.)

To create an initial window layout, click the **Windows** tab. The factory-default window layout places 16, 2K/HD windows in row 1, column 1 of the wall, as shown in **Figure 2-4**.

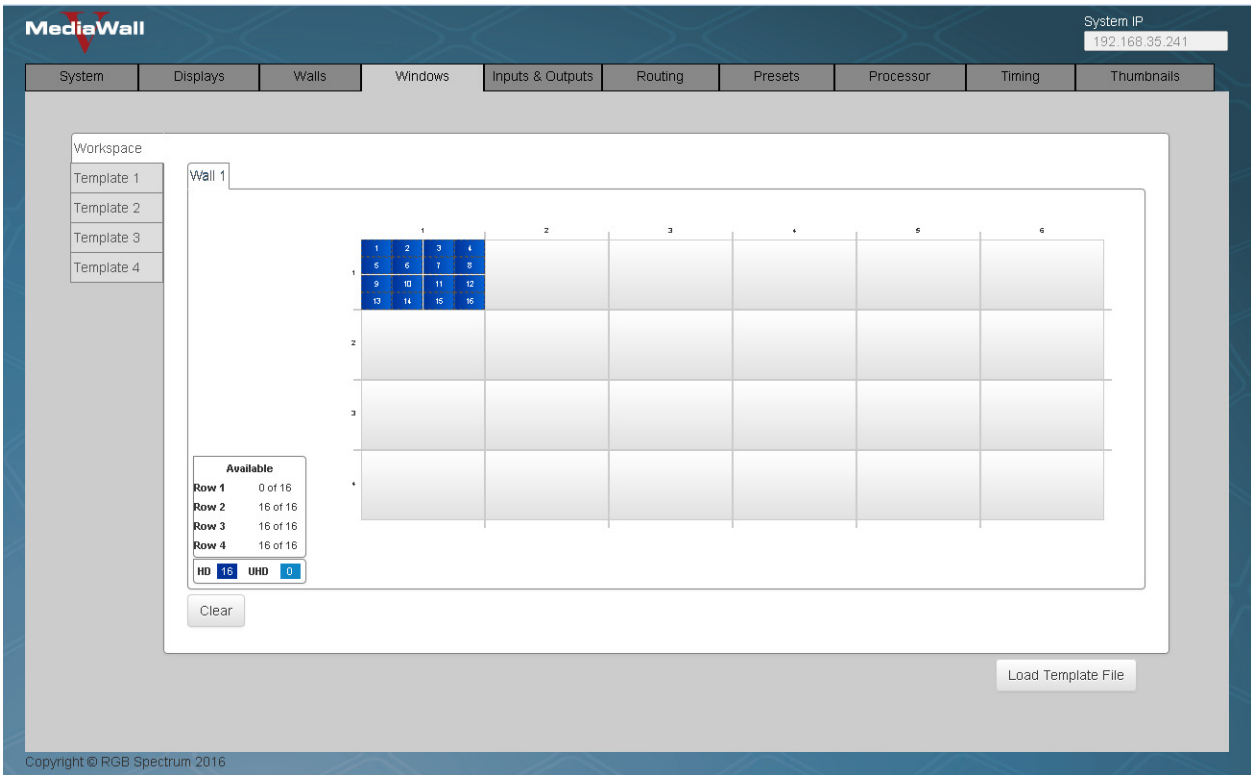
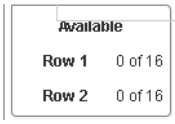


Figure 2-4 Windows > Workspace Tab Showing Default Layout

To remove all windows from the wall, click **Clear**. Then, click **OK** to confirm this action. You can now create a new layout by adding windows one at a time or loading a layout from a template.

AVAILABLE RESOURCES AND WINDOW LEGEND



The lower-left corner of the **Wall 1** area displays the available resources and the Window Legend.

Displaying a window on the wall consumes one or more **resources**, depending on the window's size, position, and resolution. Any of the following actions can trigger a change in resource consumption:

- Adding a window;
- Moving a window to another row;
- Enlarging or moving a window such that it occupies two or more rows; or
- Changing an HD window to UHD or vice versa.

When the number of available resources falls to zero, you cannot add windows to that row on the wall. To make more resources available, delete one or more windows; refer to **Deleting a Window** for instructions.

Important	To update the display of available resources after adding or deleting windows, reload the *MediaWall V* Web Interface in your browser. Then, click the **Windows** tab.

The Window Legend shows the colors that the *MediaWall V* Web Interface uses to represent HD (dark blue) and UHD (light blue) windows. It also shows the current resource allocation for HD and UHD windows.

ADDING A WINDOW TO THE WALL

To add a window to the wall:

1. Right-click on a row on the wall preview area, in an area not occupied by a window.
2. Click **Add Window**.
3. Click the label text entry box.
4. Enter up to 64 characters of window label text. Only letters, numbers and the underscore character are permitted.
5. Click **Apply**. The new window appears in the row you right-clicked on in Step 1.
6. On the wall grid, click and drag the window to position it where you want it.

POSITIONING AND SIZING WINDOWS

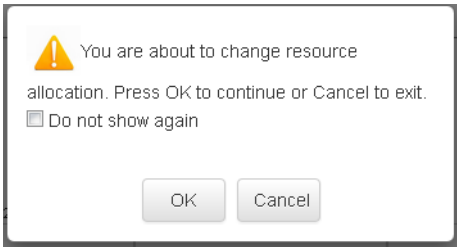
In the **Wall [n]** area of the **Windows > Workspace** tab, you can move and resize windows on the wall, as follows:

To move a window, position the mouse pointer over the window. When the cursor changes to a “pointing hand” cursor (), click on the window and drag it to the desired location.

To size a window, do either of the following:

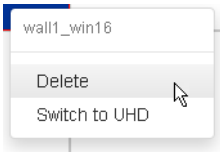
- Position the mouse pointer over a window edge. When the cursor changes to an east-west () or north-south ( ) cursor, click and drag the window edge to change the width or height; or
- Position the mouse pointer over a window corner. When the cursor changes to a northwest-southeast () or northeast-southwest () cursor, click and drag the window corner to change the width or height.

If you move or resize a window in such a way that all or part of it occupies a row other than the one in which it was created, this triggers a **resource allocation** change. A confirmation dialog box appears. Click **OK** to confirm that you want to move or resize the window, or **Cancel** to cancel.



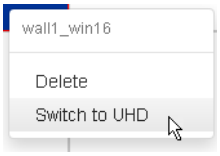
DELETING A WINDOW

To delete a window on the wall, right-click on the window in the wall preview area and click **Delete**. Then, click **OK** to confirm the deletion or **Cancel** to keep the window on the wall.

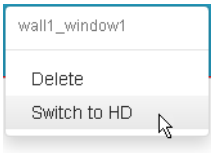


CHANGING A WINDOW'S RESOLUTION

To change a window from 2K/HD to 4K/UHD, right-click on the window in the wall preview area and click **Switch to UHD**. Then, click **OK** to confirm the change.



To change a window from 4K/UHD to 2K/HD, right-click on the window in the wall preview area and click **Switch to HD**. Then, click **OK** to confirm the change.



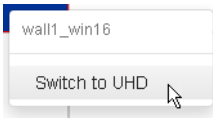
LOADING A WINDOW LAYOUT FROM A TEMPLATE

If you do not want to create your window layout from scratch, you can use a pre-defined **window template** as a starting point, customize it any way you wish, and save it as a preset. For each wall layout, the *MediaWall V* Web Interface presents numerous window templates representing a variety of window arrangements.

Tip	If none of the available, standard templates suits your needs, the *MediaWall V* Web Interface provides the ability to import and load custom window template files. For more information on working with custom window template files, **contact RGB Spectrum Technical Support**.

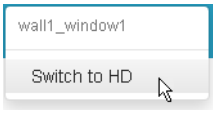
To load a layout from a template:

1. Click the **Windows** tab.
2. Click a **Template [n]** sub-tab to see a preview of that layout. Choose the one that matches your desired layout most closely.
3. (Optional) To change a window from 2K/HD to 4K/UHD in the template, right-click on the window in the wall preview area and click **Switch to UHD**;

   – OR –

   (Optional) To change a window from 4K/UHD to 2K/HD in the template, right-click on the window in the wall preview area and click **Switch to HD**.

4. When the template matches your desired layout, click **Load** to load it.

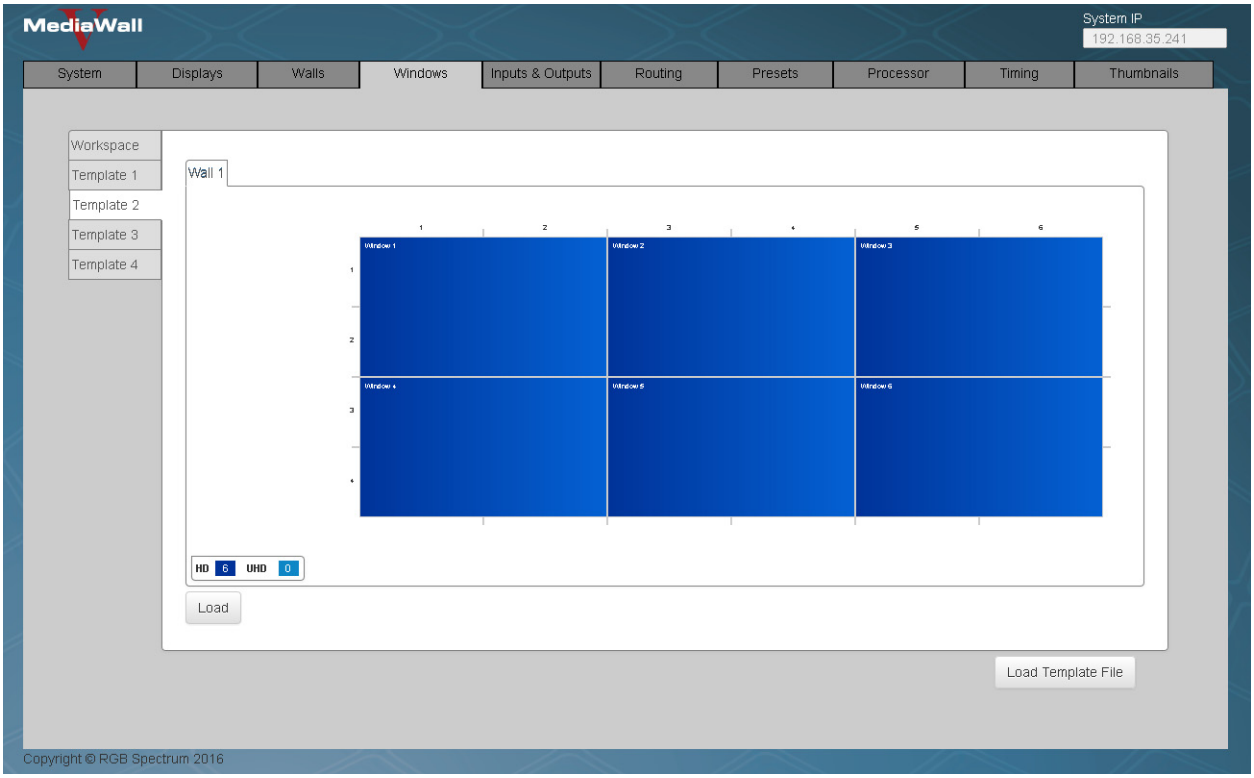
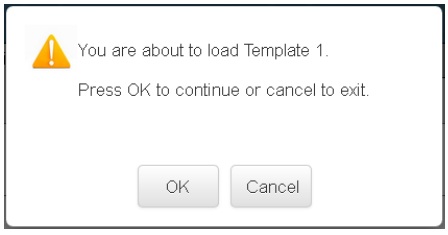


Figure 2-5 Windows Tab – Preview Layout

5. A confirmation dialog box appears. Click **OK** to confirm that you want to load the window template, or **Cancel** to cancel.



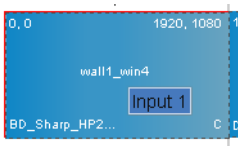
The layout is now active. To further customize it beyond what is defined in the template, click the **Workspace** sub-tab. You can now perform the customizations described in the previous sections.

2.3.4 Routing Inputs to Windows

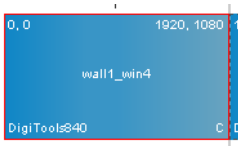
Note	**You must route UHD sources to UHD windows.**

The next step is to route your source inputs to windows on the wall. To do this, click the **Routing** tab. Then:

1. In the **Outputs** group, click the **Wall 1** tab (Figure 2-7).
2. In the **Inputs** group, click the move cursor (✥) next to the input you want to display on the wall.
3. While holding down the mouse button, drag the cursor to the **Outputs** area, over the window in which you want the input to appear. When you do, that window's border color changes to red.



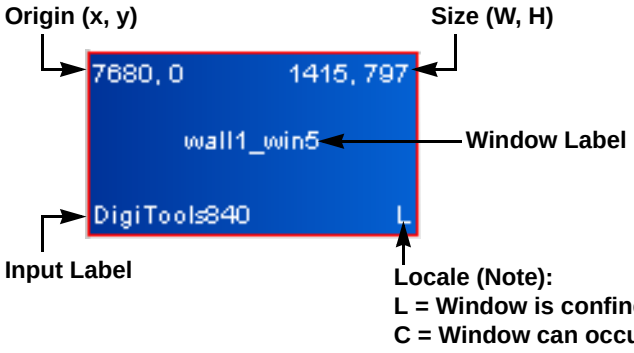
4. Release the mouse button.



5. Repeat Steps 2 through 4 for the other inputs, as needed.

WINDOW INFORMATION

The **Routing > Wall [n]** tab displays the information shown in Figure 2-6 inside each window. If the window is too small to contain the information, only the window label appears. To see information for such a window, position the mouse pointer over the window.



Note: A **locale**, in most cases, is a row on a wall. On a so-called "long" wall – seven (7) or more columns wide at 2K/HD output timing, four (4) or more columns wide at 4K/UHD @30 Hz output timing, or two (2) or more columns wide at 4K/UHD @60 Hz output timing – a locale refers to an area of a wall fed by a single output card. For example, in a 2 × 8 wall, outputs 1 through 6 and outputs 7 and 8 are two separate "locales".

Figure 2-6 Window Information

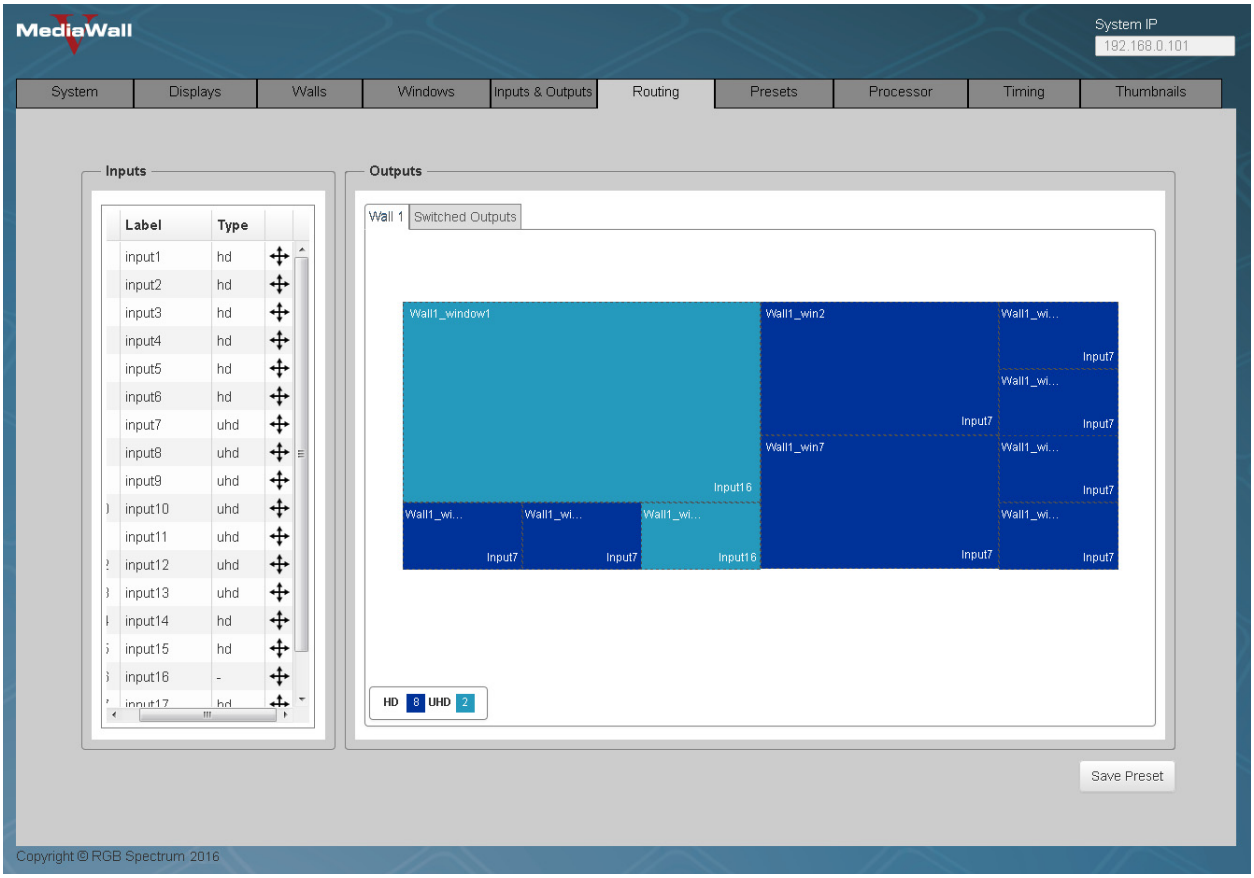


Figure 2-7 Routing Tab – Wall Outputs

2.3.5 Routing Inputs to Auxiliary or Switched Outputs

Note	Auxiliary and switched output resolution is equal to the source input resolution. The *MediaWall V* does not scale auxiliary or switched output signals.

The steps for routing source inputs to auxiliary or switched outputs are similar to those for routing inputs to windows on the wall:

1. Click the **Routing** tab.
2. In the **Outputs** group, click the **Switched Outputs** tab (Figure 2-8). Auxiliary outputs are labeled **AUX [1...4]**; switched outputs are labeled **OUT [x...y]**. (Switched outputs are numbered according to the location(s) of the Switched Output card(s) in the system.)

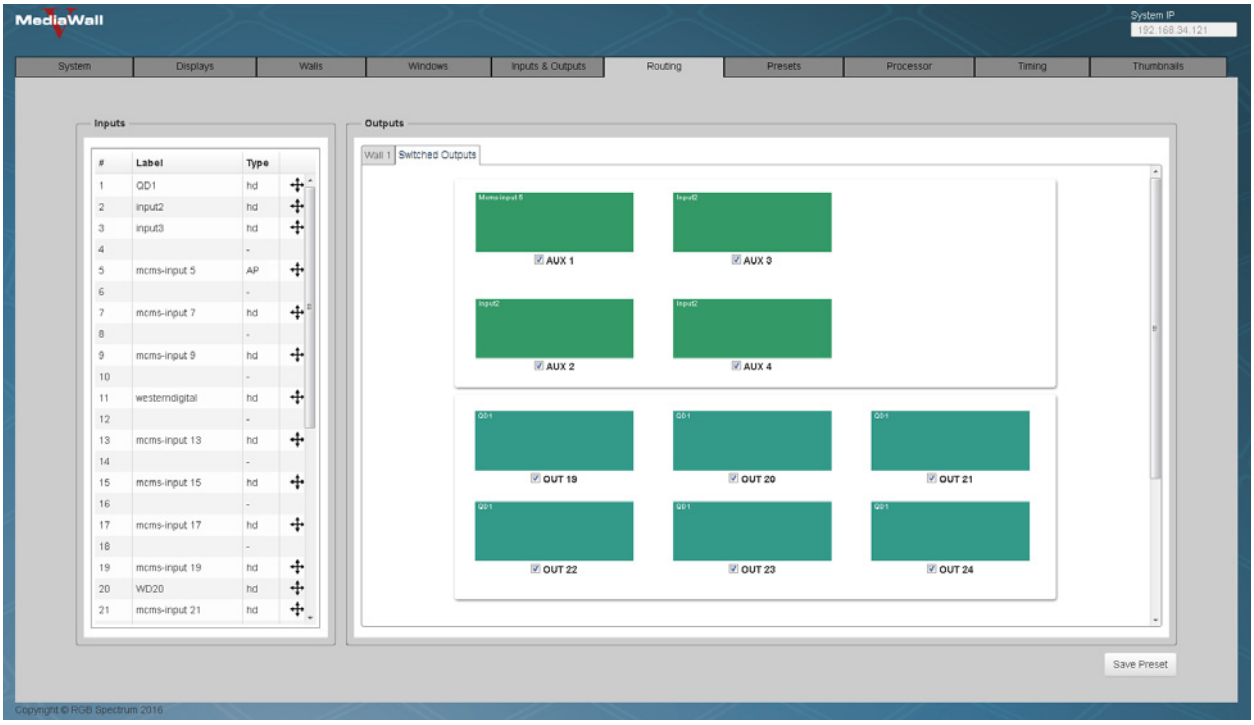
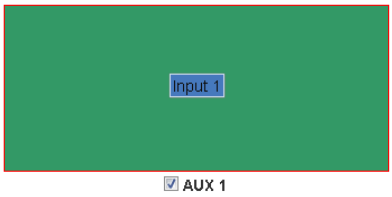


Figure 2-8 Routing Tab – Switched Outputs

3. In the **Inputs** group, click the move cursor (✥) next to the input you want to display on an auxiliary or switched output.

4. While holding down the mouse button, drag the cursor to the **Outputs** area, over the output window. When you do, that window's border color changes to red.



5. Release the mouse button.

6. Repeat Steps 3 through 5 for the other auxiliary or switched outputs.

2.3.6 Positioning and Sizing Windows

In the **Outputs** area of the **Routing** tab, you can move and resize windows on the wall. These controls work similarly to those on the **Windows > Workspace** tab (**Figure 2-4**). Refer to **Positioning and Sizing Windows on page 15** for instructions.

The Routing tab provides these additional window positioning and resizing controls not available on the **Windows > Workspace** tab:

- **Align**
- **Size and Position**
- **Maintain Aspect Ratio**
- **Scale to Screen**
- **Scale to Original**
- **Uniform Resize**

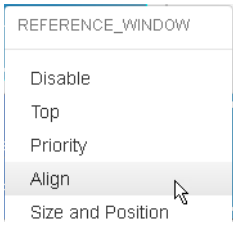
ALIGN

The Routing tab provides a convenient method for aligning multiple windows. To use it, follow these steps:

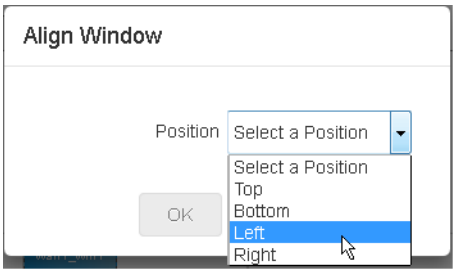
1. Click a window to designate it as the "reference window," i.e. the one to which you want to align other windows.
2. Hold down Ctrl while clicking the windows you want to align with the reference window.

   To cancel a window selection, hold down Ctrl while clicking a selected window.

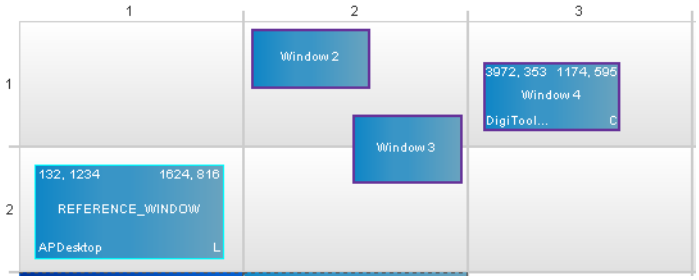
   To cancel all window selections, click anywhere in the wall preview area in an area not occupied by a window.
3. Right-click the reference window (selected in Step 1) and click **Align**.



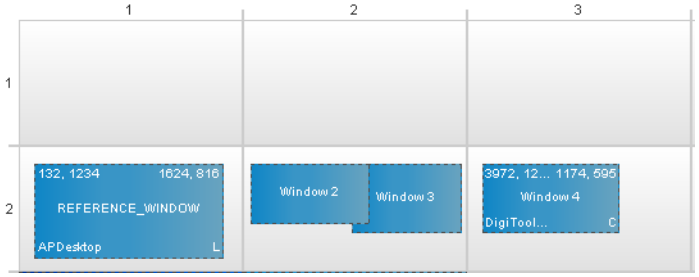
4. Select the desired **Position** relative to the reference window.
5. Click **OK**. The object window and reference window edges you selected in Step 4 are all aligned with each other. If the aligned windows overlap, higher-priority windows appear in front of lower-priority ones. See **Figure 2-9**.



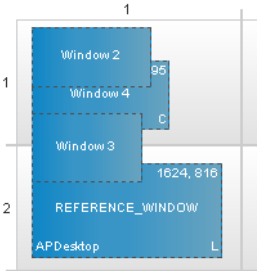
Before Alignment



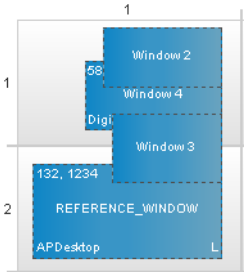
Align Top



Align Left



Align Right



Align Bottom

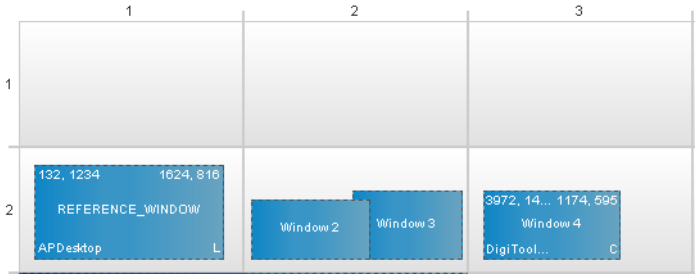


Figure 2-9 Aligning Multiple Windows

Note

The *MediaWall V* Web Interface limits the available position options based on the reference window position and locale of the object window(s); for example:

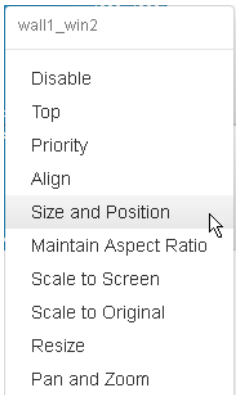
- **Left** and **Right** are invalid if that window placement would cause an object window to be clipped (i.e. partially or completely beyond the left or right wall boundary).
- **Top** and **Bottom** are invalid if an object window is "Local" (L) and such a window placement would cause the window to move partially or completely beyond the locale boundary.

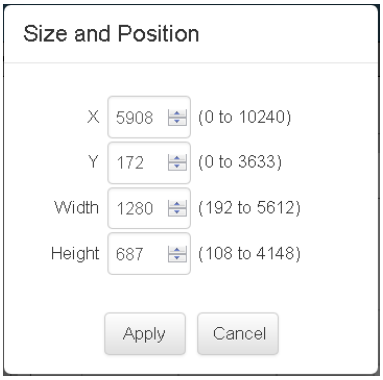
"Custom" (C) windows can be aligned with local windows (subject to the limitations imposed by the reference window position), but not vice versa.

If you select an invalid **Position**, this message appears:

SIZE AND POSITION

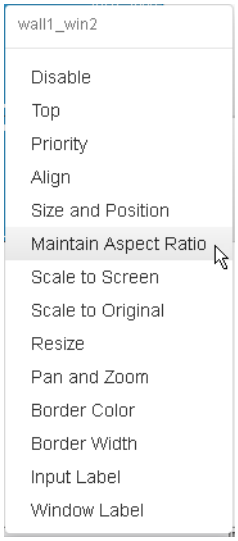
In the **Routing > Wall [n]** tab, you can precisely set a window's size and position by entering pixel values for the width, height, and X/Y coordinates of its origin. Right-click on the window in the wall preview area and click **Size and Position**. Then, enter the desired values and click **Apply**. You can type values directly, or use the spin controls.



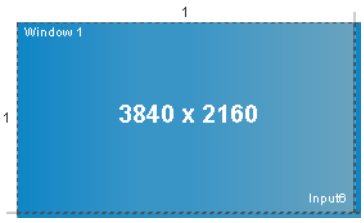


MAINTAIN ASPECT RATIO

The **Routing** tab provides a convenient method for setting the aspect ratio of a window equal to that of its source. To use it, right-click on the window in the wall preview area and click **Maintain Aspect Ratio**. When you do, the *MediaWall V* changes the window height and/or width as needed to apply the source's aspect ratio to the window; see **Figure 2-10**, **Figure 2-11** and **Figure 2-12**. (In all of the examples that follow, the output timing is 3840 × 2160 @24Hz.)



Before Applying **Maintain Aspect Ratio**
Input Resolution = 1920 × 1200 (aspect ratio = 1.60)
Window Size = 3840 × 2160 (aspect ratio = 1.78)



After Applying **Maintain Aspect Ratio**
Input Resolution = 1920 × 1200 (aspect ratio = 1.60)
Window Size = 3456 × 2160 (aspect ratio = 1.60)

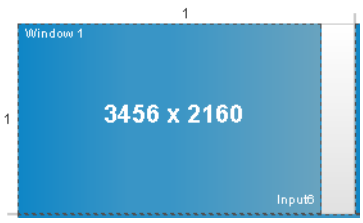
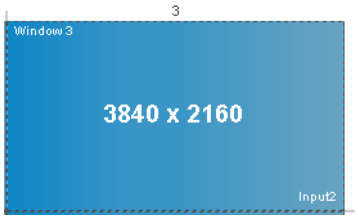


Figure 2-10 Maintain Aspect Ratio – Example 1

Before Applying **Maintain Aspect Ratio**
Input Resolution = 4096 × 2160 (aspect ratio = 1.90)
Window Size = 3840 × 2160 (aspect ratio = 1.78)



After Applying **Maintain Aspect Ratio**
Input Resolution = 4096 × 2160 (aspect ratio = 1.90)
Window Size = 3840 × 2025 (aspect ratio = 1.90)

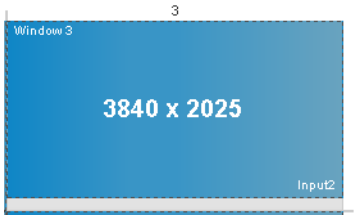


Figure 2-11 Maintain Aspect Ratio – Example 2

Before Applying **Maintain Aspect Ratio**
Input Resolution = 1920 × 1080 (aspect ratio = 1.78)
Window Size = 5760 × 1620 (aspect ratio = 3.55)

After Applying **Maintain Aspect Ratio**
Input Resolution = 1920 × 1080 (aspect ratio = 1.78)
Window Size = 3489 × 1960 (aspect ratio = 1.78)

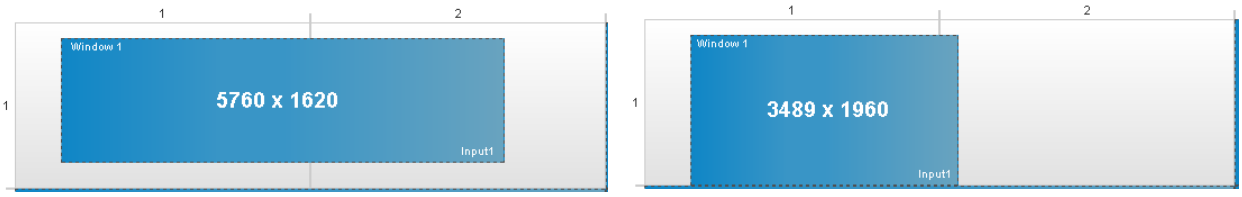
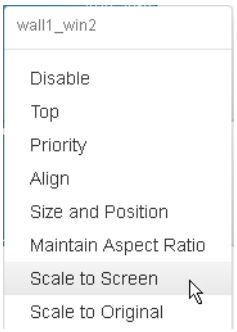


Figure 2-12 Maintain Aspect Ratio – Example 3

SCALE TO SCREEN

The **Routing** tab also provides a convenient method for enlarging a window so that it completely fills one or more wall displays. To use it, right-click on the window in the wall preview area and click **Scale to Screen**. When you do, the window expands in both directions to the nearest wall display area boundary; see **Figure 2-13** and **Figure 2-14**.



Before Applying **Scale to Screen**

After Applying **Scale to Screen**

Figure 2-13 Scale to Screen – Example 1

Before Applying **Scale to Screen**

After Applying **Scale to Screen**

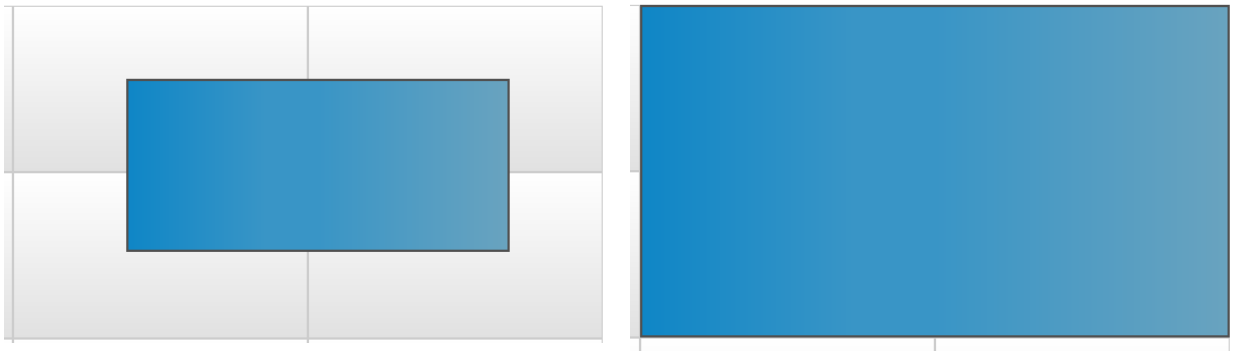


Figure 2-14 Scale to Screen – Example 2

SCALE TO ORIGINAL

The Routing tab provides a convenient method for setting the size of a window equal to that of its source image. To use it, right-click on the window in the wall preview area and click **Scale to Original**. When you do, the window width and height change to match the resolution of the source; see **Figure 2-15**.

Before Applying **Scale to Original**
Input Resolution = 1280 × 720
Window Size = 1366 × 768

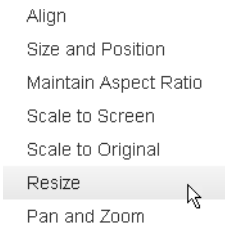
After Applying **Scale to Original**
Input Resolution = Window Size = 1280 × 720

Figure 2-15 Scale to Original

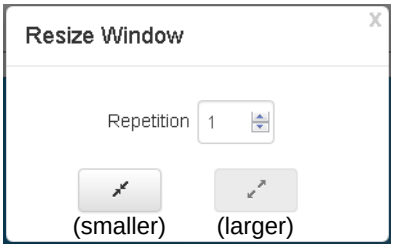
UNIFORM RESIZE

The **Routing** tab provides an additional, more precise method for resizing a window uniformly – that is, in both directions and while maintaining the aspect ratio of the source rectangle:

1. Right-click on the window in the wall preview area and click **Resize**.



2. Set the number of increments by which you want to change the window height using the **Repetition** control. For example, with the default increment of two lines, setting **Repetition** to **3** causes the window height to change by six lines each time you click a button.



   The width is changed by an amount calculated automatically to maintain the aspect ratio of the window. For example, when the height of a window with an aspect ratio of 4:3 changes by six lines, the width changes by eight pixels.

3. Click a button to make the window smaller or larger. Repeat this step as needed to achieve the desired window size.

4. When you are finished resizing the window, click (x).

To change the amount of resizing that occurs each time you click one of these buttons, follow the steps given for **Adjusting Zoom/Pan/Resize Increment Sizes on page 41**.

After positioning and sizing your windows, position one window such that it straddles at least two displays (four if the wall has two or more rows). Then, return to the **Displays Tab** and adjust the bezel width and height as needed to properly align adjacent display areas.

Tip	A good way to test bezel width settings is to view the wall using a test image that has a diagonal line passing through a mullion.

2.3.7 Saving Window, Wall, and Switched Output Settings as a Preset

When you have finished arranging your windows and routing sources to outputs, you should save your current window, wall, and switched/auxiliary output settings as a **preset** so you can recall them at a later time. The *MediaWall V 4K/UHD Display Processor* is capable of storing up to 60 presets containing these and other parameters:

- Preset name
- Window states (enabled or disabled)
- Window source selections
- Window destination rectangle dimensions and positions
- Window source rectangle dimensions and positions
- Wall/window/source label properties (enabled or disabled, position, justification, text, font, size, color, and background color)
- Window border widths and colors
- Wall clock enable, position, size, date/time format, color, and time zone
- Input source image properties (brightness, contrast, saturation, hue, and sharpness)
- Source-to-auxiliary/switched output routing information

You can also create presets that include only wall configuration settings, or only certain (or all) switched/auxiliary output settings.

To create a preset:

1. Click the **Routing** tab.
2. Click **Save Preset**.

3. Use the drop-down menu to select a location (1...60) in which you want to save the preset.
4. Enter a descriptive name for the preset in the **Preset Name** box. The preset name can be up to 20 characters long. Only letters, numbers and the underscore character are permitted.
5. Click **Save**.

2.4 Using the Application Processor (AP) (Model 500AP-4K and 550AP-4K only)

The *MediaWall V* AP is an embedded, dedicated processor that provides a shared computing resource to *MediaWall V* users for running applications and decoding IP streams.

The *MediaWall V* AP turns on and starts Windows automatically when the display processor is turned on. RGB Spectrum factory-configures the default Computer Name, User Name, and Password as follows:

- Computer Name: **MediaWall_V_PC**
- User Name: **MediaWall_V**
- Password: (no password)

Important

Do not make changes to the AP hardware and software environment, unless specifically instructed to do so by RGB Spectrum Technical Support.

Unlike a conventional, general-purpose PC, the *MediaWall V* AP is a purpose-built appliance intended for two specific uses: running applications and decoding IP streams. RGB Spectrum has carefully chosen and thoroughly tested the AP hardware and software to work together to perform these tasks optimally.

To ensure that the AP's performance is not compromised in the future by incompatible software, **do NOT do any of the following**:

- Update device drivers;
- Change BIOS settings;
- Enable automatic Windows updates;
- Update VLC Media Player to a newer version; or
- Upgrade Windows 7 to a newer version.

The AP video output is connected (internally) to *MediaWall V* Input 5. You can route this input to a UHD window on the wall, or to an auxiliary or switched output. Refer to **Routing Inputs to Windows on page 19** or **Routing Inputs to Auxiliary or Switched Outputs on page 21**.

Note

You cannot route the AP input to an HD window on the wall.

2.4.1 Controlling the AP

There are two ways to interact with the AP desktop: locally, using a mouse and keyboard connected directly to the *MediaWall V*, or remotely, using the Windows Remote Desktop Connection application.

CONTROLLING THE AP LOCALLY

1. Route Input 5 to an Auxiliary or Switched Output (refer to **Routing Inputs to Auxiliary or Switched Outputs on page 21**).
2. Connect a display to the output to which you routed Input 5 in Step 1.
3. Connect a mouse and keyboard to the USB ports on the *MediaWall V* rear panel.

CONNECTING TO THE AP USING A REMOTE DESKTOP CONNECTION

For detailed instructions on establishing a Windows Remote Desktop Connection to the *MediaWall V* AP, choose **Start > Help and Support**. Enter **remote desktop connection** in the *Search Help* box and press Enter.

In order to connect to the AP in this manner, you or a system administrator must enable Remote Access on the AP. The *MediaWall V 4K/UHD Display Processor Technical Reference Guide* describes in detail how to do this.

2.4.2 Changing the AP Desktop Size

The default *MediaWall V* AP desktop size is 1920 × 1200. However, you can change the desktop size to 3840 × 2160 if you wish, provided you either:

- Route the AP input to an auxiliary or switched output to which you have connected a 4K/UHD display; or
- Route the AP input to a UHD window on the wall.

Note	You must use the *MediaWall V* command line interface to change the AP Desktop size. Refer to the *MediaWall V 4K/UHD Display Processor Technical Reference Guide* for detailed instructions.

To set the AP desktop size to 3840 × 2160:

1. Open a serial port or Telnet command session.
2. If you have not already done so, enter administrator mode by typing:

   ```
   adminenter
   ```

   Then, type the administrator password when prompted. The default administrator password is **RGB** (upper-case).

3. On the command line, type:

```
edidload 5 2
```

To set the AP desktop size to 1920 × 1200, follow Steps 1 and 2 above. Then, on the command line, type:

```
edidload 5 1
```

In either case, the AP reads the EDID loaded into Input 5 and adjusts the screen resolution accordingly. See **Figure 2-16**.

Default AP Desktop (1920 × 1200) **UHD AP Desktop (3840 × 2160)**

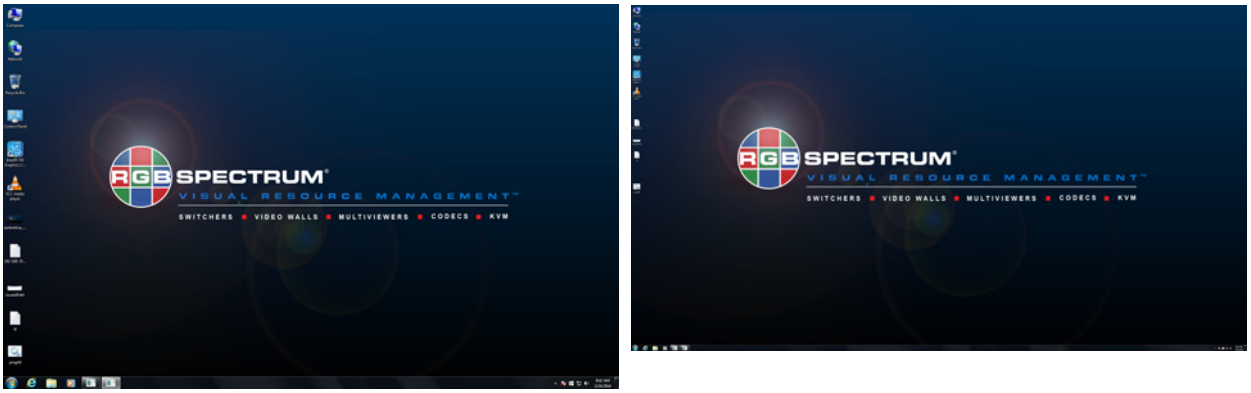


Figure 2-16 Default and UHD AP Desktops

CHAPTER 3 OPERATION

This chapter describes all of the features and functions available through the *MediaWall V* Web Interface. All of these setup tasks can also be accomplished using the command line interface (CLI); refer to the *MediaWall V 4K/UHD Display Processor Technical Reference Guide* for details.

3.1 *MediaWall V* Web Interface Overview

The *MediaWall V* Web Interface presents related system settings and status displays in a series of tabs:

- **System**

  View system software and hardware information; change system IP address.

- **Displays**

  Define the characteristics of the display devices used in your wall.

- **Walls**

  Choose a wall layout, configure wall clocks and wall labels, perform mullion compensation, set window zoom/pan/resize increment size, select a wall background color, and display a test pattern.

- **Windows**

  Create, preview and apply window layouts, add/delete windows, and specify window resolutions (2K/HD or 4K/UHD).

- **Inputs & Outputs**

  View basic input and output status information, create input (source) labels, adjust image quality settings, and enable or disable HDCP.

- **Routing**

  Route sources to windows and switched/auxiliary outputs, configure switched/auxiliary outputs, move/resize/zoom/pan/prioritize windows, enable/disable windows, customize window/input labels and window borders, and create/save presets.

- **Presets**

  Load and delete presets.

- **Processor**

  (Model 500AP-4K and 550AP-4K only) Restart the *MediaWall V* Application Processor; manage IP video stream playback and applications; update AP firmware.

- **Timing**

  View detailed input status information, and preview/apply output timing settings.

- **Thumbnails**

  Set options related to thumbnail image acquisition, processing, and multicasting to *MultiPoint* control stations and *VIEW* Controller PCs.

3.2 System

Figure 3-1 shows the **System** tab.

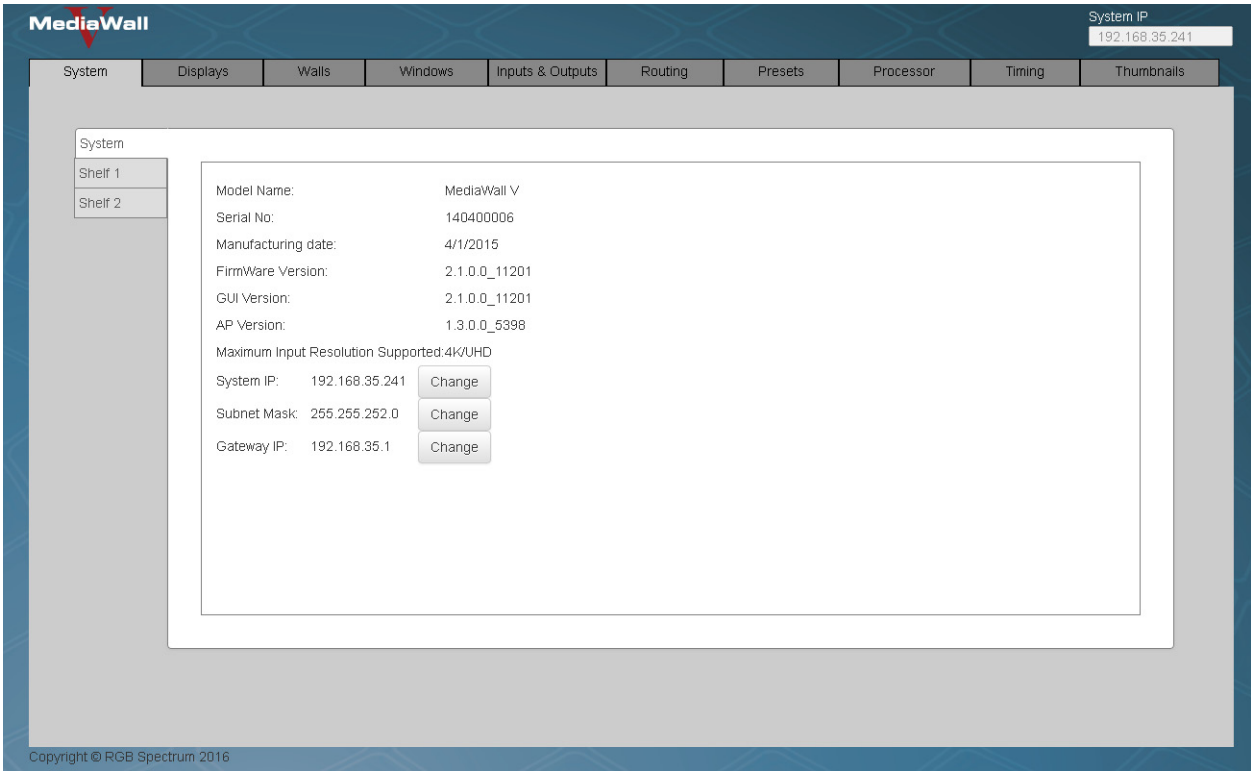


Figure 3-1 System > System Information Tab

3.2.1 System

Click the **System** sub-tab to view the following system information:

- Model Name
- Serial Number
- Manufacturing date
- Firmware Version
- GUI Version
- AP Firmware Version (Model 500AP-4K and 550AP-4K only)
- Maximum Input Resolution Supported

CHANGING NETWORK SETTINGS

To change the *MediaWall V* **System IP** address, **Subnet Mask**, and/or **Gateway IP** address:

1. Click **Change**.
2. Enter a new, valid IP address.
3. Click **Apply**.
4. Wait three to five seconds for the change to take effect.
5. To continue using the *MediaWall V* Web Interface, enter the new IP address (followed by ":8001") in the browser address bar.
6. Repeat Steps 1 through 4 to change the **Subnet Mask** and/or **Gateway IP** address, if necessary.

3.2.2 Shelf 1

Click the **Shelf 1** sub-tab to see the following hardware component information:

- Component descriptions
- Component Slot numbers
- Present (Yes/No)
- Part numbers
- Board Revision numbers
- Serial numbers
- FPGA Revision numbers
- Manufacture dates

In a *MediaWall V* Model 550 Series, this information is for the hardware in the top chassis frame.

Should you ever need to **contact RGB Spectrum Technical Support**, this information will help support personnel answer your questions and/or resolve product performance issues.

3.2.3 Shelf 2 (*MediaWall V* Model 550 Series only)

Click the **Shelf 2** sub-tab to see hardware component information for the bottom chassis frame in a *MediaWall V* Model 550 Series (similar to what is displayed for **Shelf 1**).

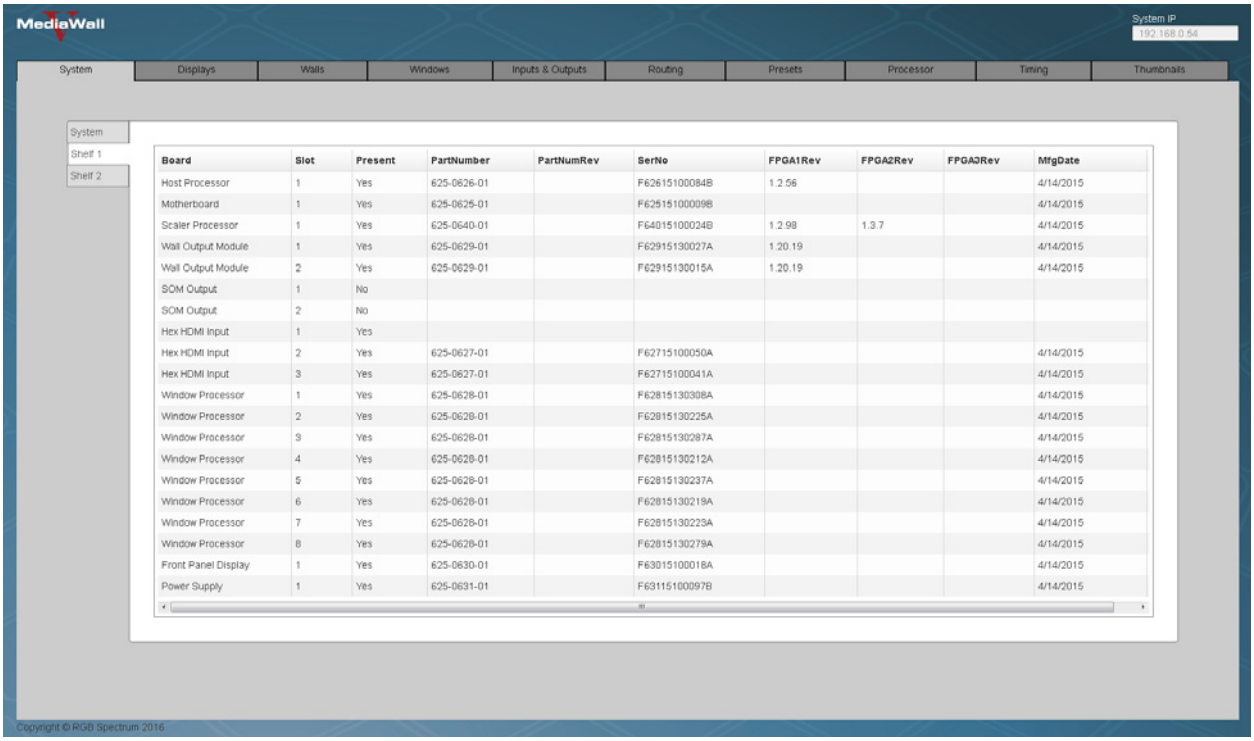


Figure 3-2 System > Hardware Information Tab

3.3 Displays

A wall is built from an array of physically separate display devices. To obtain the best results, mechanical and electrical alignment must be performed to ensure that the images in the separate displays are accurately aligned. This section deals with the alignment aids that the *MediaWall V 4K/UHD Display Processor* provides.

1. **Mechanical Alignment**

   It is extremely important to perform mechanical alignment prior to making any electrical adjustments. Make sure that the individual display devices are rigidly mounted or the wall will quickly go out of adjustment, or alignment may not be possible at all.

2. **Display adjustment for wall displays**

   Each display device has adjustments for the size and position of the image on the display screen. Follow the manufacturer's instructions for best results. Because each display device has its own controls for size and position, these controls are not duplicated by the *MediaWall V 4K/UHD Display Processor*. Note that color adjustments can be made at a later time following wall alignment.

Typically there is a small frame, called a **mullion**, around the active display area of each display device. This represents dead area in the wall and must be compensated to avoid geometric distortion of the full image. Mullions are most often used with displays having a bezel surrounding the display area.

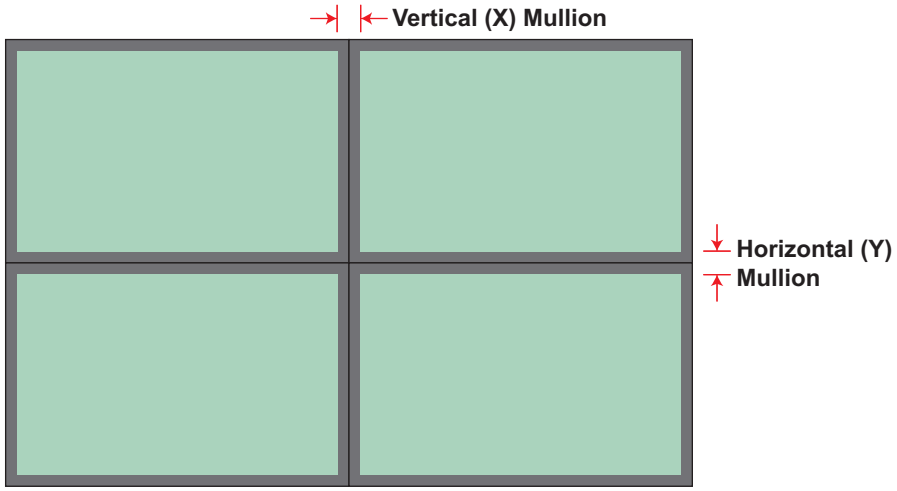


Figure 3-3 2 × 2 Wall with Vertical (X) and Horizontal (Y) Mullions

Figure 3-4 shows an example of a misaligned wall setup without any compensation for the mullion area. Note the dislocation error or offset in diagonal lines crossing mullions between cubes.

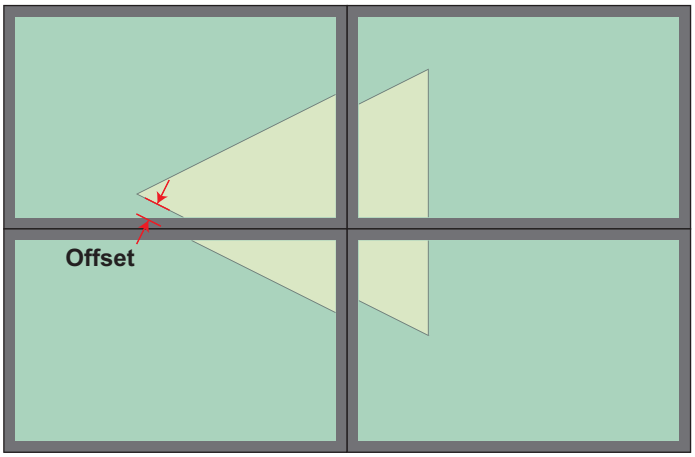


Figure 3-4 Wall Misalignment Due to Mullions

Note	Linear (single-row) walls have only vertical (X) mullions.

3.3.1 Display 1

The controls on this sub-tab allow you to specify the bezel widths and other characteristics of the display devices in your wall. For detailed instructions on using these controls, refer to **Defining Your Wall Display** in **Chapter 2**.

3.4 Walls

The controls on the **Walls** tab allow you to select a wall display definition and specify a wall layout. For detailed instructions on using these controls, refer to **Setting Wall Attributes** in **Chapter 2**.

From this tab, you can also perform these tasks:

- Configure the display of up to six clocks;
- Configure the display of up to six wall labels;
- Perform mullion and output overlap adjustments;
- Adjust the window zoom/pan/resize increment size;
- Select a wall background color; and
- Display a test pattern on the wall.

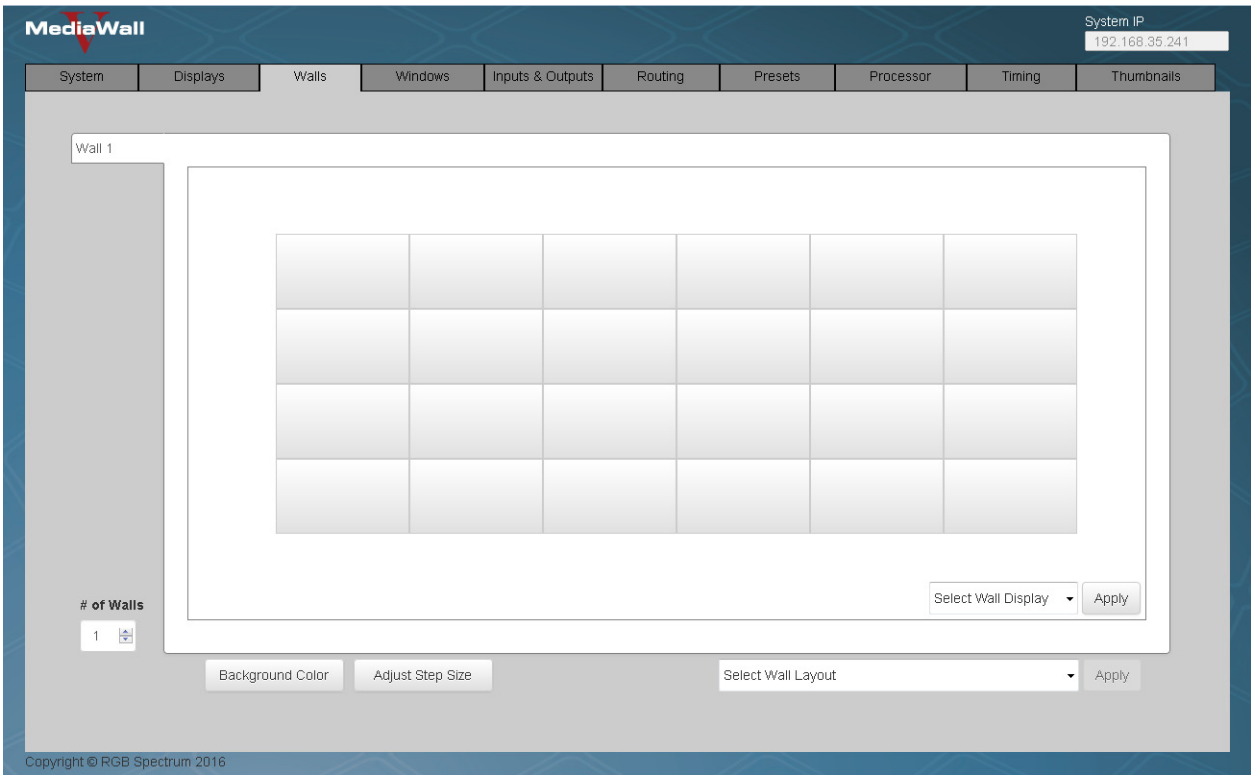


Figure 3-5 Walls Tab

3.4.1 Adjusting Zoom/Pan/Resize Increment Sizes

Note	Refer to **Zooming and Panning Within a Window** later in this chapter for more information about the *MediaWall V* Web Interface's window zoom and pan controls.

To set the horizontal and vertical increment sizes for the zoom, pan, and resize controls:

1. Click **Adjust Step Size**.

2. Adjust the horizontal and/or vertical increments as needed, up to 50 pixels. You can type values directly, or use the spin controls.

   The default zoom or resize increment is two lines. The default pan increment is two pixels (left/right) or two lines (up/down).

3. Click **Apply** to save your changes or **Cancel** to keep the current settings.

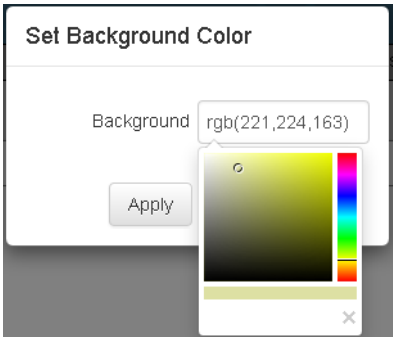
3.4.2 Changing the Wall Background Color

To change the wall background color:

1. Click **Background Color**.

2. Specify a background color using the color picker. Or, enter RGB values directly into the text entry box as follows: **rgb(221,224,163)**. Valid values are from 0 to 255 inclusive.

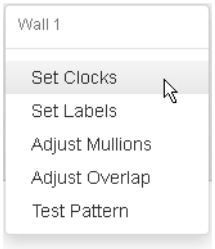
3. Click **Apply** to update the wall background color or **Cancel** to keep the current setting.



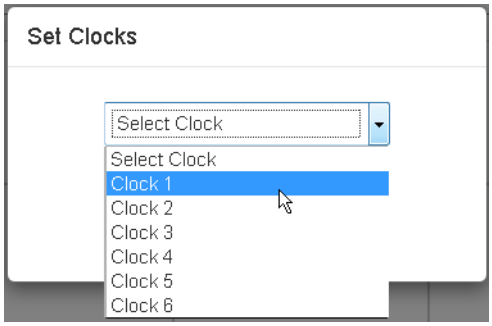
3.4.3 Changing Clock Display Settings

To enable a wall clock and change its appearance, time format or date format:

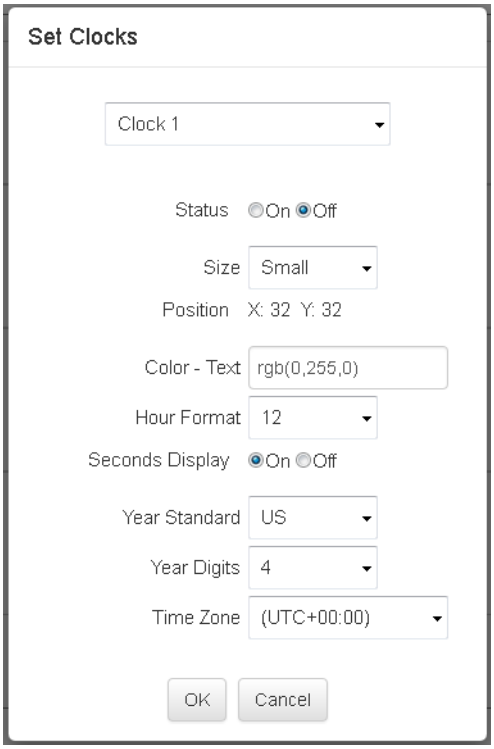
1. Right-click anywhere on the wall grid and click **Set Clocks**.



2. Select a clock to configure.



3. Set the **Status** to **On** or **Off**.
4. Set the **Size** to **Small**, **Medium**, or **Large**.
5. Click the **Color - Text** entry box.
6. Specify a clock color using the color picker. Or, enter RGB values directly into the text entry box as follows: **rgb(120,190,130)**. Valid values are from 0 to 255 inclusive.
7. Set the **Hour Format** to **12** or **24**.
8. Set the **Seconds Display** to **On** (HH:MM:SS) or **Off** (HH:MM).
9. Set the **Year Standard** to **US** (month-day-year) or **ISO** (year-month-day).
10. Set the **Year Digits** to **4** or **2**.
11. Specify the local **Time Zone**, relative to Greenwich Mean Time/Universal Coordinated Time (GMT/UTC). (The new setting takes effect when you reboot the *MediaWall V*.)



For example, for Pacific Daylight Time, the time zone is **UTC-07:00**.

12. Click **OK**.
13. On the wall grid, click and drag the clock to position it where you want it.

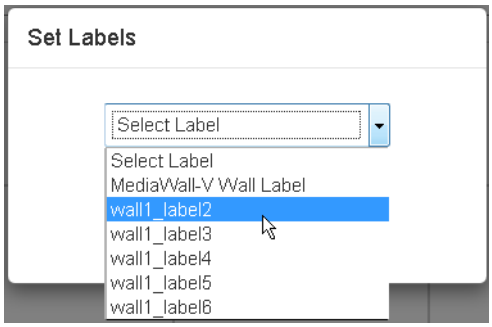
Note	Wall clocks cannot cross mullions.

3.4.4 Changing Wall Label Display Settings

To enable a wall label and change its appearance or label text:

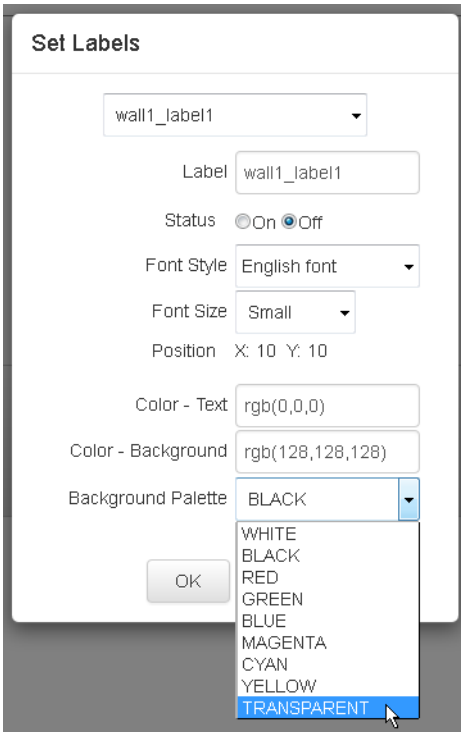
1. Right-click anywhere on the wall grid and click **Set Labels**.

2. Select a wall label to configure.



3. Click the **Label** text entry box and enter the label text.
4. Set the **Status** to **On** or **Off**.
5. Select a display **Font Style** for the label.
6. Set the **Font Size** to **Small**, **Medium**, **Large**, or **Xlarge**.
7. Specify a label text **Color** using the color picker. Or, enter RGB values directly into the text entry box as follows: **rgb(120,190,130)**. Valid values are from 0 to 255 inclusive.

8. Specify the label **Background** color. You can define the color using RGB values, or select one of eight pre-defined colors: **WHITE**, **RED**, **BLACK**, **GREEN**, **BLUE**, **MAGENTA**, **CYAN**, or **YELLOW**. To display a wall label with no background, select **TRANSPARENT**.
9. Click **OK**.
10. On the wall grid, click and drag the label to position it where you want it.



3.4.5 Compensating for Mullions or Configuring Overlapping Outputs

When an image spans across multiple displays on a wall, it can sometimes appear misaligned and distorted due to the space between the displays. Likewise, when multiple projectors are used to create a larger, unified image, visible seams may appear along the projected image edges. To address these issues, the *MediaWall V 4K/UHD Display Processor* provides mullion compensation and output overlap controls.

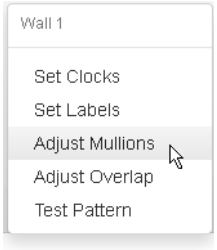
Before using these controls, create at least one window on the wall and position it such that it straddles at least two displays (four if the wall has two or more rows). Refer to **Adding a Window to the Wall** on **page 15**.

MULLION COMPENSATION

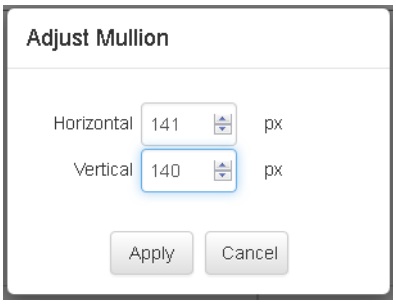
The easiest way to perform mullion compensation is by **Defining Your Wall Display** (on the **Displays** tab). The *MediaWall V* uses the information you provide to calculate the pixel density and correctly align adjacent display areas on the wall.

If necessary, you can perform further, more precise mullion adjustment from the **Walls** tab. To do this:

1. Right-click anywhere on the wall grid and click **Adjust Mullions**.



2. Change the amount of horizontal and/or vertical mullion adjustment as needed, up to 400 pixels. You can type values directly, or use the spin controls.



3. Click **Apply** to apply your changes or **Cancel** to keep the current settings.

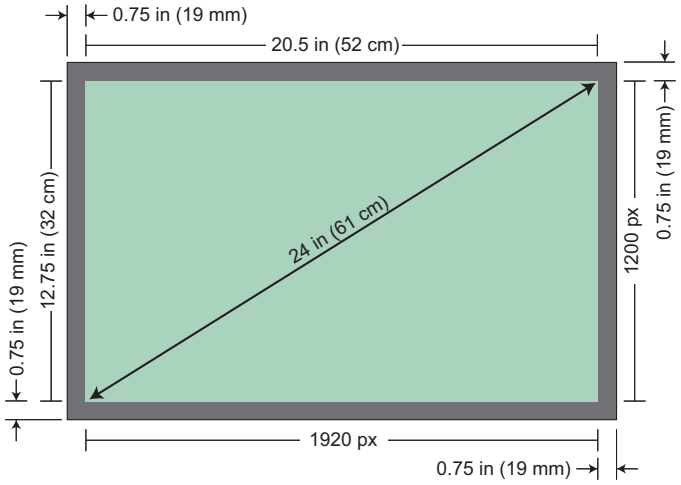
How Much Mullion Compensation Do I Need?

To calculate the required amount of mullion compensation, in terms of inches and pixels:

1. Measure the active display area of one display device.
2. Measure the display device's bezel width and height.
3. Divide the horizontal resolution by the width of the active display area. The result is the number of **horizontal pixels per inch (HPPI)**.
4. Divide the vertical resolution by the height of the active display area. The result is the number of **vertical pixels per inch (VPPI)**.
5. Multiply the left and right bezel widths (Step 2) by the HPPI (Step 3).
6. Add the two values obtained in Step 5. This is the required amount of vertical (X) mullion compensation.
7. Multiply the top and bottom bezel heights (Step 2) by the VPPI (Step 4).
8. Add the two values obtained in Step 7. This is the required amount of horizontal (Y) mullion compensation.

Example

The following example calculation is based on a 24-inch (61-cm), 1920 × 1200 display panel with an active viewing area of 20.5 × 12.75 inches (52 × 32 cm). The top, bottom, left, and right bezels all measure 0.75 inches (19 mm).



Example (continued)

1. Determine the HPPI by dividing the number of active horizontal pixels by the width of the active display area:

   HPPI = 1920 / 20.5 = 93.66

2. Determine the VPPI by dividing the number of active vertical pixels by the height of the active picture area:

   VPPI = 1200 / 12.75 in = 94.12

3. Multiply the width of the left bezel by the HPPI:

   Left Bezel Compensation = 0.75 in × 93.66 = 70.24 pixels

4. Repeat Step 3 for the right bezel:

   Right Bezel Compensation = 0.75 in × 93.66 = 70.24 pixels

5. Add these two values to arrive at the total vertical mullion compensation:

   Total Vertical (X) Mullion Compensation =
   70.24 + 70.24 = 140.48 or **140 pixels**

6. Calculate the Horizontal (Y) mullion compensation using the same approach, based on the VPPI:

   Top Bezel Compensation = 0.75 in x 94.12 = 70.59 pixels
   Bottom Bezel Compensation = 0.75 in x 94.12 = 70.59 pixels
   Total Horizontal (Y) Mullion Compensation =
   70.59 + 70.59 = 141.18 or **141 pixels**

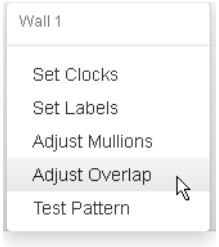
OUTPUT OVERLAP

Mullion compensation corrects distortion of the final image due to the offset caused by the bezel surrounding individual display devices. An opposite issue can occur in walls using front or rear projection. This requires a feature known as **output overlap**.

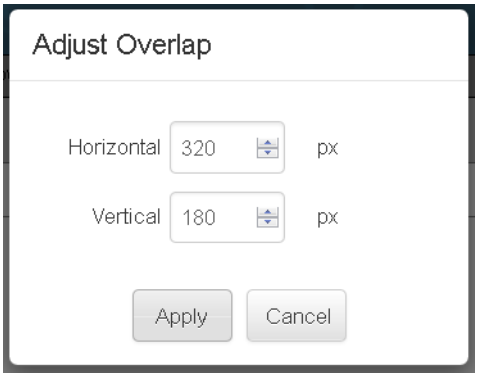
To provide a seamless transition between the images from adjacent projectors, a technique known as **edge blending** is often used. Edge blending requires that the images from projectors overlap in the region where the projector images are butted together. The *MediaWall V 4K/UHD Display Processor* provides a user-definable overlap between outputs to support the edge blending capability of projectors.

To set the amount of output overlap:

1. Right-click anywhere on the wall grid and click **Adjust Overlap**.



2. Change the amount of horizontal and vertical overlap as needed, up to 1920 pixels. You can type values directly, or use the spin controls.



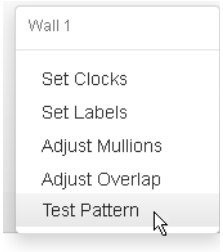
3. Click **Apply** to save your changes or **Cancel** to keep the current settings.

3.4.6 Test Patterns

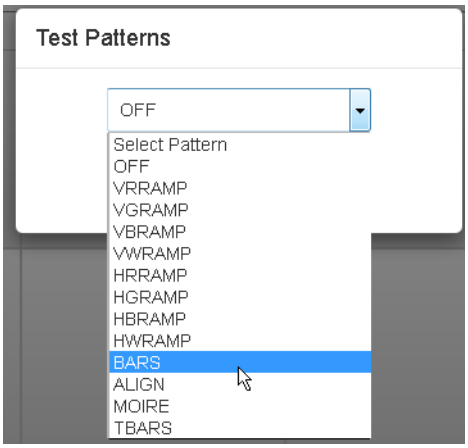
To assist in setting up and debugging an installation, the *MediaWall V* provides a number of internally generated test patterns. The test patterns are available even when no input signal is present. Test patterns are helpful to confirm proper output display connections, adjust image characteristics, and assist in alignment.

To display a test pattern:

1. Right-click anywhere on the wall grid and click **Test Pattern**.



2. Select a test pattern to display.
3. Click **OK**.



To disable the test pattern, select **OFF**, then click **OK**.

3.5 Windows

Use the controls on the **Windows** tab (**Figure 2-4**) to perform the following tasks:

- Create custom window layouts;
- Load a window layout from a template;
- Preview window layouts; and
- Change a window from 2K/HD to 4K/UHD or vice versa.

For detailed instructions on using these controls, refer to **Creating an Initial Window Layout** in **Chapter 2**.

3.6 Inputs & Outputs

From the **Inputs & Outputs** tab (**Figure 3-6**), you can:

- View a list of inputs and input status information;
- Enable or disable an input;
- Change input (source) label text;
- Adjust image quality settings for each input;
- Enable or disable HDCP on an input; and
- View HDCP status information for all outputs.

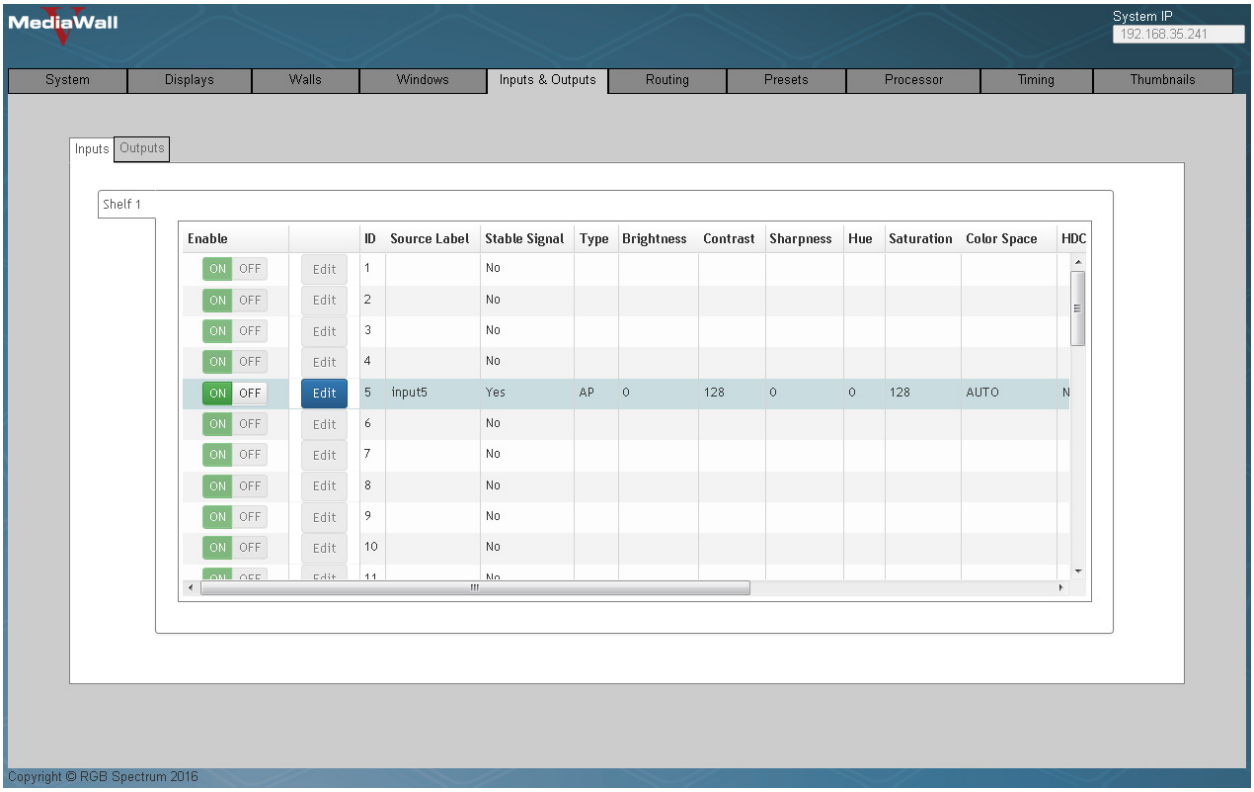


Figure 3-6 Inputs & Outputs > Inputs Tab

3.6.1 Re-ordering the Input List

To re-order the input list by number, source label, type, or other criterion, click a column heading. Click the column heading again to reverse the order.

3.6.2 Adjusting Column Widths

To change a column's width, position the mouse pointer over the column heading's left or right edge. When the cursor changes to a "column resize" cursor (⇹), click and drag to resize the column.

3.6.3 Enabling or Disabling an Input

Click **ON** or **OFF** to enable or disable an input.

Note	On a *MediaWall V* equipped with an optional Application Processor (model 500AP-4K or 550AP-4K), you cannot disable Input 5 or Input 6.

3.6.4 Resetting an HDCP Session

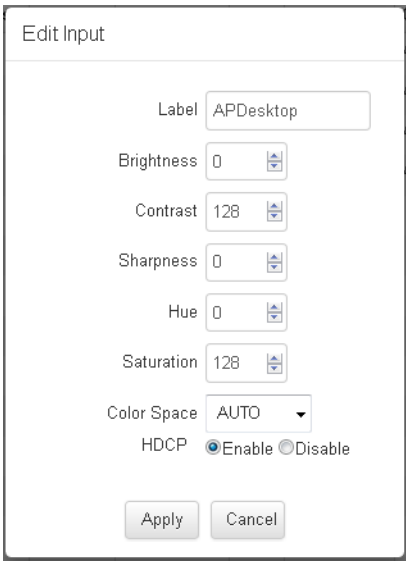
If an HDCP-protected source is not displaying correctly, click the **Reset** button for the input used by that source. This causes the source to re-authenticate the *MediaWall V* as an authorized device and resume transmitting the protected content.

3.6.5 Changing an Input (Source) Label or Adjusting Image Quality Settings

To rename an input or adjust image quality settings:

1. Double-click the **Edit** button for the input whose label or other settings you want to modify.
2. Click the **Label** text entry box.
3. Enter a new label for the input. (You set the label's appearance and position from the **Routing** tab.)
4. Adjust the **Brightness**, **Contrast**, **Sharpness**, **Hue**, and **Saturation** as needed.
5. Set the **Color Space**, as needed to produce correct colors:
   - For standard-definition sources, choose **AUTO**, **RGB** or **BT601**.
   - For 2K/HD sources, choose **AUTO**, **RGB** or **BT709**.
   - For 4K/UHD sources, choose **AUTO** or **RGB**.

   The default setting, **AUTO**, should produce the desired results in most cases.
6. Set **HDCP** to **Enable** if the source is a Blu-ray™ disc player or other source of protected content.
7. Click **Apply**.



3.6.6 Viewing HDCP Status Information for Outputs

Click the **Inputs & Outputs > Outputs** tab to view HDCP information for all outputs in the system.

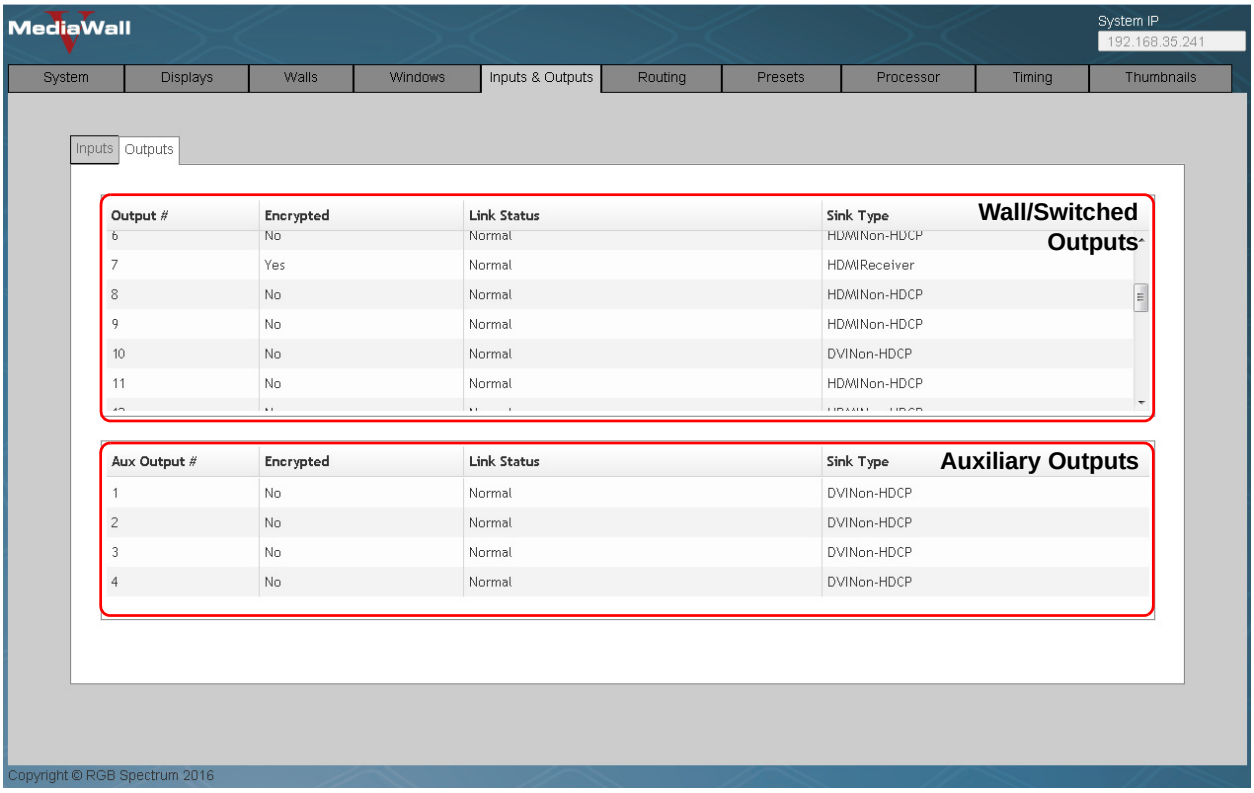


Figure 3-7 Inputs & Outputs > Outputs Tab

For each output, the *MediaWall V* Web Interface displays these attributes:

- **Encrypted - Yes** if this output is displaying HDCP-protected content, otherwise **No**.
- **Link Status - Normal**, under most conditions.
- **Sink Type -** One of the following (**[connector_type]** is **DVI** or **HDMI**):
  - **[connector_type]Receiver** if this output feeds an HDCP-capable display device.
  - **[connector_type]Repeater** if this output feeds a downstream HDCP repeater (receiver and transmitter).
  - **[connector_type]Non-HDCP** if this output feeds a non-HDCP device, or if no device is connected.

Note	For detailed technical information about HDCP, please visit **http://digital-cp.com**.

3.7 Routing

Use the controls on the **Routing** tab (Figure 2-7 and Figure 2-8) to perform the following tasks:

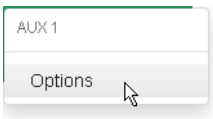
- Route a source to a window on a wall (refer to **Routing Inputs to Windows** in **Chapter 2**);
- View detailed window information (refer to **Window Information** in **Chapter 2**);
- Route a source to an auxiliary or switched output (refer to **Routing Inputs to Auxiliary or Switched Outputs** in **Chapter 2**);
- Save **Presets** containing current window, wall, and switched output attributes (refer to **Saving Window, Wall, and Switched Output Settings as a Preset** in **Chapter 2**);
- Move or resize windows (refer to **Positioning and Sizing Windows** in **Chapter 2**);
- Configure auxiliary and switched outputs;
- Disable and enable windows;
- Configure window labels, input (source) labels, and window borders;
- Zoom and pan within a window; and
- Adjust window priorities.

Note	When moving or resizing windows from the **Routing** tab, windows that were created as described in the **Adding a Window to the Wall** section may be confined to the row(s) that they currently occupy. To work around this constraint, use the controls on the **Windows > Workspace** tab (**Figure 2-4**) to move or resize windows.

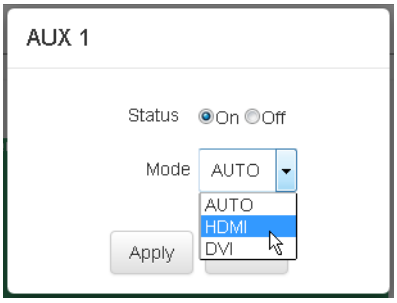
3.7.1 Configuring Auxiliary and Switched Outputs

To set options for an auxiliary or switched output:

1. Click the **Switched Outputs** tab.
2. Right-click on an output window and click **Options**.

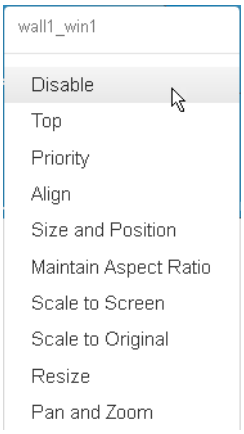


3. Set the **Status** to **On** or **Off**.
4. Set the output **Mode** to **AUTO**, **HDMI** or **DVI**. (**AUTO** sets the output mode to DVI or HDMI based on the EDID from the connected display.)
5. Click **Apply** to save your changes or **Cancel** to keep the current settings.



3.7.2 Disabling a Window

To disable a window on the wall, right-click on the window in the wall preview area and click **Disable**.



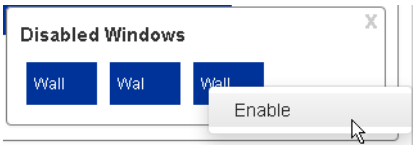
Note	Disabling a window does not increase available system resources. To increase available system resources, follow the steps for **Deleting a Window on page 16**.

3.7.3 Enabling a Disabled Window

Click **Show** to view a list of disabled windows below the wall preview area.

To see a disabled window's label, position the mouse pointer over the window.

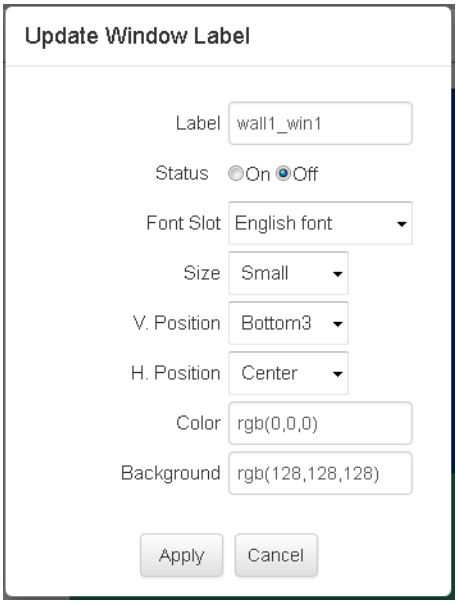
To enable a disabled window, right-click on it and click **Enable**. The window reappears on the wall, in the same position and at the same size as when you disabled it.



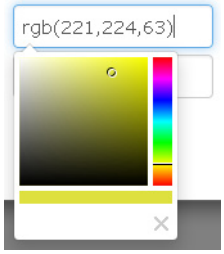
3.7.4 Configuring Window Labels

You can apply a descriptive label to each window on the wall. Window labels affect a single instance of an input on the wall. To apply the same label to all windows populated by the same input, create an input label (refer to **Configuring Input (Source) Labels** for instructions).

To configure a window label:



1. Right-click on the window in the wall preview area and click **Window Label**.
2. Click the label text entry box.
3. Enter up to 64 characters of label text. Only letters, numbers and the underscore character are permitted.
4. Set the **Status** to **On** or **Off**.
5. Select a display **Font Slot** for the label.
6. Set the **Label Size** to **Small**, **Medium**, **Large**, or **Xlarge**.
7. Set the **V. Position** to **Top1**, **Top2**, **Top3**, **Top4**, **Bottom1**, **Bottom2**, **Bottom3**, or **Bottom4**.
8. Set the **H. Position** to **Left**, **Center**, or **Right**.
9. Specify a label text **Color** using the color picker. Or, enter RGB values directly into the text entry box as follows: **rgb(221,224,63)**. Valid values are from 0 to 255 inclusive.



10. Repeat Step 9 to set the label **Background** color.
11. Click **Apply** to update the label or **Cancel** to keep the current label.

ABOUT LABEL SIZE AND POSITION SETTINGS

Label Size

Four label sizes are available: **Small** (32 px), **Medium** (64 px), **Large** (128 px), and **Xlarge** (256 px). The text height is 80 percent of the label height; for example, in a **Small** window label, the text is approximately 26 pixels high.

Label Position

You can specify a label's position with respect to either the window's border or the active video region. See **Figure 3-8**.

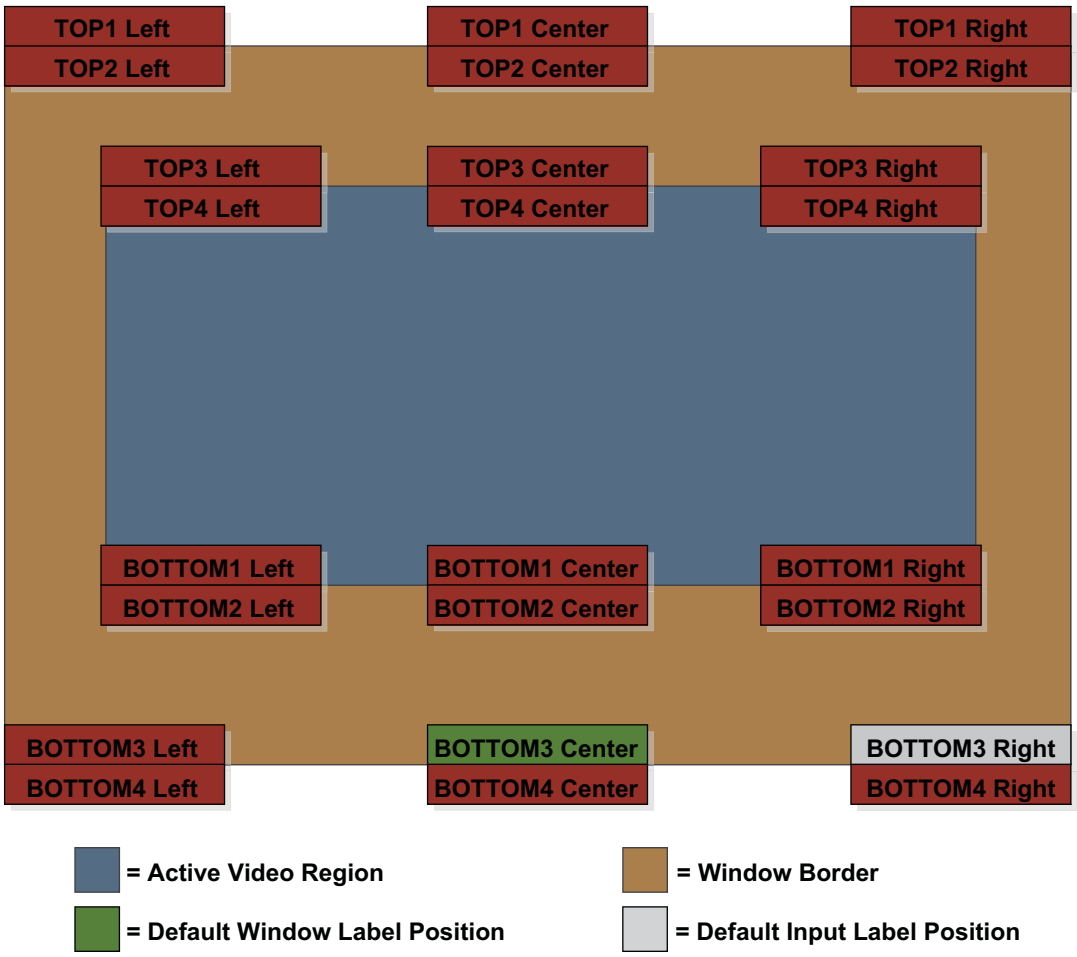
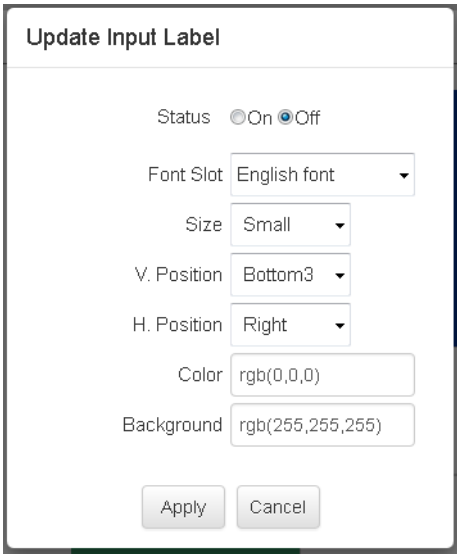


Figure 3-8 Horizontal and Vertical Label Position Options

3.7.5 Configuring Input (Source) Labels

You can apply a descriptive label to each input (source) in the system. Input labels appear in all windows populated by that input. To apply a unique label to a single window, create a window label (refer to **Configuring Window Labels** for instructions).

To configure an input label:



1. Right-click on the window in the wall preview area and click **Input Label**.
2. Set the **Status** to **On** or **Off**.
3. Select a display **Font Slot** for the label.
4. Set the **Label Size** to **Small**, **Medium**, **Large**, or **Xlarge**.
5. Set the **V. Position** to **Top1**, **Top2**, **Top3**, **Top4**, **Bottom1**, **Bottom2**, **Bottom3**, or **Bottom4**.
6. Set the **H. Position** to **Left**, **Center**, or **Right**.
7. Specify a label text **Color** using the color picker. Or, enter RGB values directly into the text entry box as follows: **rgb(120,190,130)**. Valid values are from 0 to 255 inclusive.
8. Repeat Step 7 to set the label **Background** color.
9. Click **Apply** to update the label or **Cancel** to keep the current label.

To change the input label text, click the **Inputs** tab (refer to **Changing an Input (Source) Label or Adjusting Image Quality Settings on page 52**).

3.7.6 Changing Window Border Width

To change a window border width:

1. Right-click on the window in the wall preview area and click **Border Width**.
2. Specify a border width of from 0 to 100 pixels inclusive. Click the entry box and type a value, or use the spin controls.

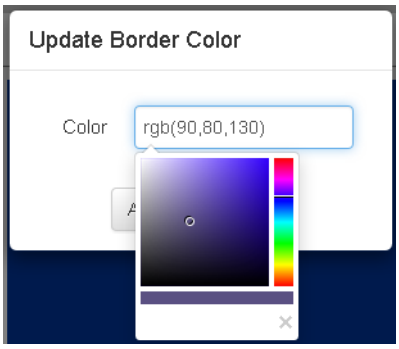
Note	Window borders reduce the active video region by the border width amount on all four sides. For example, when you enable a 5-pixel border on a 640 × 480 window, the active video region is resized to 630 × 470.

3. Click **Apply** to update the window border width or **Cancel** to keep the current setting.

3.7.7 Changing Window Border Color

To change a window border color:

1. Right-click on the window in the wall preview area and click **Border Color**.
2. Specify a border color using the color picker. Or, enter RGB values directly into the text entry box as follows: **rgb(90,80,130)**. Valid values are from 0 to 255 inclusive.
3. Click **Apply** to update the window border color or **Cancel** to keep the current setting.



3.7.8 Zooming and Panning Within a Window

Use the window zoom and pan controls (Figure 3-9) on the **Routing** tab to select a portion of the source rectangle to display in the window destination rectangle on the wall. You can zoom and pan interactively using the buttons, or by entering position and size values directly.

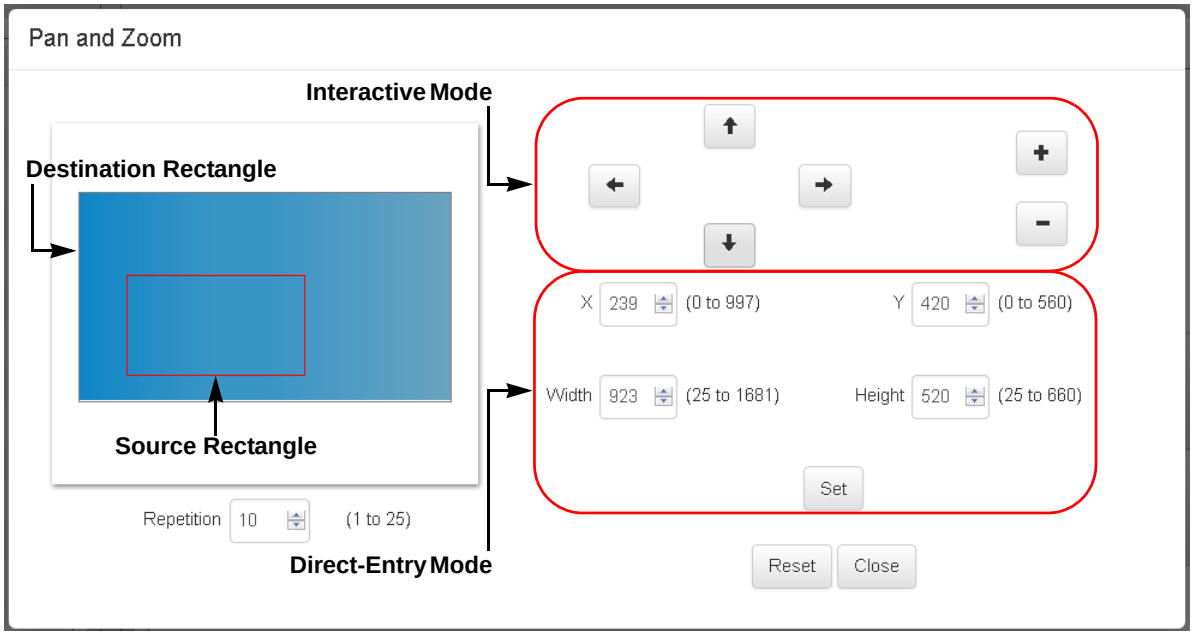


Figure 3-9 Pan and Zoom Controls

To use the window zoom and pan controls:

1. Right-click on the window in the wall preview area and click **Pan and Zoom**.
2. Enter a **Repetition** factor between 1 and 25 inclusive. This sets the zoom or pan amount that occurs each time you click a button to that multiple of the current zoom/pan/resize increment.

   The default zoom increment is 2 lines. The default pan increment is 2 pixels (left/right) or 2 lines (up/down). To change these settings, click the **Walls** tab and follow the steps given for **Adjusting Zoom/Pan/Resize Increment Sizes**.

Example	With the default increment of 2 and a **Repetition** factor of 10, each button click changes the source rectangle by 20 pixels or lines.

3. To zoom and pan interactively:
   a. Click (or click and hold) + or − to zoom in or out respectively, maintaining the window aspect ratio.
   b. Click (or click and hold) ←, →, ↑, or ↓ to pan around a zoomed-in window. Note that the pan controls work **only** on a zoomed-in window.

   As you do this, the current **X**, **Y**, **Width**, and **Height** values, as well as the valid adjustment ranges for each, update.
4. To zoom and pan using direct-entry mode:
   a. Enter **X**, **Y**, **Width**, and/or **Height** values to define the source rectangle area. You can type values directly, or use the spin controls. As you do this, the valid adjustment ranges for **X**, **Y**, **Width**, and **Height** update.
   b. Click **Set**.

Notes	The window image on the wall updates each time you perform Step 3 or Step 4 above, as does the Source Rectangle preview in the Pan and Zoom window. Zoom is currently supported for 2K/HD and 4K/UHD @30 Hz source windows only. Horizontal (left/right) panning is currently supported for 2K/HD source windows only.

To undo any zoom and pan settings, click **Reset**.

To hide the zoom and pan controls, click **Close**.

3.7.9 Setting Window Priorities

The *MediaWall V* uses the **Priority** function to determine which of several overlapping windows are visible. You can change the priority levels of windows so that different ones come to the front and others move to the back. When windows overlap, their relative visibility depends on their respective priority levels.

Note	Clocks always have a higher priority than windows.

In **Figure 3-10**, Window 2 has priority over the other windows, and overlays any window with a lower priority.

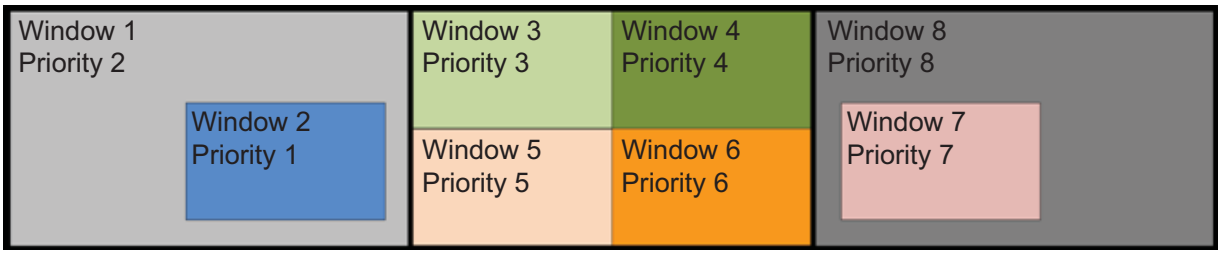
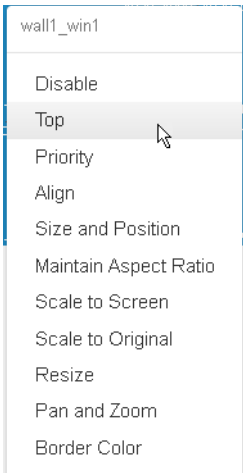


Figure 3-10 Window Priorities

Note the following:

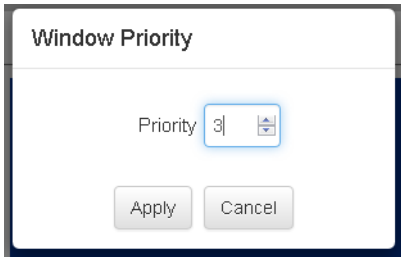
- The available levels are 1 through 64, where 1 represents the highest priority.
- The window with the highest priority appears on top. Lower priority windows are stacked beneath it.
- Only the overlapped region of a window is obscured by a higher priority window.
- No two windows can have the same priority.
- If a window's priority is increased, the window previously holding that priority is automatically demoted by one level.
- Promoting (or demoting) one window leaves the priorities of the other windows unchanged relative to each other.

To set the priority of a window to 1, right-click on the window in the wall preview area and click **Top**;



– OR –

To set the priority of a window:



1. Right-click on the window in the wall preview area and click **Priority**.
2. Specify a priority by clicking the entry box and typing a value, or using the spin controls. (The range depends on the number of enabled windows on the wall; for example, 1 through 8 if there are eight windows.)
3. Click **Apply** to confirm the change or **Cancel** to keep the current window priority setting.

To see a list of all windows and their priorities, right-click on the wall preview area, in an area not occupied by a window. Then, click **Window Priority List**.

3.8 Presets

Use the controls on the **Presets** tab to load and delete presets.

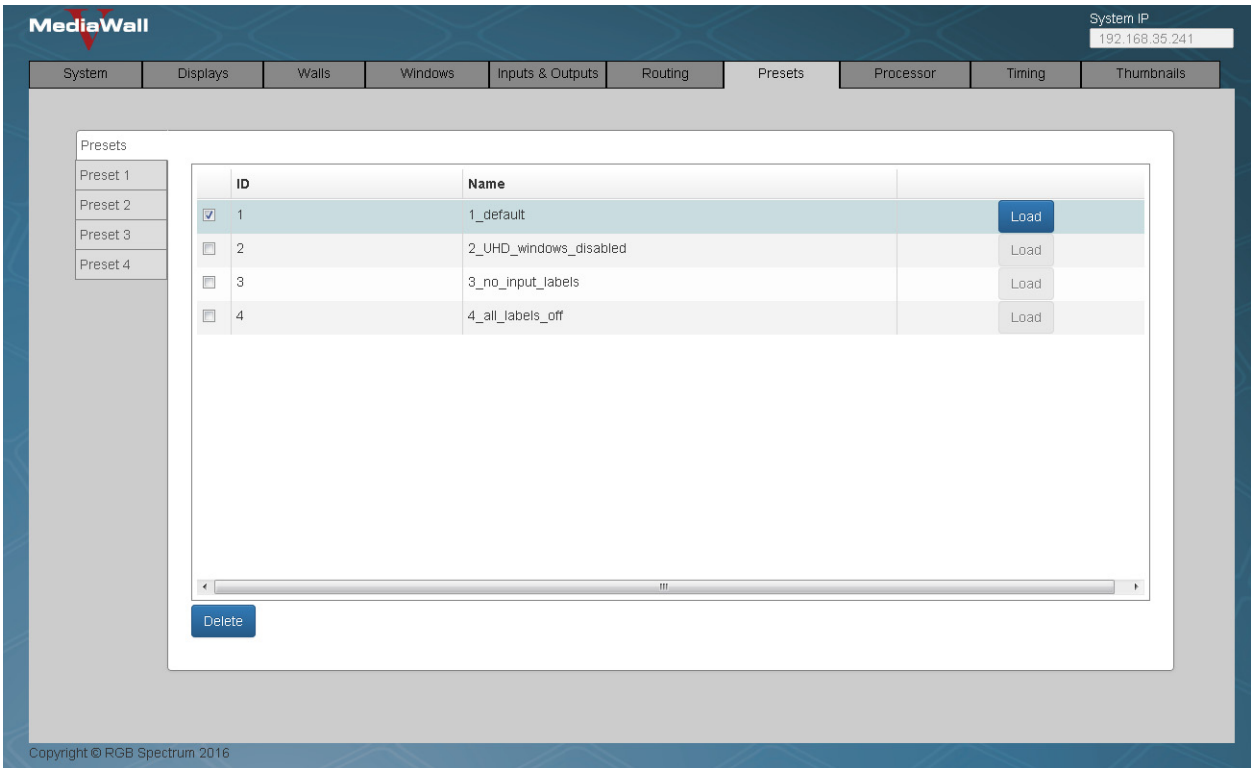


Figure 3-11 Presets Tab – Preset List

3.8.1 Preset List

Click the **Presets** tab to see a list of current presets. Each entry in the list contains the Preset number (**ID**) and Preset **Name**.

To change a column's width, position the mouse pointer over the column heading's left or right edge. When the cursor changes to a "column resize" cursor (⇹), click and drag to resize the column.

To select a preset from the list, check the box (☐) next to its number in the leftmost column. Then, click **Load** to load that preset or **Delete** to delete it.

3.8.2 Preset Preview

To preview a preset, click a **Preset [n]** sub-tab (see **Figure 3-12**).

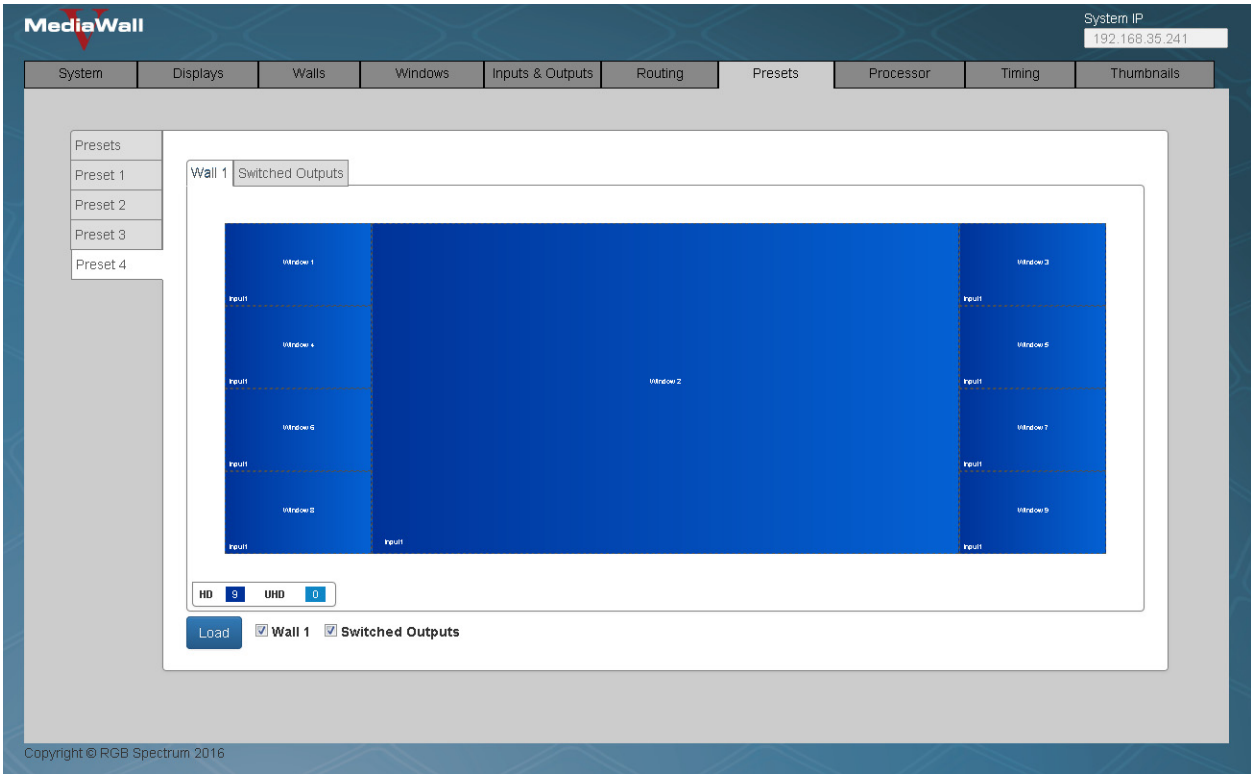
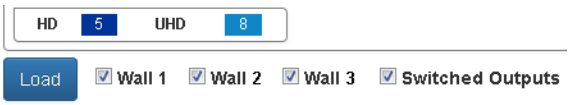


Figure 3-12 Presets > Preset [n] Tab

When loading a preset from the **Presets > Preset [n]** tab, you can choose to ignore wall configuration or switched/auxiliary output settings in that preset, keeping the current settings instead.

To load all or part of a preset:

1. (Optional) On the **Presets > Preset [n]** tab, clear the **Wall 1**, **Wall 2**, and/or **Wall 3** check boxes to ignore configuration settings for that wall in the preset;



– OR –

Clear the **Switched Outputs** check box to ignore all switched/auxiliary output configuration settings in the preset.

2. (Optional) On the **Presets > Preset [n] > Switched Outputs** tab, clear one or more **AUX [n]** or **OUT [n]** check boxes to ignore configuration settings for those outputs in the preset.
3. Click **Load**.

3.9 Processor

Use the controls on the **Processor** tab to perform the following tasks on a *MediaWall V* equipped with an optional Application Processor (model 500AP-4K or 550AP-4K):

- Manage IP video stream playback;
- Launch applications;
- Restart the *MediaWall V* Application Processor; and
- Update the AP firmware.

In order to display IP video streams on the wall, you must first route the AP desktop (Input 5) to a window on the wall. Refer to **Routing Inputs to Windows** in **Chapter 2** for instructions.

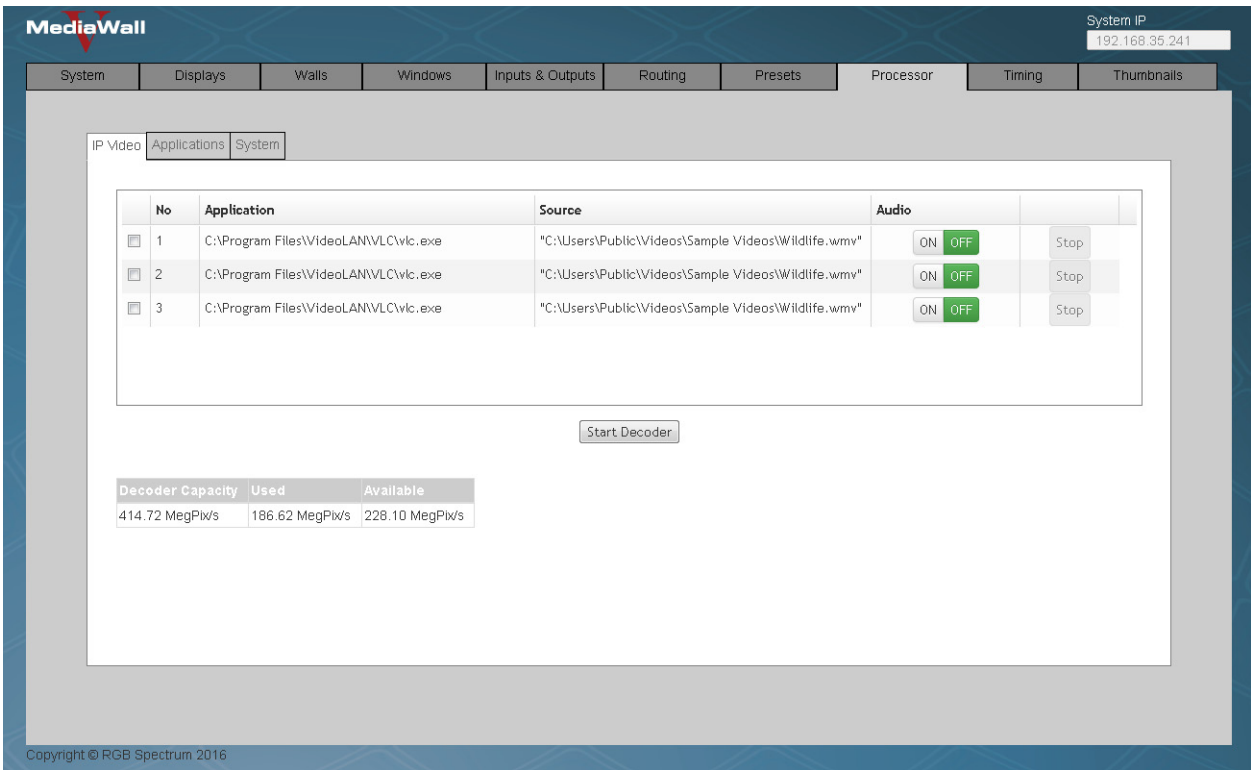


Figure 3-13 Processor > IP Video Tab

3.9.1 IP Video

The *MediaWall V* can decode and display multiple IP video streams or media files simultaneously on the AP desktop. The maximum number of simultaneous streams and/or files ranges from six (6) at 1920 × 1080p and 30 fps, to as many as 20 or more at 640 × 480p and 30 fps.

Click the **IP Video** sub-tab to see a list of active IP video streams or files. Each entry in the list contains the stream/file number (**No**), the path to the application used for playback (always VLC® Media Player®), and stream URL or path to the video file (**Source**).

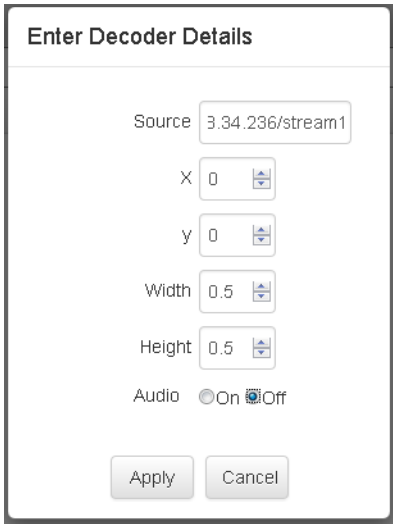
The lower-left corner of the window displays information about resource usage (in megapixels per second (**MegPix/s**)) related to IP decoding activity.

Decoder Capacity	Used	Available
414.72 MegPix/s	62.21 MegPix/s	352.51 MegPix/s

STARTING VIDEO PLAYBACK

To create a new instance of VLC Media Player and play back an IP video stream or file:

1. Click **Start Decoder**.
2. Enter the stream URL (for example, **rtsp://192.168.0.1/stream1**) or full path to the file (for example, **"C:\Users\Public\Videos\Sample Videos\Wildlife.wmv"**) in the **Source** box. Enclose the path in straight double quotes (") if it contains spaces.
3. Set the **X** and **Y** position of the top-left corner of the window in which to display the video. Enter values between 0 (top/left) and 1 (bottom/right).
4. Set the **Width** and **Height** of the window in which to display the video, relative to the AP desktop width and height.
5. Set the **Audio** to **On** or **Off**.
6. Click **Apply**.



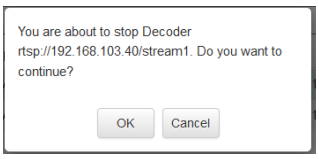
AUDIO

Use the buttons in the **Audio** column to turn the audio on or off.

STOPPING VIDEO PLAYBACK

To stop video playback:

1. Check the box (☐) next to its number in the leftmost column.
2. Click **Stop**.
3. Click **OK** to confirm that you want to stop playback, or **Cancel** to allow playback to continue.



3.9.2 Applications

In addition to displaying IP video streams on the AP desktop, the *MediaWall V* can execute other Windows applications such as Notepad and Paint.

Click the **Applications** sub-tab (**Figure 3-14**) to see a list of Windows application instances running on the AP. Each entry in the list contains the application instance number (**No**), the path to the **Application** used to display the document, and the path to the document (**Source**).

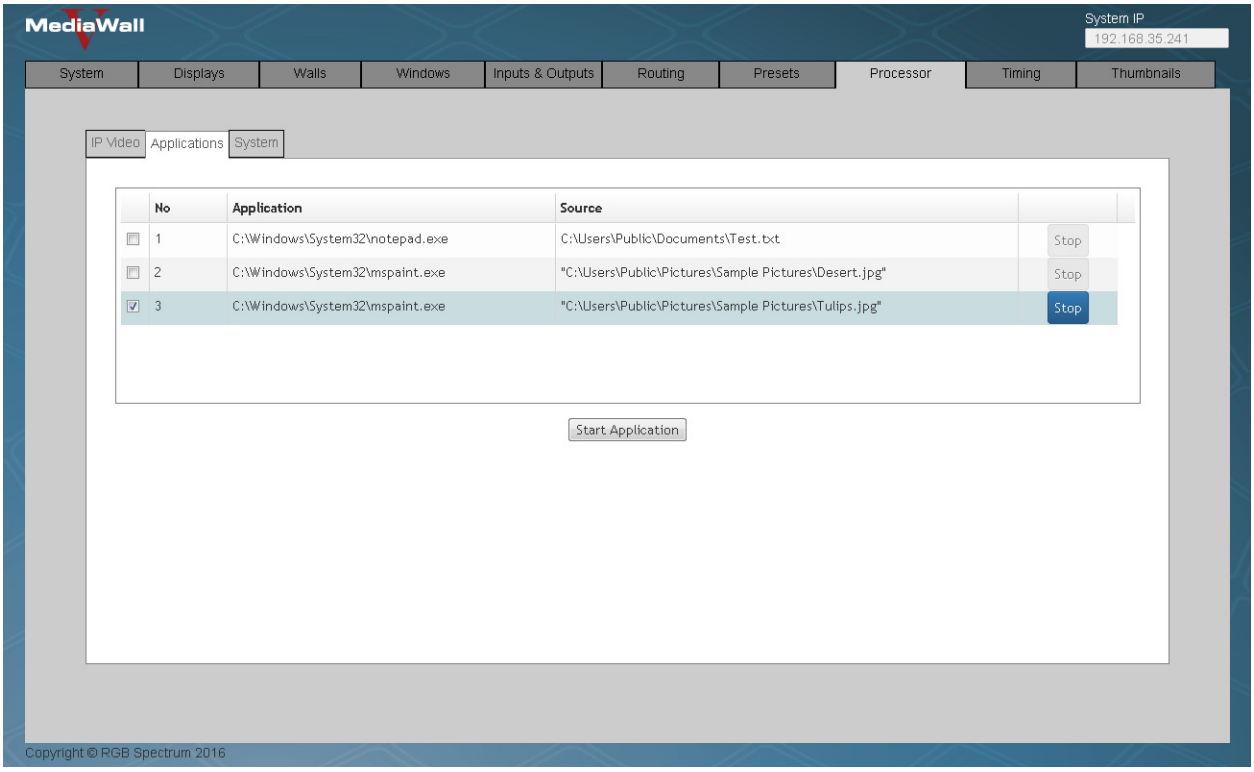
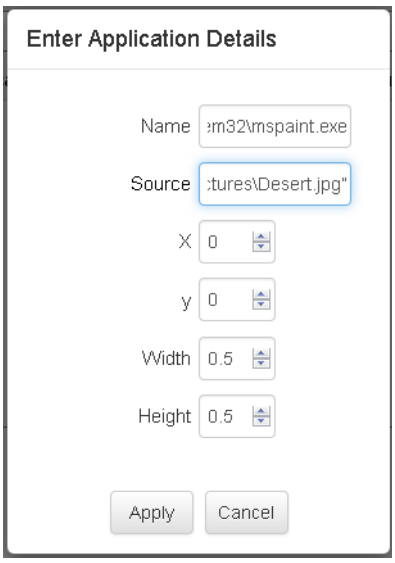


Figure 3-14 Processor > Applications Tab

To create a new application instance and display a document or media file:

1. Click **Start Application**.
2. Enter the full path to the application in the **Name** box (for example, **C:\Windows\System32\mspaint.exe**). Enclose the path in straight double quotes (") if it contains spaces.
3. Enter the full path to the document in the **Source** box (for example, **"C:\Users\Public\Pictures\Sample Pictures\Desert.jpg"**). Enclose the path in straight double quotes (") if it contains spaces.
4. Set the **X** and **Y** position of the top-left corner of the window in which to display the document. Enter values between 0 (top/left) and 1 (bottom/right).
5. Set the **Width** and **Height** of the window in which to display the document, relative to the AP desktop width and height.



6. Click **Apply**. The document you specified in Step 3 appears in a new application window on the AP desktop.

To stop an application instance running on the AP:

1. Check the box (☐) next to its number in the leftmost column.
2. Click **Stop**.
3. Click **OK** to confirm that you want to stop this application instance, or **Cancel** to continue running it.

Important	Always use the *MediaWall V* Web Interface to stop AP application instances, rather than closing the application window on the AP desktop.

3.9.3 System

Use the controls on the **Processor > System** tab (**Figure 3-15**) to restart the AP or update the AP firmware.

Note	To update the *MediaWall V 4K/UHD Display Processor* firmware, you must use the command line interface. Refer to **Appendix A** for detailed instructions.

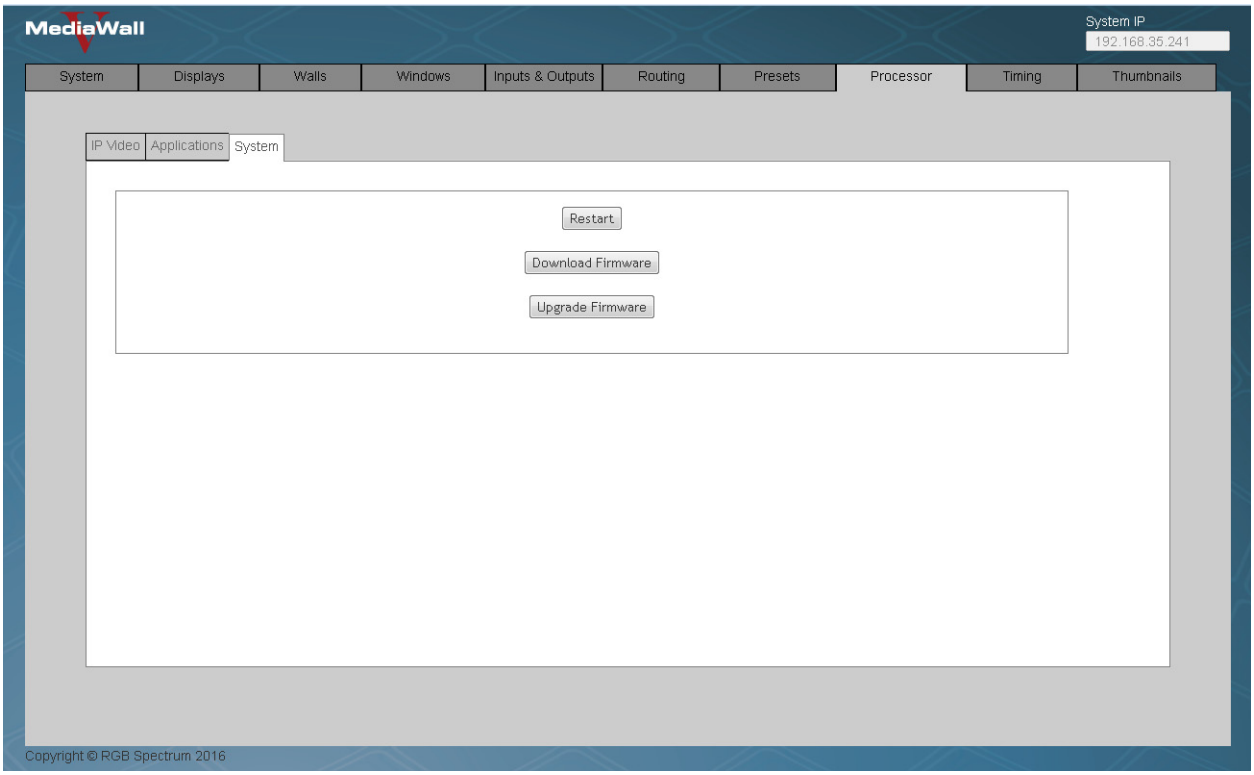


Figure 3-15 Processor > System Tab

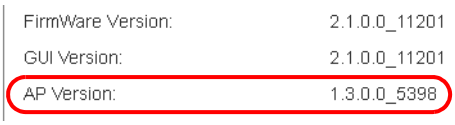
RESTART

To restart the AP, click the **System** sub-tab. Then, click the **Restart** button.

DOWNLOAD FIRMWARE (MODELS 500AP-4K AND 550AP-4K ONLY)

From time to time, RGB Spectrum will update the AP firmware to add features or make performance improvements. The *MediaWall V* Web Interface provides a convenient way to install new firmware for your *MediaWall V* AP.

To determine the current, installed AP firmware version, click the **System** tab.



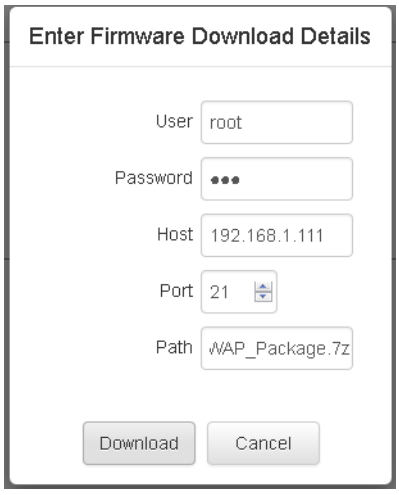
Prerequisites

There are four, prerequisite tasks to performing a *MediaWall V* AP firmware update:

1. **Setting up a File Transfer Protocol (FTP) server:** Many commercial and open-source server software products give you the ability to set up an FTP server. There are also a number of low- or no-cost, stand-alone FTP server solutions that you can deploy on your network. Seek guidance from your IT department or other knowledgeable source if you are unsure how to go about this.
2. **Obtaining updated AP firmware from RGB Spectrum:** For more information about how to obtain *MediaWall V* firmware updates, refer to **Appendix A**.
3. **Putting the firmware file on your FTP server:** The *MediaWall V* AP firmware update is packaged as a single archive file. (As of this writing, the file is called **SWAP_Package.7z**.) During the update process, the *MediaWall V* extracts the individual files from the archive and copies them to their correct location.
4. **Obtaining FTP server login information:** Consult with whomever set up the FTP server for the user name/password, server address, FTP port (usually 21), and path to the firmware file to download.

When you have completed these tasks, you are ready to proceed with the *MediaWall V* AP firmware update:

1. Click the **Processor > System** tab.
2. Click **Download Firmware**.
3. Enter the **User** name and **Password** for connecting to the FTP server.
4. Enter the FTP server IP address or fully-qualified domain name (for example, **ftp.myftp-server.com**) in the **Host** box.
5. Set the **Port** Number as required, or use the default setting of **21**.
6. Enter the full path to the AP firmware update package; for example, **/home/rgb/SWAP_Package.7z**.
7. Click **Download** to download the update file to the **C:\AP_Images** directory on the *MediaWall V* AP.



If the download is successful, the **C:\AP_Images** directory contents will be as shown in **Figure 3-16**.

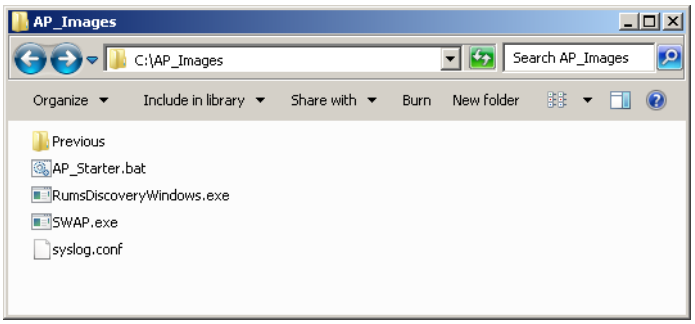


Figure 3-16 AP_Images Directory Contents Following Firmware Download

You can also confirm that the download succeeded by looking in the FTP server log for messages like those shown in **Figure 3-17**.

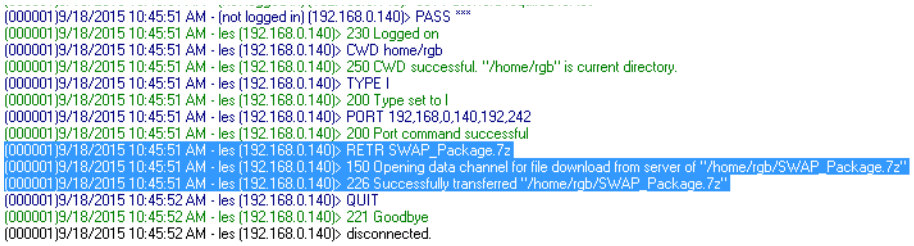
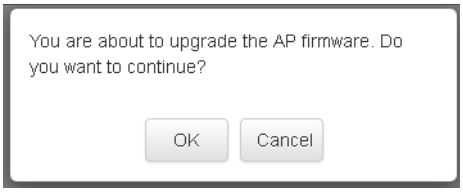


Figure 3-17 Typical FTP Server Log

If the firmware does not download successfully, confirm that you entered the firmware download details correctly, then try again.

UPGRADE FIRMWARE (MODELS 500AP-4K AND 550AP-4K ONLY)

After you have downloaded the AP update file to the *MediaWall V* AP, you can complete the upgrade process. To do this, click **Upgrade Firmware**. Then, click **OK** to confirm that you want to perform this action, or **Cancel** to cancel the upgrade. The AP reboots and installs the new firmware.



3.10 Timing

Use the controls on the **Timing** tab (**Figure 3-18** and **Figure 3-19**) to view detailed input status information, and preview/apply output timing settings.

3.10.1 Input Timing

To re-order the input list by input ID, source label, or other criterion, click a column heading. Click the column heading again to reverse the order.

To change a column's width, position the mouse pointer over the column heading's left or right edge. When the cursor changes to a "column resize" cursor (⇹), click and drag to resize the column.

For detailed input timing parameter descriptions, refer to the *MediaWall V 4K/UHD Display Processor Technical Reference Guide*.

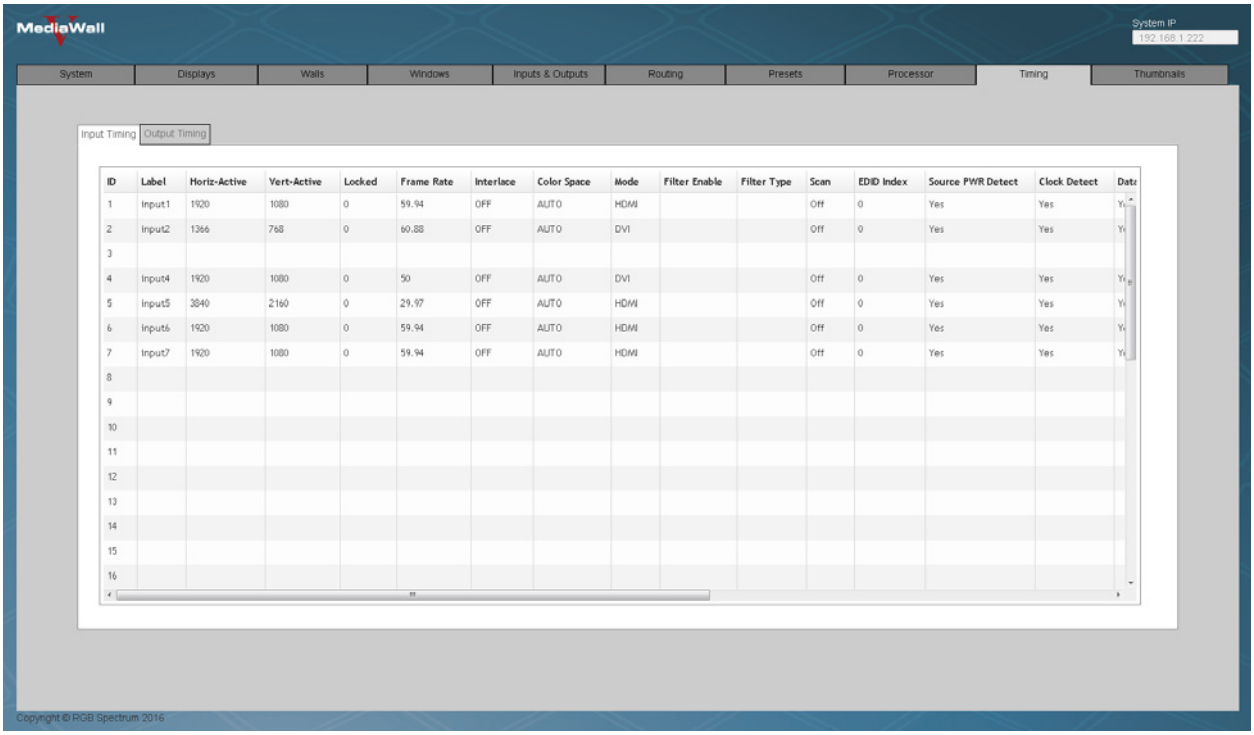


Figure 3-18 Timing > Input Timing Tab

3.10.2 Output Timing

The **Output Timing** tab (**Figure 3-19**) shows the output resolution and other timing parameters currently in effect.

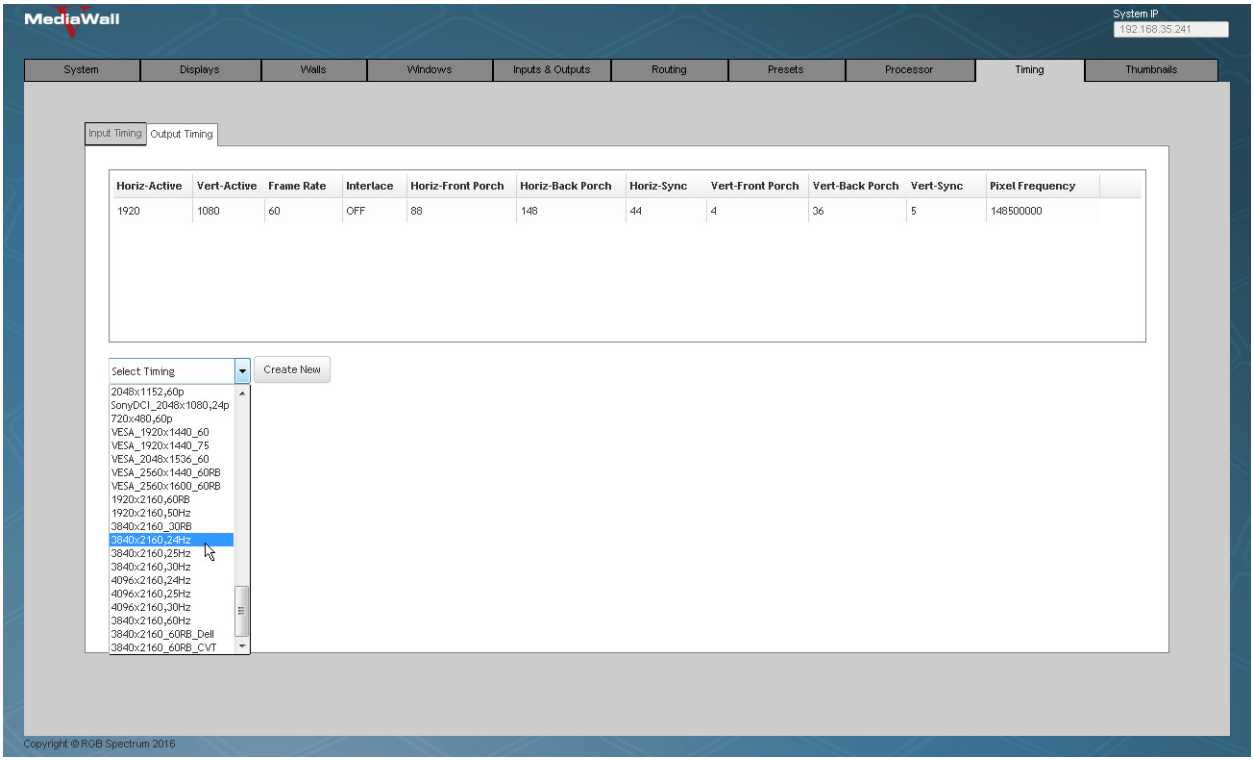
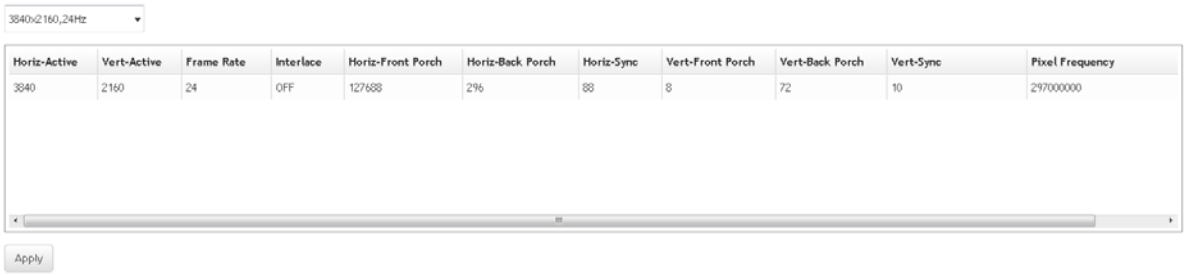


Figure 3-19 Timing > Output Timing Tab

CHANGING OUTPUT TIMING

To load a new set of output timing parameters, select one from the **Select Timing** list. The **Preview Timing** area displays the timing values that you are about to apply:



To continue, click **Apply**, then click **OK** to confirm the output timing change.

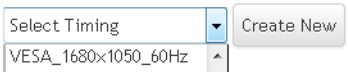
CREATING CUSTOM OUTPUT TIMINGS

If there is no entry in the **Select Timing** list that is compatible with your wall displays, you can create a new one. There are 61 available user entries, numbered 100 to 160.

Important	Only qualified engineering personnel should attempt to modify timing parameters manually.

To create, save, and load a custom output timing:

1. Find an entry in the list that is very close to the required parameters.
2. Load the entry (refer to the previous section, **Changing Output Timing**).
3. Click **Create New**.



4. If desired, click the **Name** text entry box and enter a descriptive name for this custom timing list entry. Or, use the default name, **OUTPUT_TIMING_[list entry number]**.
5. Modify the other parameters as required. For detailed output timing parameter descriptions, refer to the “Timing Parameters” section in the *MediaWall V 4K/UHD Display Processor Technical Reference Guide*.
6. Click **OK** to save the new entry to the user-defined timing list.
7. Load the entry you just created (refer to the previous section, **Changing Output Timing**).

3.11 Thumbnails

The *MediaWall V* uses **multicasting** to transmit thumbnail images that it acquires from hardware input sources to all *MultiPoint* control stations and *VIEW*™ Controller PCs. Control clients use these images to display sources on a “virtual wall.”

Note	*VIEW* Controller and *MultiPoint* do not display thumbnails of IP sources on the virtual wall.

Click the **Thumbnails** tab (**Figure 3-20**) to view or change settings related to the acquisition, processing, and multicasting of thumbnail images. When you have finished, click **Apply** to save your changes or **Cancel** to discard them.

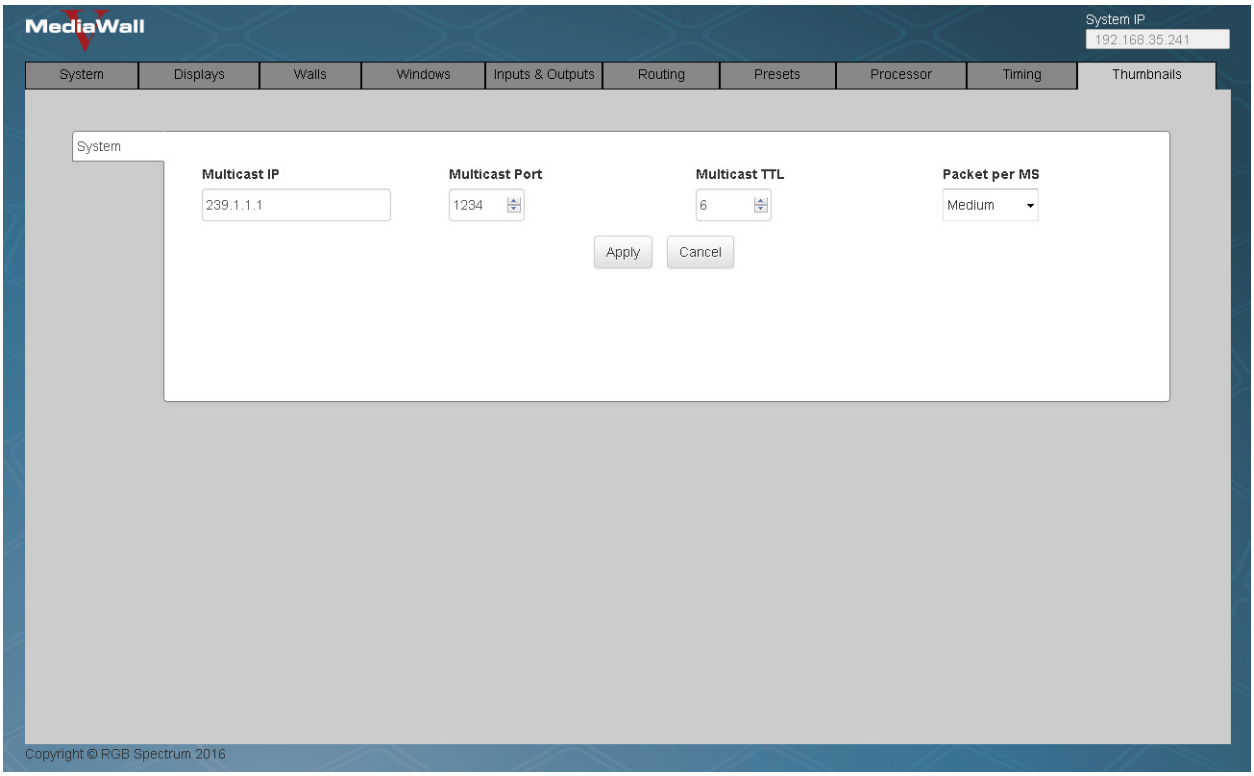


Figure 3-20 Thumbnails Tab

3.11.1 Multicast IP Address

The *MediaWall V* streams thumbnail images to this IP address. The default is **239.1.1.1**.

3.11.2 Multicast Port

The *MediaWall V* streams thumbnail images to this TCP port. The default is **1234**.

3.11.3 Multicast Time To Live (TTL)

TTL is a threshold representing the number of networks a multicast IP datagram can traverse before being dropped. The TTL prevents datagrams from being looped endlessly between two networks due to routing errors.

Valid values are from 1 to 255, inclusive. The default setting is **6**, which is appropriate for most situations.

3.11.4 Packet Per Millisecond (ms)

This control adjusts the thumbnail processing rate: **High**, **Medium**, or **Low**. The default setting is **Medium**, which is appropriate for most situations.

APPENDIX A FIRMWARE UPDATES

From time to time, RGB Spectrum updates product firmware to add new features or improve product performance. This Appendix describes how to update your *MediaWall V 4K/UHD Display Processor* firmware.

For this task, you must use the command-line interface rather than the *MediaWall V* Web Interface. For detailed instructions on using the command-line interface, refer to the *MediaWall V 4K/UHD Display Processor Technical Reference Guide*.

A.1 Obtaining Current Version Information and Checking for Updates

To determine your current firmware version numbers, click the **System** tab on the *MediaWall V* Web Interface or select **System Information** from the main menu on the *MediaWall V* Front-Panel touch screen.

To check for firmware updates for your RGB Spectrum product, visit the **Partner Portal** section of our web site (**http://www.rgb.com/partners/**). (Registration and log-in are required.) Then, select **Product Firmware**.

A.2 Downloading and Installing Firmware

A.2.1 Downloading New Firmware

Firmware updates are posted in the **Partner Portal** section of the RGB Spectrum web site. Download the file to the PC that you will be using to communicate with the *MediaWall V 4K/UHD Display Processor*.

Note	The firmware file is in compressed form and will be uncompressed automatically by the *MediaWall V 4K/UHD Display Processor*. Do not uncompress or rename the file.

A.2.2 Using FTP

You can use Windows Explorer to transfer firmware or exported configuration files to or from the *MediaWall V 4K/UHD Display Processor* via FTP, as follows:

TRANSFERRING FILES TO THE *MediaWall V* USING FTP

1. Connect the *MediaWall V* to the PC using the Ethernet port, either directly or via a network.
2. Open Windows Explorer.
3. In the Address bar, enter the user name, password, and IP address of the *MediaWall V* as follows:

   `ftp://<user_name>:<password>@<ipaddress>`

   — OR —

   Enter `ftp://<user_name>@<ipaddress>` and enter the password when prompted.

Example	If the user name is `rgb`, the password is `spectrum`, and the IP address of the *MediaWall V* is `192.168.1.200`, enter the following: `ftp://rgb:spectrum@192.168.1.200`

4. Open another Explorer window and navigate to the folder containing the firmware or configuration file.
5. Drag-and-drop the file to the Explorer window you opened in Step 2.

TRANSFERRING FILES FROM THE *MediaWall V* USING FTP

1. Follow Steps 1 through 3 for **Transferring Files to the MediaWall V Using FTP**.
2. (Optional) Open another Explorer window and choose a destination folder for the firmware or configuration file.
3. Drag-and-drop the file from the *MediaWall V* to the destination folder you chose in Step 2, or the desktop.

A.2.3 Saving System Settings

To save current settings to a PC:

1. Open a serial port or Telnet command session.
2. On the command line, type:

   ```
   settingsexport [filename.db]
   ```

   where **[filename.db]** is the name of the settings file that will contain the *MediaWall V 4K/UHD Display Processor* settings.

   Your command session must be in administrator mode in order to specify a file name. If you do not specify a file name or your session is in user mode, it will be named **export.db**.

   Upper- and lower-case letters and numbers may be used in the file name. Do not use spaces or "/" and "\" characters (use the underscore character instead of a space).
3. Follow the steps for **Transferring Files from the MediaWall V Using FTP** to move the exported settings from the *MediaWall V* to your PC.

A.2.4 Uploading and Installing Firmware

1. Follow the steps for **Transferring Files to the MediaWall V Using FTP** to transfer the new firmware file from the PC to the *MediaWall V*.
2. If you have not already done so, enter administrator mode by typing:

   ```
   adminenter
   ```

   Then, type the administrator password when prompted. The default administrator password is **RGB** (upper-case).
3. On the command line, type:

   ```
   ufw
   ```

   If you choose to begin the update, the *MediaWall V 4K/UHD Display Processor* will proceed to load the file. You will see status information in the command window as the update process backs up current firmware, extracts new firmware and shuts down the system.

.

Important	This process may take several minutes. **DO NOT** turn the *MediaWall V* off or remove AC power until the update is complete.

4. **If you are updating from firmware version 1.3 or earlier:** On the command line, type:

   ```
   rfd
   ```

   This command restores all system settings (except for network settings) to their factory-default values and restarts the system.

5. To verify that the new firmware is loaded, refresh the *MediaWall V* Web Interface browser window, then click the **System** tab. Or, select **System Information** from the main menu on the *MediaWall V* Front-Panel touch screen.

A.2.5 Restoring Settings

If you find it necessary to restore your *MediaWall V* configuration settings following a firmware update, proceed as follows:

1. Follow the steps for **Transferring Files to the MediaWall V Using FTP** to move the exported settings back to the *MediaWall V*.
2. Open a serial port or Telnet command session.
3. Restore the saved settings from the PC using the `settingsimport` command.

APPENDIX B

CONTACT INFORMATION

B.1 Corporate Headquarters

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