

VISIONARY

NETWORK AUDIO VIDEO

E5100 • Encoder | D5100 • Decoder User Manual



CONTENTS

Contents

INTRODUCTION	1
NETWORK AV INFRASTRUCTURE PREREQUISITES	1
NETWORK REQUIREMENTS.....	2
POWER OVER ETHERNET (POE)	2
SWITCH SPEED.....	2
CHOOSING AN ETHERNET SWITCH	3
SWITCH GUIDELINES	3
IMPLEMENTATION CONSIDERATIONS	4
INSTALLING ON A CONVERGED NETWORK.....	4
INSTALLING ON A DEDICATED NETWORK	6
SINGLE SWITCH NETWORKING	6
MULTIPLE SWITCH NETWORKING	6
INSTALLATION AND CONNECTIONS (SYSTEM EXAMPLES)	7
ONE SOURCE TO ONE DISPLAY	7
ONE SOURCE TO MANY DISPLAYS	8
MANY SOURCES TO MANY DISPLAYS	9
MANY SOURCES TO MANY DISPLAYS WITH USB OVER IP (KVM)	10
VIDEO WALL	11
NETWORK DISCOVERY	12
CONFIGURATION	14
CONFIGURING ENCODER AND DECODER IP ADDRESSES.....	14
CONFIGURING STREAM SETTINGS (MANUALLY).....	15
STREAM ROUTING MODE (DECODER ONLY)	15
UNICAST MODE	15
MULTICAST MODE	15
STREAM BIT RATE	16
STREAM FRAME RATE	16
FAST(ER) SWITCHING	16
USB OVER IP (KVM)	16
USB MODE	16
USB MULTICAST.....	16
USB UNICAST.....	16
FAST(ER) KVM SWITCHING.....	17
RS-232 OVER IP	17
RS-232 OVER IP MODE.....	17
CEC OVER IP (DECODER ONLY)	18
CEC API EXAMPLES.....	18
GPIO.....	18
GPIO API EXAMPLES.....	20
VIDEO FORMAT SETTINGS (DECODER ONLY).....	20
AUDIO SETTINGS	21
AUDIO SOURCE	21
NATIVE AES67 AUDIO	22
VIDEO WALL	22
EDID.....	23
CUSTOM SPLASH SCREEN (DECODER ONLY)	24
ADVANCED CONFIGURATION	25
VIDEO SOURCE TIMEOUT (DECODER ONLY).....	25
VIDEO POWER SAVE (DECODER ONLY)	25
HDCP FORCE ON.....	25
GENLOCK (DECODER ONLY)	25

VIDEO OUTPUT SETTING (DECODER ONLY)	25
OSD TEXT DISPLAY (DECODER ONLY)	25
MASS CONFIGURATION (DECODER ONLY)	26
ENCODER OPTIONS.....	27
E5100 ENCODER DEVICE TAB	27
E5100 ENCODER NETWORK TAB	28
E5100 ENCODER CONFIGURATION TAB	29
E5100 SYSTEM TAB	31
DECODER OPTIONS.....	32
D5100 DECODER DEVICE TAB.....	32
D5100 DECODER NETWORK TAB.....	33
D5100 DECODER CONFIGURATION TAB	34
D5100 DECODER SYSTEM TAB	38
CONTROL.....	39
VISION LITE	39
THIRD-PARTY CONRCTL DRIVERS AND PLUGINS.....	45
API	45
TROUBLESHOOTING	45
LED INDICATORS.....	45
CHECKING THE FIRMWARE	45
SUPPORT	45
FACTORY DEFAULT SETTINGS.....	45
DIAGNOSTICS PAGE	46
NETWORK INFO	46
VIDEO INFO.....	47
AUDIO INFO	48
USB INFO.....	49
FLASH LEDs.....	50
TEMPERATURE.....	51
RACK MOUNT KIT	52
PRODUCT SPECIFICATIONS	53

INTRODUCTION

Visionary Solutions 4K UHD over IP cinema quality, ultra-low latency [sub-frame] 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.

PacketAV E5100/D5100 is nothing short of a paradigm shift for networked AV. True convergence is finally here; a single platform to support audio and Video over IP. Integrate 4K UHD video over IP into your audio network and bypass the constraints of traditional switch matrix systems by harnessing the flexibility and scalability of converged IP networks.

Visionary's PacketTV® 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.

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. Using an existing CAT 5/6 infrastructure, users can connect CAT 5/6 to any decoder anywhere on the same GbE network. The decoder takes the IP packets received over CAT 5/6 cables, converts them back into an HDMI signal connecting directly to a display, delivering visually lossless video along with USB over IP (KVM) and RS-232 over IP controls. 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 E5100/D5100 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 E5100/D5100 will work with most non-blocking, IGMP with IGMP Snooping, 1GbE network switches. At least one layer-3 switch with IGMP-query capability is required. For PIM (multicast routing) of E5100/D5100 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. E5100/D5100 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.

POWER OVER ETHERNET (PoE)

Power over Ethernet (PoE) is a system that uses a PoE Ethernet switch as a power source to provide both electrical power and data over a single cable to devices on a network, such as the E5100/D5100 devices. This reduces the number of cables and power supplies that are required to power the devices in the network. The result is lower cost, less downtime, easier maintenance, and greater flexibility for the network installation.

When selecting a PoE power supply scheme, it is important to select a PoE Ethernet switch that is capable of providing enough power per port, as well as total power to accommodate all devices simultaneously. You should plan on the maximum available PoE power per port for E5100/D5100 (15.4W). In some operating conditions less power will be demanded per E5100/D5100, call Visionary Solutions for details.

To calculate the number of devices that can be used on a PoE Ethernet switch, divide the total PoE power capability of the switch by the power required for each port and round down. For example, many PoE Ethernet switches can provide up to 370W of DC power. If each port needs 15.4W of power, a switch can supply power to a total of 24 ports.

Examples:

- A Cisco SG300-52P has a PoE power output of 375W and the ports require 15.4W: $375 / 15.4 = 24.35$. Therefore, 24 devices can be powered by this switch.
- A Cisco SG300-52MP has a PoE power output of 740W and the ports require 15.4W: $740 / 15.4 = 48$. Therefore, 48 devices can be powered by this switch.

Some switches can only supply PoE power to a certain number of ports. If it is necessary to use this type of switch, PoE injectors can be used or a local power supply can be provided for the switch, or you may need to disable the detection of the PoE for those ports in the Ethernet switch.

Exceeding the PoE switch limit can cause erratic behavior on the network system. The PoE switch cuts power to prevent overloading, which may cause units to reset at seemingly random intervals.

PoE specification standards are:

- IEEE 802.3-2008 provides up to 10W of DC power.
- IEEE 802.3af provides up to 15.4W of DC power. Only 12.95W is assured to be available at the device.
- IEEE 802.3at, known as PoE+ or PoE plus, provides up to 32W of DC. Only 25.5W is assured to be available at the device.

Class 0 devices comply with the PoE standard that provides up to 15.4W of DC power for each port. The real power draw is between 5-10W.

Class 3 devices comply with IEEE 802.3-2008 that provides up to 10W of DC power.

SWITCH SPEED

The E5100 encoder will produce up to 800Mb/s of data. Therefore, 10 encoders will require $10 \times 800\text{MB/s} = 8\text{Gbps}$. E5100/D5100 requires the switch to be GbE. E5100/D5100 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:

- 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 $(2 \times 1000\text{-Mbps} \times N)$ 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 $(2 \times 1000 \times 24) = 48\text{Gbps}$ 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, E5100/D5100 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 E5100/D5100 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 Fastleave configuration option. When enabled, Fastleave 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 Fastleave 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. **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

E/D5100 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.

INSTALLING ON A CONVERGED NETWORK

Figure 1 illustrates how E/D5100 endpoints can be installed on an existing (converged) network. When using an existing infrastructure, a dedicated VLAN is recommended to separate the AV traffic from other network data. All switches that will handle AV traffic must be 1 GbE capable per the specifications in *Network Requirements*.

Visionary Solutions recommends that all encoders be turned off before connecting to an existing network. Once connected, encoders can be turned on one at a time to determine network impact.

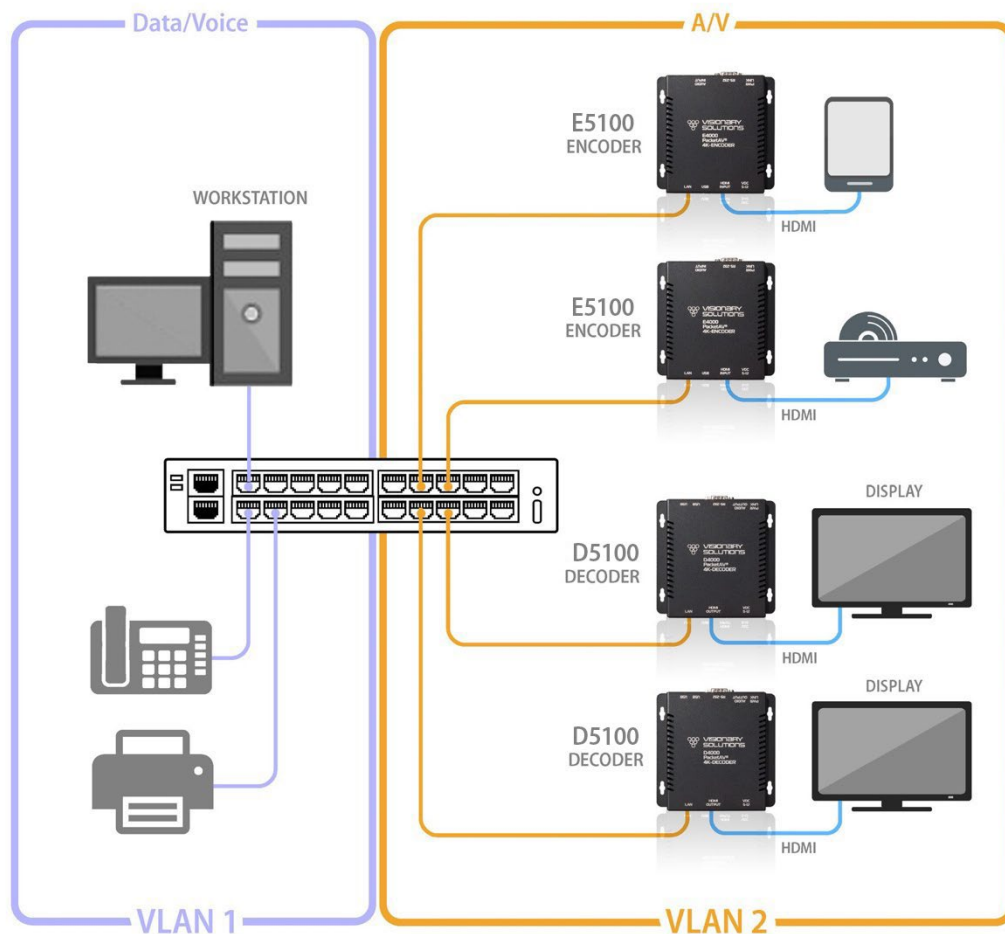


Figure 1. Converged Network Diagram

INSTALLING ON A DEDICATED NETWORK

Figure 2 illustrates how E/D5100 endpoints can be installed on a dedicated network. A dedicated network is recommended for transmitting AV over IP. We offer various models of preconfigured switches for resale to our partners. These switches are shipped pre-configured for AV over IP from the factory. Please contact sales@visionary-av.com for more information.

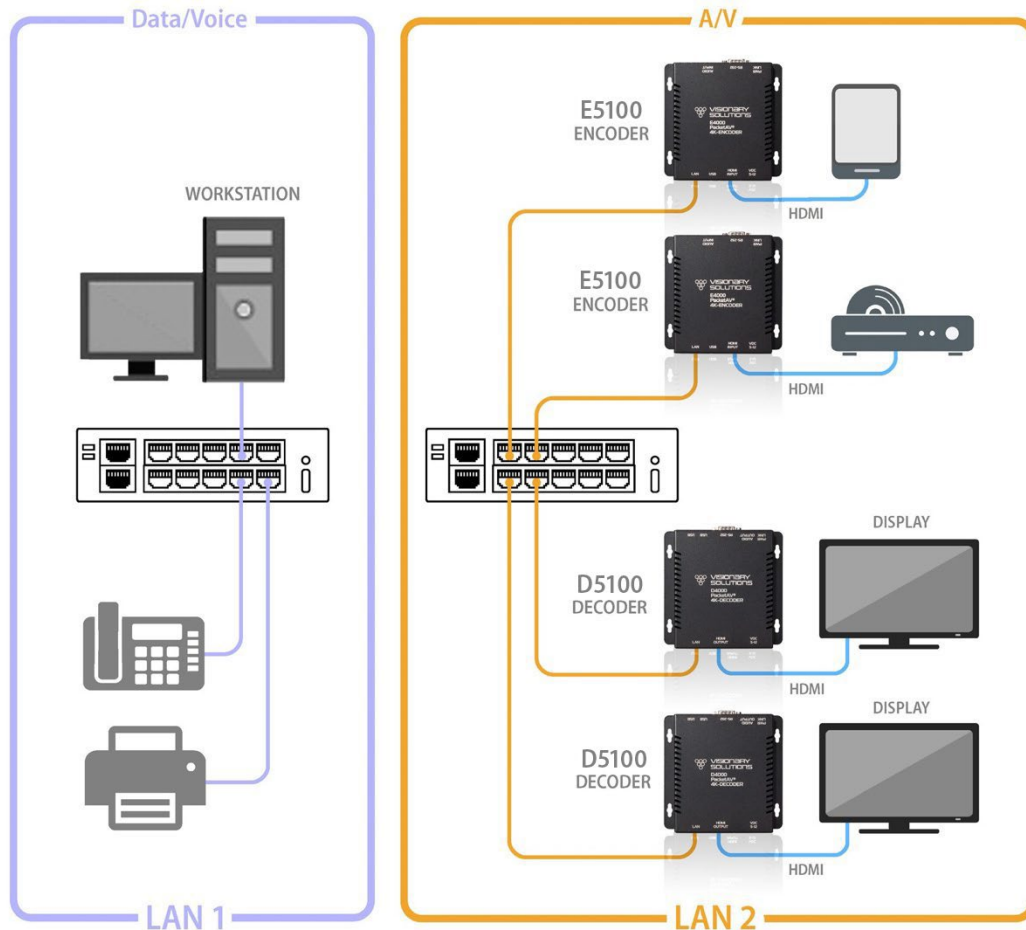


Figure 2. Dedicated Network Diagram

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 $(2 \times 1000\text{-Mbps} \times N)$ 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 $(2 \times 1000 \times 24) = 48\text{Gbps}$ 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.

- $(\text{Link Bandwidth}) / (800\text{Mbps}) = \text{Number of simultaneous streams across link for 4K}$ and $(\text{Link Bandwidth}) / (200\text{Mbps}) = \text{Number of simultaneous streams across link for 1080p}$.
- The maximum number of streams possible between switches = $\text{link bandwidth (10Gbps)} / 800\text{Mbps (for 4K)} \times \text{number of encoders (or 200Mbps for 1080p)}$.

- 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.

$$\frac{\text{Link Bandwidth}}{\text{800 Mbps for 4K or 200 Mbps for 1080p}} = \text{Total \# of Streams}$$

10,000 Mbps (recommended)

INSTALLATION AND CONNECTIONS (SYSTEM EXAMPLES)

This section provides installation and connection instructions for five configuration examples. For each encoder and decoder in the system examples below, follow these step-by-step connection instructions.

1. Use an HDMI cable to connect the AV source to the **HDMI Input** port on the encoder unit.
2. (Optional) Use a second HDMI cable to connect the HDMI Loop-through port on the encoder unit to a local display.
3. Connect an HDMI cable from the display to the **HDMI Output** port on the decoder unit.
4. Connect a CAT 5 (or better) cable from the Ethernet port on the encoder unit to a PoE port on the network switch.
5. Connect a CAT 5 (or better) cable from the Ethernet port on the decoder unit to a PoE port on the network switch.
6. (Optional) Connect the included 5V DC power supplies to both the encoder and decoder units. Connect the included AC power cords from the power supplies to available electrical outlets.

ONE SOURCE TO ONE DISPLAY

In this basic installation scenario, sending video from a single source to a single display, a single encoder and decoder (point-to-point) can be linked directly together or over a network. If linked directly, the CAT 5e (or better) cable linking the devices should not run more than 100m (328ft).

The devices do not connect automatically and must first be configured through embedded web interfaces. This step requires a connection to a network. Once the devices are linked on the network, they can be connected directly. See section *Configuration*.



Figure 3. One Source to One Display Diagram

ONE SOURCE TO MANY DISPLAYS

Sending video from a single source to multiple displays requires a network switch. A single encoder can be linked to multiple decoders (point-to-multipoint) over a network. Implementing a one to many installations dramatically decreases the amount of equipment required at the source location.

The encoder and each decoder can be located no more than 100m (328ft) from the switch.

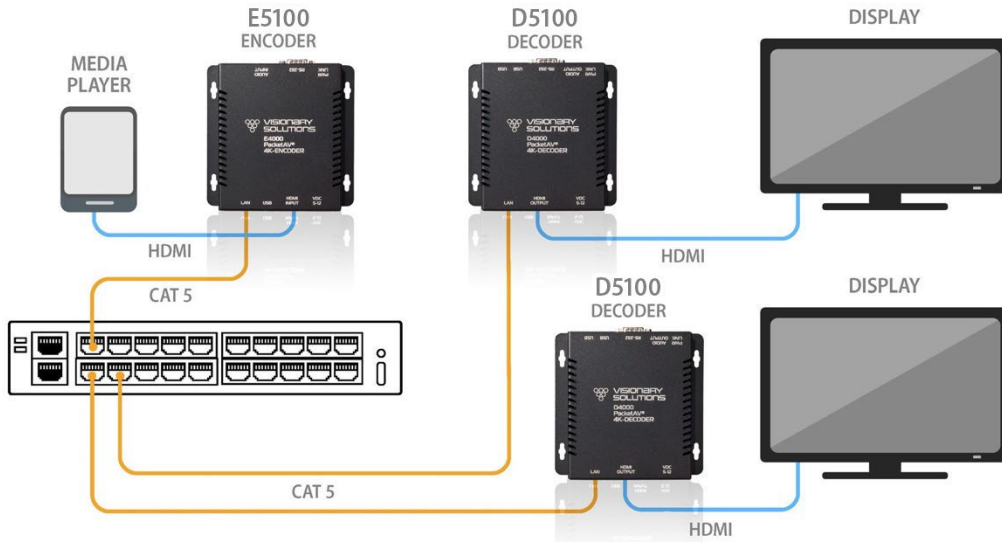


Figure 4. One Source to Many Displays Diagram

MANY SOURCES TO MANY DISPLAYS

Sending video from multiple sources to multiple displays requires a network switch. Multiple encoders can be linked to multiple decoders (multipoint-to-multipoint) over a network. The many encoders to many displays' configuration allows almost any number of sources and displays. Multiple switches can be linked by fiber, providing flexibility and scalability, and expanding the size and reach of the configuration to a practically limitless scale.

Each encoder and each decoder can be located no more than 100m (328ft) from the switch.

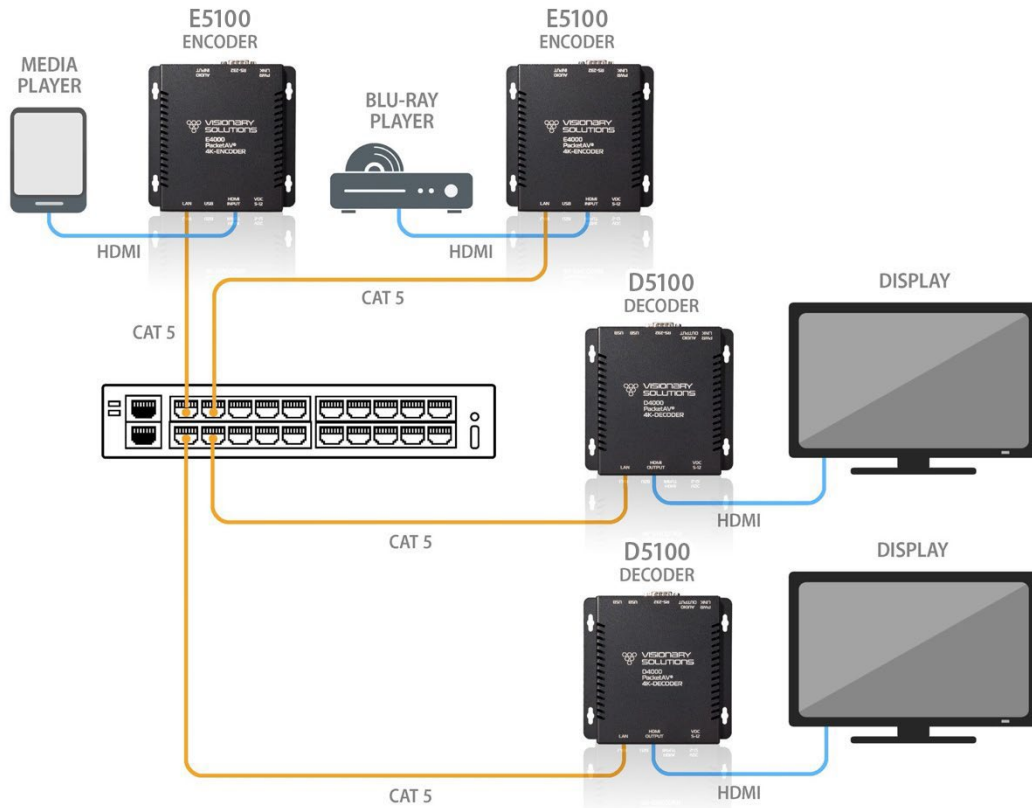


Figure 5. Many Sources to Many Displays Diagram

MANY SOURCES TO MANY DISPLAYS WITH USB OVER IP (KVM)

Allowing users to remotely access and control computers from multiple sources with multiple displays requires a network switch. Multiple encoders can be linked to multiple decoders (multipoint-to-multipoint) over a network. The many encoders to many displays' configuration allow almost any number of sources and displays. Multiple switches can be linked by fiber, providing flexibility and scalability, and expanding the size and reach of the configuration to a practically limitless scale.

Each encoder and each decoder can be located no more than 100m (328ft) from the switch.

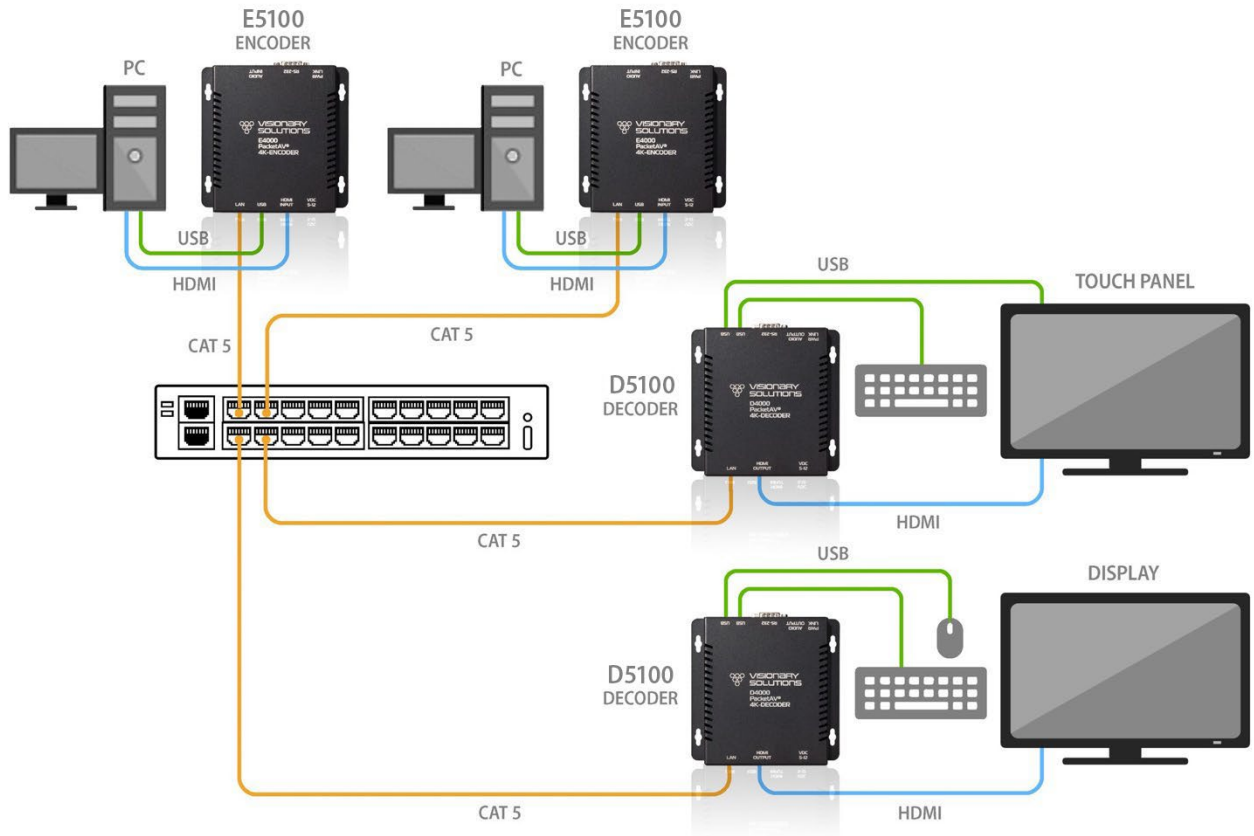


Figure 6. Many Sources to Many Displays with USB over IP Diagram

VIDEO WALL

The video wall configuration requires a network switch to display multiple video sources to many displays or a single display in any combination of video streams. Multiple encoders can be linked to multiple decoders (multipoint-to-multipoint) over the network. The video wall configuration allows almost any number of sources and displays. Multiple switches can be linked by fiber, providing flexibility and scalability, and expanding the size and reach of the configuration to a practically limitless scale.

Each encoder and each decoder can be located no more than 100m (328ft) from the switch.

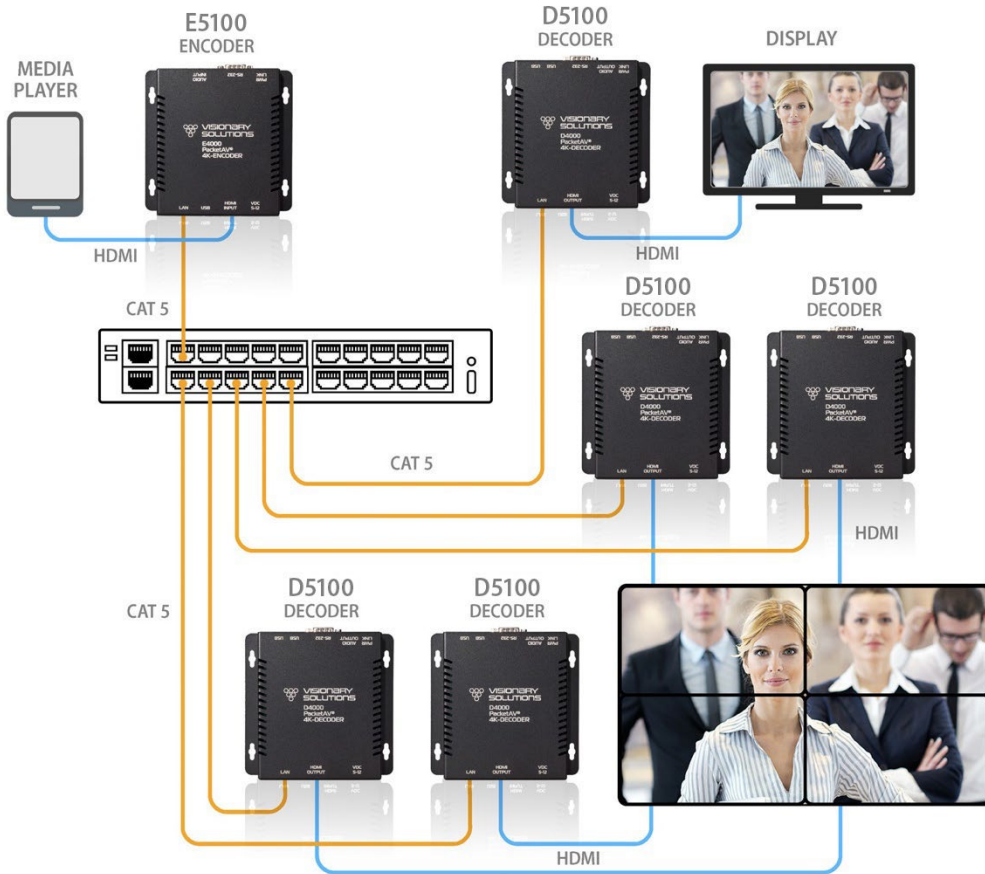


Figure 7. Video Wall Diagram

NETWORK DISCOVERY

Discover your E/D5100 endpoints on the network.

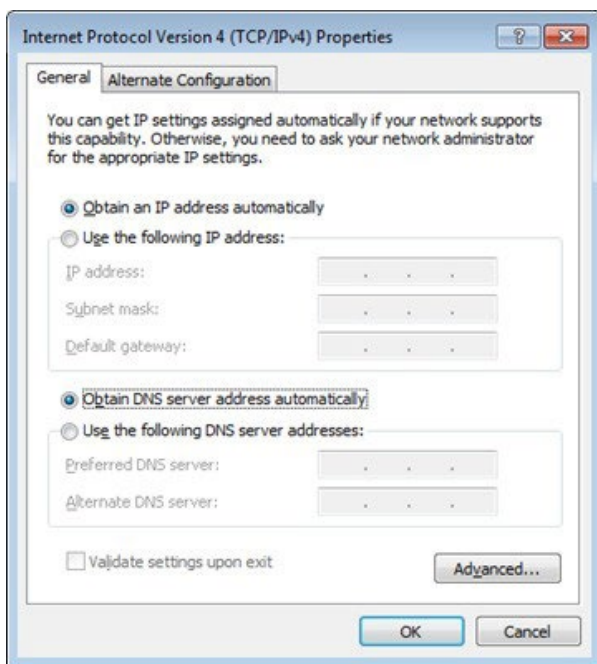
By default, the encoders and decoders are shipped from the factory in DHCP mode with Auto IP Failover. In DHCP mode, each encoder and decoder unit is automatically assigned a unique IP address by the DHCP server. If there is no DHCP server on the network, the encoders and decoders (after about one minute) 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 E/D5100 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**:

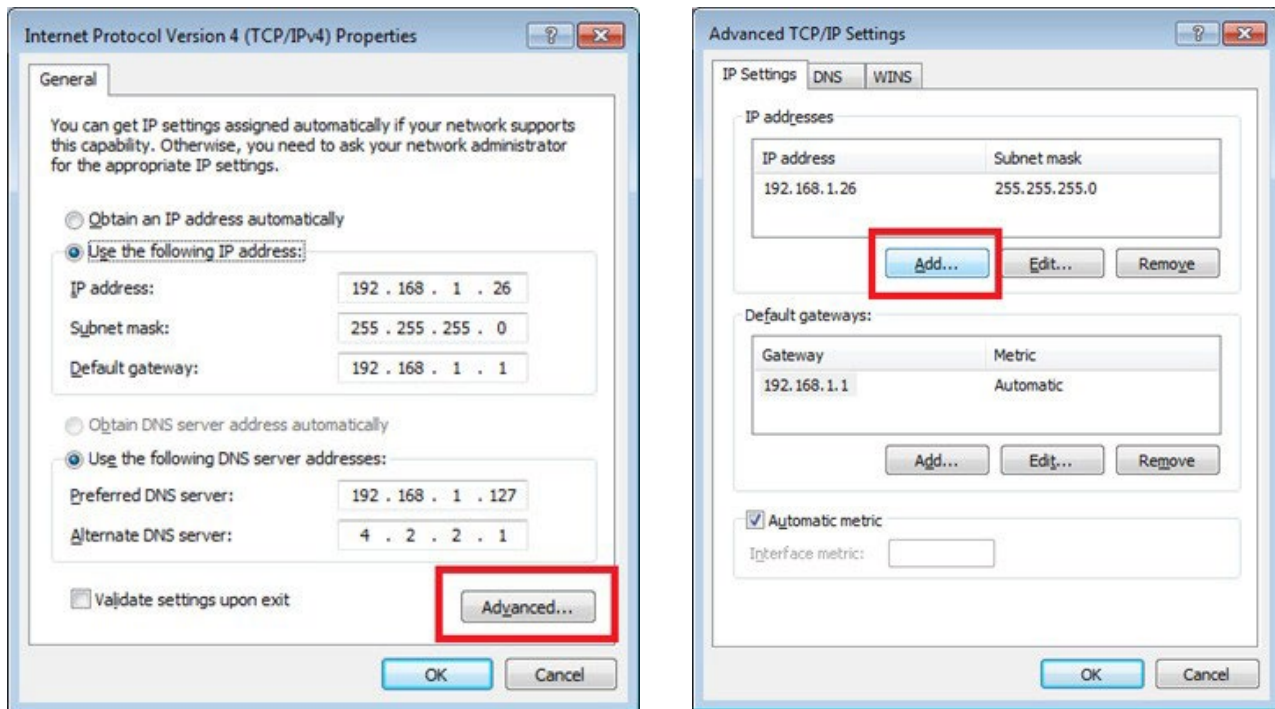
- **Method 1:** If there is a DHCP server on the network, accept **Obtain an IP address automatically** (the default). The computer will be automatically assigned a unique IP address by the DHCP server on the same subnet, allowing communication with the E/D5100 endpoints.
- **Method 2:** Configure your 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**:

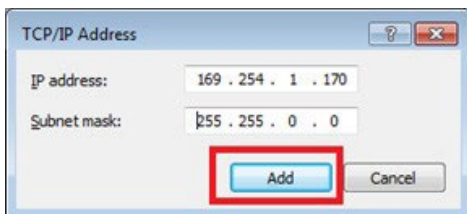
- **Method 1:** If there is no DHCP server on the network, a Windows PC will “failover” to Auto IP in a similar way as the encoders and decoders. Accept **Obtain an IP address automatically** (the default). After about one minute the computer will assign itself a unique IP address within the range of 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 226.1.2.20 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 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, are 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)

STREAM ROUTING MODE (DECODER ONLY)

The stream routing mode is used to change between Linked and Independent routing modes. When in linked mode all 3 stream services (Video, Audio, USB) are routed together. When the decoder is in independent mode, all 3 AV stream services are routed independently. This will allow a decoder to be tuned to 3 separate encoders if desired. The decoder may receive the video from 1 encoder, the audio from another and USB KVM connection to a 3rd encoder.

Use the `STREAM.HOST` (Linked) or `STREAM.HOST_VIDEO` (Independent), `STREAM.HOST_AUDIO` (Independent), `STREAM.HOST_USB` (Independent) set an encoder IP address to select the desired encoder for each stream. Then click the **CONNECT** button to connect the decoder to the encoder stream(s).

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 (see Figure 1).

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 (see Figures 2-5).

Note: Visionary's DuetE-5 encoders default 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 **CONNECT** button to connect to the encoder AV stream.
 - c. Click **Save** to save the new settings as the default route for the decoder when it boots. 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.

STREAM BIT RATE

The bit rate (**STREAM.BIT_RATE**) defaults to **auto**. This means that the encoder will choose the optimal bit rate for the input resolution and content. This can range up to a maximum of 850Mbps for highly complex 4K video. If you are trying to limit bandwidth used, you can set this to 200Mbps (this gives excellent 1080P60) down to 50Mbps. You can experiment with your normal content and see what bit rate setting is best for your use case, or just leave this in **auto** if you are not limited on bandwidth between switches.

STREAM FRAME RATE

The frame rate (**STREAM.FRAME_RATE**) of the incoming video may be reduced to allow higher resolutions at lower bandwidth. For instance, you might have 1080P60 content that is of slow moving scenes or other less complex video. You could then use the 50% setting to lower the frame rate to 30fps. You could also set the stream bit rate to a lower value to make sure that the stream only uses that amount of bandwidth.

FAST(ER) SWITCHING

Below are some options for decreasing switch time (faster switching):

1. Set the decoders to scale the HDMI output for the monitor resolution. This is the VIDEO.FORMAT value on the config.html page. If the decoders are set to VIDEO.FORMAT=SOURCE then switching time can be longer due to changes in format.
2. All of the sources must have the same resolution and refresh rate. Ensure that the encoders’ input format matches the formats of the monitors connected to the decoders. Make sure that all encoders are using VIDEO.HDCP_FORCE_ON, or that all sources are the same (HDCP on or off but not a mix).

USB OVER IP (KVM)

When connecting USB devices to encoders and decoders, the function is similar to that of a video matrix. Connecting a computer to an encoder unit and a Human Interface Device (HID) device to a decoder unit allows you to control the computer from the decoder unit.

USB over IP enables USB devices to be used remotely and supports both Bulk and Isochronous transfer modes (up to 250Mbps). Up to 7 USB devices may connect simultaneously to a single encoder. The USB over IP routing may be routed independently from video or audio routing. This will enable users to set USB routing connections separate from video and/or audio stream routing. USB over IP is enabled by default.

USB MODE

The encoders/decoders are set to Active per Request or Active on Link mode based on the STREAM.MODE setting (multicast or unicast) chosen.

USB MULTICAST

The USB connection initiates once a decoder and encoder are communicating. Multiple decoders can communicate with and have simultaneous USB control of the same encoder. All decoders automatically activate USB control of the encoder they switch to, and every decoder watching that encoder has USB control.

USB UNICAST

Multiple USB devices may be connected to one or more decoder units. However, only one encoder unit can have USB control at a time. In other words, only one decoder can communicate with the encoder at any given time. By default, the first decoder unit connected has USB control.

FAST(ER) KVM SWITCHING

USB.KVM_FAST: Default FALSE. When set to TRUE (Checked) allows for rapid transition of KVM control when switching between two encoders. Not compatible with touchscreen. Both the encoder and decoder need to have the value of setting match (and a reboot) to take effect.

RS-232 OVER IP

The encoders and decoders support RS-232 over IP and RS-232 pass-through, allowing the control of remote RS-232 devices. The encoder and decoder units used to pass through the RS-232 data must be set to the same baud rate as the RS-232 host and client. In unicast mode, an encoder unit is able to communicate with only one decoder unit at a time. In multicast mode, an encoder unit is able to communicate with multiple decoder units simultaneously.

RS-232 OVER IP MODE

Bi-directional IP/Ethernet to RS-232 (Static Baudrate).

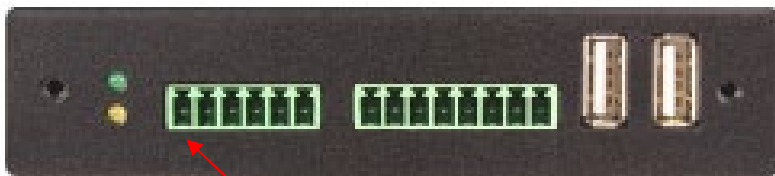
This requires an Ethernet connection at the sending end and an RS-232 cable at the responding end. Commands are entered via a TCP connection to [port 6752](#). Anything entered into the TCP session at the sending side will be sent out of the RS-232 port on the responding side.

1. Access the web interface for the encoder or decoder unit and log in with **username=adminpassword=admin**.
2. Click the **Configuration** tab.
3. Set **SERIAL.ENABLED** to **TRUE**.
4. Locate the **SERIAL.SETTINGS** and change the RS-232 settings to match the settings of the RS-232 device being used. See example in the table below.

Table 2. RS-232 Settings for an Example RS-232 Device

Description	Setting
Baud Rate	19200
Data Bits	8
Parity	None
Stop Bits	1

5. Click **Save**. The unit will automatically reboot.
6. Connect using a TCP socket [port 6752](#) to the IP address of the encoder or decoder connected to the responding RS-232 device.
7. Send commands.



Pin 1: TXD
Pin 2: RXD
Pin 3: GND

Figure 8. RS-232 Connector Pinout Diagram

CEC OVER IP (DECODER ONLY)

The decoders support CEC over IP, allowing control of a CEC (Consumer Electronics Control) enabled display through the HDMI connection. The decoder receives the CEC commands and passes the commands through the HDMI connection to the CEC enabled display. CEC commands may be triggered by the decoder web UI (System tab) or using API commands. The API uses references commands to trigger the desired CEC action or control.

CEC-O-Matic (<https://www.cec-o-matic.com>) is a website that may be used to assist as a general reference when testing and configuring CEC. Type the reference commands into CEC-O-Matic and it should decode reference and describe the specific purpose or command for that code. The site can also assist when configuring the syntax of a new command.

Note: The TV/display has CEC enabled (Samsung calls it Anynet+). The setup menu of the display may be needed to enable this feature.

CEC API EXAMPLES

On CEC Command: `CMD=START&UNIT.ID=ALL&VIDEO.SEND_CEC_GENERIC=10:04&CMD=END`

- Reference Command: **10:04**

Off CEC Command: `CMD=START&UNIT.ID=ALL&VIDEO.SEND_CEC_GENERIC=1F:36&CMD=END`

- Reference Command: **1F:36**

HDMI 1 Command: `CMD=START&UNIT.ID=ALL&VIDEO.SEND_CEC_GENERIC=1F:82:10:00&CMD=END`

- Reference Command: **1F:82:10:00**

HDMI 2 Command: `CMD=START&UNIT.ID=ALL&VIDEO.SEND_CEC_GENERIC=1F:82:20:00&CMD=END`

- Reference Command: **1F:82:20:00**

HDMI 3 Command: `CMD=START&UNIT.ID=ALL&VIDEO.SEND_CEC_GENERIC=1F:82:30:00&CMD=END`

- Reference Command: **1F:82:30:00**

GPIO

1x1 I/O user configurable - There is 1 GPIO input and 1 GPIO outputs for E/D5100. To have access to GPIO you need to first set GPIO.ENABLED to TRUE. Then send API queries from control system or DSP via UDP to port 8000 of the E/D5100, for the GPIO input and send API commands to the GPIO output. The GPIO outputs are latching, you will send TRUE or FALSE commands.

GPIO Inputs:

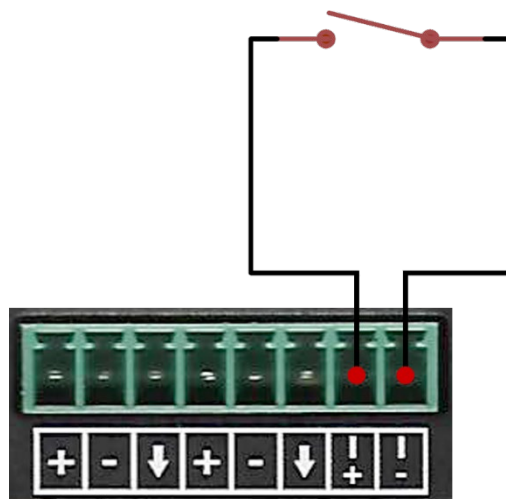
Accept 0-5VDC referenced to the GND pin of the Euroblock connector. They have a 10K Ohm resistor to ground, and then a 1K Ohm resistor in series to the internal logic. If higher input voltage is needed, we can help specify an external series resistor that can be added. Reverse voltage should not be applied to any GPIO input, but there are protection diodes to prevent small overloads from damaging the unit.

GPI Specifications:

- Requires a simple dry contact closure.

GPI Configuration:

1. To begin, access the Web GUI of the unit on which you'd like to enable GPIO, set the GPIO.ENABLED checkbox to TRUE, then Save/Reboot the unit.
2. Wire up the device to be monitored by the GPI, such as below. *Note that this model's GPI requires a contact closure with no voltage necessary.*



Monitoring the status of the GPI:

After the setup is complete, the GPI status can be queried by a control system using the below API command:

Via UDP (sent to unit's IP address, port 8000):

```
CMD=START&UNIT.ID=ALL&QUERY.KEY=UNIT.GPIO_IN1&CMD=END
```

Via http:

```
http://admin:admin@<Unit's IP>/cgi-bin/wapi.cgi?CMD=START&UNIT.ID=ALL&QUERY.KEY=UNIT.GPIO_IN1&CMD=END
```

Response if unit is receiving a logic high: &UNIT.GPIO_IN1=1&API.STATUS=SUCCESS_QUERY_KEY

Response if unit is receiving a logic low:

```
&UNIT.GPIO_IN1=0&API.STATUS=SUCCESS_QUERY_KEY
```

Please note that the UNIT.GPIO_INx may be monitored from the unit's web GUI as well, but the page must be reloaded to reflect any changes to GPI status.

GPIO Outputs:

GPIO Output supplies 5VDC through a 470 Ohm resistor. This can be used to directly drive an LED or external logic inputs. When set to low, it can sink up to 50mA at up to 24VDC. There is protection for over/reversed voltage, but it is best to limit overloads.

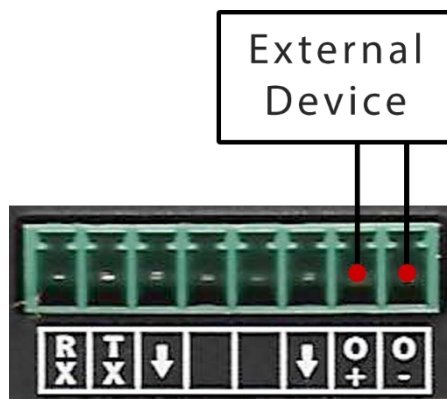
Please see the API for how to send IR codes.

GPO Specifications:

- These pins are the dry contacts of a relay, therefore no voltage is available on these pins.

GPO Configuration:

1. To begin, access the Web GUI of the unit on which you'd like to enable GPIO, set the GPIO.ENABLED checkbox to TRUE, then Save/Reboot the unit.
2. Wire up the device to be controlled by the GPO.



Controlling the GPO:

After the setup is complete, the GPO can be triggered by a control system using the below API command (using GPIO_OUT1 as an example):

Via UDP (sent to unit's IP address, port 8000):

```
CMD=START&UNIT.ID=ALL&UNIT.GPIO_OUT1=TRUE&CMD=END
```

Via http:

```
http://admin:admin@<Unit's IP>/cgi-bin/wapi.cgi? CMD=START&UNIT.ID=ALL&UNIT.GPIO_OUT1=TRUE&CMD=END
```

Note that the UNIT.GPIO_OUTx may also be controlled in real-time from the web GUI by clicking the corresponding checkbox.

GPIO API EXAMPLES

Input query commands: *Note: 0 = False, 1 = True*

GPIO In1 Query: `CMD=START&UNIT.ID=ALL&QUERY.KEY=UNIT.GPIO_IN1&CMD=END`

Example Response: `&UNIT.GPIO_IN1=0&API.STATUS=SUCCESS_QUERY_X\n`

Output commands: *Note: 0 = False, 1 = True*

GPIO OUT1 - True: `CMD=START&UNIT.ID=ALL&UNIT.GPIO_OUT1=TRUE&CMD=END`

Example Response: `&UNIT.GPIO_OUT1=TRUE&API.STATUS=SUCCESS\n`

Example Query: `&UNIT.GPIO_OUT1=1&API.STATUS=SUCCESS_QUERY_X\n`

GPIO OUT1 - False: `CMD=START&UNIT.ID=ALL&UNIT.GPIO_OUT1=FALSE&CMD=END`

Example Response: `&UNIT.GPIO_OUT1=FALSE&API.STATUS=SUCCESS\n`

Example Query: `&UNIT.GPIO_OUT1=0&API.STATUS=SUCCESS_QUERY_X\n`

VIDEO FORMAT SETTINGS (DECODER ONLY)

By default, the **VIDEO.FORMAT** field on the D5100 decoder is set to **Source**. This means that the same source resolution being encoded by the currently "tuned" E5100 is passed through to the output. This is for cases where you are certain that the display connected to the D5100 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.

AUDIO SETTINGS

AUDIO SOURCE

The E/D5100 series is capable of using HDMI or Analog audio sources.

- The E5100 encoder uses the STREAM.AUDIO to select the source of audio sent over the AV over IP stream.
- The D5100 decoder uses the STREAM.AUDIO to select what audio is sent out the HDMI output.

STREAM.AUDIO=HDMI

E5100 – STREAM.AUDIO = HDMI

Encoder receives HDMI input with embedded audio and encodes it into the AV over IP stream that includes video.

D5100 – STREAM.AUDIO = HDMI

1. Decoder receives AV over IP stream with both audio and video and decodes it to the HDMI output.
2. Sends the first two LPCM channels out the Analog audio (unbalanced consumer line level via Euroblock connector).

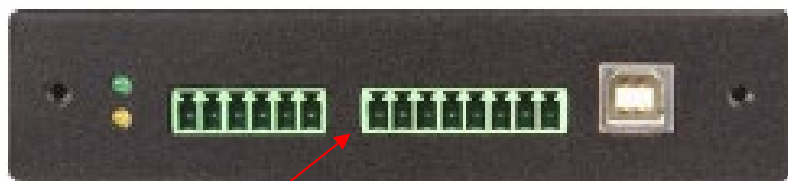
STREAM.AUDIO=Analog (Encoders only)

E5100 – STREAM.AUDIO=Analog

Uses the Analog audio (balanced or unbalanced consumer line level via Euroblock connector) and sends it out the AV stream.

***D5100 is always passing analog audio via the Euroblock connector. D5100 allows volume level setting of analog audio output. This output is always the first two channels of audio in the AV over IP stream (encoded source audio must be LPCM).

AUDIO CONNECTIONS



Pin 1: + (Left)
 Pin 2: -
 Pin 3: Shield
 Pin 4: + (Right)
 Pin 5: -
 Pin 6: Shield

Figure 9. Audio Connector Pinout Diagram

NATIVE AES67 AUDIO

Native AES67 Audio Capabilities

Overview

The Visionary E/D5200 AV-over-IP endpoints are equipped with native AES67 audio capabilities, providing high-quality, synchronized audio transmission over IP networks. AES67 is an open standard for audio over IP and Ethernet interoperability, facilitating seamless integration between devices from different manufacturers. This feature allows for seamless integration with professional audio systems and ensures compatibility with other AES67-compliant devices.

Encoder Capabilities

2 Channels of AES67 Output from the Encoded HDMI Stream

- **Audio Extraction:** The E5100 encoder captures audio from the HDMI input and encodes it into two AES67 audio channels.

Decoder Capabilities

2 Channels of AES67 Output from the Decoded AV Stream

- **Audio Extraction:** The D5100 decoder receives the AV stream and extracts two channels of AES67 audio output.

Discovery and Stream Management

Session Announcement Protocol (SAP)

- **Automatic Discovery:** The E/D5200 uses SAP for the discovery of AES67 streams, allowing devices on the network to automatically announce and discover available audio streams.

Network Configuration

Multicast Addressing Scheme

- **Multicast IP Address:** AES67 audio streams are multicast to the address 239.69.c.d, where c.d are the last two octets of the unit's IP address.
 - *Example:* If the unit's IP address is 192.168.1.50, the multicast address will be 239.69.1.50.
- **Port Number:** The port used for AES67 audio is 5004.

VIDEO WALL

Multiple D5100 decoders can be grouped together to create a video wall. Setup involves assigning each decoder to its position in the video wall. The decoders create a video wall by scaling the video content to a size that matches the full video wall.

When video walls are square (same number of rows and columns), the content will be scaled appropriately because the aspect ratio is maintained. When video walls have a different number of rows and columns, the content will be stretched by the video wall processor. Standard 16:9 content will appear wider or taller than normal. To maintain the proper aspect ratio on video walls that have a different number of rows and columns, content should be custom created. The decoders also have the capability to rotate the video output clockwise.

Note: Check the **Zoom** settings on each display to get the best fit. Look for options like **Screen Fit** (Samsung), **Full Pixel** (Sony), **Dot-by-Dot** (Sharp), or **Just Scan** (LG). The effect of these preferences is to turn off HDMI Overscan.

The following step-by-step instructions describe how to configure a 2x2 video wall. As you change these parameters, the diagram representing these settings automatically adjusts to provide you with a visual guide.

1. Access the web interface for each decoder unit that will be part of the video wall and log in with **username=admin** and **password=admin**.
2. Click the **Configuration** tab.
3. On each decoder:
 - a. Set **VW.ENABLED** to **True** on by selecting the check box.
 - b. Assign a user defined video wall name to each decoder that will be part of the video wall: **VW.NAME**.

Assign the same name to each decoder that will be part of the video wall you are creating. For example: Videowall_1. The Vision Lite software uses this name to automatically group all of the decoders into a video wall object that can then have

sources routed to it in the Vision Lite drag and drop “routing” user interface.

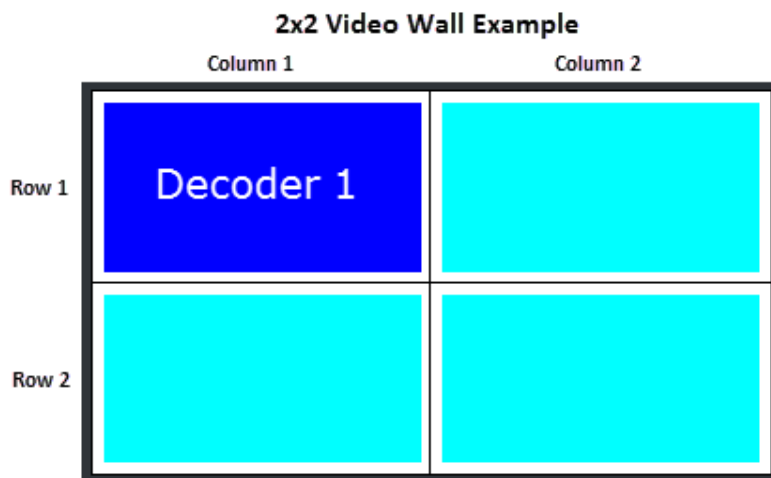
- c. Set the **VW.STRETCH_TYPE**. This options chooses how a video is scaled to the wall area. The default is **Fit**, which scales the video to fit the wall area, changing the aspect ratio as needed.
- d. Set the video wall rotation **VW.ROTATION**. Options are 0, 90, 180, or 270 degrees clockwise.
- e. Set the Bezel and Gap settings: **VW.OVERALL_WIDTH**, **VW.VISIBLE_WIDTH**, **VW.OVERALL_HEIGHT**, **VW.VISIBLE_HEIGHT**. Units = 0.1mm.
- f. Set the Row and Column settings: **VW.MAX_ROWS**, **VW.MAX_COLUMNS**.
In this 2x2 video wall example, set the **VW.MAX_ROWS** to **2** and set the **VW.MAX_COLUMNS** to **2**.
- g. Set the position on the video wall for the decoder to display: **VW.ROW**, **VW.COLUMN**.

In this 2x2 video wall example, set the position of the decoder as follows:

First decoder: **VW.ROW = 1** and **VW.COLUMN = 1** Second decoder: **VW.ROW = 1** and **VW.COLUMN = 2**

Third decoder: **VW.ROW = 2** and **VW.COLUMN = 1** Fourth decoder: **VW.ROW = 2** and **VW.COLUMN = 2**

The display highlighted in dark blue indicates the position of the decoder that you are configuring in the video wall, based on your settings.



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

The units are now configured in video wall mode.

EDID

The default EDIDs that come with the E5100 encoder cover a range of resolutions and audio formats that are widely supported. There may be some instances where the default EDIDs do not produce the expected or desired results for a unique system, such as for certain special resolutions, color-space options, and audio formats. In those cases, produce the desired result by capturing the EDID settings from your display and updating the EDID on the E5100 encoder. You can use EDID capture software such as **Monitor Asset Manager 2.9** (<http://www.entechtaiwan.com/util/moninfo.shtml>) to copy the EDID from your display.

The EDID describes the formats for audio and video that an HDMI sync can process. The source device uses this information to determine the audio and video format that is output. The source gets its EDID from the encoder. The E5100 encoder is the only device that is presenting an EDID to the source. No matter how many displays are in the system, the devices never report their EDID to the source.

Most source devices are set to output according to the EDID it is receiving. Therefore, to make the source device output a different audio or video format you must update the EDID on the E5100 encoder.

CUSTOMIZING THE EDID

E5100 encoders can import custom-built EDIDs. An EDID is a string of 256 bytes of information formatted in hexadecimal notation. These bytes share information about all of the capabilities of the endpoint device, and different devices format the EDID in their own way.

The EDID file must be formatted properly in order to be imported to an E5100 encoder.

1. Create a text file with the extension `.edid`.
2. Format the 256 bytes of EDID data as in the example below (substituting your values).

Example:

```
0x00, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0x00, 0x59, 0x24, 0x03, 0x00, 0x01, 0x00, 0x00, 0x00,
0x05, 0x19, 0x01, 0x03, 0x80, 0x3d, 0x23, 0x78, 0x2a, 0x5f, 0xb1, 0xa2, 0x57, 0x4f, 0xa2, 0x28,
0x0f, 0x50, 0x54, 0xbf, 0xef, 0x80, 0x71, 0x40, 0x81, 0x00, 0x81, 0xc0, 0x81, 0x80, 0x95, 0x00,
0xa9, 0xc0, 0xb3, 0x00, 0xd1, 0x00, 0x04, 0x74, 0x00, 0x30, 0xf2, 0x70, 0x5a, 0x80, 0xb0, 0x58,
0x8a, 0x00, 0x60, 0x59, 0x21, 0x00, 0x00, 0x1e, 0x00, 0x00, 0x00, 0xfd, 0x00, 0x18, 0x4b, 0x1e,
0x5a, 0x1e, 0x00, 0x0a, 0x20, 0x20, 0x20, 0x20, 0x20, 0x20, 0x00, 0x00, 0x00, 0xfc, 0x00, 0x47,
0x65, 0x6e, 0x65, 0x72, 0x69, 0x63, 0x5f, 0x34, 0x4b, 0x0a, 0x20, 0x20, 0x00, 0x00, 0x00, 0xff,
0x00, 0x30, 0x0a, 0x20, 0x20, 0x20, 0x20, 0x20, 0x20, 0x20, 0x20, 0x20, 0x20, 0x20, 0x01, 0x3f,
0x02, 0x03, 0x39, 0xc3, 0x4b, 0x90, 0x04, 0x1f, 0x13, 0x03, 0x12, 0x20, 0x0f, 0x1e, 0x24, 0x26,
0x35, 0x09, 0x7f, 0x04, 0x0f, 0x7f, 0x04, 0x15, 0x07, 0x50, 0x3d, 0x1f, 0xc0, 0x5f, 0x54, 0x01,
0x57, 0x06, 0x00, 0x67, 0x54, 0x00, 0x83, 0x5f, 0x00, 0x00, 0x6e, 0x03, 0x0c, 0x00, 0x10, 0x00,
0x80, 0x3c, 0x20, 0x10, 0x80, 0x01, 0x02, 0x03, 0x04, 0x02, 0x3a, 0x80, 0xd0, 0x72, 0x38, 0x2d,
0x40, 0x10, 0x2c, 0x45, 0x80, 0x60, 0x59, 0x21, 0x00, 0x00, 0x1e, 0x01, 0x1d, 0x00, 0x72, 0x51,
0xd0, 0x1e, 0x20, 0x6e, 0x28, 0x55, 0x00, 0x60, 0x59, 0x21, 0x00, 0x00, 0x1e, 0x02, 0x3a, 0x80,
0x18, 0x71, 0x38, 0x2d, 0x40, 0x58, 0x2c, 0x45, 0x00, 0x60, 0x59, 0x21, 0x00, 0x00, 0x1e, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x9d
```

3. Save the `*.edid` file.
4. Upload the EDID to the encoder.
5. Power cycle the encoder to use the new EDID file.

The source device may need to be power-cycled in order to accept the new EDID. Physically remove power from the source device then reapply it.

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: REJECT, SOURCE, 1_X, 2_X

Decoder: SOURCE, 1_X, 2_X.

REJECT = will not accept a source signal with HDCP encryption

SOURCE = will pass on the signal received from source (encoder) or via AV stream (decoder)

1_X = will apply 1.x encryption

2_X = will apply 2.x encryption.

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 Screen 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

MASS CONFIGURATION (DECODER ONLY)

UNIT.SERIAL	UNIT.MODEL	UNIT.FIRMWARE	UNIT.FIRMWARE_DATE	IP.MODE	IP.ADDRESS	IP.NETMASK	IP.GATEWAY	IP.DNS_SERVER	AUDIO.DAC_MUTE	AUDIO.DAC_MUX	AUDIO.DAC_VOLUME	AUDIO.DAC_SAMPLE_RATE
188-003-002310	E-WP-H	E-WP-H-002310	2.3.153	Wed 31 Aug 2022 11:56:12 -0700	dhcp	192.168.13.214	255.255.255.0	192.168.13.1	192.168.1.127	TRUE	HDMI	48000
188-003-002439	E-WP-BT	E-WP-BT-002439	2.3.153	Wed 31 Aug 2022 11:56:12 -0700	dhcp	192.168.13.217	255.255.255.0	192.168.13.1	192.168.1.127	TRUE	HDMI	80
188-004-000281	DuetD-2	DuetD-2-118	2.3.154-wpaf1	Wed 21 Sep 2022 17:01:28 -0700	static	192.168.13.118	255.255.255.0	192.168.13.1	192.168.1.127	FALSE	STREAM	48000
188-004-000338	DuetD-2	DuetD-2-115-Dell	2.3.154-wpaf1	Wed 21 Sep 2022 17:01:28 -0700	static	192.168.13.115	255.255.255.0	192.168.13.1	8.8.8.8	FALSE	STREAM	48000
188-004-080001	DuetD-2	DuetD-2-115	2.3.154-spf1	Fri 30 Sep 2022 14:35:35 -0700	static	192.168.13.117	255.255.255.0	192.168.13.1	192.168.1.127	FALSE	STREAM	48000


Decoders have the ability to auto discover all endpoints on the network, export to .CSV file (all configurable parameters included), make changes offline, upload .CSV file through embedded web page of encoder/decoder and push configuration to the network. No external software required – mass configuration capabilities are built into the decoder embedded webpage UI.

Use the following command to enable Mass Configuration on a decoder. Mass Configuration should be used with extreme caution and should only be enabled on 1 decoder in the system.

Example: `CMD=START&UNIT.ID=ALL&UNIT.MASS_CONFIG=TRUE&CMD=END`

ENCODER OPTIONS

E5100 ENCODER DEVICE TAB

E5100		Device	Network	Configuration	System
Key	Value				
UNIT.ID	E5100-000320				
UNIT.MODEL	E5100				
UNIT.SERIAL	186-009-000320				
UNIT.FIRMWARE	3.18.12				
UNIT.FIRMWARE_DATE	Mon, 07 Oct 2024 14:13:11 -0700				
Monitor					

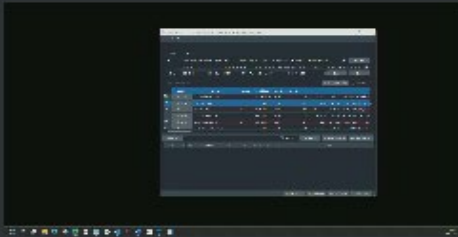
UNIT.ID – By default, the UNIT.ID of the encoder is the Model Number and the serial number (e.g., E5100-000320). This can be changed by the user on the **Network** tab.

UNIT.MODEL – E5100 (encoder) or D5100 (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	
Video Info	VIDEO INFO: Source=3840x2160@60P
Audio Info	AUDIO INFO: Source=HDMI Type=LPCM Frequency=48 KHZ Size=24 bits Channels=2

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.

E5100 ENCODER NETWORK TAB

E5100		Device	Network	Configuration	System
Save		Information			
UNIT.ID	E4100-007185				
UNIT.SET_ID	<input type="text"/>				
UNIT.LOCATION	<input type="text"/>				
UNIT.MAC_ADDRESS	00:0E:14:40:1B:AD				
IP.MODE	static ▼				
IP.ADDRESS	<input type="text" value="192.168.13.151"/>				
IP.NETMASK	<input type="text" value="255.255.255.0"/>				
IP.GATEWAY	<input type="text" value="192.168.13.1"/>				
IP.DNS_SERVER	<input type="text" value="192.168.1.127"/>				

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

SET.UNIT_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 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.xxxxx fields. See section *Configuring 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.xxxxx fields. See section *Configuring 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.xxxxx fields. See section *Configuring 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.xxxxx fields. See section *Configuring Encoder and Decoder IP Addresses*.

E5100 ENCODER CONFIGURATION TAB

Parameter	Value
STREAM.MODE	multicast
STREAM.BIT_RATE	auto
STREAM.FRAME_RATE	100%
STREAM.QOS_DSCP	26
STREAM.AUDIO	HDMI
AUDIO.AES67_ENABLED	<input type="checkbox"/> FALSE
VIDEO.HDCP_FORCE_ON	SOURCE
VIDEO.EDID	03_1080P60_LPCM_2C

Buttons: Save, Select CUSTOM EDID file, Upload file

Input fields: Filename

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

STREAM.BIT_RATE – See section *Stream Bit Rate*.

STREAM.FRAME_RATE – See section *Stream Bit Rate*.

STREAM.QOS_DSCP - Used to set the QoS DSCP tag (default is set to 26)

STREAM.AUDIO – Select the source of audio for the AV over IP stream - HDMI, Analog - See section *Audio Settings*.

AUDIO.AES67_ENABLED – Used to enable (TRUE) or disable (FALSE) native AES67 - See section *Native AES67 Audio*.

VIDEO.HDCP_FORCE_ON - See section *HDCP Force On*.

VIDEO.EDID – Used to select between different default, prebuilt, and custom EDID files. See section *EDID*.

Select CUSTOM EDID file – Browse to select a custom EDID file. The filename must be in the format *.edid. See section *EDID*.

Upload file – Upload the selected custom EDID file. See section *EDID*.

E5100 CONFIGURATION TAB (CONT.)

USB.ENABLED	<input checked="" type="checkbox"/> TRUE
USB.KVM_FAST	<input type="checkbox"/> FALSE
SERIAL.ENABLED	<input checked="" type="checkbox"/> TRUE
SERIAL.SETTINGS	Baudrate: 115200
	Data bits: 8
	Parity: None
	Stop bits: 1
GPIO.ENABLED	<input checked="" type="checkbox"/> TRUE
UNIT.GPIO_IN1:	<input checked="" type="checkbox"/> TRUE
UNIT.GPIO_OUT1:	<input type="checkbox"/> FALSE

USB.ENABLED – Turn on or off USB over IP. See section *USB over IP (KVM)*.

USB.KVM_FAST – See section *USB over IP (KVM)*.

SERIAL.ENABLED – Turn on or off RS232 over IP. See section *RS-232 over IP*.

SERIAL.SETTINGS – See section *RS-232 over IP*. Options are: Baudrate, Data bits, Parity, and Stop bits.

GPIO.ENABLED – Turn on or off GPIO over IP. See section *GPIO*.

UNIT.GPIO_IN1 – Reports if GPIO IN1 status is TRUE or FALSE. See section *GPIO*.

UNIT.GPIO_OUT1 – Sets GPIO OUT1 to either TRUE or FALSE. See section *GPIO*.

E5100 SYSTEM TAB

E5100 Device Network Configuration System

Reboot Factory Default

Change Password

Password

Reenter Password

Select update file Update filename

Update Unit

Information

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.

DECODER OPTIONS

D5100 DECODER DEVICE TAB

D5100		Device	Network	Configuration	System	MassConfig
Key	Value					
UNIT.ID	D5100-000389					
UNIT.MODEL	D5100					
UNIT.SERIAL	186-008-000389					
UNIT.FIRMWARE	3.18.12					
UNIT.FIRMWARE_DATE	Mon, 07 Oct 2024 14:37:58 -0700					

UNIT.ID – By default, the UNIT.ID of the encoder is the Model Number and the serial number (e.g., D5100-000389). This can be changed by the user on the **Network** tab.

UNIT.MODEL – E5100 (encoder) or D5100 (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 release

The screenshot shows the D5100 Decoder Device Tab interface. At the top left is a 'Monitor' button. To its right is a video preview window showing a black screen with the text 'D5200' in blue. Below the video window are two sections: 'Video Info' and 'Audio Info'. The 'Video Info' section displays: VIDEO INFO: Source=3840x2160@60P, Scaler=3840x2160@60P. The 'Audio Info' section displays: AUDIO INFO: Source=HDMI, Type=LPCM, Frequency=48 KHz, Size=24 bits, Channels=2.

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.

D5100 DECODER NETWORK Tab

D5100		Device	Network	Configuration	System	MassConfig
Save		Information				
UNIT.ID	D5100-000389					
UNIT.SET_ID	<input type="text"/>					
UNIT.LOCATION	<input type="text" value="Rack_Window"/>					
UNIT.MAC_ADDRESS	00:0E:14:80:01:85					
IP.MODE	<input type="text" value="static"/>					
IP.ADDRESS	<input type="text" value="192.168.13.141"/>					
IP.NETMASK	<input type="text" value="255.255.255.0"/>					
IP.GATEWAY	<input type="text" value="192.168.13.1"/>					
IP.DNS_SERVER	<input type="text" value="8.8.8.8"/>					

UNIT.ID – By default, the UNIT.ID of the encoder model number and serial number. 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 Encoder and Decoder IP Addresses*.

IP.DHCP_STATUS – Shows the unit's current status: valid or invalid

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.xxxxx fields. See section *Configuring 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.xxxxx fields. See section *Configuring 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.xxxxx fields. See section *Configuring 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.xxxxx fields. See section *Configuring Encoder and Decoder IP Addresses*.

D5100 DECODER CONFIGURATION TAB

The screenshot shows the 'Configuration' tab for the D5100 decoder. At the top, there are navigation tabs: D5100, Device, Network, Configuration (selected), System, and MassConfig. A 'Save' button is on the left, and a green message box says 'Page is finished loading.' The settings are as follows:

STREAM.HOST_LINKED	<input type="checkbox"/>	FALSE
STREAM.HOST_VIDEO	CONNECT	192.168.13.223
STREAM.HOST_AUDIO	CONNECT	192.168.13.223
STREAM.HOST_USB	CONNECT	192.168.13.131
STREAM.MODE		multicast
STREAM.QOS_DSCP		26
STREAM.AUDIO		STREAM

STREAM.HOST_LINKED – Used to set stream mode to linked or independent, TRUE (LINKED) or FALSE (INDEPENDENT). See section *Configuring Stream Settings (Manually)*.

STREAM.HOST – Displays current encoder IP address the decoder is tuned in LINKED mode. See section *Configuring Stream Settings (Manually)*.

STREAM.HOST_VIDEO – Select the source of video for the AV over IP stream See section *Configuring Stream Settings (Manually)*.

STREAM.HOST_AUDIO – Select the source of audio for the AV over IP stream See section *Configuring Stream Settings (Manually)*.

STREAM.HOST_USB – Select the source of USB for the AV over IP stream. See section *Configuring Stream Settings (Manually)*.

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

STREAM.QOS_DSCP - Used to set the QoS DSCP tag (default is set to 26)

STREAM.AUDIO – Select the source of audio for the AV over IP stream - HDMI, Analog - See section *Audio Settings*.

The screenshot shows the 'Audio Settings' section with the following controls:

AUDIO.VOLUME	80	<input type="range"/>
AUDIO.MUTE	<input type="checkbox"/>	FALSE
AUDIO.HDMI_MUTE	<input type="checkbox"/>	FALSE
AUDIO.AES67_ENABLED	<input checked="" type="checkbox"/>	TRUE

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)*.

AUDIO.HDMI_MUTE – Used to mute or unmute D5200 HDMI audio output. Is a dynamic runtime parameter, may also be set by rebooting decoder. See section *Audio Settings*.

AUDIO.AES67_ENABLED – Used to enable (TRUE) or disable (FALSE) native AES67 - See section *Native AES67 Audio*.

D5100 CONFIGURATION TAB (CONT.)

VIDEO.FORMAT	Auto
VIDEO.SOURCE_TIMEOUT	<input checked="" type="checkbox"/> TRUE
VIDEO.POWER_SAVE	<input type="checkbox"/> FALSE
VIDEO.HDCP_FORCE_ON	1_X
VIDEO.GENLOCK	<input checked="" type="checkbox"/> TRUE
VIDEO.OUTPUT	NORMAL
VIDEO.INFO_TEXT	<input type="checkbox"/> FALSE
VIDEO.OSD_TEXT	_58008_
Select Splash file	Filename
Upload file	

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)*.

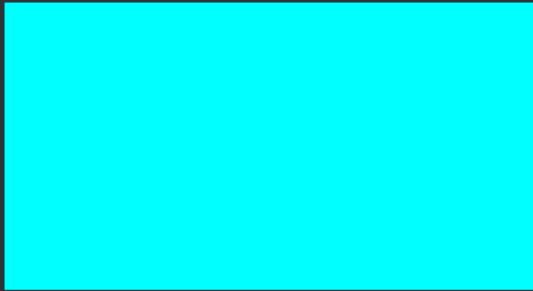
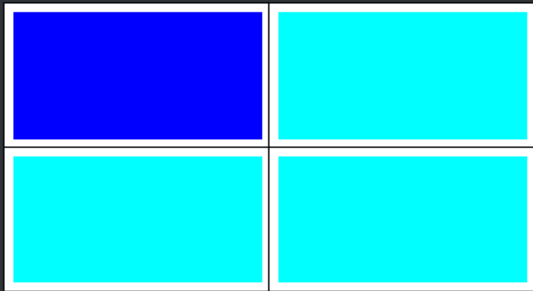
VIDEO.INFO_TEXT - Enables (TRUE) or Disables (FALSE) the showing of IP addresses and connection on display.

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)*.

D5100 CONFIGURATION TAB (CONT.)

VW.ENABLED	<input checked="" type="checkbox"/> TRUE	
VW.NAME	<input type="text" value="Wall"/>	
VW.STRETCH	<input type="text" value="Fit"/>	
VW.ROTATE	<input type="text" value="180"/>	
BEZEL AND GAP SETTINGS UNITS=0.1mm		
VW.OVERALL_WIDTH	<input type="text" value="1600"/>	
VW.VISIBLE_WIDTH	<input type="text" value="1540"/>	
VW.OVERALL_HEIGHT	<input type="text" value="900"/>	
VW.VISIBLE_HEIGHT	<input type="text" value="840"/>	
ROW AND COLUMN SETTINGS		
VW.MAX_ROWS	<input type="text" value="2"/>	
VW.MAX_COLUMNS	<input type="text" value="2"/>	
VW.ROW	<input type="text" value="1"/>	
VW.COLUMN	<input type="text" value="1"/>	

VW.ENABLED – Setting for turning Video Wall mode on or off. See section *Video Wall*.

VW.NAME – Hidden until VW.ENABLED is set to TRUE. User defined Video Wall name. For example: Videowall_1 or Videowall_3. (letters, numbers, dashes, and underscores only). See section *Video Wall*.

VW.STRETCH – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.ROTATE – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.OVERALL_WIDTH – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.VISIBLE_WIDTH – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.OVERALL_HEIGHT – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.VISIBLE_HEIGHT – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.MAX_ROWS – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.MAX_COLUMNS – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.ROW – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.ROW- Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

VW.COLUMN – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall*.

D5100 CONFIGURATION TAB (CONT.)

USB.ENABLED	<input checked="" type="checkbox"/> TRUE
USB.KVM_FAST	<input type="checkbox"/> FALSE
SERIAL.ENABLED	<input checked="" type="checkbox"/> TRUE
SERIAL.SETTINGS	Baudrate: 115200 <input type="text"/>
	Data bits: 8 <input type="text"/>
	Parity: None <input type="text"/>
	Stop bits: 1 <input type="text"/>
GPIO.ENABLED	<input checked="" type="checkbox"/> TRUE
UNIT.GPIO_IN1:	<input checked="" type="checkbox"/> TRUE
UNIT.GPIO_OUT1:	<input type="checkbox"/> FALSE

USB.ENABLED – Turn on or off USB over IP. See section *USB Over IP (KVM)*.

USB.KVM_FAST – Hidden until USB.ENABLED is set to TRUE. See section *USB Over IP (KVM)*.

SERIAL.ENABLED – Turn on or off RS232 over IP. See section *RS-232 Over IP*.

SERIAL.SETTINGS – Hidden until USB.ENABLED is set to TRUE. See section *RS-232 Over IP*. Options are: Baudrate, Data bits, Parity, and Stop bits.

GPIO.ENABLED – Turn on or off GPIO over IP. See section *GPIO*.

UNIT.GPIO_IN1 – Reports if GPIO IN1 status is TRUE or FALSE. See section *GPIO*.

UNIT.GPIO_OUT1 – Sets GPIO OUT1 to either TRUE or FALSE. See section *GPIO*.

D5100 DECODER SYSTEM TAB

Reboot – This button reboots the unit.

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

CEC-Power-On – Used to tun a device on using CEC control commands. See section *CEC Over IP (Decoder Only)*.

CEC-Power-Off – Used to tun a device off using CEC control commands. See section *CEC Over IP (Decoder Only)*.

CEC-GENERIC – Used to change a device input/source (HDMI -1, HDMI-2, HDMI-3, TOGGLE MUTE) using CEC control commands. See section *CEC Over IP (Decoder Only)*.

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

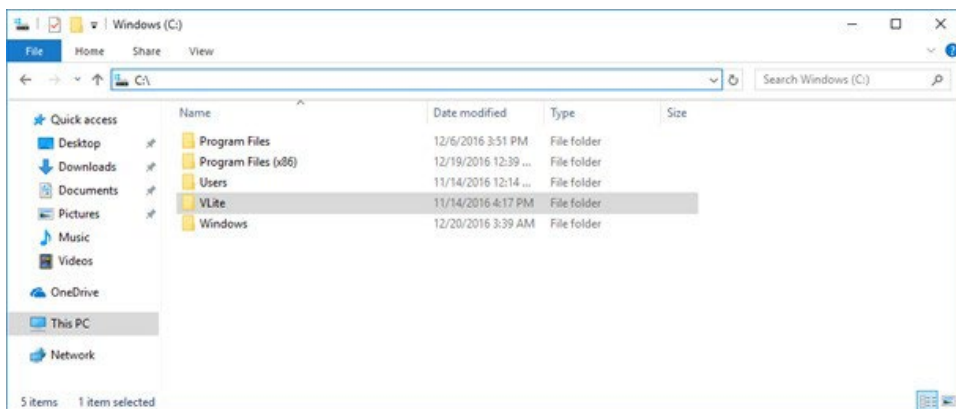
Vision Lite is a 4K Matrix Switching, Video Wall Control, and configuration software for use with our E5100 Encoder and D5100 Decoder endpoints.

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.

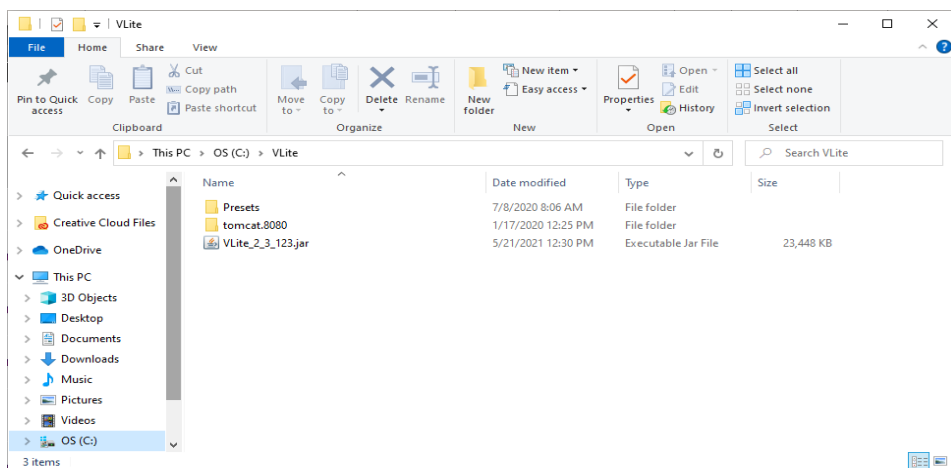
Vision Lite automatically discovers units on your network without any configuration.

Follow these instructions to install the Vision Light software.

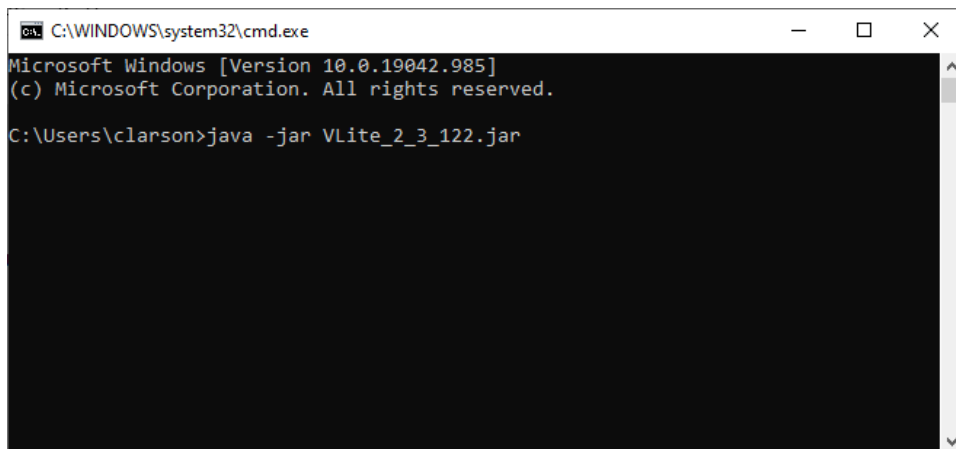
1. The latest Java JRE runtime is a prerequisite on the machine running VLite. The JRE can be found here: <http://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html>.
2. Download the latest Vision Lite software from visionary-av.com.
3. Manually create a read/write-able folder/directory `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.



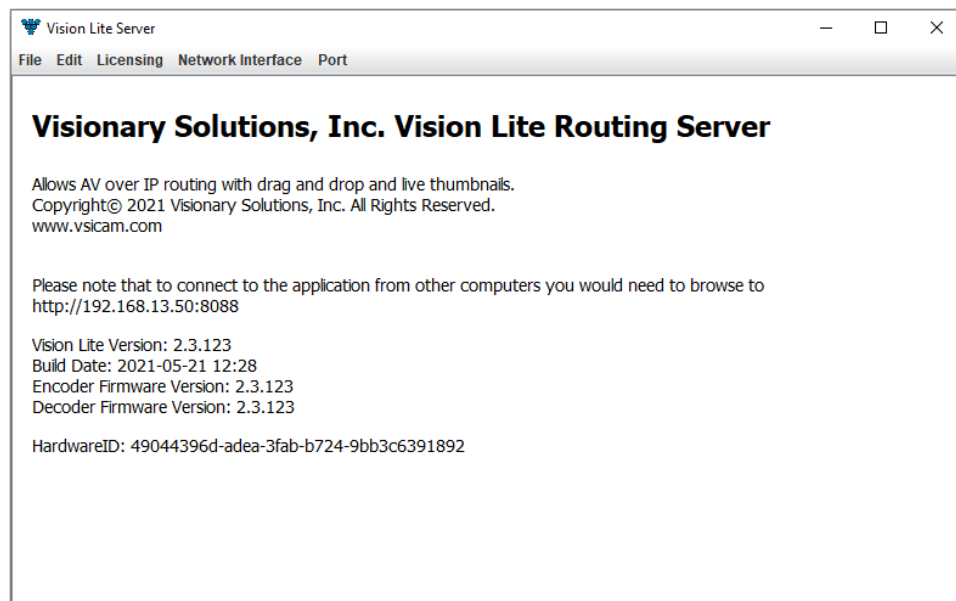
5. Launch the Vision Lite Server application by double clicking the `VLite.jar` file, OR from a command line interface using the following command: `java -jar VLite.jar`.



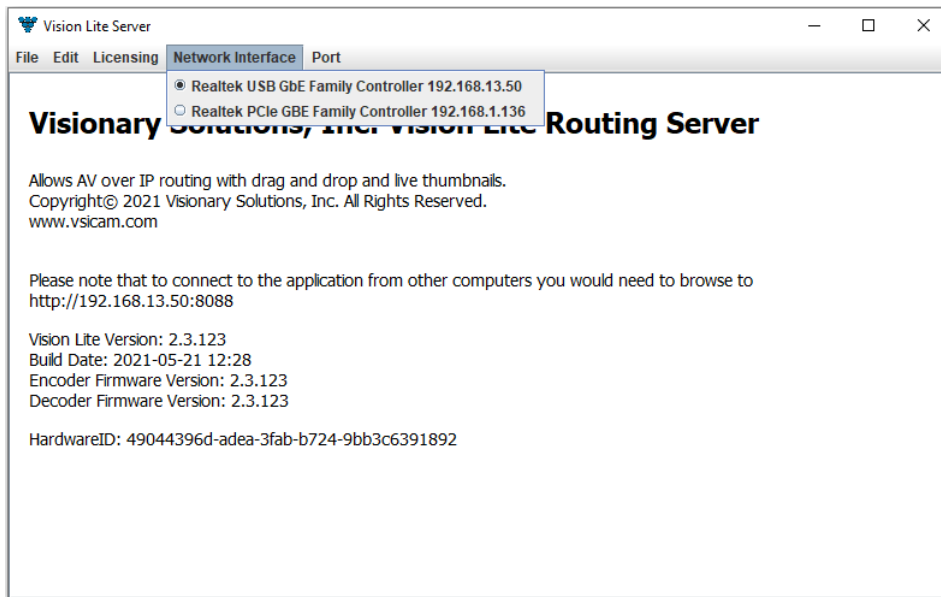
```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.19042.985]
(c) Microsoft Corporation. All rights reserved.

C:\Users\clarson>java -jar VLite_2_3_122.jar
```

6. The Vision Lite Server window opens.



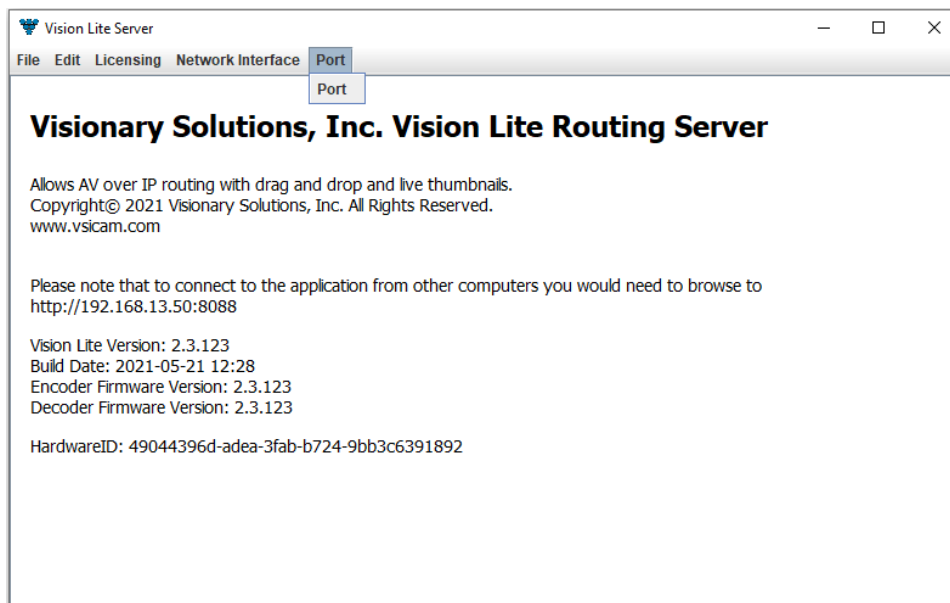
7. Go to the **Network Interface** menu and select the appropriate network interface.

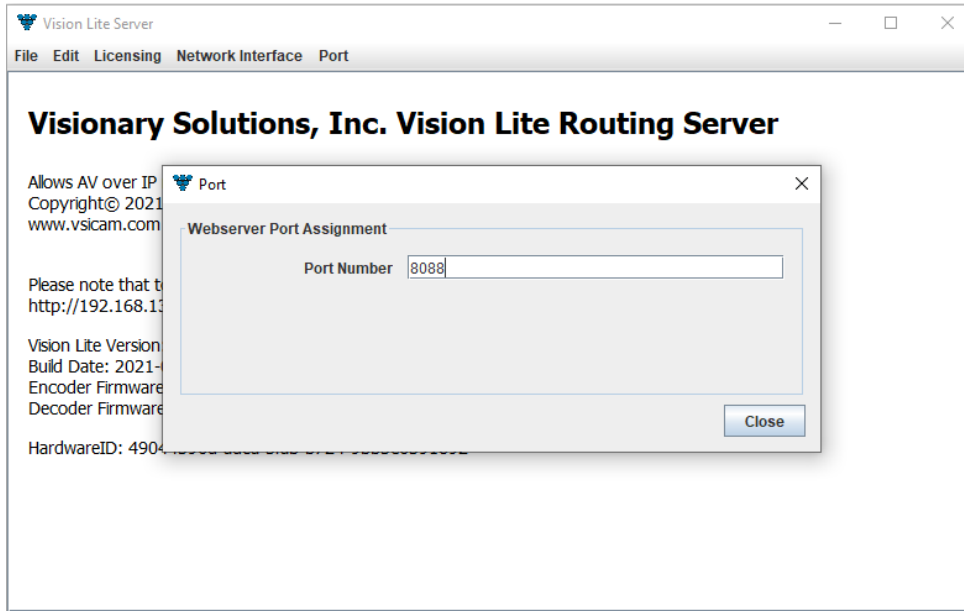


Select the network interface that the Vision Lite Server will be “listening” on. If your machine has more than one network interface, you will need to select the interface that is connected to the same network as the units.

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

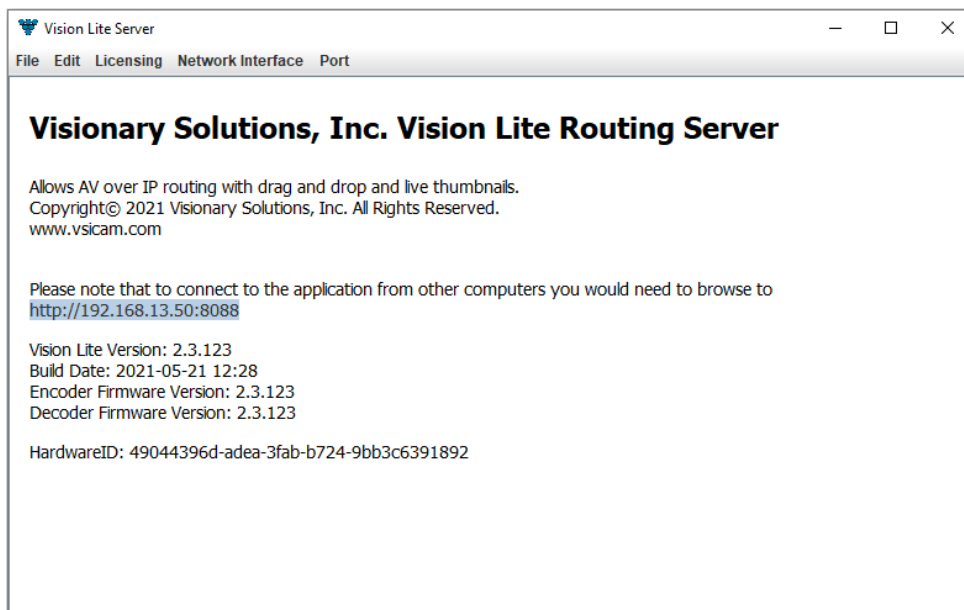
8. The default port assignment for VLite is 8080, other programs running on the computer may be using port 8080. If that is the case, the port for VLite will need to be changed for VLite to open. To change the port assignment, click on “Port” then enter the desired port number.



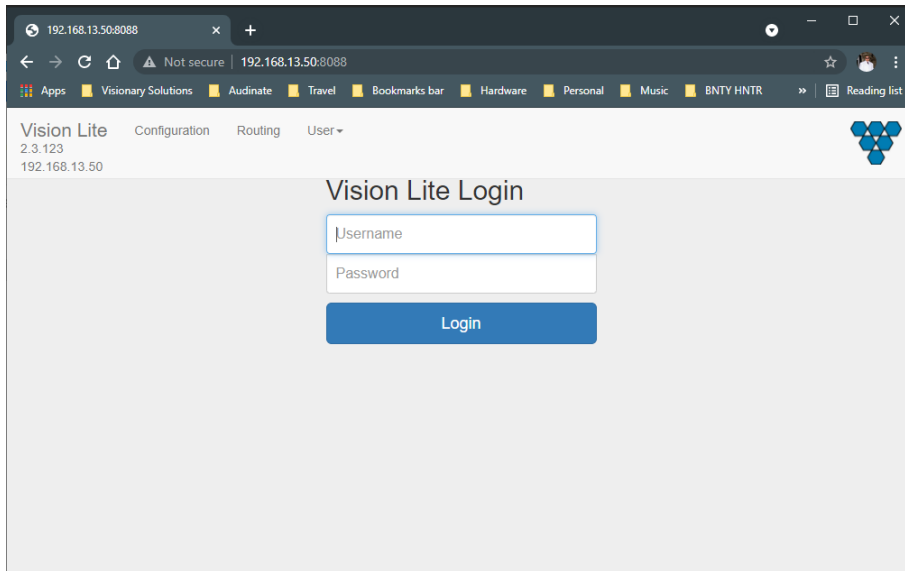


Important: The Vision Lite Server window needs to be closed and then reopened for the new port number to be assigned.

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.

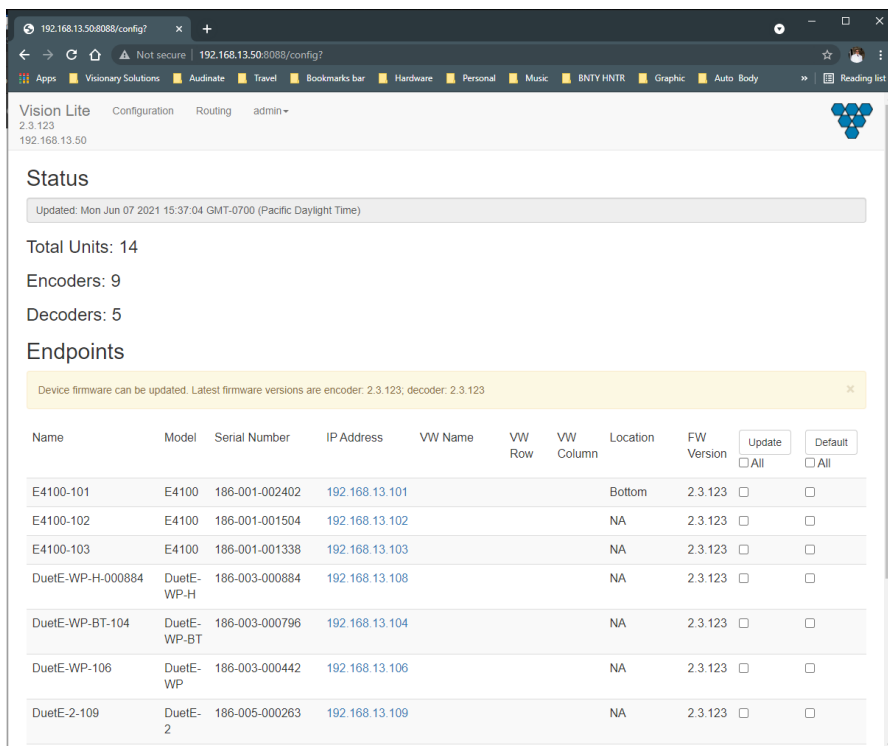


Note: You can log in from any machine on the network.

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.

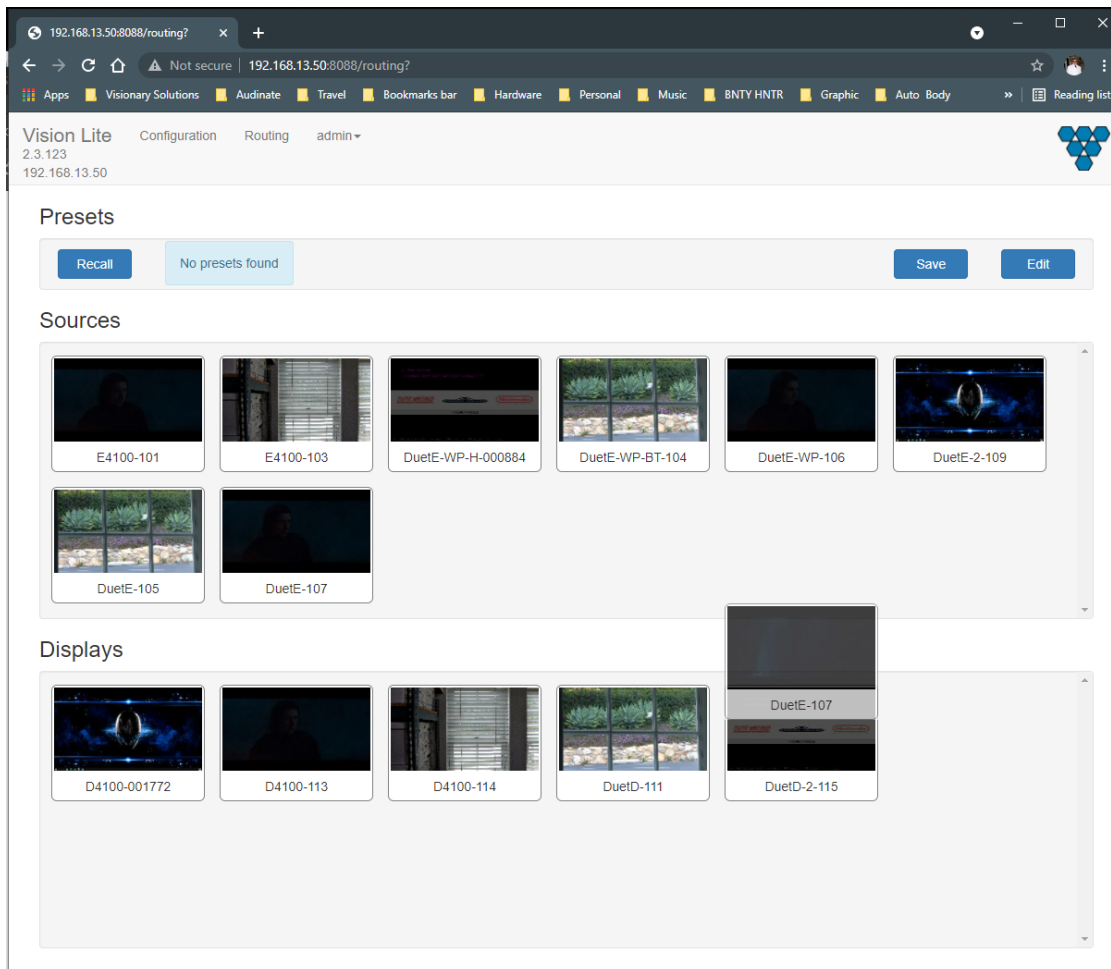


- On the **Configuration** page, you can click on the IP Address (hyperlink) of any endpoint to open the embedded web interface for each unit. On the unit's web interface, you can rename the units and/or set a user defined location.

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, Extron, etc., are available. Please contact support@visionary-av.com for details.

API

An API providing access to the full range of features on the encoders and decoders is offered to qualified System Integrators. Please contact support@visionary-av.com for details.

TROUBLESHOOTING

This section provides useful information to help you to resolve any difficulty you might have with your E5100/D5100 endpoints.

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 E5100/D5100 firmware in order to troubleshoot the unit. To find the firmware version of your E5100/D5100 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 E5100/D5100 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*.

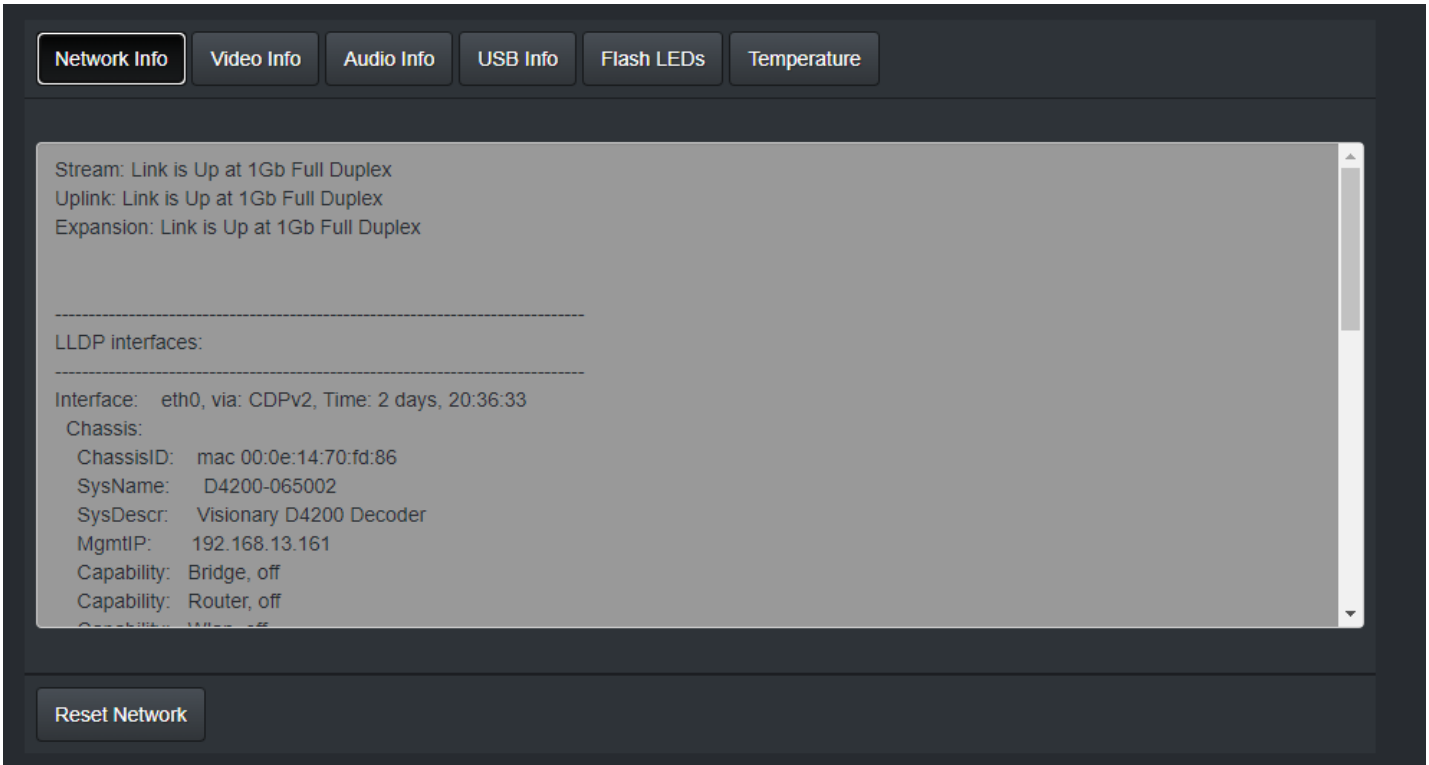
Method:

1. Access the web interface for the unit that will be factory defaulted.
2. Log in with **username=adminpassword=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.

DIAGNOSTICS PAGE

Every encoder and decoder have a diagnostics page that is accessible via the web UI. To access the diagnostics page, either click on the thumbnail preview on the units Device page of its web interface or type the following address into a web browser: <http://admin:admin@<unit IP address>/diagnostics.html>. The diagnostics page provides the following information:

NETWORK INFO



Displays the current network link speed for Encoder or Decoder. In addition, the network info displays local and neighbor LLDP information.

VIDEO INFO

Network Info | **Video Info** | Audio Info | USB Info | Flash LEDs | Temperature

```

VIDEO.TIMING=Output Timing Convert: Enabled [0x8000005F]
Timing Table: Serial Number[0x006B] [3840]X[2160] [30]Hz
Pixel Rate: 296703KHz, Htotal: 4400, Vtotal: 2250
Hbp: 296, Vbp: 72, Hsw: 88, Vsw: 10
Progressive, HPos, VPos
Color Depth: [0]
HDCP: [On], version 1.x
HDCP Convert: Disable
Capture Windows: [1920]X[1080] [60]Hz
Compress Windows: [1920]X[1080] [60]Hz
Active Windows: [1920]X[1080] [60]Hz
CRT Windows: [1920]X[1080]
Scan Mode: Progressive
Signal Type: HDMI 16:9

QUERY.VIDEO_TIMING=OK
    
```

Reset Network

Displays the current video information, containing but not limited to resolution, refresh rate, scan mode, and HDCP.

AUDIO INFO

The screenshot shows a web interface with a dark grey background. At the top, there is a horizontal row of six buttons: 'Network Info', 'Video Info', 'Audio Info' (which is highlighted with a white border), 'USB Info', 'Flash LEDs', and 'Temperature'. Below this row is a large, light grey rectangular area containing the following text:

```
AUDIO.INFO=State: On
Source: HDMI
Type: LPCM (0x80)
Sample Freq: 48 KHz
Sample Size: 24 bits
Valid Ch: 2

QUERY.AUDIO_INFO=OK

API.STATUS=SUCCESS_QUERY
```

At the bottom left of the interface, there is a button labeled 'Reset Network'.

Displays the current audio source codec, type, sample frequency, and sample size information.

USB INFO

The screenshot shows a web interface for a device. At the top, there are six tabs: Network Info, Video Info, Audio Info, USB Info, Flash LEDs, and Temperature. The 'USB Info' tab is selected and highlighted with a white border. Below the tabs is a large grey rectangular area containing the following text:

```

USB.INFO=0 255.255.255.255
1 192.168.13.161
2 -
3 -
4 -

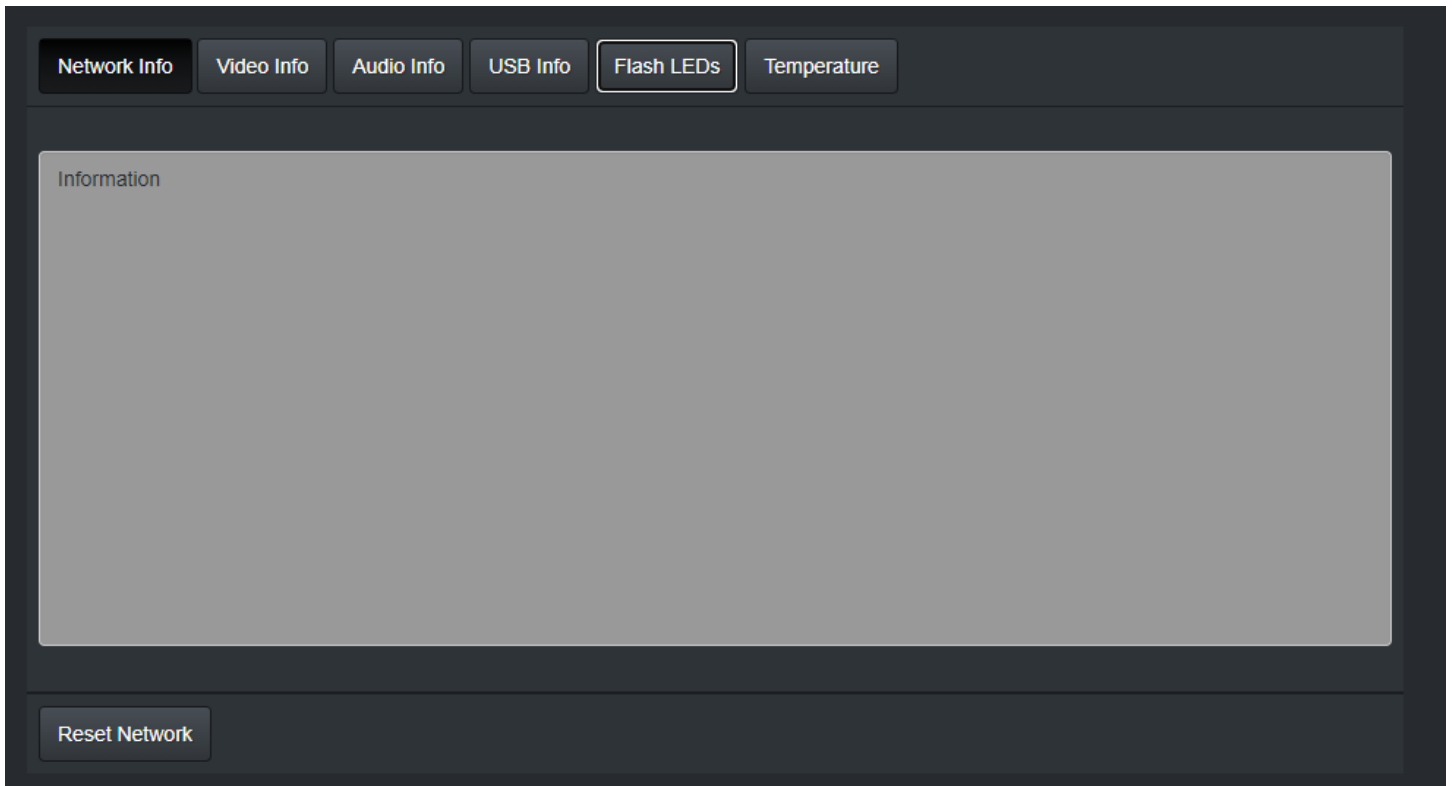
QUERY.USB_INFO=OK

API.STATUS=SUCCESS_QUERY
    
```

At the bottom left of the interface, there is a button labeled 'Reset Network'.

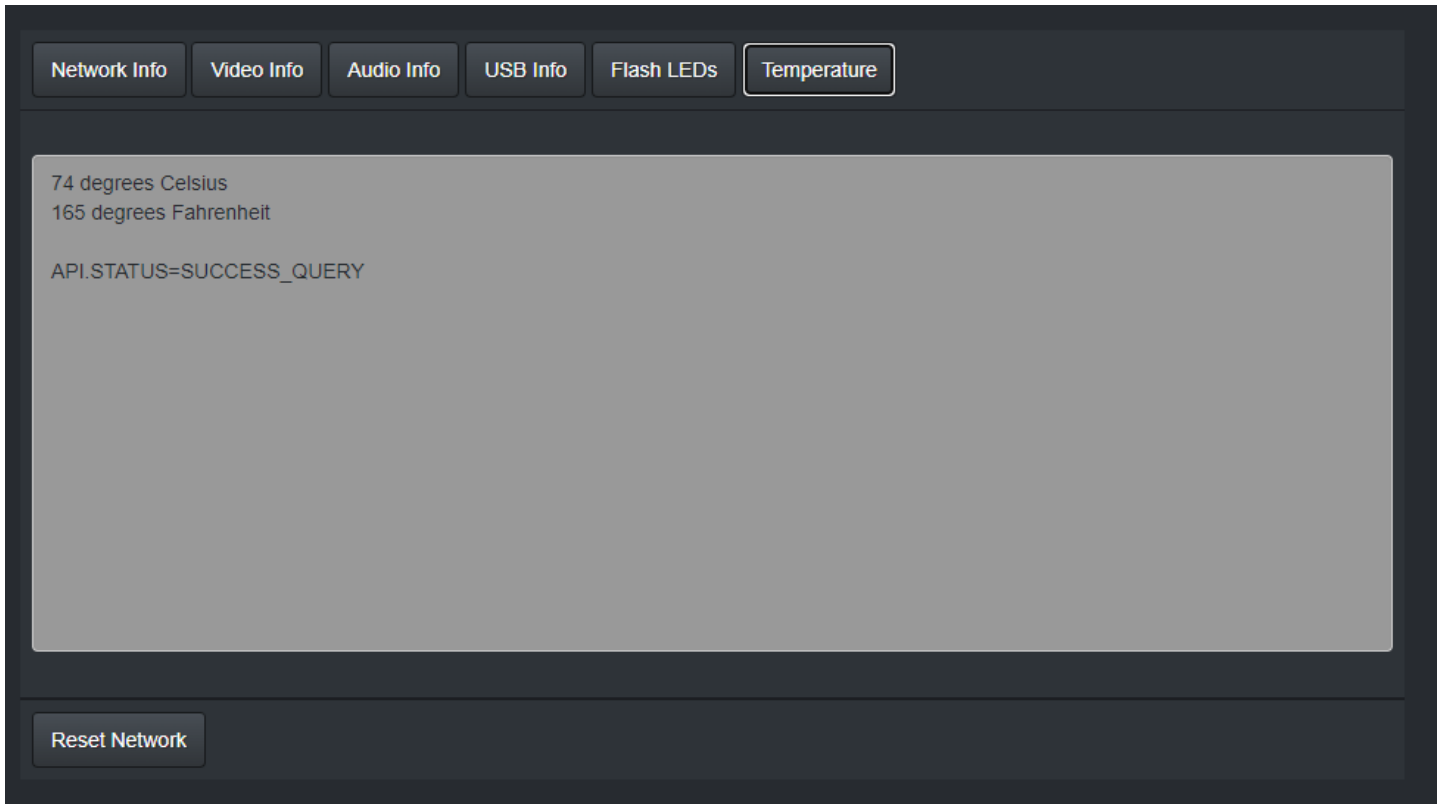
Displays the current USB/KVM IP connections.

FLASH LEDs



Flashed the front LEDs of the unit.

TEMPERATURE



Displays the current unit temperature in both Celsius and Fahrenheit.

RACK MOUNT KIT

The optional rack mount system for encoders/decoders is available as a kit from Visionary Solutions.



Figure 10. Rack Mount System

PRODUCT SPECIFICATIONS

Encoding / Decoding	
Video Codec	JPEG2000 based visually lossless video compression algorithm
Audio Codec	LPCM, Native AES67
Bit Rates	50 to 800 Mbps
Latency	Ultra-low Latency Sub-Frame (visually lossless video) ~2ms @ 1080p60 & 4K60 4:4:4 ~4ms @ 1080p30 & 4K30
Streaming Protocols	IP, UDP, TCP, ICMP, IGMP
Copy Protection	HDCP 2.2, 2.3 AES-256 Encryption
Video	
Maximum Resolutions	High Dynamic Range (HDR) 4K60 4:4:4 HDR 8 bit 4K30 4:4:4 HDR 12 bit 1080p60 4:4:4 HDR 12 bit 1080p30 4:4:4 HDR 12 bit Supports HDR10, HDR10+, HLG, Dolby Vision
Input Signal Types (Encoder)	HDMI (with Loop Out) capable of receiving source input video formats up to 4K60 4:4:4
Output Signal Types:	Decoder: 1x HDMI capable of scaling and outputting video formats up to 4K60 4:4:4 Encoder: (HDMI Loop Out) capable of outputting video formats up to 4K60 4:4:4
Switcher (Encoder)	2 x HDMI® and 1 x USB-C input and 1 x HDMI output (manual or auto-switching)
Scaler (Decoder)	Supports a wide range of resolutions and rates, up to 4K in/1080P out, 1080P in/4K out, image rotation, and video wall up to 16x16 Integrated scaling helps optimize image quality and switching performance
Audio	
Input Signal Types	HDMI Audio, Analog Stereo Audio, Dante®/AES67* Network Audio (up to 4 channels) <ul style="list-style-type: none"> • 1 analog stereo input, unbalanced or balanced • 1 digital input de-embedded from HDMI
Output Signal Types	HDMI Digital Audio (NLPCM pass-through), Analog Stereo Audio, Native AES67 Network Audio <ul style="list-style-type: none"> • 1 Digital audio output via HDMI • 1 Analog Stereo Audio balanced output • 1 Native AES67 digital audio output (up to 2 channels)
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS-ES, DTS 96/24, DTS-HD High Res, DTS-HD Master Audio, DTS:X, LPCM up to 8 channels.
Analog Formats	Stereo 2-channel
Analog-To-Digital Conversion	24-bit 48 kHz
Digital-To-Analog Conversion	24-bit 48 kHz
Native AES67	24-bit 48 kHz
Analog Output Volume Adjustment	-80 to +20 dB

Communication & Control of External Devices	
Ethernet	Network connectivity for control and IP traffic pass-through to remote LAN devices
USB	USB 2.0 host or device signal extension and routing
GPIO	For extension and control of third-party devices
Serial / RS-232	Bi-directional device control and monitoring
IR	Device control via infrared
HDMI	HDCP 2.2, 2.3, EDID (encoder), CEC (decoder)
Connectors	
LAN	8-pin RJ-45 connector, female; 100BASE-TX / 1000BASE-T Ethernet port / PD port POE (IEEE 802.3af or 802.3at)
HDMI INPUT (Encoder)	HDMI Type A connector, female; HDMI digital video/audio inputs
HDMI Outputs (Encoder loop-through & Decoder output)	HDMI Type A connectors, female; HDMI digital video/audio inputs
1 st – 8 pin Euroblock 3.81mm pitch connector	GPIO out / RS-232 ports
2 nd - 8 pin Euroblock 3.81mm pitch connector	Encoder Stereo Balanced Analog Audio Input Decoder Stereo Balanced Analog Audio Output GPIO in ports
USB Host (Decoder)	(2) USB Type-A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device
USB Device (Encoder)	(1) USB Type-B connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host
Power	
Power Consumption	12 W typical
Environmental	
Cooling	Convection / no fan (no moving parts)
Temperature	32° to 104° F (0° to 40° C)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	41 BTU/hr
Acoustic Noise	0 dBA
Form Factor	
Dimensions	Height: 1.15 in. (29.3 mm) Width: 5.75 in. (146 mm) Depth: 5.37 in. (136.4 mm)
Weight	1.0 lb (0.45 kg)
Compliance	
	CE, FCC, C-tick, RoHS, WEEE