VISIONARY
NETWORK AUDIO VIDEO

MV4 • IP MultiViewer   User Manual

CONTENTS

INTRODUCTION

Visionary Solutions 4K UHD over IP cinema quality, ultra-low latency [~1 frame - visually lossless] encoder and decoder bypass the constraints of traditional switch matrix distribution systems by harnessing the flexibility and scalability of converged IP networks.

With the growing demand for 4K UHD video, professional AV designers and IT directors–in an increasingly converged AV/IT environment–can use Visionary Solutions products as an alternative to conventional distribution systems.

Visionary's PackeTV® and PacketAV® products can be deployed on any industry standard IP network. They can be used on existing enterprise IP networks or on a physically separate parallel network [private network] to offload traffic, using the same network protocols, methods, and devices but without intermingling video traffic with data or voice, and with equal ease of installation.

Visionary's MV4 is a high-performance IP Multiviewer with integrated scaling and multi-windowing technology. The MV4 IP Multiviewer is a 1RU rack-mountable windowing appliance that connects to a network and accepts up to (4) AV over IP streams from PacketAV Matrix Series ultra-low latency 4K encoders. The MV4 is designed for processing these dynamically switchable input streams simultaneously in a variety of layouts. Each input can be scaled and positioned according to default presets (such as quad view, side-by-side, Full, PiP, PaP, 3+1, etc.) or in any user-defined configuration. With the MV4 users can mix and match input resolutions, scale any video input up to 4K UHD and route any input to any window, combining up to four sources together into a single 4K image. The combined output video is then encoded into a single stream sent to one or more PacketAV Matrix Series Decoders at resolutions up to 4K. Multiple MV4's can be cascaded to provide 7×1, 10×1, 13×1, 16x1 or higher capability.

The MV4 IP Multiviewer enables users to select audio from any of the four sources for playback — even one not currently displayed. Seamless switching ensures no frame loss during window and video transitions. Both 1080p60 (HD) and 4K (UHD) inputs can be displayed without downscaling, taking full advantage of the MV4 IP Multiviewer's remarkable image processing. MV4 presents a paradigm shift in traditional multiwindowing technology that has until now required a separate HDMI multiviewer at each display. This flexible and scalable method of IP distributed multi-windowing allows the MV4 to be centrally located mounted in an MDF rack or anywhere else on the network, expanding capabilities while reducing installation and maintenance costs.

The MV4 IP Multiviewer is controllable via the front panel buttons along with an intuitive on-screen (OSD) Graphical User Interface, simplifying system configuration. Third-party control is supported via API. Visionary's MV4 IP Multiviewer is an ideal solution for small and large commercial venues that require monitoring or displaying of multiple sources simultaneously. From the conference room to the control room, to the classroom, the versatile MV4 represents the next evolution in IP Multiviewer technology.

An encoder is connected to an [HDMI] AV source signal [a camera, STB, media player, PC or server, BluRay player, or digital signage player, etc.]. The signal is converted into a packetized network stream that is compatible with off-the-shelf IGMP enabled Gigabit Ethernet (GbE) switches (Jumbo Frames enabled). Using an existing CAT 5∕6 infrastructure, users can connect CAT 5∕6 to any MV4 IP Multiviewer anywhere on the same GbE network. The MV4 decoders take the IP packets received over CAT 5∕6 cables, same as other Visionary Packet AV decoders, and sends them to the MV4 encoder to be converted into a packetized network stream that is received by a Packet AV decoder.   The decoder then converts them back into an HDMI signal connecting directly to a display, delivering visually lossless video. A signal from any encoder can be sent to any decoder on the same network. The signals can easily be controlled with our Vision Lite software to create different outputs on the display side, including video wall or matrix switching.

NETWORK AV INFRASTRUCTURE PREREQUISITES

This section is intended to provide a basic understanding of applicable networking technologies and the infrastructure requirements needed for a successful Visionary Solutions Encoder/Decoder/MV4 system installation, and to ensure a rapid deployment and seamless integration. Many network issues can be minimized or solved before they occur with appropriate knowledge and proper planning.

The MV4 will work with most non-blocking, IGMP with IGMP Snooping, 8K or better Jumbo Packet 1GbE network switches. At least one layer-3 switch with IGMP-query capability is required. For PIM (multicast routing) of MV4 video streams, the network switches would need to be capable of PIM (Sparse, Dense, or Sparse-Dense).

Do not connect any encoders or decoders to a switch until the switch is configured for multicasting and IGMP Snooping is enabled. Check with your switch manufacturer for the default configuration settings.

NETWORK PROTOCOLS

All data on a network is encapsulated in packets, according to the TCP/IP protocols. Data packets are routed through the network to their destination(s) by switches using information in the header of IP packets. Transmission can be unicast or multicast. Unicast transmissions are point-to-point, from a single source to a single destination. Multicast transmissions originate from a single device and are received by a group of devices on the network, according to the Internet Group Management Protocol (IGMP). Multicast transmission is ideal for bandwidth-intensive application such as media distribution as it allows for efficient use of network bandwidth. Only a single copy of the data is distributed to multiple destinations. On the other hand, unicast distribution of media to multiple destinations is an extremely inefficient use of network bandwidth because duplicate copies of the data are sent, point-to- point, from the source to each destination. Encoder/Decoder/MV4 devices make use of the multicast protocol. More information concerning IGMP may be found here at:

http://docwiki.cisco.com/wiki/Internet_Protocol_Multicast#Internet_Group_Management_Protocol

There are two ways to implement multicast routing when using our equipment:

- **IGMP** (Internet Group Management Protocol): Allows video streams (groups) to be dynamically routed only to those ports requesting the video stream. The IGMP feature prevents the multicast video traffic from flooding the network and can significantly reduce traffic in a layer-3 network. This is the recommended setting for our equipment.
- **PIM** (Protocol Independent Multicast): Functions independently of IP routing protocol. PIM Dense Mode (PIM-DM) is less preferred for this application because it floods the network using unicast routing protocols to build routing tables. For more information, visit: http://docwiki.cisco.com/wiki/Internet_Protocol_Multicast#Protocol-Independent_Multicast.

NETWORK REQUIREMENTS

For help determining the network requirements for your Visionary Solutions installation, please contact support@visionary-av.com.

SWITCH SPEED

The E4100 encoder will produce up to 800Mb/s of data. Therefore, 10 encoders will require 10 x 800MB/s = 8Gbps. Encoder/Decoder/MV4 requires the switch to be GbE. Encoder/Decoder/MV4 technology is used to transmit visually lossless 8~10:1 compressed video up to 4K along with other AV signals such as audio, USB, and control signals. For video alone, this means raw bandwidth of up to 800Mbps for 4K.

CHOOSING AN ETHERNET SWITCH

Switches must support these functions:

- Gigabit Ethernet
- Jumbo Frames (enabled)
- IGMP Snooping
- IGMP Querier
- IGMP Snooping Fast Leave

If the switches are used for multi-switch networking, they must also support PIM Routing (Sparse, Dense, or Sparse-Dense). These features may be helpful as well:

- Dynamic multicast router port

- Forwarding unknown multicast to multicast router ports only

Any network switch should have a backplane capacity of at least (2 x 1000-Mbps x N) where N is the number of ports on the switch passing the video traffic. For example, a 24-port switch where all available ports may be used to pass video traffic should have a (2 x 1000 x 24) = 48Gbps backplane. One channel of encoder video can be sent or received from each port in this switch example although full bandwidth may not be used at any one time.

The maximum distance between devices is 100m (328ft) over CAT 5e (or better) cable. This distance can be extended in increments of 100m (328ft) by using a gigabit switch as a repeater between devices. Copper to fiber adapters can extend the maximum distance between devices up to 10km through the use of fiber.

Since different brands and models of switches perform differently when handling multicast IP packets, functional verification and pressure testing are also recommended in any installation. Switches that perform well in smaller installations may not work well in larger installations. Recommended configuration settings may vary based on your switch.

Visionary Solutions offers sample switch configuration files, optimized for Network AV, for certain switch brands/models for testing purposes. Contact support@visionary-av.com to obtain the files.

SWITCH GUIDELINES

1. **Enable IGMP querying and snooping (set IGMP Version to IGMP V2 if the switch is capable)**. To enable the transmission of a source to multiple destinations, MV4 devices make use of multicast. The default behavior of a layer-2 switch is to broadcast those packets, which means that every packet will be transmitted to all possible destinations. IGMP snooping checks IGMP packets passing through the network, picks out the group registration, and configures multicasting accordingly. A layer-2 switch supporting IGMP Snooping can passively snoop on IGMP Query, Report, and Leave (IGMP version 2) packets transferred between IP multicast routers/switches and IP multicast hosts to determine the IP multicast group membership. This is why any network switch used with MV4 must support IGMP Snooping. Our end points use IGMP protocol to assign the end points into multicast groups and the router uses IGMP snooping to efficiently route multicast packets only to the receivers that want to receive them.

   IGMP Snooping is used to identify multicast IP packets, assign IP packets into multicast groups so that the router only sends to devices that want to receive the packets, establish membership in a multicast group, and register a router to receive designated multicast traffic. Multicast filtering is achieved by dynamic group control management. Many switches have the IGMP Snooping feature disabled by default and manual configuration is required. Often, checking the **Enable IGMP Snooping** option is the only setting needed to enable IGMP Snooping. Implementing IGMP Snooping is vendor specific and additional configuration is often needed.

   IGMP Snooping Querier is used to send out group membership queries on a timed interval, retrieve IGMP membership reports from active members, and update the group membership tables. The Leave Group packet is sent when a device wants to leave a group.

   Because multicasting video traffic can flood a network and significantly reduce the flow of traffic, it is important to ensure that your network infrastructure and backbone switches support IGMP Snooping so that your core network is able to ignore the traffic streams multicasting can generate. By default, all multicast traffic should be blocked until requested by a multicast group member. Without IGMP Querying/Snooping, multicast traffic is treated in the same manner as a broadcast transmission, which forwards packets to all ports on the network. With IGMP Querying/Snooping, multicast traffic is only forwarded to ports that are members of that multicast group. IGMP Snooping generates no additional network traffic, which significantly reduces the multicast traffic passing through your switch.

   Note: Some switches require that the routing table be pre-loaded so that the switch does not have to interrogate each IP packet to determine its destination. Static routing can be used to route multicast traffic. Protocols similar to Generic Routing Encapsulation (GRE) can be used to encapsulate multicast packets in unicast wrappers for point-to-point transmission between switches, and when the packets arrive at the destination IP address, the unicast wrapper is removed.

2. **Enable Fast Leave**. The switch may also support IGMP Snooping Fast Leave, which shortens the time takes for a device to leave a group and be made available to join to a different group. A switch can be informed that a device wants to leave a multicast channel by sending it a IGMP Leave Group packet. Once received, the time it takes for the switch to apply the new configuration may vary from one switch to another. Most switches have a Fast Leave configuration option. When enabled, Fast Leave speeds up the time needed for a port assigned to one multicast group to leave the group and join a different multicast group. This significantly reduces the video switching time. Always enable the Fast Leave option when it is available.

3. **Allow multicast traffic on all network ports through which video streams pass**.

4. **Ensure current Access Control Lists (ACLs) are not filtering multicast or control traffic**.

5. **Remove Flow Control and/or Storm Control on any network port passing the video stream**.

6. **Enable VLANs to separate video traffic from data and voice**.

7. **Enable Jumbo Frames**.

8. **Disable Green Ethernet (or efficiency mode)**. Some switches have the ability to lower the power consumption on the ports as

a

"Green" feature. This can cause issues with bandwidth intensive devices (like our encoders and decoders).

IMPLEMENTATION CONSIDERATIONS

MV4 devices can be installed on a physically separate network or converged onto an existing GbE network. When implementing, it is important to decide at the earliest stages of planning if the system will be integrated into the rest of the network or if it will reside on a dedicated AV network. Each has its own advantages and disadvantages, but wherever possible we recommend the use of a dedicated AV switch. Using the existing network is of course possible–but it adds extra complexity to the installation and often removes control of the networking equipment from the site's AV staff or installer.

The first thing to consider is how much control the install and site teams have over the network configuration. Do they have access and clearance to change the managed switch configurations on the fly? Is the network administrator willing to make the necessary changes to support multicast and IGMP traffic on their network? Will they allow the creation of a VLAN or change their existing VLAN configuration to support the required configuration? If the answer to these questions is no, then it is highly recommended that the system be installed on a separate dedicated network switch. If this is not an option, then a conversation needs to take place with the network admin staff to ensure they are aware of the requirements.

SINGLE SWITCH NETWORKING

Single switch networking can be used when there are no more than 100m (328ft) from the central distribution point. Any network switch should have a backplane capacity of at least (2 x 1000-Mbps x N) where N is the number of ports on the switch passing the video traffic. For example, a 24-port switch where all available ports may be used to pass video traffic should have a (2 x 1000 x 24) = 48Gbps backplane.

MULTIPLE SWITCH NETWORKING

The maximum distance between devices is 100m (328ft) over CAT 5e (or better) cable. This distance can be extended in increments of 100m (328ft) by using a gigabit switch as a repeater between devices. Copper to fiber adapters can extend the maximum distance between devices up to 10km through the use of fiber.

When using multiple switches, we recommend at least 10Gbps bi-directional connections between switches.

- (Link Bandwidth)/(800Mbps) = Number of simultaneous streams across link for 4K and (Link Bandwidth)/(200Mbps) = Number of simultaneous streams across link for 1080p.
- The maximum number of streams possible between switches = link bandwidth (10Gbps) / 800Mbps (for 4K) x number of encoders (or 200Mbps for 1080p).
- For 4K streaming, the total number of streams (800xn) must be ≤ 10,000.
- For 1080p streaming, the total number of streams (200xn) must be ≤ 10,000.

$$\frac{\text{Link Bandwidth}}{\text{10,000 Mbps (recommended)}} = \text{Total \# of Streams}$$

800 Mbps for 4K
or
200 Mbps for 1080p

NETWORK DISCOVERY

Discover your MV4 IP Multiviewer on the network. By default, the encoders and decoders are shipped from the factory in DHCP mode with Auto IP Failover. In DHCP mode, each encoder and decoder unit are automatically assigned a unique IP address by the DHCP server. If there is no DHCP server on the network, the encoders and decoders (after about one minute) will "failover" to Auto IP mode where each encoder and decoder unit assigns itself a unique IP address within the range of 169.254.1.0–169.254.254.255, with a 255.255.0.0 subnet mask and a gateway address of 169.254.0.254.

To configure the units, you must access the web interface of each encoder and decoder using a computer.

In order to communicate with the MV4 IP Multiviewer endpoints, the devices must be on the same subnet as your computer. You may need to change the computer's network settings to accomplish this.

On a Microsoft Windows computer, configure your network settings as follows:

1. Click **Start** menu, go to **Control Panel > Network and Sharing center > Change Adapter Settings > Local Area Connection**. Right-click and choose **Properties**.

2. Highlight **Internet Protocol Version 4 (TCP/IPv4)** then click **Properties**. This opens the window you use to configure your network settings.
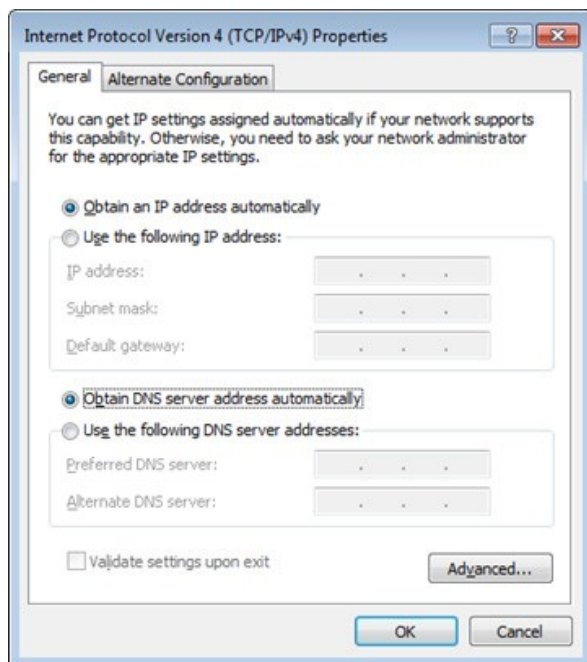
To set up your computer to communicate with endpoints that are using **DHCP:**

- **Method 1**: If there is a DHCP server on the network, accept **Obtain an IP address automatically** (the default)**.** The computer will be automatically assigned a unique IP address by the DHCP server on the same subnet, allowing communication with the MV4 encoder/decoders.

- **Method 2**: Configure your computer with a static IP address within the defined DHCP range for your network (the subnet (VLAN) defined by the DHCP netmask for your network). Choose **Use the following IP address**. Enter an IP address then click **OK**. To avoid address conflicts, enter a static address that is not in the range of addresses that will be given out by the DHCP server. For example: If the DHCP range = 192.168.1.100 –192.168.1.150 and netmask = 255.255.255.0, you can assign 192.168.1.151.

To set up your computer to communicate with endpoints that are using **Auto IP:**

- **Method 1**: If there is <u>no DHCP server on the network</u>, a Windows PC will "failover" to Auto IP in a similar way as the encoders and decoders. Accept **Obtain an IP address automatically** (the default)**.** After about one minute the computer will assign itself a unique IP address within the range of 169.254.1.0–169.254.254.255, with a 255.255.0.0 subnet mask, allowing communication with the encoders and decoders on the network that are also assigned IP addresses via Auto IP.

- **Method 2**: If the computer already has a statically-assigned IP address:

  1. Click **Advanced** > **Add**.
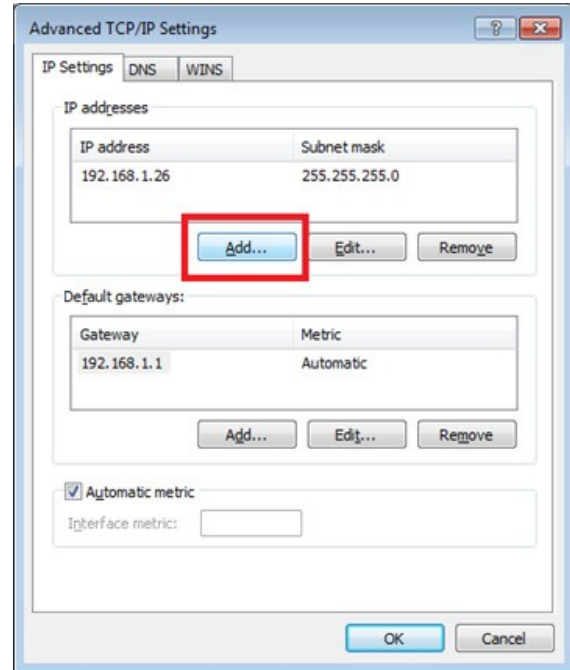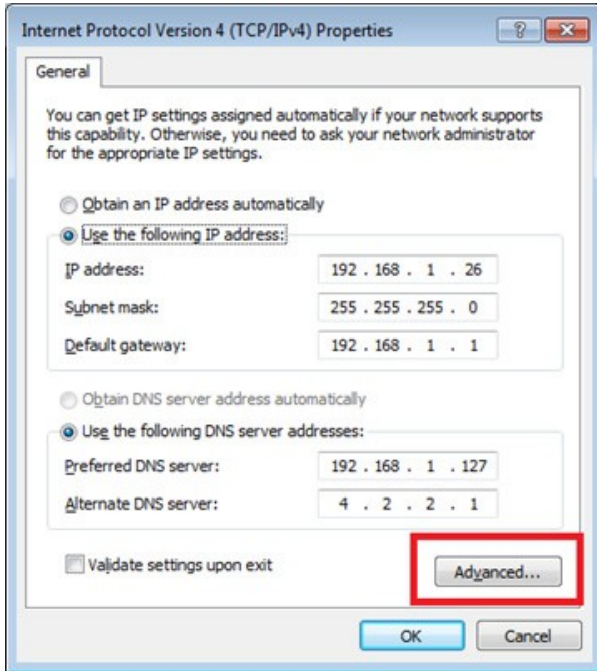
  2. Click **Add** to enter a unique IP address within the range of 169.254.1.0–169.254.254.255, with a subnet of 255.255.0.0.
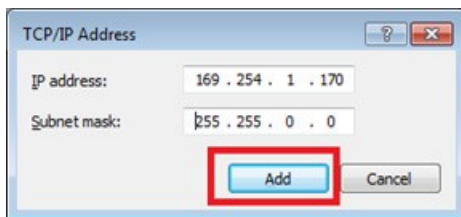
- **Method 3**: Configure the computer with a unique static IP address within the range of 169.254.1.0 –169.254.254.255, with a subnet of 255.255.0.0. If your address is not unique conflicts will occur.

There are multiple ways to discover (find the assigned IP address) the encoders and decoders on your network.

  1. Use the Vision Lite application to auto-discover units. **RECOMMENDED** – refer to section *Vision Lite*.

  2. Look at the DHCP server list of assigned IP addresses.

  3. Use **avahi-browse** (requires avahi-daemon to be running) to find the unit IP addresses.

  4. Using a Linux operating system (OS) on the network, ping 226.0.0.19 from the same subnet (VLAN) as the unit to return a list of assigned IP addresses. On a Windows OS, the ping command only displays the first responding address.

  5. Use **nmap** to scan for Visionary Solutions MAC Addresses.

  6. For decoders only: Connect to the network via HDMI to a display. The IP address displays on the bottom right of the **Boot up screen image** on the display device when there is no source connected.

Once discovered, you can use the embedded web interface on each encoder and decoder unit to configure and change the network settings. To log in to the web interface, enter the unit's IP address in a web browser for the URL OR click the IP address in the Vision Lite application **Configuration** page. Log in with **username**=admin **password**=admin.

CONFIGURATION

CONFIGURING MV4 ENCODER AND DECODER IP ADDRESSES

As previously mentioned, by default, the encoders and decoders are shipped from the factory in DHCP mode with Auto IP Failover. For a permanent installation, and to ensure system consistency, it is recommended to configure all of the encoders and decoders with static IP addresses.

Important: IP configuration changes must be done correctly to avoid any communication disruptions with the units. Communication with the Vision Lite Server and the computer that the application resides on is dependent upon the computer being in the same IP address range as the encoders and decoders on the network. Therefore, before making any IP address changes to the units, we recommend having two statically-assigned IP addresses on the computer.

When using DHCP, configure the first static IP address to an address within the defined DHCP range for your network (the subnet (VLAN) defined by the DHCP netmask for your network). Be sure that the static address you assign is not in the range of addresses that will be given out by the DHCP server to avoid address conflicts. For example: If the DHCP range = 192.168.1.100 – 192.168.1.150 and netmask = 255.255.255.0, you can assign 192.168.1.151.

When using Auto IP, assign an address within the range of 169.254.1.0 – 169.254.254.255, with a 255.255.0.0 subnet mask.

AND

Configure a second static IP address in the range of the IP addresses you are planning to assign to the units. Assign new IP addresses to the encoder and decoder units as follows:

1. Access the web interface for the encoder or decoder unit.

2. Log in with **username=**admin **password**=admin.

3. Click the **Network** tab.

4. Set **IP.MODE** to **Static**.

5. Set the **IP.ADDRESS**. Example: 192.168.1.45

6. Set the **IP.NETMASK**. Example: 255.255.255.0

7. Set the **IP.GATEWAY**. Example: 192.168.1.1

8. Set the **IP.DNS_SERVER** (optional). Example: 4.2.2.1

9. Click **Save** to save the new settings. The unit will automatically reboot. The unit is now configured with the new network settings.

> Once the initial configuration is complete, you will be primarily using the Vision Lite matrix routing control software (or other third-party control systems) to route the encoder and decoder streams to each other. When using these systems, the **STREAM.HOST** setting, described in the following sections, is automatically updated each time a routing/switch occurs.
>
> In the absence of a control system, it is still possible to manually configure the stream settings. The instructions are included below.

CONFIGURING STREAM SETTINGS (MANUALLY)

UNICAST MODE

The term unicast is used to describe a configuration where information is sent from one point to another point. A unicast transmission sends IP packets to a single recipient on a network. It is possible to have multiple encoder and decoder units connected in a system. However, in unicast mode, an encoder unit can communicate with only one decoder unit at a time.

1. Access the web interface for the encoder and decoder units that will be using unicast mode.

2. Log in with **username**=admin **password=**admin

3. Click the **Configuration** tab.

4. Set **STREAM.MODE** to **Unicast**.

5. On the encoder:

    a. Click **Save** on to save the new settings. The unit will automatically reboot.

6. On the decoder:

    a. Set **STREAM.HOST** to the IP address of the encoder that the decoder is tuned in to.

    b. Click **Save** on to save the new settings. The unit will automatically reboot. The units are now connected in unicast mode.

MULTICAST MODE

The term multicast is used to describe a configuration where information is sent from one or more points to a set of other points. For example, a single encoder unit can transmit data to multiple decoder units. In addition, if multiple encoder units are used, each encoder unit can transmit data to any decoder that is not already receiving data from another encoder unit.

Note: Visionary's MV4E encoder defaults to a multicast stream based on their serial numbers. We recommend that you leave this as the stream address unless the range (225.168.0.0– 225.169.255.255) conflicts with other multicast streams on your network. If you need to change the multicast stream address, please contact support@visionary-av.com for assistance.

1. Access the web interface for the encoder or decoder unit that will be using multicast mode.

2. Log in with **username**=admin **password=**admin.

3. Click the **Configuration** tab.

4. Set **STREAM.MODE** to **Multicast**.

5. On the encoder:

    a. Click **Save** to save the new settings. The unit will automatically reboot.

6. On the decoder:

    a. Set **STREAM.HOST** to the IP address of the encoder that the decoder is tuned in to.

    b. Click **Save** to save the new settings. The unit will automatically reboot.

    7. Repeat steps 1–4 and step 6 for each decoder you want to tune into the encoder's multicast stream. The units are now connected in multicast mode.

VIDEO FORMAT SETTING (DECODER ONLY)

By default, the **VIDEO.FORMAT** field on the MV4D decoder is set to **Source**. This means that the same source resolution being encoded by the currently "tuned" MV4D is passed through to the output. This is for cases where you are certain that the display connected to the MV4D can handle any of the source resolutions that it may be tuned to. If the connected display cannot show an encoded resolution, set this field to a value that the display can decode. For example, if you are tuning a 4K encoded stream and are using an HD display, set this value to 1080P60. The decoder will scale the tuned stream to 1080P60 and allow the display to show the stream.

CUSTOM SPLASH SCREEN (DECODER ONLY)

A custom splash screen may be uploaded to the decoder for use when there is no audio source, or a source time out occurs. The file must be a JPEG (`*.jpg`) and be less than 500KB (524287 bytes) in size. Resolution should be 1920x1080. Other resolutions will result in lower quality or aspect ratio mismatch.

ADVANCED CONFIGURATION

VIDEO SOURCE TIMEOUT (DECODER ONLY)

VIDEO.SOURCE_TIMEOUT – When there is no source available, time out TRUE will cause the decoder to switch to the splash screen after approximately 10 seconds.

VIDEO POWER SAVE (DECODER ONLY)

VIDEO.POWER_SAVE – After the time out, turn off the HDMI output.

HDCP FORCE ON

Encoder: Force the encoder to accept only HDCP sources.

Decoder: Force the decoder to HDCP encrypt the output.

HDCP Force On determines whether a unit forces HDCP for all sources or sinks (TRUE) or allows non-encrypted to go through natively (FALSE). When FALSE switching can be slow if you need to renegotiate the HDMI link.

GENLOCK (DECODER ONLY)

When set to FALSE allows the decoder output to free run and not be genlocked to the source encoder. Useful for some projectors that cannot accommodate wide clock range. Should be set to TRUE for video wall setups.

VIDEO OUTPUT SETTING (DECODER ONLY)

Sets the HDMI output operation of a decoder to NORMAL, OFF, LOGO or STANDBY.   NORMAL is normal operation transmitting video out the HDMI output.   OFF disables the HDMI output.   LOGO displays the splash screen out the HDMI output.   STANDBY displays a black screen out the HDMI output.   Each time a decoder gets tuned to an encoder the VIDEO.OUTPUT is automatically set to NORMAL.

OSD TEXT DISPLAY (DECODER ONLY)

The OSD (On Screed Display) is used to put user text onto the screen as an overlay.   Once text is entered, the text will appear in the upper left corner of the display.   The default text color is blue.   To obtain a key to unlock advanced OSD features (font, font size, position, and color) contact sales@visionary-av.com.

MV4 CONFIGURATION

SUPPORTED RESOLUITION

- Max Input/Output: 4K30 4:4:4 HDR 8 bit (3840x2160 30Hz) / 1080P60 4:4:4 HDR 12 bit (1920x1080 60Hz)
- 4K30 4:4:4 HDR 8 bit (3840x2160 30Hz) output supports up to 2-windows except in Quad Mode
- Independent Video In to Video Out resolution.

*Note: rotation only supports the same input/output resolutions.*

DISPLAY MODES

MV4 IP Multiviewer supports Quad (2x2), Picture In Picture (PIP), Picture Aside Picture (PAP), Full Screen, and Custom Multiview layout configurations

QUAD MODE

In Quad Mode, the screen is split into four fields of equal size each displaying the entire contents of four different video sources.

- Supports 1080P & 4K30 output
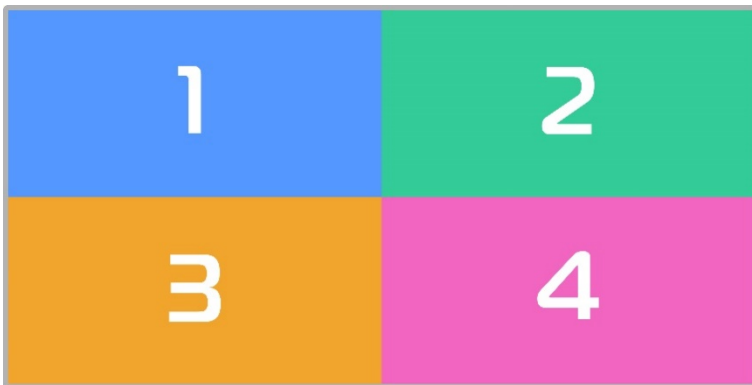
PICTURE IN PICTURE (PIP) MODE

In PIP Mode, the full screen display of one of the four video sources is accompanied by one, two, or three small images of the three other video sources on the right-hand margin of the screen allowing simultaneous monitoring.

- Supports 1080P output (max. 4 windows)
- Supports 4K30 output (max. 2 windows)
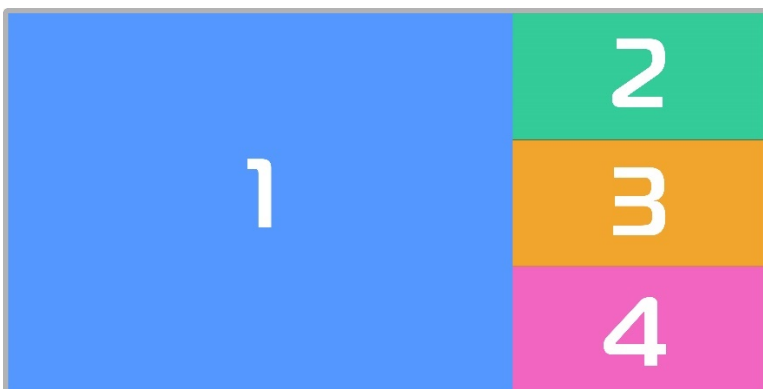
PICTURE ASIDE PICTURE (PAP/POP) MODE

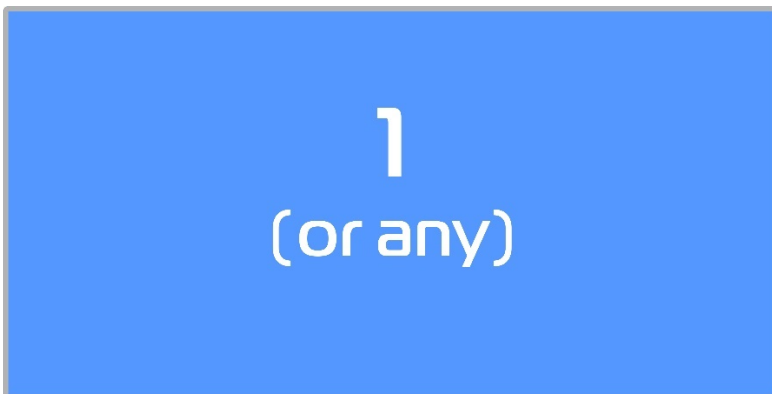In PAP Mode, the screen is split in two fields of equal size displaying dual window side-by-side (portrait).

- Supports 1080P & 4K30 output
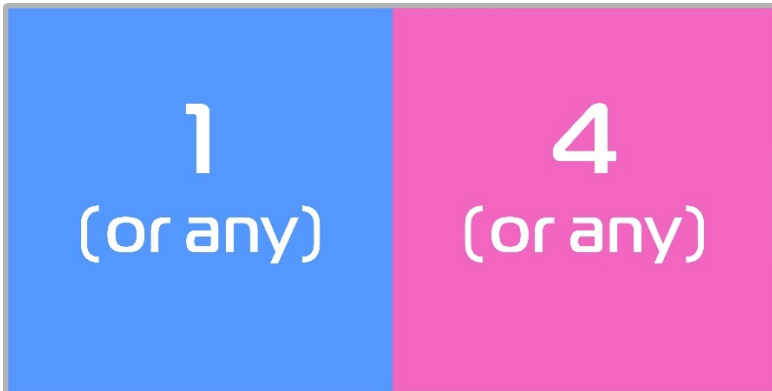
FULL SCREEN MODE

In Full Screen Mode, one of the four video sources is displayed in full screen size and maximum resolution.

- Supports 1080P & 4K30 output

CUSTOM MODE

In Custom Mode each video source is displayed in its own separate, detached window.   The size, position and selection of the windows are customizable.   Including the ability to rotate each image 90 degrees to the left or right for a vertical mounted display.   Custom mode allows for the layering of windows and adjustment of the transparency of each video source.   2- and 3- source viewing is possible with this mode.   Custom mode can maintain input aspect ratio if desired, no stretching necessary.

- Supports 1080P output (max. 4 windows)

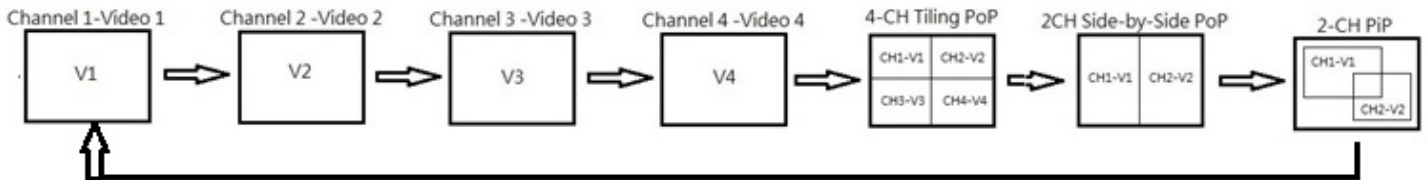- Supports 4K30 output (max. 2 windows)
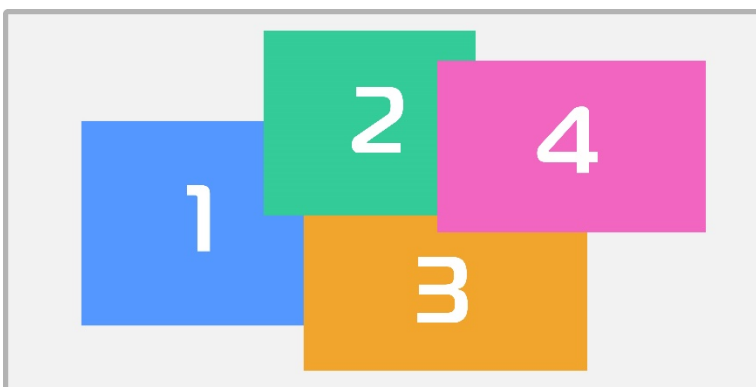
FRONT PANEL CONTROL

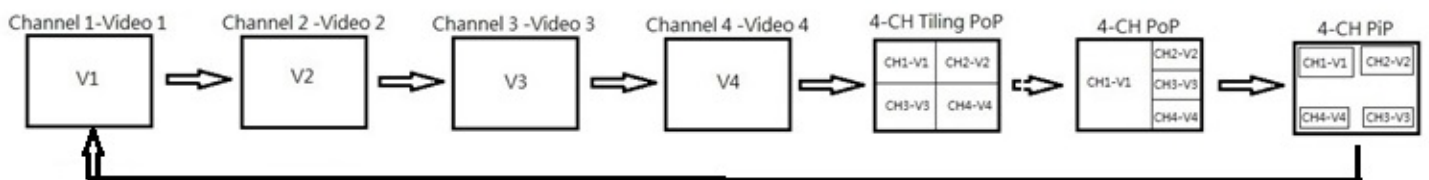*Note: Press and hold the UP/DOWN buttons can increase/decrease the value continuously.*

MODE

Press MODE button to cycle the following MV4 multiviewer modes.

4K30 Output
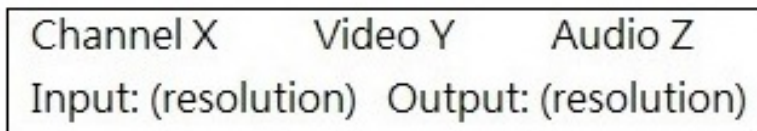

1080P Output

RES

Used to switch the output resolution between 1080P and 4K30

INFO

Used to display the OSD information as the below format.

AUDIO

Used to change the audio source from DECODER 1 through 4 in sequence.

ENTER

Used to display the OSD menu or to choose/enter the selected item.

BACK

Used to get back to the previous menu or to close the OSD.

UP

Used to move up the OSD selection or to increase the selected adjustable value.

DOWN

Used to move down the OSD selection or to decrease the selected adjustable value.

OSD MENUS

Note: OSD functions will automatically save the last value setting.

Press ENTER to call out:

> ___VSI Multiviewer Menu___
> - Image Quality Adjust
> - Image Channel Set Up
> - Image Convert

Use UP/DOWN front panel buttons to select a menu option, and then press ENTER button.

IMAGE QUALITY ADJUST

Image Quality Adjust is available for all the modes.

> ___Image Quality Adjust___
> - Brightness
> - Contrast
> - Saturation
> - Hue
> - Reset
> - Factory Default

1. Use UP/DOWN front panel buttons to select a menu option, and then press ENTER button.

2. Use the UP/DOWN buttons to adjust the value of the selected option.

3. Use the BACK button to return to the previous menu option.

4. Factory Default is the Channel 1-Video 1 at 1080P RES.

IMAGE CHANNEL SET UP

Image Channel Set Up for the Quad Mode: (1080P & 4K30)

1	2
3	4
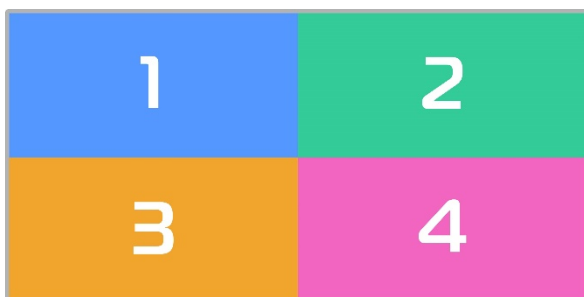
> ___Image Channel Set Up___
> - Channel 1   Input 1
> - Channel 2   Input 2
> - Channel 3   Input 3
> - Channel 4   Input 4

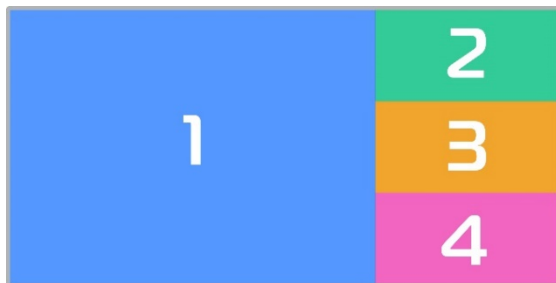1. Use the UP/DOWN front panel buttons to change its input source.

Image Channel Set Up for Picture Aside Picture (PAP) Mode: (4K30 Only)

Image Channel Set Up
- Channel L   Input 1/2/R
- Channel R   Input 3/4/L

1. Use the UP/DOWN front panel buttons to select Channel L or Channel R.

2. Use the ENTER front panel button to select the input source for selected channel.

3. Input R is copy from Channel R, Input L is copy from Channel L

Image Channel Set Up for Picture in Picture (PIP) Mode: (1080P Only)

Image Channel Set Up
- Channel 1
- Channel 2
- Channel 3
- Channel 4

1. Use the UP/DOWN front panel button to select the channel to set up and then ENTER.

Channel 1 Image Set Up
- Input Video   1/2/3/4
- Size & Position
- Output   ON/OFF

2. **Input Video**: Press ENTER to change input video source.

3. **Output**: Press ENTER to switch ON/OFF.

4. **Size & Position**: Press ENTER to choose the following OSD functions:

Ch1 Size & Position Adjust
- Step: 001/005/010/050/100
- Hor Start: 0000~1920
- Hor Width: 0000~1920
- Ver Start: 0000~1080
- Ver Height: 0000~1080
- Reset

5. **Step**: Press ENTER to set up the interval each UP/DOWN button press (step).

6. **Hor Start**: Press ENTER to adjust the image's horizontal start position by UP/DOWN button press.

7. **Hor Width**: Press ENTER to adjust the image's width by UP/DOWN button press.

8. **Ver Start**: Press ENTER to adjust the image's vertical start position by UP/DOWN button press.

9. **Ver Height**: Press ENTER to adjust the image's height by UP/DOWN button press.

10. **Reset**: Press ENTER to return all the above settings to factory default.

Image Channel Set Up for Picture in Picture (PIP) Mode: (4K30 Only)

Image Channel Set Up
- Channel 1
- Channel 2

1. Use the UP/DOWN front panel buttons to select the channel to set up and then ENTER:

Channel 1 Image Set Up
- Input Video   1/2
- Size & Position
- Output   ON/OFF

2. **Input Video**: Press ENTER to change input video source.

3. **Output**: Press ENTER to switch ON/OFF.

4. **Size & Position**: Press Enter to choose the following OSD functions:

Ch1 Size & Position Adjust
- Step: 001/005/010/050/100
- Hor Start: 0000~3840
- Hor Width: 0000~3840
- Ver Start: 0000~2160
- Ver Height: 0000~2160
- Img L Hor Start: 0000~3840
- Img R Hor Start: 0000~3840
- Img L Ver Start: 0000~2160
- Img R Ver Start: 0000~2160
- Reset

5. **Step**: Press ENTER to set up the interval each UP/DOWN button press (step).

6. **Hor Start**: Press ENTER to adjust the image's horizontal start position by UP/DOWN button press.

7. **Hor Width**: Press ENTER to adjust the image's width by UP/DOWN button press.

8. **Ver Start**: Press ENTER to adjust the image's vertical start position by UP/DOWN button press.

9. **Ver Height**: Press ENTER to adjust the image's height by UP/DOWN button press.

10. **Img L Hor Start**: use to adjust image's left Horizontal position to match the above Hor Start.

11. **Img R Hor Start**: use to adjust image's right Horizontal position to match the above Hor Start.

12. **Img L Ver Start**: use to adjust image's left Vertical position to match the above Ver Start.

13. **Img R Ver Start**: use to adjust image's right Vertical position to match the above Ver Start.

14. **Reset**: Press ENTER to return all the above settings to factory default.

Here are some tips to assist with image adjustment when in 4K30 Picture in Picture (PIP) mode:

1. Slightly adjust the Hor Start/Width to eliminate the gap between left and right half sections.

2. When the image crosses the center line, slightly adjust Img L Ver Start, Img R Ver Start and Img L Hor.

3. Move image to meet the frame if the input source is 4K30.

4. Slightly adjust Img L Ver Start and Img L Hor.

5. Move it to meet the frame if the input source is less than 4K30.

Image Channel Setup is not available for the Full Screen Mode. (1080P & 4K30)

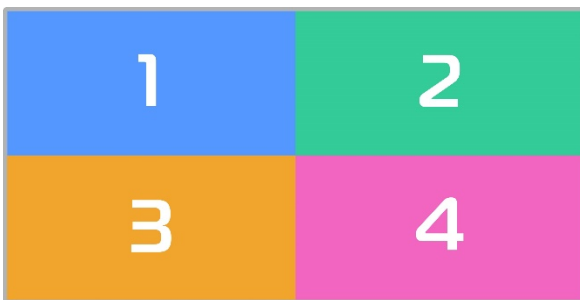## IMAGE CONVERT

Image Convert for Quad Mode: (1080P & 4K30)

1. Use the UP/DOWN front panel buttons to select the channel to adjust.

2. Use the ENTER button to set Mirror OFF/ON for selected channel.

Image Convert for Custom Mode: (1080P Only)
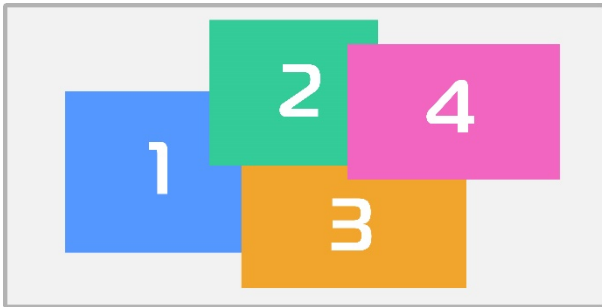

Image Convert
- Ch1 Mirror   OFF/ON
- Ch1 Alpha Blending   64~0
- Ch2 Mirror   OFF/ON
- Ch2 Alpha Blending   64~0
- Ch3 Mirror   OFF /ON
- Ch3 Alpha Blending   64~0
- Ch4 Mirror   OFF/ON
- Ch4 Alpha Blending   64~0

1. Use the UP/DOWN front panel buttons to select the channel and option to adjust.

2. Use the ENTER button to set Mirror OFF/ON for selected channel.

3. Use the ENTER button to select alpha blending (image transparency), then adjust using UP/DOWN buttons. The overlay sequence is Ch1/2/3/4(top).

Image Convert for Custom Mode: (4K30 Only)

Image Convert
- Ch1 Mirror   OFF/ON
- Ch1 Alpha Blending   64~0
- Ch2 Mirror   OFF/ON
- Ch2 Alpha Blending   64~0

1. Use the UP/DOWN front panel buttons to select the channel and option to adjust.

2. Use the ENTER button to set Mirror OFF/ON for selected channel.

3. Use the ENTER button to select alpha blending (image transparency), then adjust using UP/DOWN buttons.

Image Convert for Picture Aside Picture (PAP/POP): (4K30 Only)
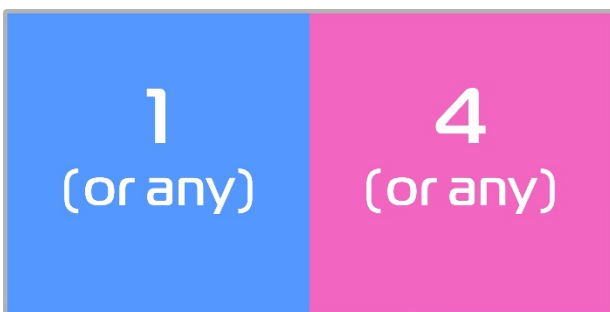

Image Convert
- Channel L Mirror   OFF/ON
- Channel R Mirror OFF/ON

1. Use the UP/DOWN front panel buttons to select the channel to adjust.

2. Use the ENTER button to set Mirror OFF/ON for selected channel.

Image Convert for Full Screen Mode: (1080p & 4K30)

1. Use the UP/DOWN front panel buttons to select the option to adjust.
2. **Mirror**: Press ENTER to switch between OFF/ON.
3. **Rotation**: Press ENTER to switch between OFF/R90/180/L90

    Note: Rotation is only available for single-viewing mode and when the input/output resolutions are the same.

4. **Reset**: Press ENTER to return all the above settings to factory default.

FRONT & REAR HARDWARE IMAGES

FRONT

REAR
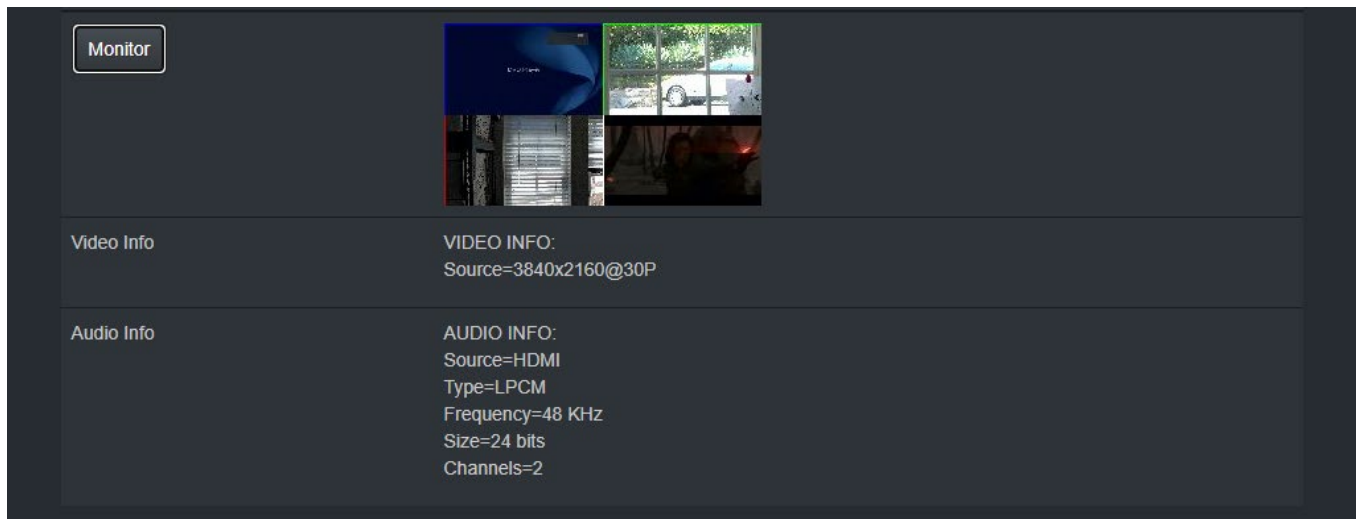
ENCODER OPTIONS

MV4 ENCODER DEVICE TAB

UNIT.ID – By default, the UNIT.ID of the encoder is the Model Number and the serial number (e.g., MV4E-000101, serial number: 186-007-000101). The UNIT.ID can be changed by the user on the **Network** tab.

UNIT.MODEL – MV4E (encoder).

UNIT.SERIAL – The serial number of the unit. The serial number can also be found on the bottom label of each unit.

UNIT.FIRMWARE – The current firmware version of the unit.
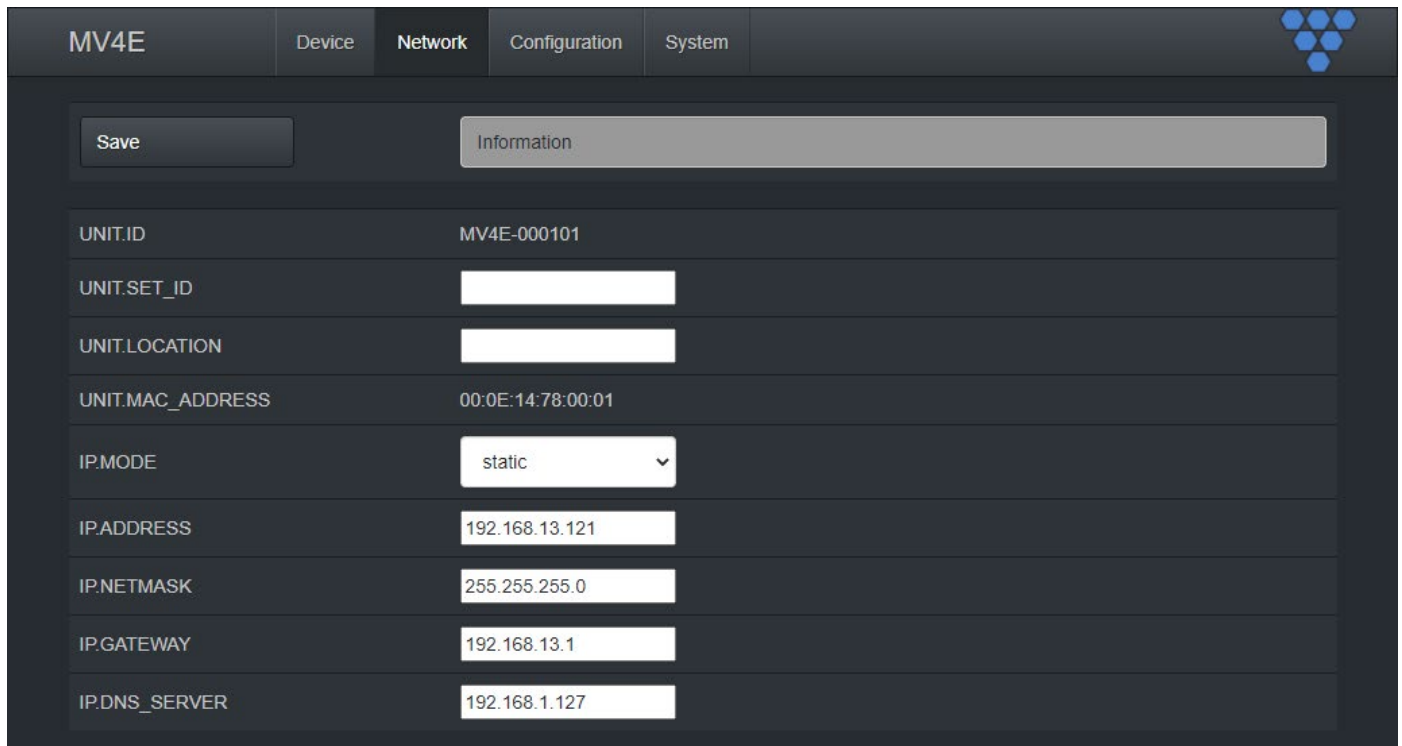
UNIT.FIRMWARE_DATE – The date the firmware was released.

MONITOR BUTTON – Displays the live thumbnail preview of the video being transmitted to the AV stream.

VIDEO INFO – Displays the current source resolution being transmitted to the AV steam.

AUDIO INFO - Displays the current source audio codec, type, frequency, size, and number of channels.

MV4 ENCODER NETWORK TAB

UNIT.ID – By default, the UNIT.ID of the encoder is the MAC Address. This can be changed by the user on the **Network** tab.

UNIT.SET_ID – User defined device name. For example: Display_1 or Source_3 (letters, numbers, dashes, and underscores only).

UNIT.LOCATION – User defined device location. For example: Office_1 or Conference_Room_2 (letters, numbers, dashes, and underscores only).

UNIT.MAC_ADDRESS – The MAC address of the unit.

IP.MODE – Modes are Static or DHCP. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

IP.ADDRESS – Shows the current value based on the unit's mode. In Static mode, shows the unit's static settings. In DHCP mode, shows if the values are valid. If DHCP is failed, the mode shows as Auto IP (even though you cannot select this mode directly), and the Auto IP values display in the IP.xxxxxx fields. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

IP.NETMASK – Shows the current value based on the unit's mode. In Static mode, shows the unit's static settings. In DHCP mode, shows if the values are valid. If DHCP is failed, the mode shows as Auto IP (even though you cannot select this mode directly), and the Auto IP values display in the IP.xxxxxx fields. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

IP.GATEWAY – Shows the current value based on the unit's mode. In Static mode, shows the unit's static settings. In DHCP mode, shows if the values are valid. If DHCP is failed, the mode shows as Auto IP (even though you cannot select this mode directly), and the Auto IP values display in the IP.xxxxxx fields. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

IP.DNS_SERVER – (optional) Shows the current value based on the unit's mode. In Static mode, shows the unit's static settings. In DHCP mode, shows if the values are valid. If DHCP is failed, the mode shows as Auto IP (even though you cannot select this mode directly), and the Auto IP values display in the IP.xxxxxx fields. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

MV4 ENCODER CONFIGURATION TAB

STREAM.MODE – Unicast or multicast. See section *Configuring Stream Settings (Manually).*

STREAM.AUDIO – Select the source of audio for the AV over IP stream - DECODER_1, DECODER_2, DECODER_3, DECODER_4.

STREAM.VIDEO – Used to set encoder input source select – DECODER_1, DECODER_2, DECODER_3, DECODER_4, QUAD, POP, PIP

VIDEO.HDCP_FORCE_ON – Force the encoder to accept only HDCP sources. See section *HDCP Force On*.

MV4 ENCODER SYSTEM TAB

Reboot – This button reboots the unit.

Factory Default – This button factory defaults the unit. See section *Troubleshooting.*

Change Password – This button changes the unit's web interface login password to values entered below (default is admin).

- Password – enter new password

- Reenter Password – reenter new password

Important: Make sure you write the new password down. If it is lost or forgotten, you will need to call Visionary Solutions support to assist in a console factory default of the unit.

Select update file – Browse to a new firmware file supplied by Visionary Solutions or downloaded from visionary-av.com.

Update Unit – This button will initiate a firmware update per the specified file above.

Information – Real-time status messages displayed during a reboot, firmware update, or factory default action.

DECODER OPTIONS

MV4 DECODER DEVICE TAB

UNIT.ID – By default, the UNIT.ID of the decoder is the Model Number and the serial number (e.g., MV4D-000104, serial number: 186-007-000104). The UNIT.ID can be changed by the user on the **Network** tab.

UNIT.MODEL –MV4D (decoder).

UNIT.SERIAL – The serial number of the unit. The serial number can also be found on the bottom label of each unit.

UNIT.FIRMWARE – The current firmware version of the unit.

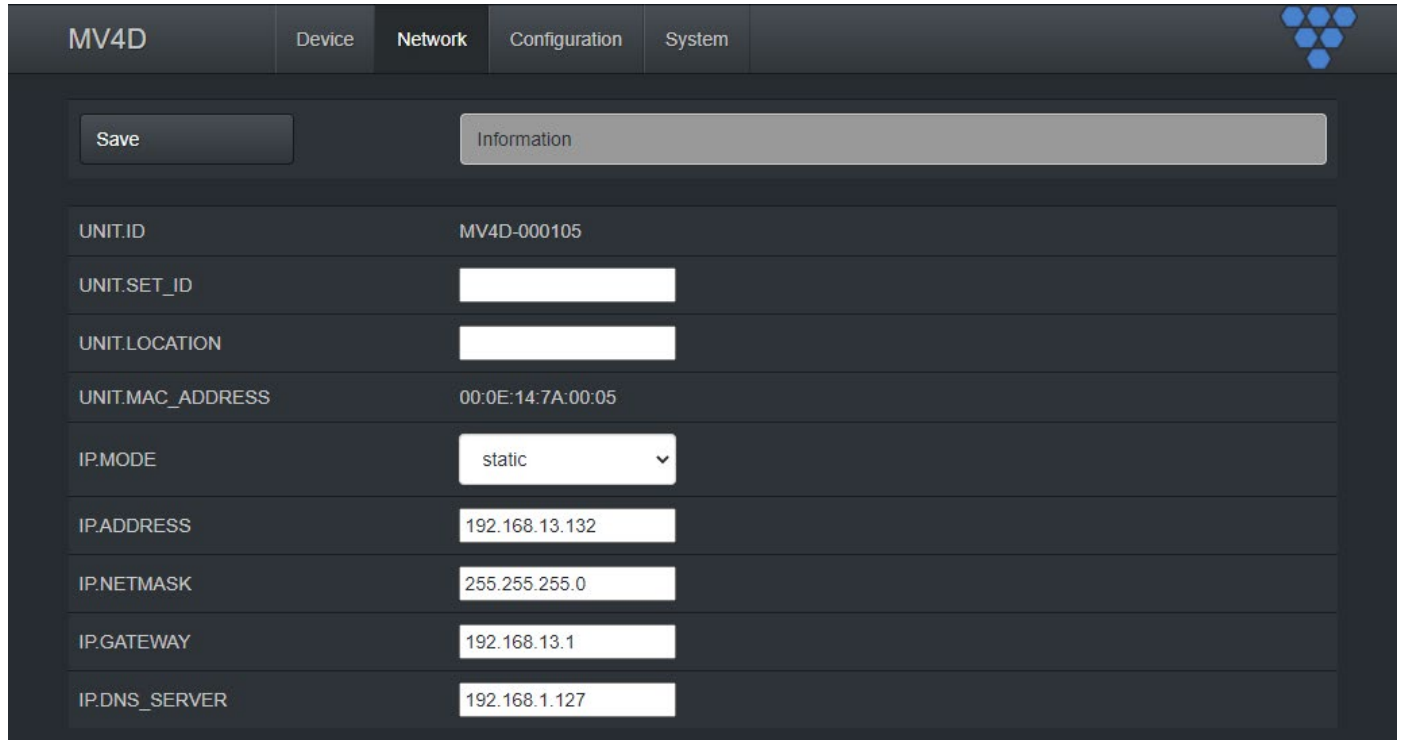**UNIT.FIRMWARE_DATE** – The date the firmware was released.

MONITOR BUTTON – Displays the live thumbnail preview of the video being received from the AV stream.

VIDEO INFO – Displays the current source resolution being received from the AV steam and the HDMI scaled output resolution.

AUDIO INFO - Displays the current source audio codec, type, frequency, size, and number of channels.

MV4 DECODER NETWORK TAB

UNIT.ID – By default, the UNIT.ID of the encoder is the MAC Address. This can be changed by the user on the **Network** tab.

UNIT.SET_ID – User defined device name. For example: Display_1 or Source_3 (letters, numbers, dashes, and underscores only).

UNIT.LOCATION – User defined device location. For example: Office_1 or Conference_Room_2 (letters, numbers, dashes, and underscores only).

MAC.ADDRESS – The MAC address of the unit

IP.MODE – Modes are Static or DHCP. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

IP.ADDRESS – Shows the current value based on the unit's mode. In Static mode, shows the unit's static settings. In DHCP mode, shows if the values are valid. If DHCP is failed, the mode shows as Auto IP (even though you cannot select this mode directly), and the Auto IP values display in the IP.xxxxxx fields. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

IP.NETMASK – Shows the current value based on the unit's mode. In Static mode, shows the unit's static settings. In DHCP mode, shows if the values are valid. If DHCP is failed, the mode shows as Auto IP (even though you cannot select this mode directly), and the Auto IP values display in the IP.xxxxxx fields. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

IP.GATEWAY – Shows the current value based on the unit's mode. In Static mode, shows the unit's static settings. In DHCP mode, shows if the values are valid. If DHCP is failed, the mode shows as Auto IP (even though you cannot select this mode directly), and the Auto IP values display in the IP.xxxxxx fields. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

IP.DNS_SERVER – (optional) Shows the current value based on the unit's mode. In Static mode, shows the unit's static settings. In DHCP mode, shows if the values are valid. If DHCP is failed, the mode shows as Auto IP (even though you cannot select this mode directly), and the Auto IP values display in the IP.xxxxxx fields. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

MV4 DECODER CONFIGURATION TAB

STREAM.HOST – See section *Configuring Stream Settings (Manually).*

STREAM.MODE – Unicast or multicast. See section *Configuring MV4 Encoder and Decoder IP Addresses.*

STREAM.AUDIO – Displays the decoder audio source for the AV over IP stream.

AUDIO.VOLUME – See section *Configuring Stream Settings (Manually).*

AUDIO.MUTE – Used to mute or unmute AV stream audio. Is a boot parameter, unit must be rebooted for change to be applied. See section *Configuring Stream Settings (Manually).*

VIDEO.FORMAT – See section *Video Format Setting (Decoder Only).*

VIDEO.SOURCE_TIMEOUT – See section *Video Source Timeout (Decoder Only).*

VIDEO.POWER_SAVE – See section *Video Power Save (Decoder Only).*

VIDEO.HDCP_FORCE_ON – Force the decoder to HDCP encrypt the output. See section *HDCP Force On.*

VIDEO.GENLOCK – Used to enable or disable Genlock. See section *Genlock (Decoder Only).*

VIDEO.OUTPUT – Used to set the HDMI output operation. See section *Video Output Setting (Decoder Only).*

VIDEO.INFO_TEXT - Enables (TRUE) or Disables (FALSE) the showing of IP addresses and connection on display.

VIDEO.OSD_TEXT - Used to put user text onto the screen as an overlay.   See section *OSD Text Display (Decoder Only).*

Select Splash file – Browse to a file to use as a splash. See section *Custom Splash Screen (Decoder Only).*

Upload file – Upload the selected splash file. See section *Custom Splash Screen (Decoder Only).*

MV4 Decoder System Tab
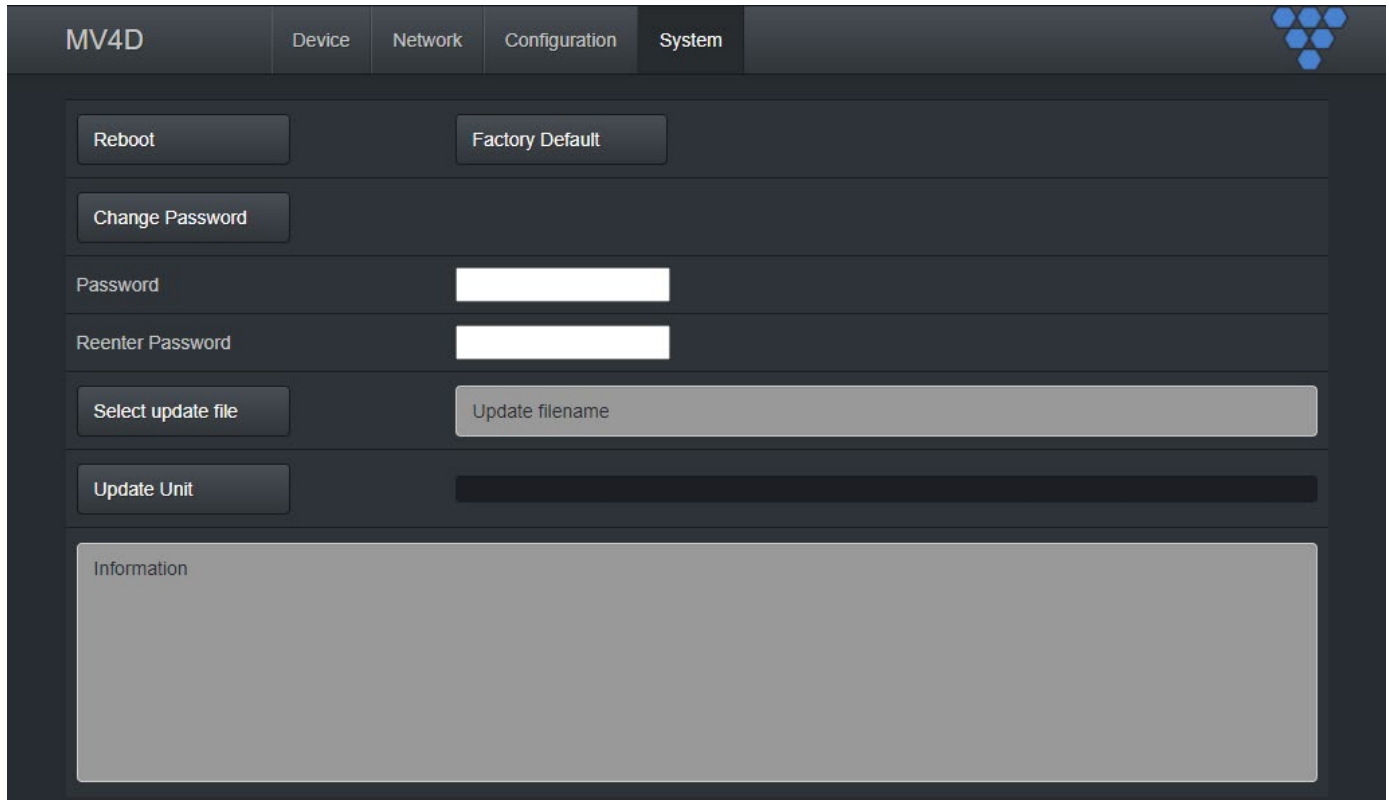
Reboot – This button reboots the unit.

Factory Default – This button factory defaults the unit. See section *Troubleshooting.*

Change Password – This button changes the unit's web interface login password to values entered below (default is admin).

• Password – enter new password

• Reenter Password – reenter new password

Important: Make sure you write the new password down. If it is lost or forgotten, you will need to call Visionary Solutions support to assist in a console factory default of the unit.

Set update file – Browse to a new firmware file supplied by Visionary Solutions or downloaded from visionary-av.com.

Update Unit – This button will initiate a firmware update per the specified file above.

Information – Real-time status messages displayed during a reboot, firmware update, or factory default action.

CONTROL

VISION LITE

Vision Lite is a 4K Matrix Switching, Video Wall Control, and configuration software for use with our encoder and decoder endpoints.

The Vision Lite Server Application is cross-platform capable (or OS agnostic), meaning that the software works on Windows, Mac, and Linux. The Vision Lite User Interface is a browser-based application that works on PCs, Apple or Android tablets, and mobile devices. Browsers supported are Chrome, Firefox, Internet Explorer, and so on.

Vision Lite automatically discovers units on your network without any configuration.

Follow these instructions to install the Vision Light software.

1. The latest Java JRE runtime is a prerequisite on the machine running VLite. The JRE can be found here:

    http://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html.

2. Download the latest Vision Lite software from visionary-av.com.

3. Manually create a read/write-able folder/directory `C:\VLite` at the root of your C:\ drive. This is the recommended directory to place the downloaded `VLite.jar` file, but you can place the file anywhere on your computer.
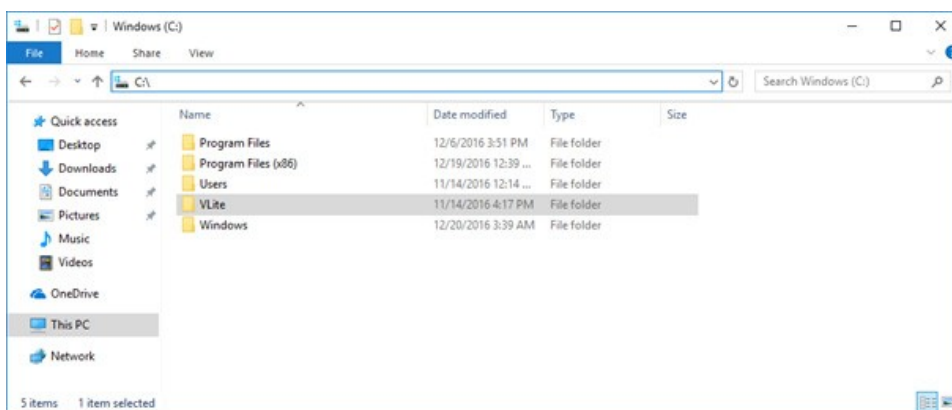
4. Save the `VLite.jar` file that you downloaded to the `\VLite` folder you just created.
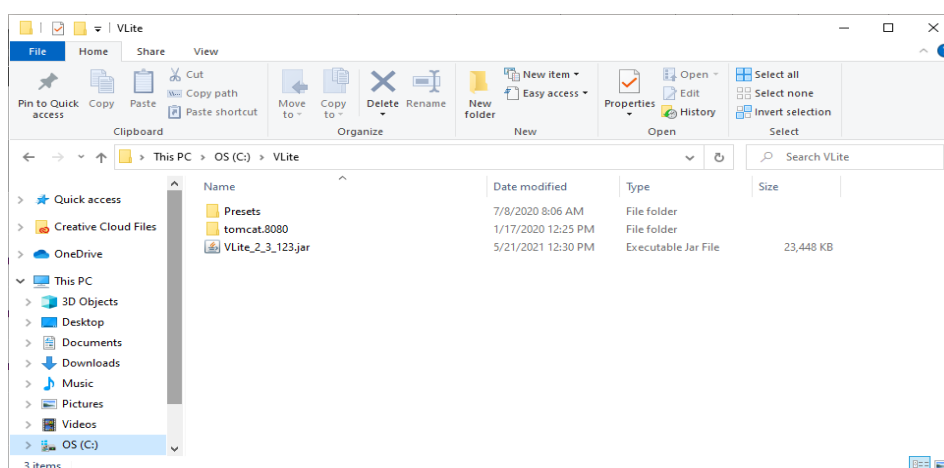
5. Launch the Vision Lite Server application by double clicking the `VLite.jar` file, OR from a command line interface using the following command: `java -jar VLite.jar`.

6. The Vision Lite Server window opens.
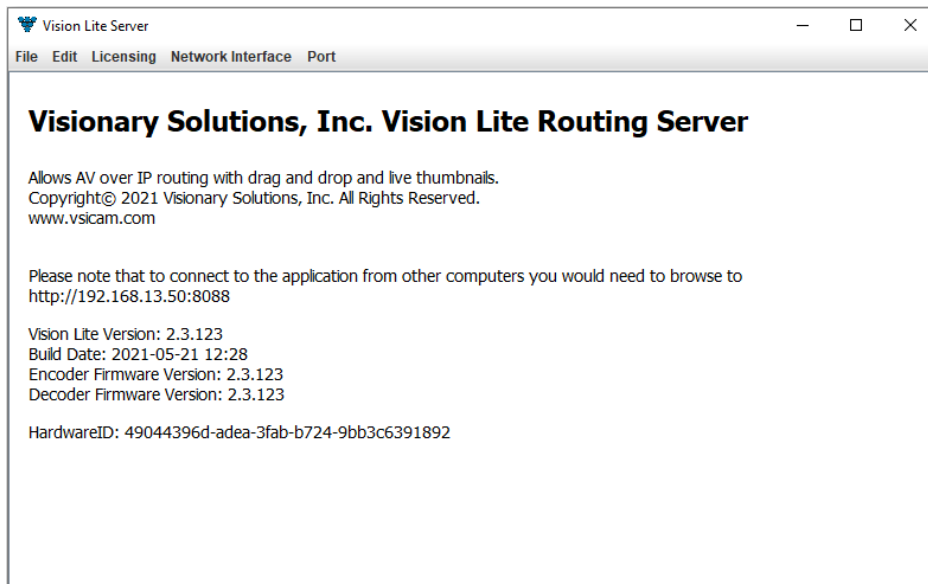
7. Go to the **Network Interface** menu and select the appropriate network interface.
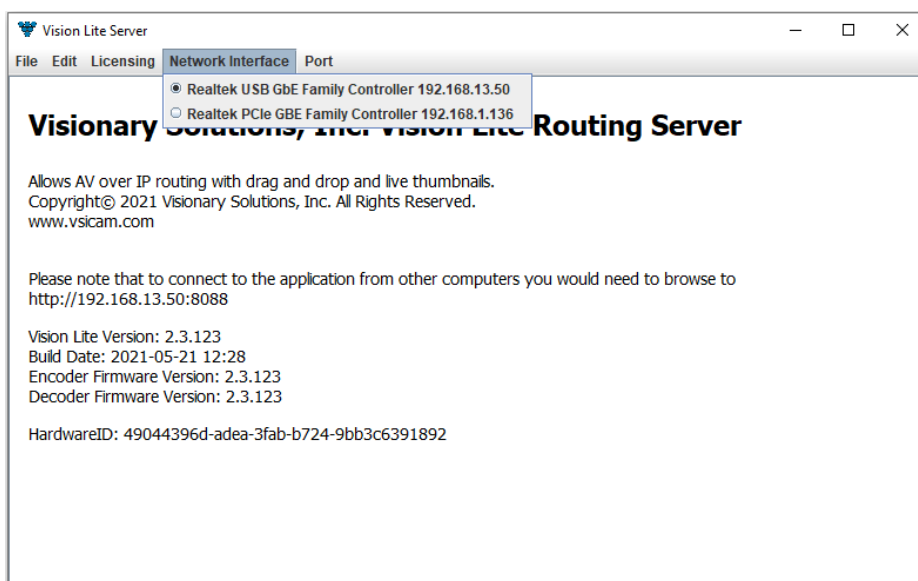
Select the network interface that the Vision Lite Server will be "listening" on. If your machine has more than one network interface, you will need to select the interface that is connected to the same network as the units.

Important: The Vision Lite Server window can be minimized in the background; however, it must always be running.

8. The default port assignment for VLite is 8080, other programs running on the computer may be using port 8080.   If that is the case, the port for VLite will need to be changed for VLite to open.   To change the port assignment, click on "Port" then enter the desired port number.
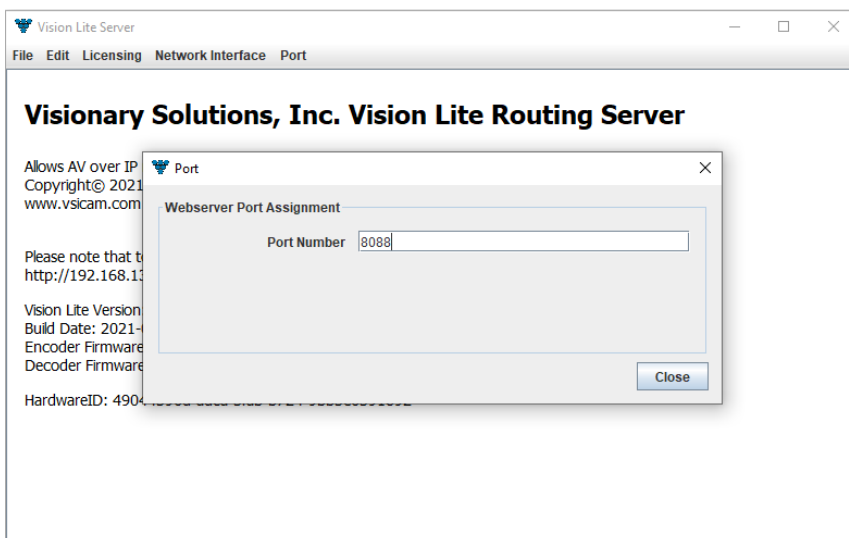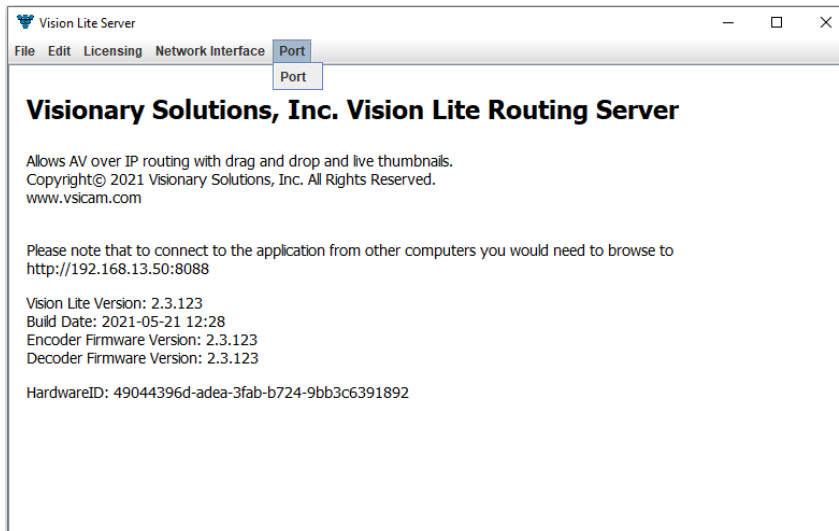
Important: The Vision Lite Server window needs to be closed and then reopened for the new port number to be assigned.

9. Copy the Vision Lite Server IP Address from the Vision Lite Server window to your clipboard.
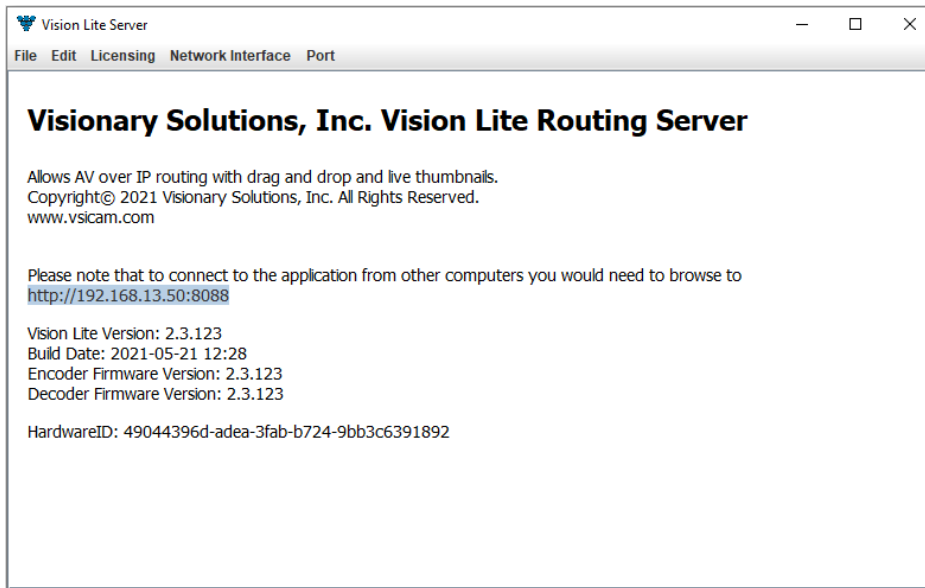
10. To launch the Vision Lite User Interface, open a browser page and copy the Vision Lite Server IP Address IP Address to the URL.
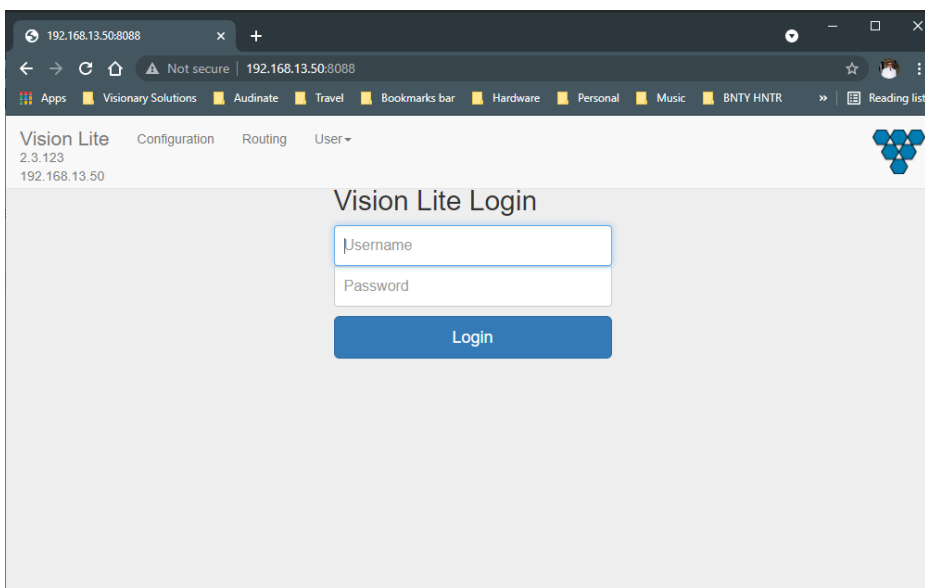
Note: You can log in from any machine on the network.

11. Log in with **username**=admin **password**=admin.

Note: A second user type with limited access rights is available. Log in with **username**=user1 **password**=user1.

12. The **Configuration** page opens. You now have access to configure each unit.
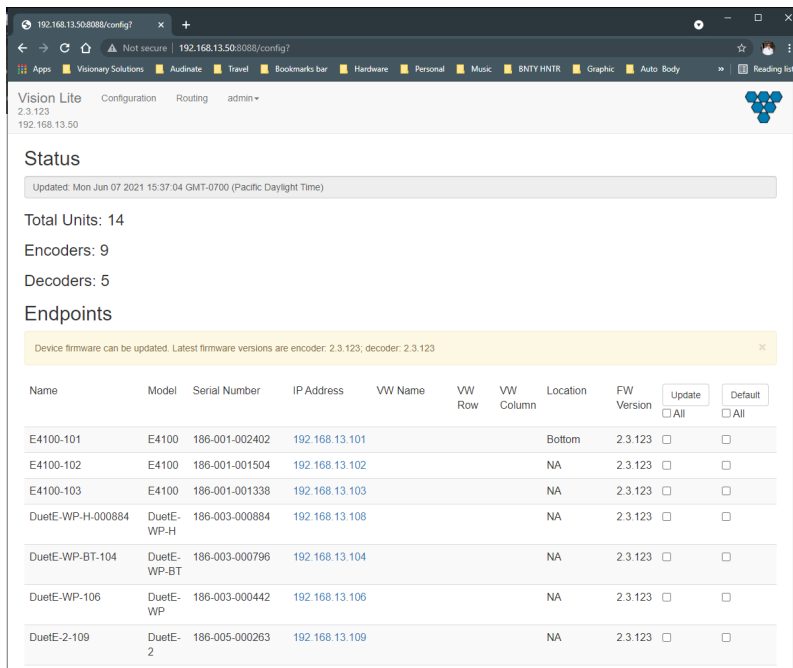
- On the **Configuration** page, you can click on the IP Address (hyperlink) of any endpoint to open the embedded web interface for each unit. On the unit's web interface, you can rename the units and/or set a user defined location.

Important: SPECIAL CHARACTERS ARE NOT ALLOWED FOR UNIT ID AND LOCATION. Example: −@#$% are *not* allowed.

Note: When making changes to the endpoints, the endpoints briefly disappear from the Vision Lite User Interface while they are rebooting and the application rediscovers them.

- From the **Configuration** page, you can update the firmware for any units that may be out of date. The Vision Lite software displays a message if a newer firmware is available.

- On the **Routing** tab, you can drag-n-drop to route and switch sources to displays.
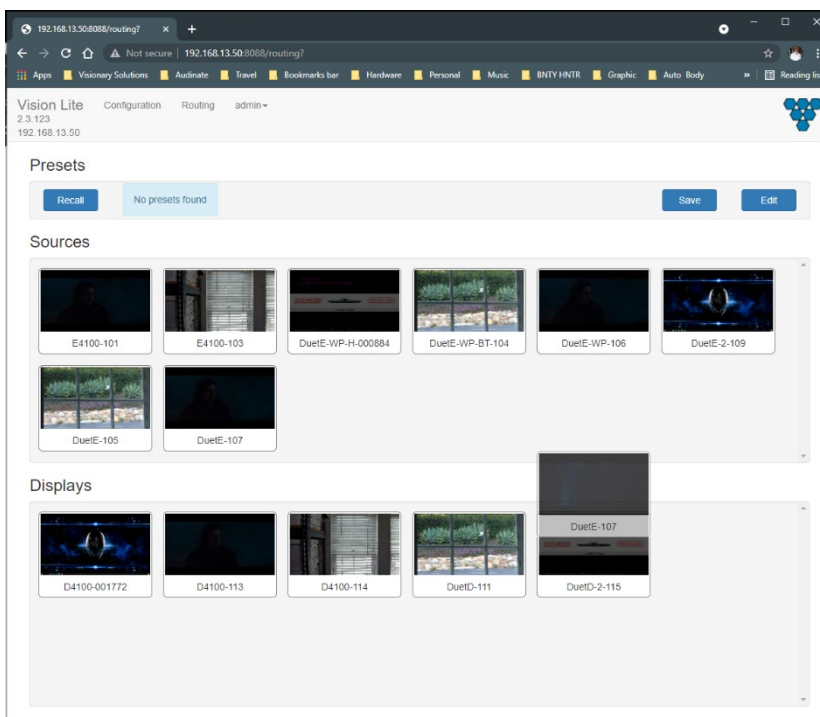
Note: Double-click the preview of a unit to open that unit's web UI from the **Routing** tab.

THIRD-PARTY CONTROL DRIVERS AND PLUGINS

Various third party control drivers and plugins, such as QSC, Symetrix, Crestron, AMX, etc., are available. Please contact support@visionary-av.com   for details.

API CONTROL

The MV4 IP Multiviewer is capable of being controlled from a variety of third-party manufacturers, supported systems include Crestron, Extron, AMX, RTI, QSC and Symterix. The API is a human readable key value pair accessible via, HTTP GET/POST, UDP unicast, and UDP multicast. Please note that although most of the HTTP examples below are shown as GET for simplicity, use of POST for HTTP API is recommended. UDP API is more efficient if your control system supports it.

When using the API, it is important to keep in mind that all changes are volatile. This means that without a save, changes will be lost upon reboot!

All commands start with CMD=START and end with CMD=END to allow multiple key value pairs per command sequence. All keys and values are case sensitive.

Architecture:

Key Value System	Port/IP Address	Notes
HTTP	Port 80	
UDP Socket	Port 8000	Will listen on unicast and multicast
Multicast Address	226.0.0.19	
HTTP GET	Port 80	Queries
HTTP POST	Port 80	Set values
&		Separates Key Value Pairs
=		Separates Keys and Values
CMD=START		Start of all commands
CMD=END		End of all commands

HTTP GET:

Require authentication (Default: username=admin, password=admin)

*Example Quer*y http://admin:admin@192.168.8.101/cgibin/wapi.cgi?CMD=START&QUERY.ALL=TRUE&CMD=END

HTTP POST:

Example: Set decoder to connect to the encoder at 192.168.8.101 and display the stream

1. URL: http://192.168.8.101/cgi-bin/wapi.cgi

2. Request Header: "Content-Type", "application/x-www-form-urlencoded"

3. Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to "Basic YWRtaW46YWRtaW4="

4. Post Data: "CMD=START&UNIT.ID=ALL&STREAM.HOST=192.168.8.101&STREAM.CONNECT=TRUE&CMD=END"

Example: Flash Unit LEDs

GET:

http://admin:admin@192.168.8.101/cgi-

bin/wapi.cgi?CMD=START&UNIT.ID=ALL&UNIT.FU=TRUE&CMD=END

POST:

1. http://192.168.8.101/cgi-bin/wapi.cgi

2. Request Header: "Content-type", "application/x-www-form-urlencoded"

3. Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic YWRtaW46YWRtaW4=

4. POST Data: "CMD=START&UNIT.ID=ALL&UNIT.FU=TRUE&CMD=END"

Key	Default Value	Values	Applies To:	Notes
AUDIO.MUTE	FALSE	TRUE, FALSE	DECODER	Mute/Unmute the audio in the HDMI output for monitors where the volume may get inadvertently set.
AUDIO.VOLUME	80	0-100	DECODER	Set the analog volume. For Encoders it sets the input volume, for Decoders, the output volume.
MV.BORDER_OFF	None	{CHX|MODE}	ENCODER	Used to turn border off, per channel. CHX= {1, 2, 3, 4, ALL} MODE= {FULL, QUAD, POP, PIP, ALL}
MV.BORDER_ON	None	{CHX|MODE}	ENCODER	Used to turn border on, per channel. CHX= {1, 2, 3, 4, ALL} MODE= {FULL, QUAD, POP, PIP, ALL}
MV.BUTTON	None	UP, DOWN, ENTER, BACK, RES, INFO, AUDIO, MODE	ENCODER	Used to emulate the front panel buttons of the MV4.
MV.CUSTOM_MOV	None	{RES|CHX|HS|VS}	ENCODER	Only available in Custom Mode. Used to set the custom position of a channel. RES={4k,1080p} CHX={4k:1,2 or 1080p:1,2,3,4}

				HS=Horz start, VS=Vert start
MV.CUSTOM_POS	None	{RES|CHX|HS|VS|HW|VW}	ENCODER	Only available in Custom Mode. Used to set the custom size and position of a channel. RES={4k,1080p} CHX={4k:1,2 or 1080p:1,2,3,4} HS=Horz start, VS=Vert start, HW=Horz Size, VW=Vert Size
MV.RESOLUTION	1080	4K, 1080	ENCODER	Used to set the MV4 encoder/HDMI output resolution.
MV.FDEFAULT	None	TRUE	ENCODER	Used to perform factory default.
MV.HRESET	None	TRUE	ENCODER	Used to reset/reboot the MV4.
STREAM.AUDIO	DECODER_1	DECODER_1, DECODER_2, DECODER_3, DECODER_4	ENCODER	Used to select which decoder audio is being sent with AV stream/HDMI output being transmitted by the MV4 encoder.
STREAM.HOST	None	Any valid Unicast IP Address of an ENCODER	DECODER	IP address of the encoder that the decoder is tuned in to.
STREAM.MODE	multicast	multicast, unicast	ENCODER	Changes steam mode between multicast and unicast.
STREAM.VIDEO	QUAD	DECODER_1, DECODER_2, DECODER_3, DECODER_4, QUAD, PIP, POP	ENCODER	Used to set the mode of the AV stream/HDMI output being transmitted by the MV4 encoder.
VIDEO.GENLOCK	False	True, False	DECODER	Allows the decoder output to free run and

				not be genlocked to the source encoder. Useful for some projectors that cannot accommodate wide clock range. Should be set to TRUE for video wall setups.
VIDEO.HDCP_FORCE_ON	TRUE for D4X00 FALSE for E4X00	TRUE, FALSE	DECODER	This determines whether a unit forces HDCP for all sources or sinks (TRUE) or allows non-encrypted to go through natively (FALSE). When FALSE switching can be slow if you need to renegotiate the HDMI link.
VIDEO.INFO_TEXT	TRUE	TRUE, FALSE	DECODER	Enables (TRUE) or Disables (FALSE) the showing of IP addresses and connection information on the splash screen
VIDEO.OSD_TEXT	NONE	Text to be displayed on OSD	DECODER	Can be used to put user text onto the screen as an overlay.
VIDEO.FORMAT	SOURCE	Source, (Codes from Video Format Table below)	DECODER	This value controls the output scaling of the decoder. See Table 1 for Values to Codes
VIDEO.OUTPUT	NORMAL	NORMAL, OFF, STANDBY, LOGO	DECODER	OFF is HDMI output disabled. STANDBY is HDMI output blank screen. LOGO is HDMI output of splash screen. NORMAL is normal operation

VIDEO.POWER_SAVE	FALSE	TRUE, FALSE	DECODER	After VIDEO.SOURCE_TIMEOUT when there is no IP Video Stream detected, TRUE sets HDMI output to off, FALSE sets output to display the splash screen
VIDEO.SOURCE_TIMEOUT	TRUE	TRUE, FALSE	DECODER	When set to TRUE, decoder output will switch to off or splash screen depending upon setting of VIDEO.POWER_SAVE when there is no IP Video Stream detected

Example: Set MV4 to quad mode, displaying all 4 sources simultaneously

GET:

http://admin:admin@192.168.8.101/cgi-bin/wapi.cgi?CMD=START&UNIT.ID=ALL&STREAM.VIDEO=QUAD&CMD=END

POST:

1. http://192.168.8.101/cgi-bin/wapi.cgi
2. Request Header: "Content-type", "application/x-www-form-urlencoded"
3. Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic YWRtaW46YWRtaW4=
4. POST Data: "CMD=START&UNIT.ID=ALL& STREAM.VIDEO=QUAD&CMD=END"

Example: Set MV4 to display decoder 1 only

GET:

http://admin:admin@192.168.8.101/cgi-bin/wapi.cgi?CMD=START&UNIT.ID=ALL&STREAM.VIDEO=DECODER_1&CMD=END

POST:

1. http://192.168.8.101/cgi-bin/wapi.cgi
2. Request Header: "Content-type", "application/x-www-form-urlencoded"
3. Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic YWRtaW46YWRtaW4=

4.   POST Data: "CMD=START&UNIT.ID=ALL& STREAM.VIDEO=DECODER_1&CMD=END"

Example: Emulate pressing the MV4 front panel Mode button to change the MV4 output mode

GET:

http://admin:admin@192.168.8.101/cgi-

bin/wapi.cgi?CMD=START&UNIT.ID=ALL&MV.BUTTON=MODE&CMD=END

POST:

1.   http://192.168.8.101/cgi-bin/wapi.cgi

2.   Request Header: "Content-type", "application/x-www-form-urlencoded"

3.   Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic
     YWRtaW46YWRtaW4=

4.   POST Data: "CMD=START&UNIT.ID=ALL& MV.BUTTON=MODE&CMD=END"

Example: Turn boarder off for channel 2 when in Quad Mode

GET:

http://admin:admin@192.168.8.101/cgi-

bin/wapi.cgi?CMD=START&UNIT.ID=ALL&MV.BORDER_OFF=2|QUAD&CMD=END

POST:

1.   http://192.168.8.101/cgi-bin/wapi.cgi

2.   Request Header: "Content-type", "application/x-www-form-urlencoded"

3.   Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic
     YWRtaW46YWRtaW4=

4.   POST Data: "CMD=START&UNIT.ID=ALL&MV.BORDER_OFF=2|QUAD&CMD=END"

Example: Turn boarder on for channel 2 when in Quad Mode

GET:

http://admin:admin@192.168.8.101/cgi-

bin/wapi.cgi?CMD=START&UNIT.ID=ALL&MV.BORDER_ON=2|QUAD&CMD=END

POST:

1.   http://192.168.8.101/cgi-bin/wapi.cgi

2.   Request Header: "Content-type", "application/x-www-form-urlencoded"

3.   Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic
     YWRtaW46YWRtaW4=

4.   POST Data: "CMD=START&UNIT.ID=ALL&MV.BORDER_ON=2|QUAD&CMD=END"

Example: Set the custom size and position for channel 1 in Custom Mode: Resolution 1080P, Position
300x100, Size 1920x1080

GET:

http://admin:admin@192.168.8.101/cgi-

bin/wapi.cgi?CMD=START&UNIT.ID=ALL&MV.CUSTOM_POS=1080p|1|300|100|1920|1080&CMD=END

POST:

1. http://192.168.8.101/cgi-bin/wapi.cgi

2. Request Header: "Content-type", "application/x-www-form-urlencoded"

3. Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic YWRtaW46YWRtaW4=

4. POST Data: "CMD=START&UNIT.ID=ALL&MV.CUSTOM_POS=1080p|1|300|100|1920|1080&CMD=END"

Example: Move channel 1 to a specific position in Custom Mode: Resolution 1080P, Position 300x100

GET:

http://admin:admin@192.168.8.101/cgi-

bin/wapi.cgi?CMD=START&UNIT.ID=ALL&MV.CUSTOM_MOV=1080p|1|300|100&CMD=END

POST:

1. http://192.168.8.101/cgi-bin/wapi.cgi

2. Request Header: "Content-type", "application/x-www-form-urlencoded"

3. Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic YWRtaW46YWRtaW4=

4. POST Data: "CMD=START&UNIT.ID=ALL&MV.CUSTOM_MOV=1080p|1|300|100&CMD=END"

Example: Put MV4 into a custom layout (1080P) that show channel 1 full screen, and channels 2, 3, and 4 displayed in the lower 3rd of display.

GET:

http://admin:admin@192.168.8.101/cgi-

bin/wapi.cgi?CMD=START&UNIT.ID=ALL&STREAM.VIDEO=PIP&MV.CUSTOM_POS=1080p|1|194|42|1919|1079&MV.CUSTOM_POS=1080p|2|220|670|480|270&MV.CUSTOM_POS=1080p|3|920|670|480|270&MV.CUSTOM_POS=1080p|4|1600|670|480|270&CMD=END

POST:

1. http://192.168.8.101/cgi-bin/wapi.cgi

2. Request Header: "Content-type", "application/x-www-form-urlencoded"

3. Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic YWRtaW46YWRtaW4=

4. POST Data:
   "CMD=START&UNIT.ID=ALL&STREAM.VIDEO=PIP&MV.CUSTOM_POS=1080p|1|194|42|1919|1079&MV.CUSTOM_POS=1080p|2|220|670|480|270&MV.CUSTOM_POS=1080p|3|920|670|480|270&MV.CUSTOM_POS=1080p|4|1600|670|480|270&CMD=END"

Example: Put MV4 into a custom layout (1080P) that show channel 1 full screen, and channels 2, 3, and 4 displayed in the upper 3rd of display.

GET:

http://admin:admin@192.168.8.101/cgibin/wapi.cgi?CMD=START&UNIT.ID=ALL&STREAM.VIDEO=PIP&MV.CUSTOM_POS=1080p| 1|1/94|42|1919|1079&MV.CUSTOM_POS=1080p|2|220|180|480|270&MV.CUSTOM_POS=1080p|3|920|180|480|270&MV.CU STOM_POS=1080p|4|1600|180|480|270&CMD=END

POST:

1. http://192.168.8.101/cgi-bin/wapi.cgi

2. Request Header: "Content-type", "application/x-www-form-urlencoded"

3. Request Header: "Authorization", "Basic " + Base64EncodedString("admin:admin") this evaluates to Basic YWRtaW46YWRtaW4=

4. POST Data:

   "CMD=START&UNIT.ID=ALL&STREAM.VIDEO=PIP&MV.CUSTOM_POS=1080p|1|194|42|1919|1079&MV.CUSTOM_POS= 1080p|2|220|180|480|270&MV.CUSTOM_POS=1080p|3|920|180|480|270&MV.CUSTOM_POS=1080p|4|1600|180|4 80|270&CMD=END"

TROUBLESHOOTING

This section provides useful information to help you to resolve any difficulty you might have with your MV4 IP Multiviewer.

LED INDICATORS

Power LED (Green) – Blinking: Power on and the unit is booting up.

     – Solid On: Power on and the unit is active

Link LED (Green) – Blinking: 1) The unit is connecting with encoder or decoder. 2) The HDMI source is removed.

     – Solid On: All the connections are working.

CHECKING THE FIRMWARE

It is important to know the version of the MV4 firmware in order to troubleshoot the unit. To find the firmware version of your MV4 from the embedded device web Interface, navigate to the **Device** tab and the firmware version is shown.

SUPPORT

Should you require any technical assistance, please contact your Visionary Solutions reseller. If your questions cannot be answered immediately, your reseller will forward your queries through the appropriate channels to ensure a rapid response.

You can also:

- Download user documentation. Go to visionary-av.com.

- Find answers to resolved problems in the FAQ database. Search by product, category, or phrases. Go to visionary-av.com.

- Report problems to Visionary Solutions support staff by sending an email to support@visionary-av.com.

- Visit the Customer Support section of the Visionary Solutions web site at visionary-av.com.

FACTORY DEFAULT SETTINGS

This procedure provides a way to reset the MV4 units back to the factory default settings, which may be necessary or desirable in certain circumstances.

The unit will reboot to its factory default settings. Note that a factory default causes all of the settings, including the network settings, to be reset to factory default values. Performing a factory default reset will restore the **IP.MODE** settings to DHCP, causing the unit to acquire a new IP address. If there is no DHCP server available on the network, the unit will use Auto IP addressing. See section *Network Discovery*.

Method 1:

1. Access the web interface for the unit that will be factory defaulted.

2. Log in with **username**=admin**password**=admin.

3. Click the **System** tab.

4. Click **Factory Default**.

5. Click **OK** on the pop-up.

6. The unit will reset to its factory default settings.

Method 2:

1. Locate the reset button on rear panel of the MV4.

2. Use a paperclip or similar device to press physical reset button.

3. Press and hold the reset button until the LED on the front of the MV4 indicate the unit has been reset (Fast Link LED).

4. The unit will reset to its factory default settings.

Reset: Used to factory default encoder and all decoders.

PRODUCT SPECIFICATIONS

Encoding/Decoding

Video Codec	JPEG2000 based visually lossless video compression algorithm
Bit Rates	50 to 800 Mbps
Latency	Ultra-low Latency 42ms @ 1080p60 116ms @ 4K30 4:4:4
Streaming Protocols	IP, UDP, TCP, ICMP, IGMP
Copy Protection	HDCP 2.2, AES-128 Encryption

Video

Maximum Resolutions	High Dynamic Range (HDR) 4K30 4:4:4 HDR 8 bit 1080p60 4:4:4 HDR 12 bit 1080p30 4:4:4 HDR 12 bit
Input Signal Types (Encoder)	Up to (4) AV over IP streams from PacketAV Matrix Series ultralowlatency 4K encoders over Ethernet
Output Signal Types	1x HDMI capable of scaling and outputting video formats up to 4K30 4:4:4 1x AV over IP stream over Ethernet
Scaler	Supports a wide range of resolutions and rates, up to 4K in/1080p out, 1080p in/4K out and image rotation Integrated scaling helps optimize image quality and switching performance

Audio

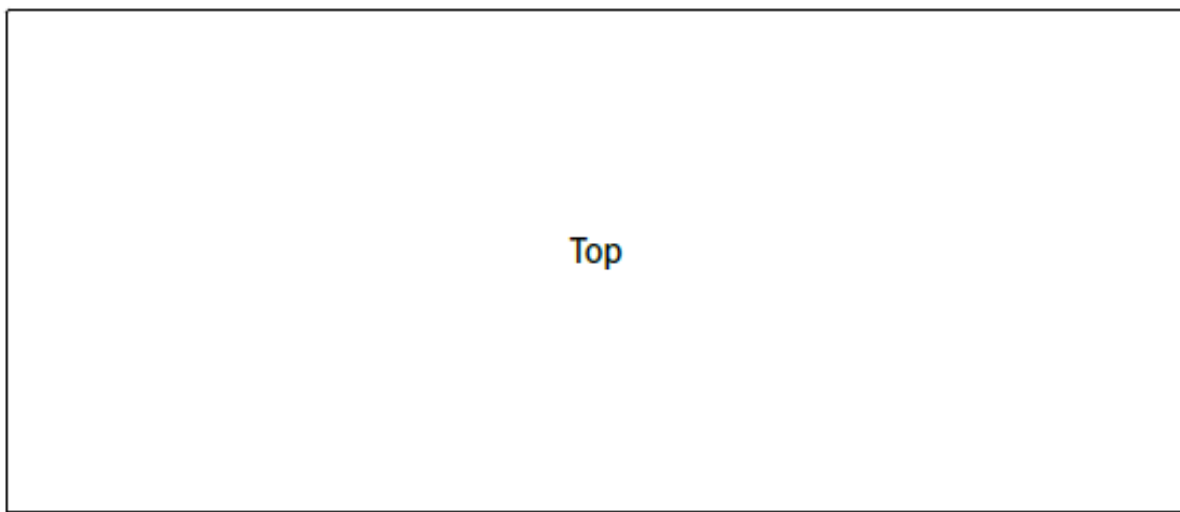|	
Input Signal Types	Embedded in the AV over IP stream from the PacketAV Matrix series encoder source.
Output Signal Types	• 1 Embedded AV over IP stream output. • 1 digital audio output via HDMI Independently Selectable from one of the input streams
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby True HD, Dolby Atmos, DTS ®, DTS-ES, DTS96/24, DTS-HD High Res, DTS-HD Master A udio, DTS:X, LPCM up to 8 channels.

Control

Front Panel Buttons	Control via buttons along with on-screen (OSD) Graphical User Interface
IP Control	UDP Unicast / Multicast API Control (encoder LAN port)

Connectors

Decoder LAN 1 - 4	8-pin RJ-45 connector, female; 100BASE-TX / 1000BASE-T Ethernet ports
Encoder LAN	RJ-45 connector, female; 100BASE-TX / 1000BASE-T Ethernet port
HDMI Output	HDMI Type A connector, female; HDMI digital video/audio inputs
Power	One 120 Volt AC power input

Power

Power Supply, Internal	1.8 Amp @ 115 Volts AC; 100-240 Volts AC power supply
Power Consumption	55 W typical

Environmental

Cooling	Active – fans (2)
Temperature	32° to 104° F (0° to 40° C)
Humidity	10% to 85% RH (non-condensing)
Heat Dissipation	up to 188 BTU/hr
Acoustic Noise	15.7 dBA (fan)

Form Factor

Dimensions	Height: 1.74 in. (44.2 mm) Width: 17 in. (431.8 mm) Depth: 7.5 in. (191 mm)
Weight	5.73 lb.(2.6 kg)

Compliance

	CE, FCC, C-tick, RoHS, WEEE

Dimensions
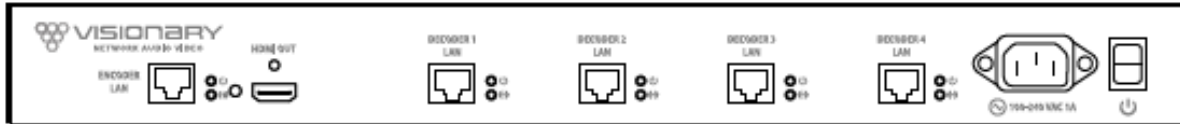
Back

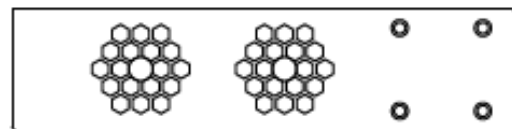17"- 431.8 mm

Top

7.5"- 191 mm

18.7"- 475 mm

MV4 IP MULTIVIEWER

Front

1.74" 44.2 mm
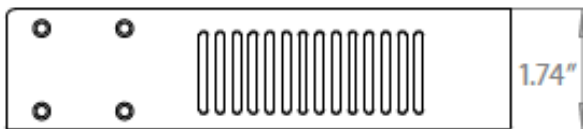
7.5"- 191 mm

Right Side

Left Side