VISIONARY
NETWORK AUDIO VIDEO

DuetE-5 • Encoder | DuetD-5 • Decoder User Manual

www.visionary-av.com

Contents

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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 Duet-5 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 PackeTV® and PacketAV® products can be deployed on any industry standard IP network. They can be used on existing enterprise IP networks or on a physically separate parallel network [private network] to offload traffic, using the same network protocols, methods, and devices but without intermingling video traffic with data or voice, and with equal ease of installation.

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 Duet-5 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 Duet-5 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 Duet-5 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. Duet-5 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 an 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 Duet-5 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, is it 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 Duet-5 (15.4W). In some operating conditions less power will be demanded per Duet-5, 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 NETGEAR M4250-26G4XF-PoE+ (GSM4230PX) has 24 PoE+ ports available and a PoE power output of 480W and the ports require 15.4W: 480 / 15.4 = 31.16. Therefore, 24 devices can be powered by this switch.
- A NETGEAR M4250-40G8XF-PoE+ (GSM4248PX) has 40 PoE+ ports available and a PoE power output of 960W and the ports require 15.4W: 960 / 15.4 = 62.33. Therefore, 40 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 DuetE-5 encoder will produce up to 800Mb/s of data. Therefore, 10 encoders will require 10 x 800MB/s = 8Gbps. Duet-5 requires the switch to be GbE. Duet-5 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 x 1000-Mbps x N) where N is the number of ports on the switch passing the video traffic. For example, a 24-port switch where all available ports may be used to pass video traffic should have a (2 x 1000 x 24) = 48Gbps backplane. One channel of encoder video can be sent or received from each port in this switch example although full bandwidth may not be used at any one time.

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

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

Visionary Solutions offers sample switch configuration files, optimized for Network AV, for certain switch brands/models for testing purposes. Contact support@visionary-av.comto 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, Duet-5 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 Duet-5 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 an IGMP Leave Group packet. Once received, the time it takes for the switch to apply the new configuration may vary from one switch to another. Most switches have a Fast-Leave configuration option. When enabled, Fast-Leave speeds up the time needed for a port assigned to one multicast group to leave the group and join a different multicast group. This significantly reduces the video switching time. Always enable the Fast-Leave option when it is available.
3. **Allow multicast traffic on all network ports through which video streams pass**.
4. **Ensure current Access Control Lists (ACLs) are not filtering multicast or control traffic**.
5. **Remove Flow Control and/or Storm Control on any network port passing the video stream**.
6. **Enable VLANs to separate video traffic from data and voice**.
7. **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

Duet-5 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 Duet-5 endpoints can be installed on an existing (converged) network. When using an existing infrastructure, dedicated VLANs are recommended to separate the video 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.

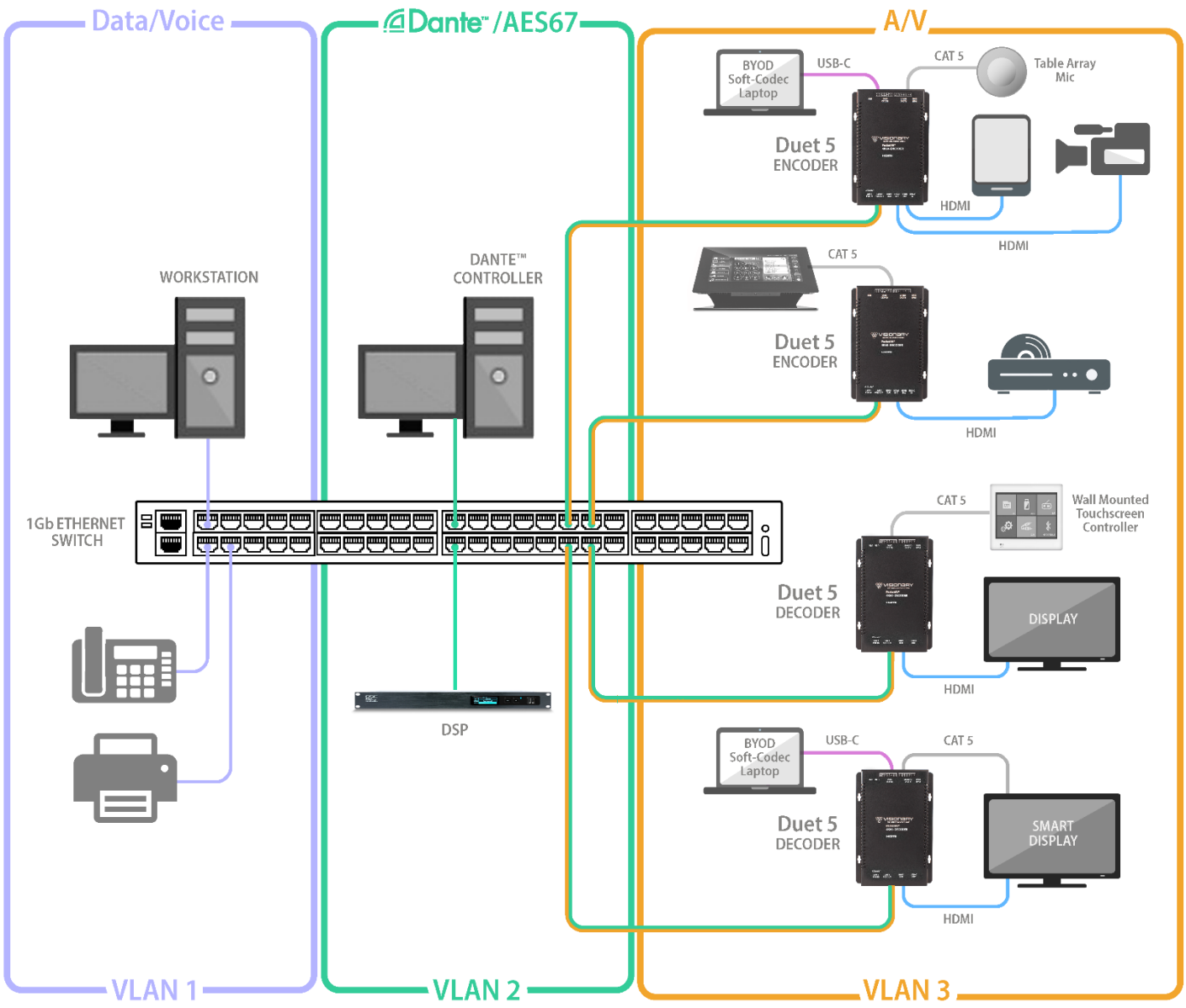


Figure 1. Converged Network Diagram

Installing On A Dedicated Network

Figure 2 illustrates how Duet-5 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.

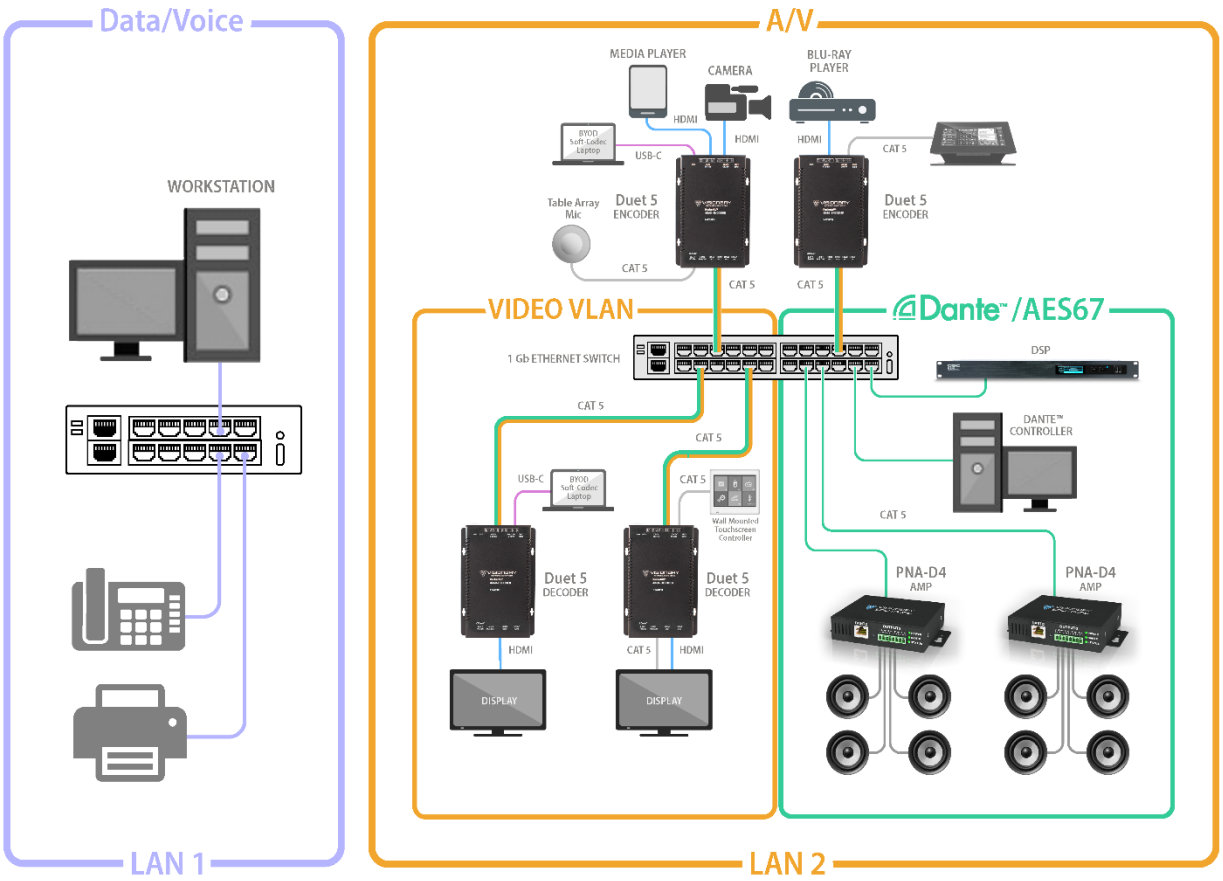


Figure 2. Dedicated Network Diagram

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 x 1000-Mbps x N) where N is the number of ports on the switch passing the video traffic. For example, a 24-port switch where all available ports may be used to pass video traffic should have a (2 x 1000 x 24) = 48Gbps backplane.

Multiple Switch Networking

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

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

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

$$\frac{\text{Link Bandwidth}\ \text{10,000 Mbps (recommended)}}{\text{800 Mbps for 4K}\ \text{or}\ \text{200 Mbps for 1080p}} = \text{Total \# of Streams}$$

INSTALLATION AND CONNECTIONS (SYSTEM EXAMPLES)

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

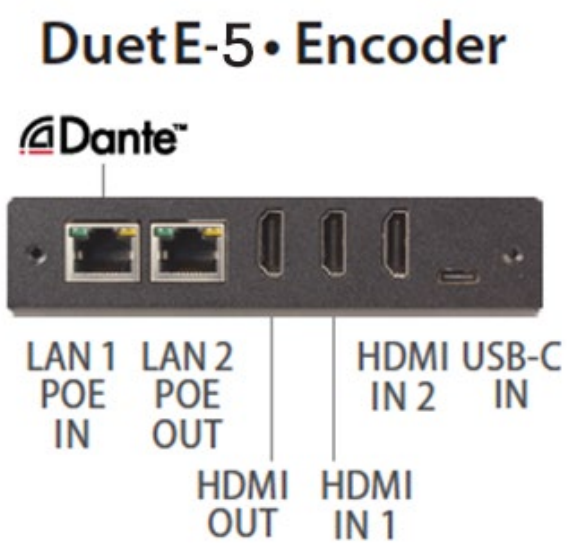
1. Use an HDMI cable to connect the AV source to the **HDMI IN1** and/or **HDMI IN2** port on the encoder unit.
2. (Optional) Use a USB-C cable to connect the AV source to the **USB-C IN** port on the encoder unit.

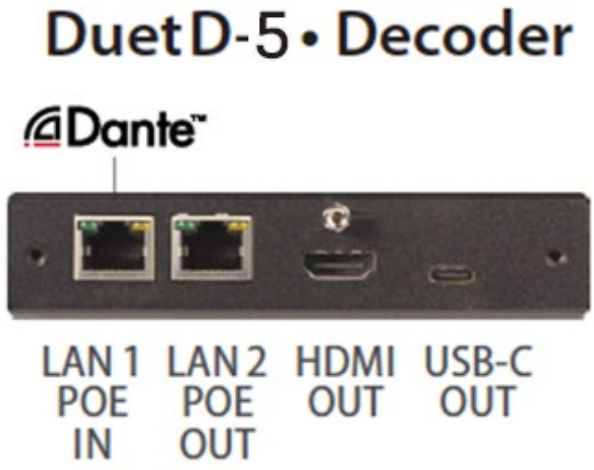
***Note**: USB-C IN may be used to connect easily and share media from your Mac, Laptop, Tablet, Mobile, and Other USB-C enabled devices. Not all devices will be compatible; Source devices must support DisplayPort Alt Mode for USB Type-C or Thunderbolt.*

3. (Optional) Use an additional HDMI cable to connect the **HDMI OUT** (Loop-through) port on the encoder unit to a local display.
4. Connect an HDMI cable from the display to the **HDMI OUT** port on the decoder unit.
5. (Optional) Connect a USB-C cable from a PC or Soft Codec to the **USB-C OUT** port on the decoder unit.

***Note**: USB-C OUT enables soft-codec integration via driverless USB 2.0 connection to a PC for web conferencing applications such as Zoom, Skype, Cisco WebEx, and Microsoft Teams. Dynamically switch and view decoder output on your PC for recording, editing, videoconferencing, and streaming applications. Use the PC streaming software of your choice and live broadcast your signal to any online video platform. USB Video Class (UVC) - compliant, a video capture standard that is compatible with Mac OSX, Windows®, Linux® and Android operating systems. Output Resolutions up to 1080p.*

6. Connect a CAT 5 (or better) cable from the **LAN1** port on the encoder unit to a PoE port on the network switch.
7. Connect a CAT 5 (or better) cable from the **LAN1** port on the decoder unit to a PoE port on the network switch.





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*.

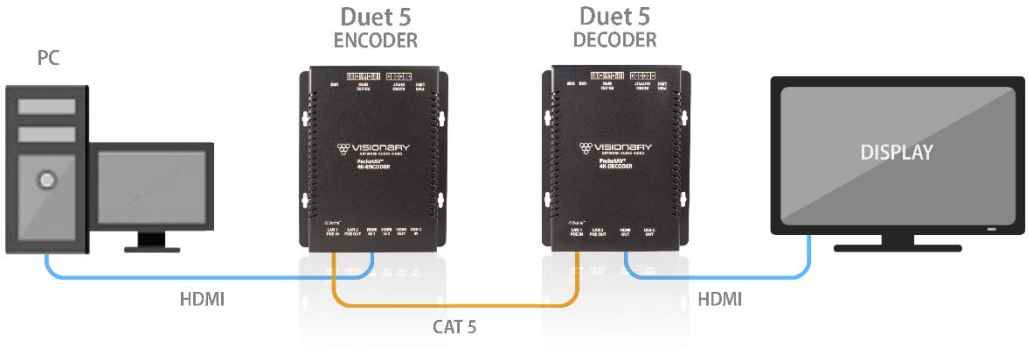


Figure 4. One Source to One Display Diagram

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.

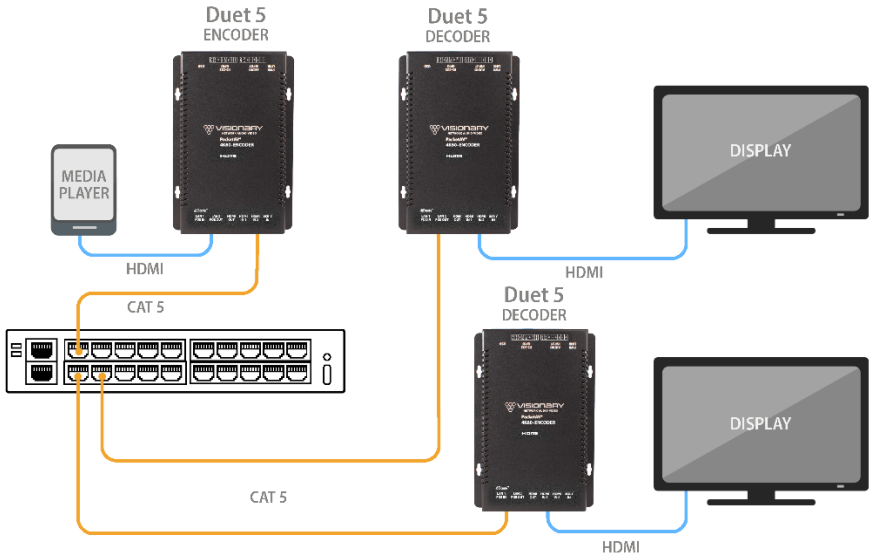


Figure 5. One Source to Many Displays Diagram

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 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.

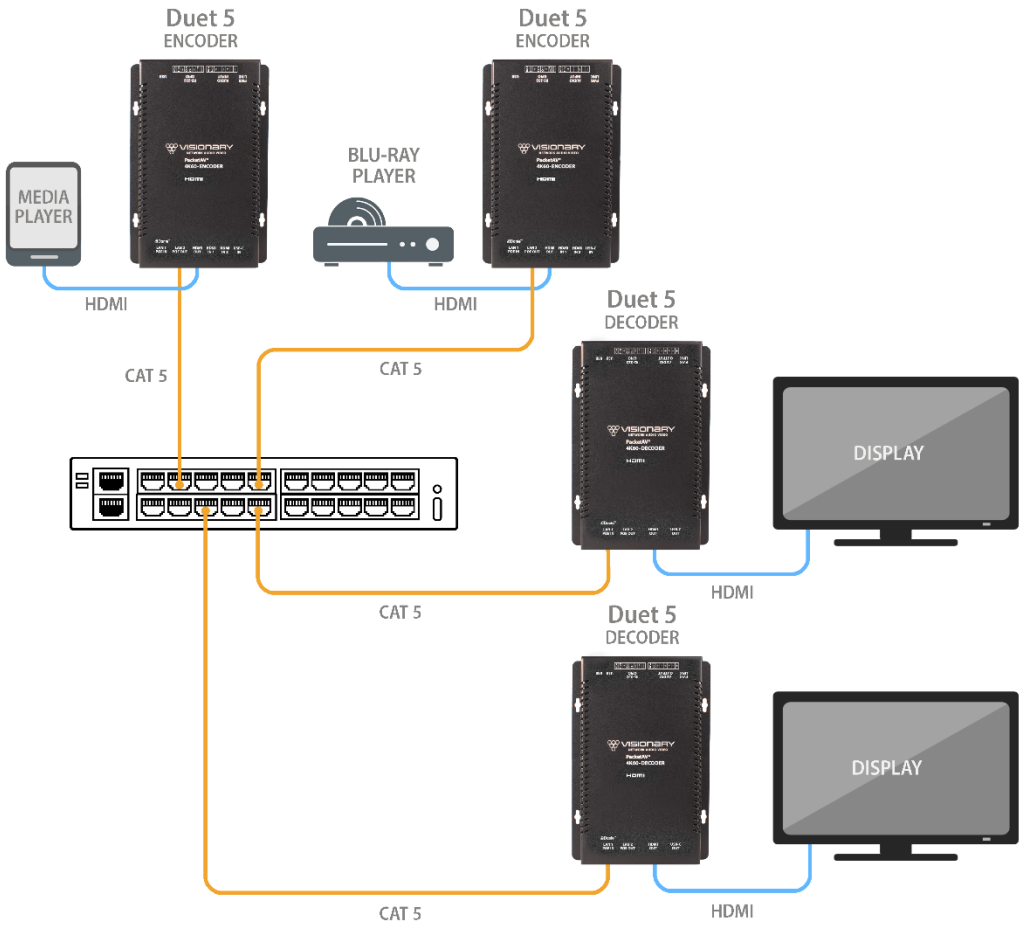


Figure 6. Many Sources to Many Displays Diagram

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

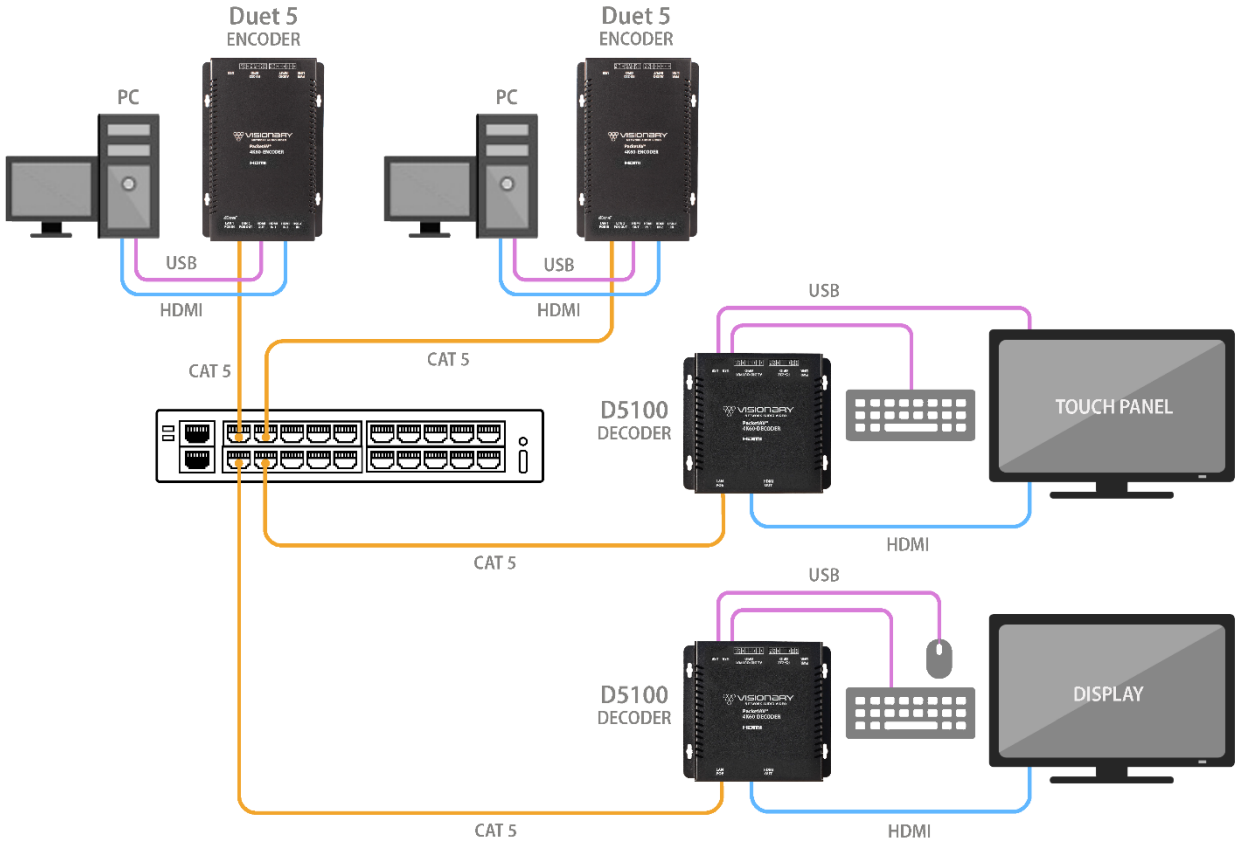


Figure 7. Many Sources to Many Displays with USB over IP Diagram

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

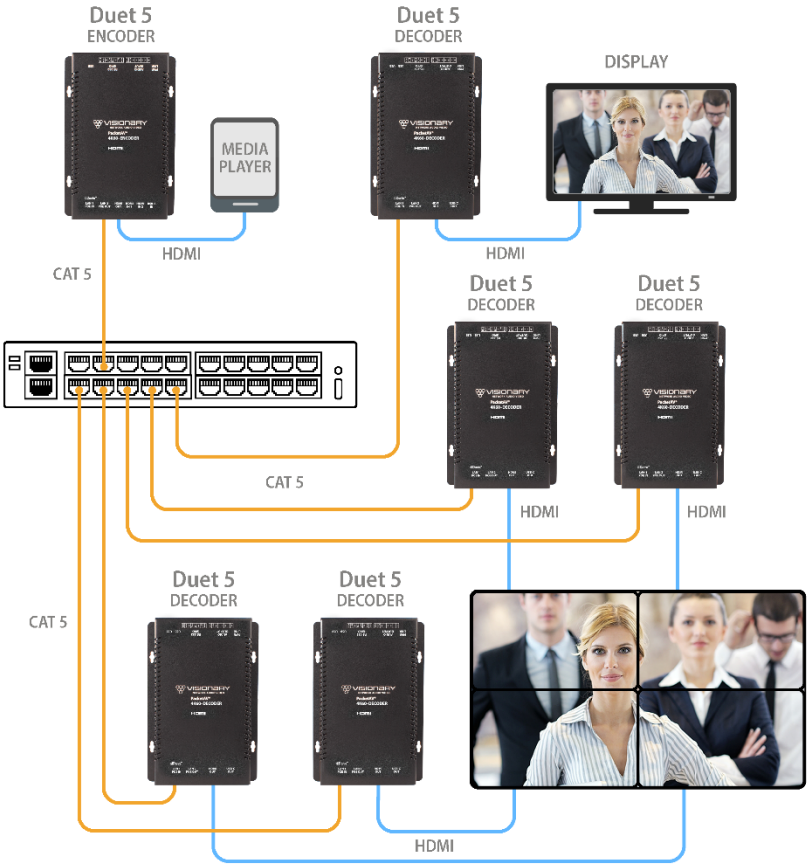


Figure 8. Video Wall Diagram

NETWORK DISCOVERY

Discover your Duet-5 endpoints on the network.

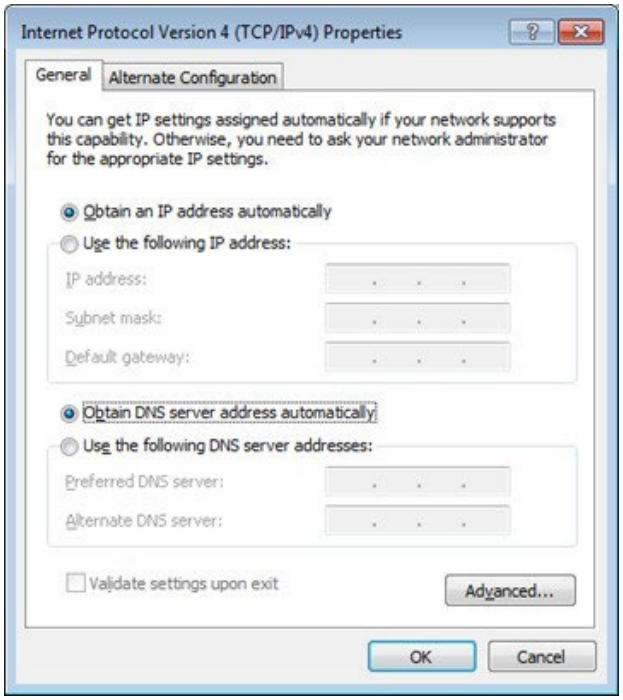
By default, the encoders and decoders are shipped from the factory in DHCP mode with Auto IP Failover. In DHCP mode, each encoder and decoder unit are automatically assigned a unique IP address by the DHCP server. If there is no DHCP server on the network, the encoders and decoders (after about one minute)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

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

In order to communicate with the Duet-5 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:**

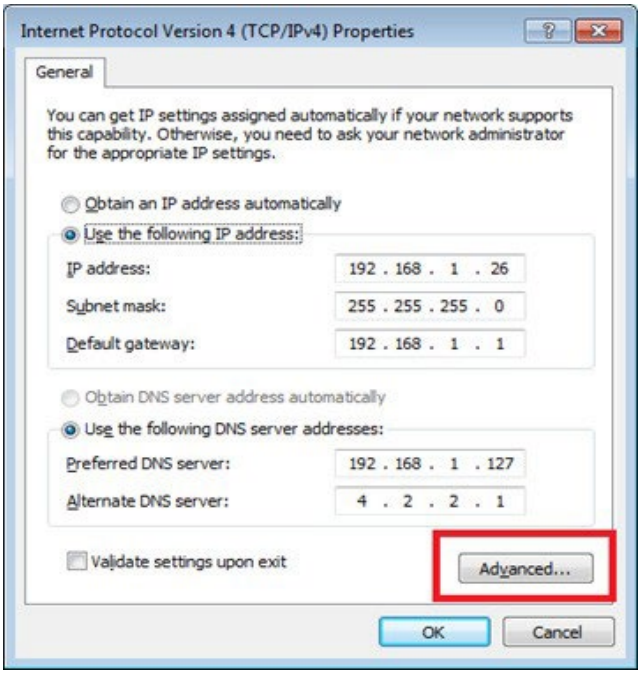
- **Method 1**: If there is a DHCP server on the network, accept **Obtain an IP address automatically** (the default)**.** The computer will be automatically assigned a unique IP address by the DHCP server on the same subnet, allowing communication with the Duet-5 endpoints.
- **Method 2**: Configure 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.

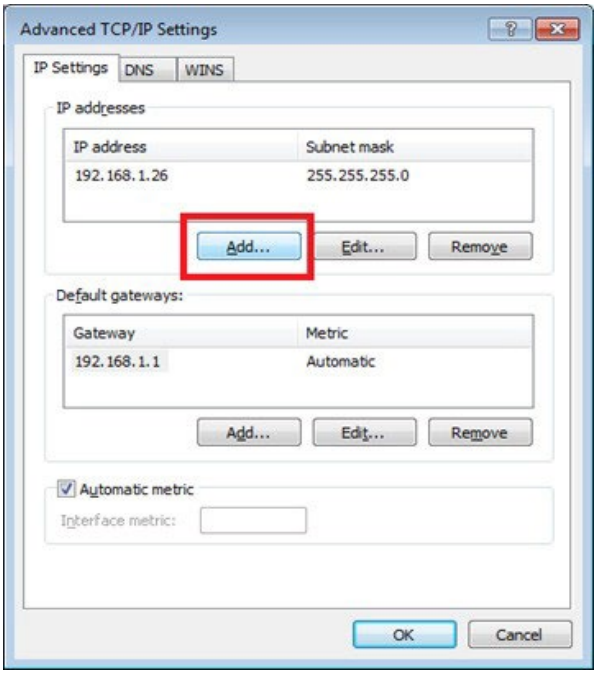
To set up your computer to communicate with endpoints that are using **Auto IP:**

- **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.

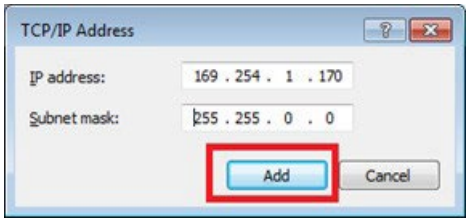
- **Method 2**: If the computer already has a statically-assigned IP address:

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

   The unit is now configured with the new network settings.

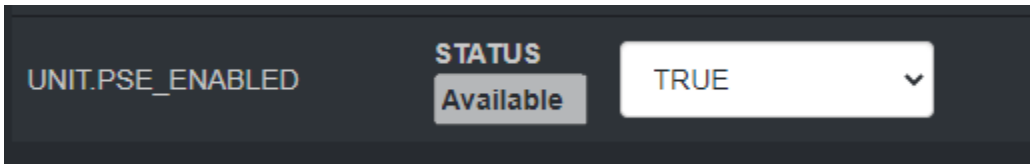
DUET-5 LAN1 & LAN2 ETHERNET EXPANSION PORT

Duet-5 is equipped with a single main gigabit (**LAN1)** Port for 4K UHD Video, Control, and Powered Device (PD). This single Ethernet port is used for Video over IP and control, with VLAN tagging capability to separate LAN1 & LAN2 network traffic as needed.

Duet-5 is also equipped with an Ethernet Expansion (**LAN2)** Port - Power Sourcing Equipment (PSE). This port enables network connectivity for control and IP traffic pass-through to remote LAN devices (ex. displays, projectors, control touch-panels). The port can also be used to daisy-chain multiple endpoints for easy video wall creation or extend distances to displays.

Power connected devices with PoE pass-through.

DuetE-5 Encoders and DuetD-5 Decoders only require standard PoE power (15w or lower), however, when PoE+ is supplied to the Main LAN1 port you can pass-through PoE power to devices connected to the **LAN2** Ethernet Expansion Port.



When PoE+ is supplied to the LAN1 port, the UNIT.PSE_ENABLED status found at the bottom of the unit's web UI Network tab will display "Available." When the Status window displays "Available," use the drop-down menu to choose either TRUE or FALSE. When set to TRUE, PoE will be supplied out the LAN2 Ethernet Expansion port.

VLAN Trunk Mode

The Duet-5 utilizes a single physical network interface (LAN1) for PoE power, video, audio, and control. The VLAN trunk mode of a Duet-5 may be enabled to separate network traffic to meet the specific needs of a system. When VLAN.TRUNK_MODE is set to FALSE (Default), the AV stream, Dante audio and control traffic are all on the same VLAN/network. When VLAN.TRUNK_MODE is set to TRUE, the AV stream/control traffic connects to a separate VLAN than the Dante audio traffic. In addition, the Ethernet Expansion Port (LAN2) may be member of the same VLAN as the AV stream/control traffic, Dante audio traffic, or an additional 3rd VLAN.

Enabling VLAN trunk mode for Duet-5 as follows:

1. Access the web interface for the Duet-5 unit.
2. Log in with **username**=admin **password**=admin
3. Click the **Network** tab
4. Set **VLAN.TRUNK_MODE** to **TRUE**
5. Set **IP.VLAN_TAG_STREAM** to the VLAN configured for the AV stream Example: 1
6. Set **IP.VLAN_TAG_EXPANSION** to the VLAN configured for control data. Example: 2
7. Click **Save** to save the new settings. The unit will automatically reboot.

The unit is now configured with the new network settings.

***Important**: The port on the network switch the Duet-5 is connected must also be configured as a trunk port and must be a tagged member of assigned VLANs.*

Once the initial configuration is complete, you will be primarily using the Vision Lite matrix routing control software (or other third-party control systems) to route the encoder and decoder streams to each other. When using these systems, the **STREAM.HOST** setting, described in the following sections, is automatically updated each time a routing/switch occurs.

In the absence of a control system, it is still possible to manually configure the stream settings. The instructions are included below.

ETHERNET EXPANSION PORT (LAN2)

The Ethernet Expansion Port (LAN2) port of a Duet-5 may be configured differently to fit the specific network needs of a system.

IP.EXPANSION_PORT = ENABLED
When IP.EXPANSION_PORT is set to ENABLED (default), the LAN2 port of the Duet-5 may be used to connect additional network devices to the same network LAN1 is connected. If IP.VLAN_TRUNK_MODE is also set to TRUE, the LAN2 port of the Duet-5 may be assigned to the tag of the AV stream VLAN, Dante VLAN, or an additional 3rd VLAN.

***Important**: The port on the network switch the Duet-5 is connected must also be configured as a trunk port and must be a tagged member of assigned VLANs.*

IP.EXPANSION_PORT = DISABLED
When IP.EXPANSION_PORT is set to DISABLED, the LAN2 port of the Duet-5 will be disabled and will not communicate.

IP.EXPANSION_PORT = SEPERATE
When IP.EXPANSION_PORT is set to SEPERATE, the LAN1 port of the Duet-5 is used for the AV stream/control traffic and the LAN2 port is used for Dante audio traffic. This enabled the Duet-5 to have a dedicated physical connection to the Dante network.

EXTREME NETWORKS' FABRIC ATTACH

Extreme Networks' Fabric Attach is a feature that automates the provisioning and attachment of devices and services to the network. It works within the Extreme Fabric Connect architecture to simplify network deployment by allowing endpoints to dynamically signal their networking requirements—such as VLAN assignments and Quality of Service (QoS) settings—to the network switches.

Visionary's AV-over-IP endpoints have enhanced their compatibility with Extreme Networks Fabric Attach technology through the introduction of new configuration parameters. These parameters—IP.FA_ENABLE, IP.FA_ISID_STREAM, IP.FA_ISID_DANTE, and IP.FA_ISID_EXPANSION—enable seamless integration and automated network service provisioning within Extreme Networks' Fabric Connect environments.

Compatibility and Network Integration
By utilizing these parameters, Visionary's AV-over-IP endpoints can:

- **Automate Network Configuration**: Devices automatically communicate their service requirements to the network, which then provisions the necessary paths and resources without manual intervention.
- **Ensure Quality of Service**: Different types of traffic (video, audio, control data) are properly segmented and prioritized, enhancing overall network performance and reliability.
- **Simplify Management**: Network administrators can manage large deployments more efficiently, as the Fabric Attach protocol reduces the complexity associated with manual configuration.

Enabling Fabric Attach Integration

- **IP.FA_ENABLE**: Setting this parameter to TRUE activates Fabric Attach on the Visionary endpoint. This allows the device to participate in the Fabric Attach protocol, which automates the provisioning of network services and streamlines the deployment process within Extreme Networks' environments.

Assigning Internal Service Identifiers (I-SIDs)
When Fabric Attach is enabled, the following parameters allow you to assign specific I-SIDs to different types of traffic, ensuring proper segmentation and quality of service:

- **IP.FA_ISID_STREAM**: Assigns an I-SID for streaming video traffic on LAN1. This ensures that video streams are properly tagged and prioritized within the network.
- **IP.FA_ISID_DANTE**: Assigns an I-SID for Dante audio traffic on LAN1. Dante audio networks require precise timing and low latency, and assigning a dedicated I-SID helps maintain audio quality.
- **IP.FA_ISID_EXPANSION**: Assigns an I-SID for the expansion port traffic on LAN1. This is useful for additional data channels or control signals that need to be managed separately.

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 STEAM.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 multicast or unicast based on the STREAM.MODE setting (multicast or unicast).

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 bi-directional 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.

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**=admin**password**=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.

Note: Syntax used shall be that of the device being controlled.

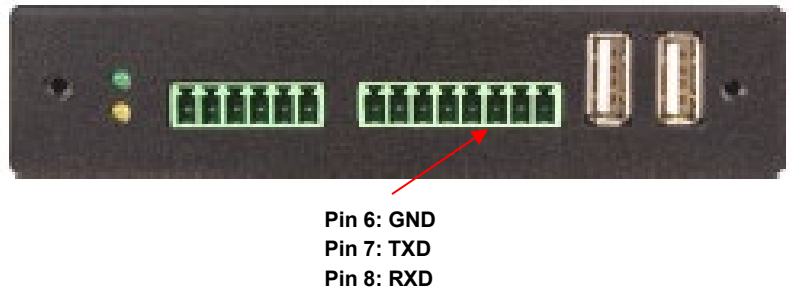


Figure 9. RS-232 Connector Pinout Diagram

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**

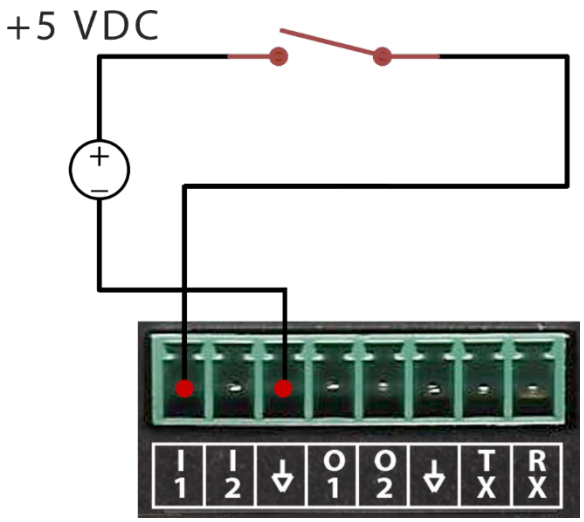
GPIO

2x2 I/O user configurable - There are up to 2 GPIO inputs and up to 2 GPIO outputs for Duet-2. To have access to GPIO you need to first set GPIO.ENABLED to TRUE. When IR.ENABLED is set to TRUE, you have 1 GPIO input and 1 GPIO output available. When IR.ENABLED is set to FALSE, you have 2 GPIO inputs and 2 GPIO outputs available.

Send API queries from control system or DSP via UDP to port 8000 of the Duet-2, for the GPIO input and send API commands to the GPIO output. The GPIO outputs are latching, you will send TRUE or FALSE commands.

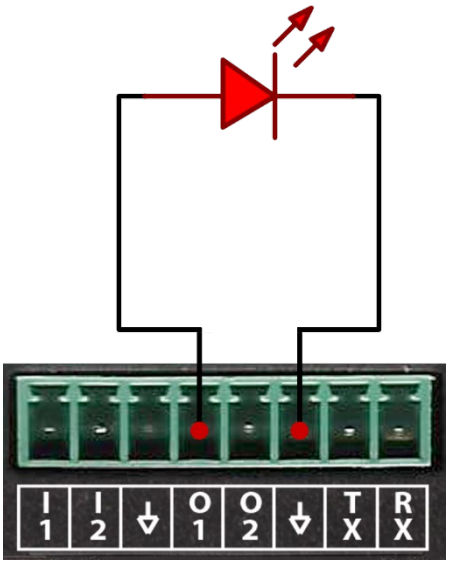
GPIO Inputs:
These accept 0-5VDC referenced to the GND pin of the Euroblock connector. They have a 10K Ohm resistor to ground, and then a 1K Ohm resistor in series to the internal logic. If higher input voltage is needed, we can help specify an external series resistor that can be added. Reverse voltage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

Example with a +5 VDC supply and switch:

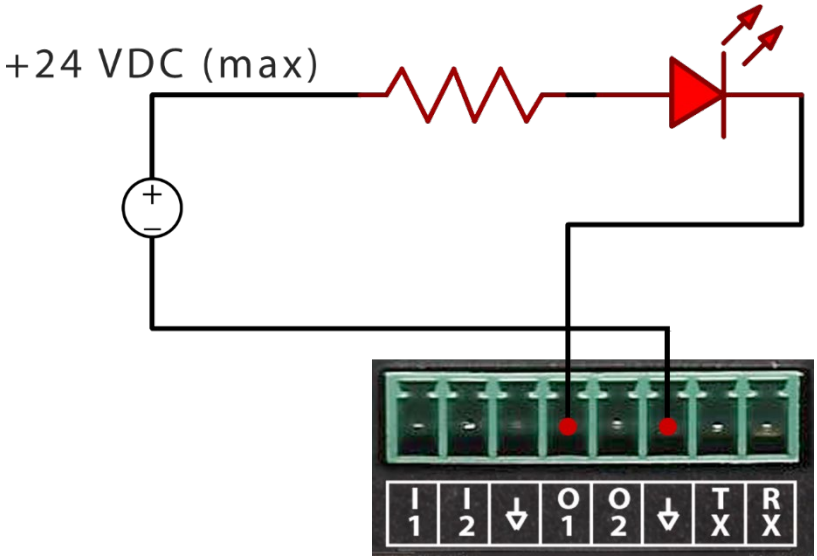


GPIO Outputs:
GPIO Output 1 supplies 5VDC through a 470 Ohm resistor. This can be used to directly drive and LED or external logic inputs. When set to low, it can sink up to 50mA at up to 24VDC. There is protection for over/reversed voltage, but it is best to limit overloads. GP Output 2 can be used the same as 1, or to drive the IR emitter. When in IR mode, it will supply 5VDC with a series resistance of approximately 24 Ohms. This is enough to drive many 5VDC IR Emitter LEDs. Please see the API for how to send IR codes.

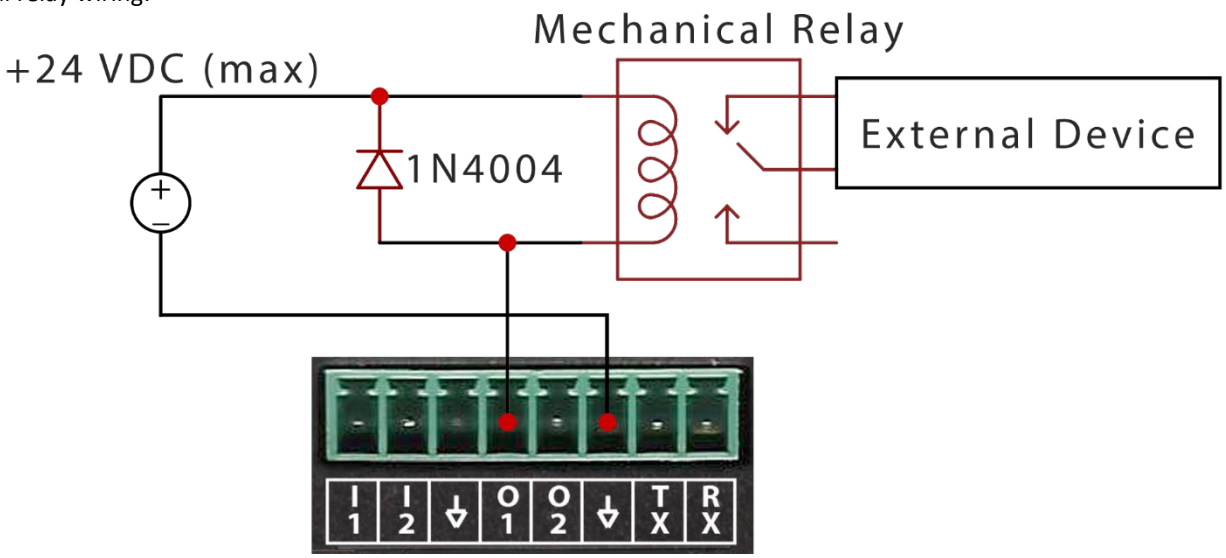
LED Wiring:



Wiring up an LED with a higher voltage/current demand:



Mechanical relay wiring:



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

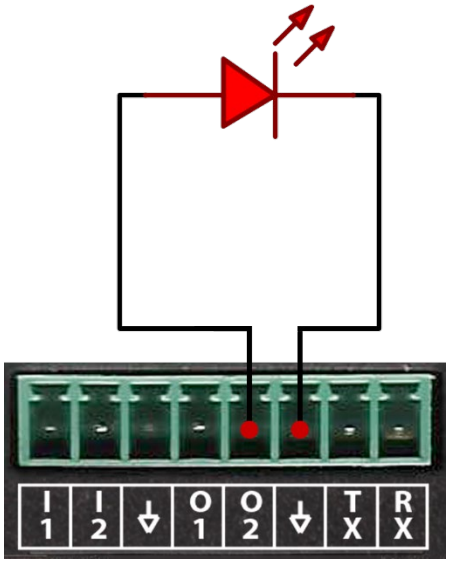
Output commands: *Note: 0 = False, 1 = True*
GPIO OUT1 - True: CMD=START&UNIT.ID=ALL&UNIT.GPIO_OUT1=TRUE&CMD=END
Example Response: &UNIT.GPIO_OUT1=TRUE&API.STATUS=SUCCESS\n
Example Query: &UNIT.GPIO_OUT1=1&API.STATUS=SUCCESS_QUERY_X\n

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

IR OVER IP

GPIO Output 2 may be used to drive and IR Emitter LED (5VDC type). Arbitrary codes can be sent using PRONTO format to the Duet-2. To enable the IR over IP feature, IR.ENABLED must be set to TRUE.

IR LED Wiring:



IR API EXAMPLES

Send IR Command: (Samsung Mute Example)
UNIT.IR_SEND=38000,1,1,172,172,22,64,22,64,22,64,22,21,22,21,22,21,22,21,22,21,22,64,22,64,22,64,22,21,22,21,22,21,22,21,22,21,22,64,22,64,22,64,22,64,22,21,22,21,22,21,22,21,22,21,22,21,22,21,22,21,22,21,22,64,22,64,22,64,22,64,22,1820

Example:
CMD=START&UNIT.ID=ALL&UNIT.IR_SEND=38000,1,1,172,172,22,64,22,64,22,64,22,21,22,21,22,21,22,21,22,21,22,64,22,64,22,64,22,21,22,21,22,21,22,21,22,21,22,21,22,21,22,64,22,64,22,64,22,64,22,21,22,21,22,21,22,21,22,21,22,21,22,21,22,21,22,21,22,21,22,64,22,64,22,64,22,64,22,1820&CMD=END

VIDEO FORMAT SETTINGS (DECODER ONLY)

By default, the **VIDEO.FORMAT** field on the DuetD-5 decoder is set to **Source**. This means that the same source resolution being encoded by the currently "tuned" DuetD-5 is passed through to the output. This is for cases where you are certain that the display connected to the DuetD-5 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. When set to Auto the decoder use the EDID of the connected display and will transmit the display's preferred resolution.

AUDIO SETTINGS

AUDIO SOURCE

The Duet-5 series is capable of using HDMI or Analog audio sources.

- The DuetE-5 encoder uses the STREAM.AUDIO to select the source of audio sent over the AV over IP stream.
- The DuetD-5 decoder uses the STREAM.AUDIO to select what audio is sent out the HDMI output.

STREAM.AUDIO=HDMI

DuetE-5 – STREAM.AUDIO = HDMI

1. Encoder receives HDMI or USB-C input with embedded audio.
3. Encoder takes embedded HDMI or USB-C audio (same as above) and encodes it into the AV over IP stream that includes video.

DuetD-5 – STREAM.AUDIO = HDMI

1. Decoder receives AV over IP stream with both audio and video and decodes it to the HDMI and USB-C output.

STREAM.AUDIO=ANALOG (Encoders only)

DuetE-5 – STREAM.AUDIO=Analog

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

***DuetD-5 is always passing analog audio via the Euroblock connector. DuetD-5 allows volume level (AUDIO.VOLUME) setting of analog audio output. AUDIO.DAC_MUTE will mute or unmute the audio being transmitted out the analog output. This output is always the first two channels of audio in the AV over IP stream.

AUDIO.DAC_MUX=STREAM (Decoder only)

1. Decoder receives AV over IP stream with both audio and video and decodes just the audio to the decoder analog output.

Audio Connections

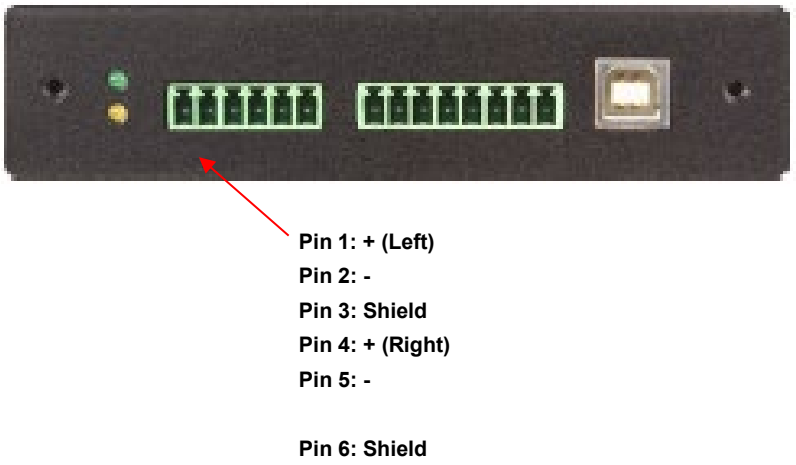
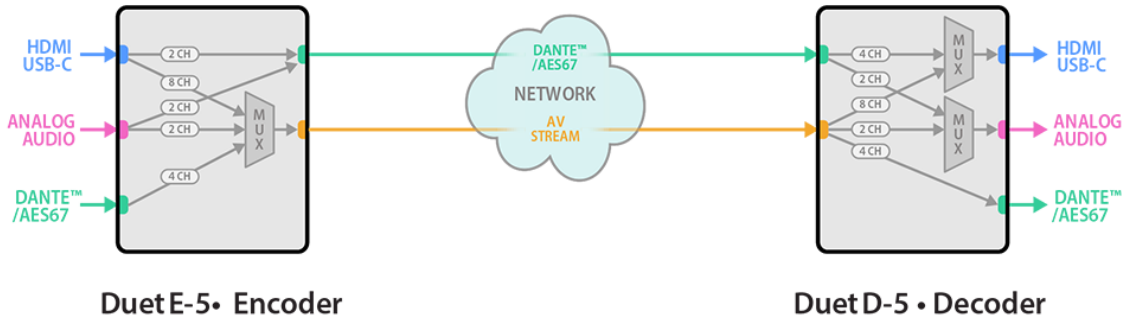


Figure 10. Audio Connector Pinout Diagram

Audio Workflow



DANTE AUDIO CHANNELS

DuetE-5 :

- Dante **Tx** Channels **1&2**: First 2 channels of audio from HDMI/USB-C input source
- Dante **Tx** Channels **3&4**: First 2 channels of audio from analog audio input source
- Dante **Rx** Channels **1-4**: Audo received via Dante audio source, transmitted as AV stream audio when STEAM.AUDIO setting set to DANTE

DuetD-5 :

- Dante **Tx** Channels **1-4**: Audio received via encoder AV stream
- Dante **Rx** Channels **1-4**: Audo received via Dante audio source, transmitted as HDMI/USB-C audio output when STEAM.AUDIO setting set to DANTE

VIDEO WALL

Multiple 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 J**ust 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.

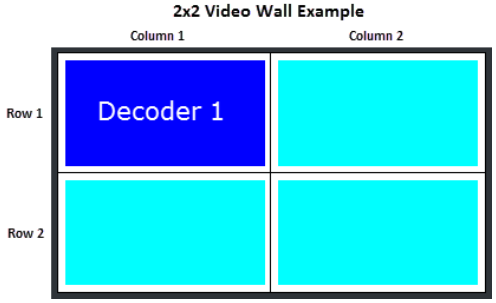
1. Access the web interface for each decoder unit that will be part of the video wall and log in with **username**=`admin` **password**=`admin`.
2. Click the **Configuration** tab.
3. On each decoder:
   a. Set **VW.ENABLED** to **True** on by selecting the check box.
   b. Assign a user defined video 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 option 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 DuetE-5 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 DuetE-5 encoder. You can use EDID capture software such as **Monitor Asset Manager 2.9** (http://www.entechtaiwan.com/util/moninfo.shtm) 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 DuetE-5 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 DuetE-5 encoder.

Customizing The EDID

DuetE-5 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.

DuetE-5 allows for individual EDID settings to be selected for each encoder input. The EDIDs may be set using the Configuration tab of the encoder web UI. VIDEO.EDID1 = HDMI1 IN, VIDEO.EDID2 = HDMI2 IN, VIDEO.EDID3 = USB-C IN.

The EDID file must be formatted properly in order to be imported to a DuetE-5 encoder.

1. Create a text file with the extension `.bin`.
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 `*.bin` 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.

Multi-input EDID Management (Encoder Only)

DuetE-5 encoders support multi-input select between HDMI1, HDMI2, and USB-C. Each of the selectable inputs have their own selectable EDID setting. VIDEO.EDID1 is used for HDMI1, VIDEO.EDID2 is used for HDMI2, and VIDEO.EDID3 is used for USB-C.

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. The 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 tell the source the encoder is not an HDCP compliant device 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.

INPUT SOURCE SELECTION AND PRIORITY (ENCODER ONLLY)

DuetE-5 encoders support multi-input selection between AUTO, HDMI1, HDMI2, and USB-C for both the AV stream and HDMI OUT (Loop Out). The input selection for the AV stream and HDMI OUT are configured separately. This gives the user the ability to select an input source for the AV stream, then select a different source for the HDMI OUT. Example: HDMI1 selected for AV stream and USB-C selected for the HDMI OUT.

When the input select is set to AUTO, use STREAM.VIDEO_PRIORITY to set the priority for the AV stream source. Use VIDEO.HDMI_OUT_PRIORITY to set the priority for the HDMI OUT. Auto select will choose the source based on priority. If the priority is set to HDMI1 HDMI2 USB-C, the DuetE-5 will select HDMI1 as its source, if there is no source connected to HDMI1 the DuetE-5 will then automatically switch to the next input in the priority selection. In this example, the DuetE-5 would automatically switch to HDMI2 if HDMI1 is not connected.

GENLOCK (DECODER ONLY)

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

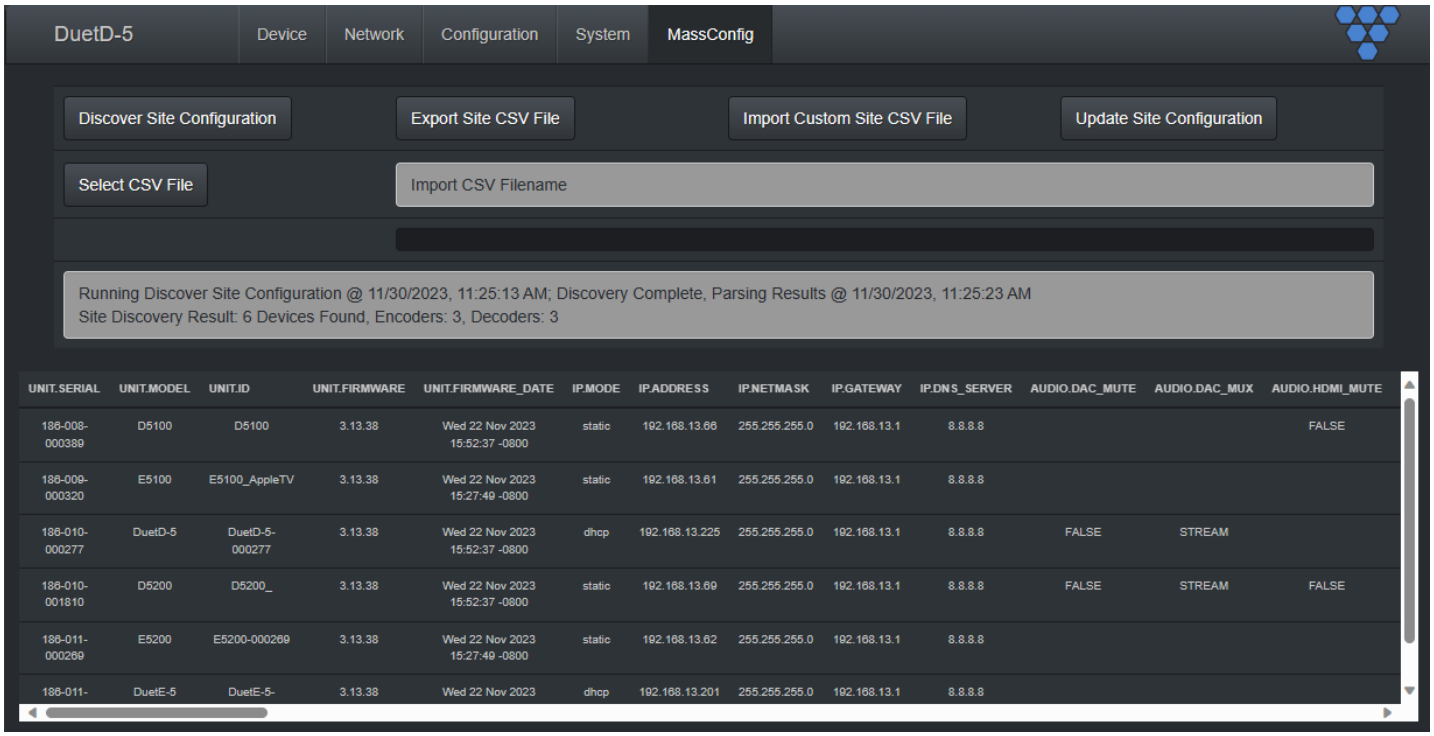
VIDEO OUTPUT SETTING (DECODER ONLY)

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

OSD TEXT DISPLAY (DECODER ONLY)

The OSD (On Screed Display) is used to put user text onto the screen as an overlay. Once the 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)



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.

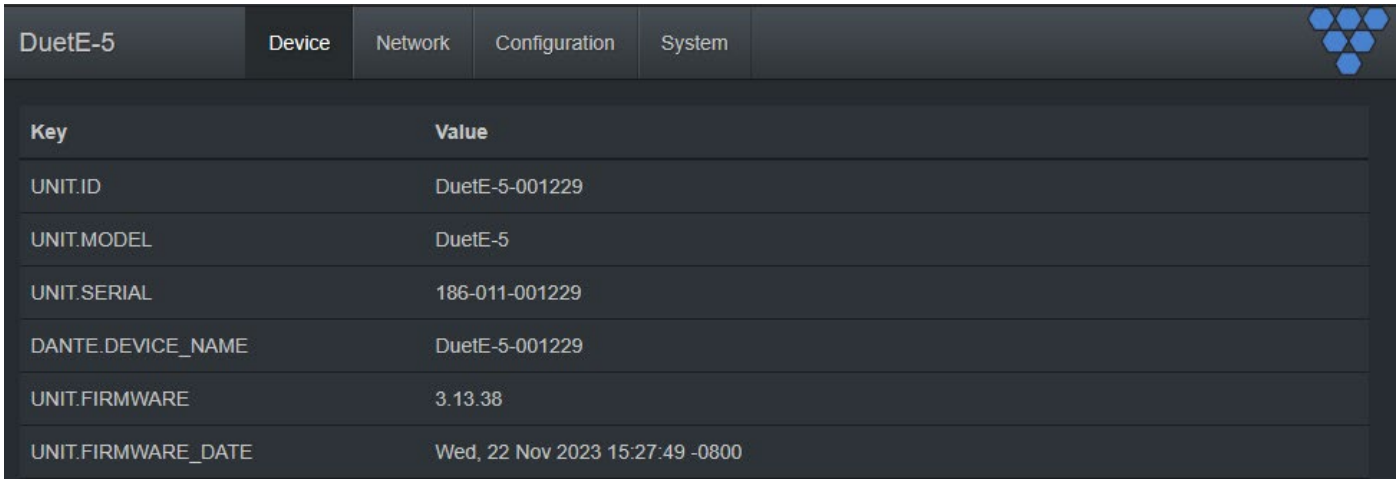
Example:
UDP: (Port 8000)
CMD=START&UNIT.ID=ALL&UNIT.MASS_CONFIG=TRUE&CMD=END

HTTP: http://admin:admin@<Decoder_IP>/cgi-bin/wapi.cgi?CMD=START&UNIT.ID=ALL&UNIT.MASS_CONFIG=TRUE&CMD=END

Copy & Paste HTTP command: *(copy & paste after the decoder IP address in a web browser)*
/cgi-bin/wapi.cgi?CMD=START&UNIT.ID=ALL&UNIT.MASS_CONFIG=TRUE&CMD=END

ENCODER OPTIONS

DUETE-5 ENCODER DEVICE TAB



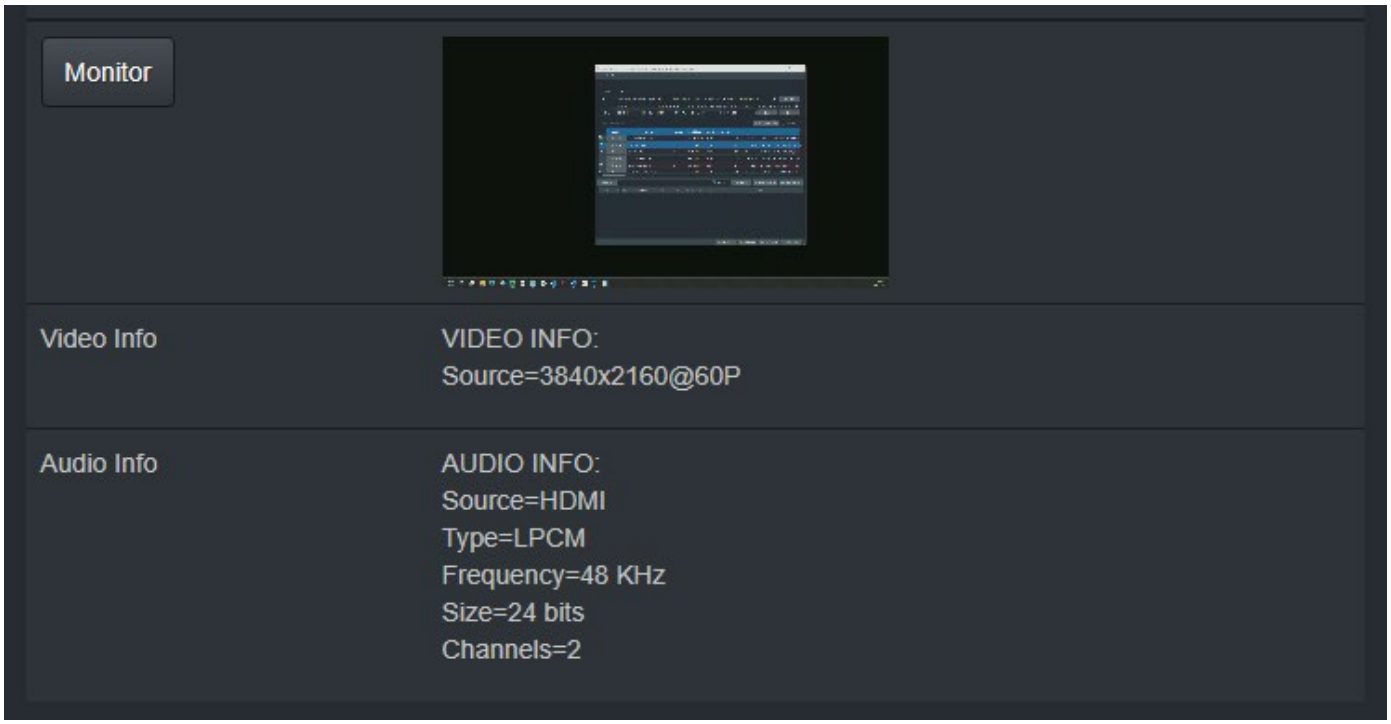
UNIT.ID – By default, the UNIT.ID of the encoder is the Model Number and the serial number (e.g., DuetE-5-000263, serial number: 186-005-000263). The UNIT.ID can be changed by the user on the **Network** tab.

UNIT.MODEL – DuetE-5 (encoder).

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

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

UNIT.FIRMWARE_DATE – The date the firmware was released.



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

Note: Click preview to access Diagnostics page.

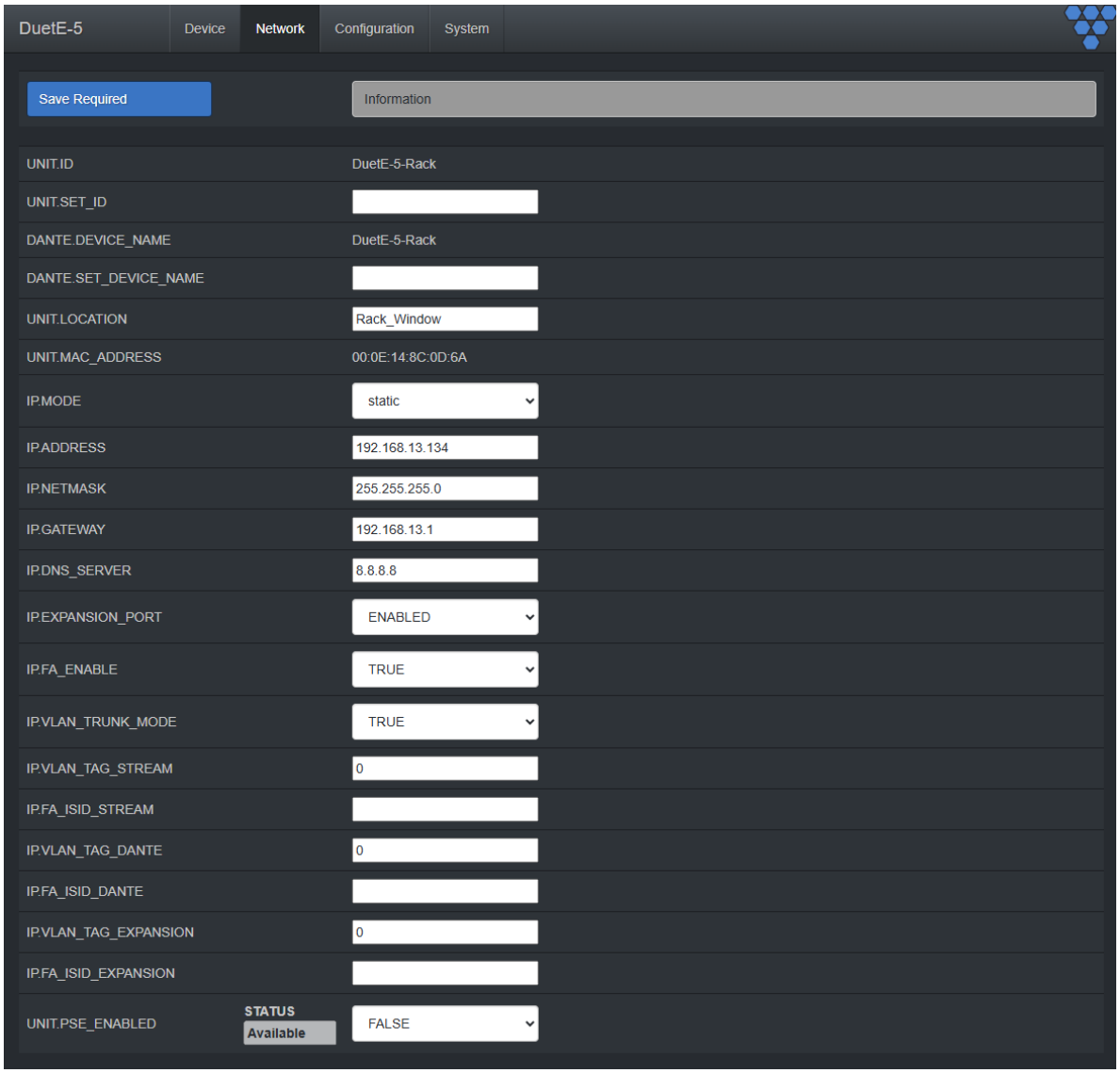
Note: 5 Series encoders and decoders have a live thumbnail preview sub steam that is full motion video only (no audio) up to 720P that is accessible via the following URL: http://<unit_IP_address>/web/preview.html

example: http://192.168.8.101/web/preview.html

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

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

DUETE-5 ENCODER NETWORK TAB



UNIT.ID – By default, the UNIT.ID of the encoder is the 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).

DANTE.DEVICE_NAME – This is the current Dante Device Name for the unit. This is the name displayed in Dante Controller.

DANTE.SET_DEVICE_NAME – User defined Dante device name. For example: Display-1 or Source-3 (letters, numbers, and dashes 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.xxxxxx 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.xxxxxx 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.xxxxxx 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.xxxxxx fields. See section *Configuring Encoder and Decoder IP Addresses.*

IP.EXPANSION_PORT – Used to set the mode for LNA2 expansion port. See section *Configuring Encoder and Decoder IP Addresses.*

IP.FA_ENABLE – Used to set to enable or disable Fabric Attach (for use with Extreme network switches. See section *Configuring Encoder and Decoder IP Addresses.*

IP.VLAN_TRUNK_MODE – Modes are TRUE and FALSE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.VLAN_TAG_STREAM – Used to assign stream (LAN1) VLAN tag when IP.VLAN_TRUNK_MODE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.FA_ISID_STREAM – Used to assign the stream internal service identifier (LAN1) tag when IP.FA_ENABLE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.VLAN_TAG_DANTE – Used to assign Dante (LAN1) VLAN tag when IP.VLAN_TRUNK_MODE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.FA_ISID_DANTE – Used to assign the Dante internal service identifier (LAN1) tag when IP.FA_ENABLE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

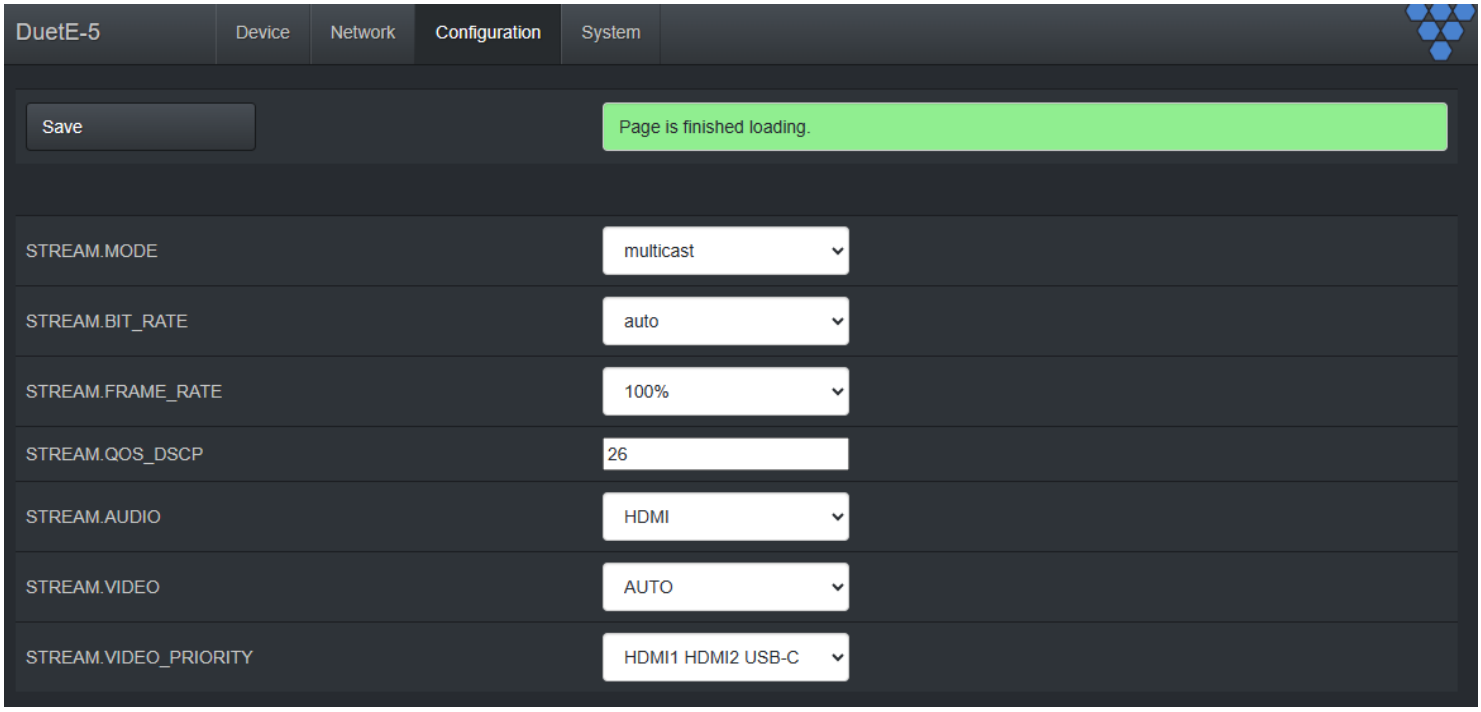
IP.VLAN_TAG_EXPANSION - Used to assign expansion port (LAN2) VLAN tag when IP.VLAN_TRUNK_MODE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.FA_ISID_EXPANSION – Used to assign the expansion port internal service identifier (LAN1) tag when IP.FA_ENABLE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

UNIT.PSE_ENABLED – Used to enable PoE power transmit out LAN2 expansion port. When the DuetE-5 is supplied PoE+ power from the network switch and UNIT.PSE_ENABLED is set to TRUE, the encoder will transmit PoE power out the LAN2 expansion port.

Note: DuetE-5 must be supplied with PoE+ power from the network switch to transmit PoE power out the LAN2 expansion port.

DUETE-5 ENCODER CONFIGURATION TAB



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.*

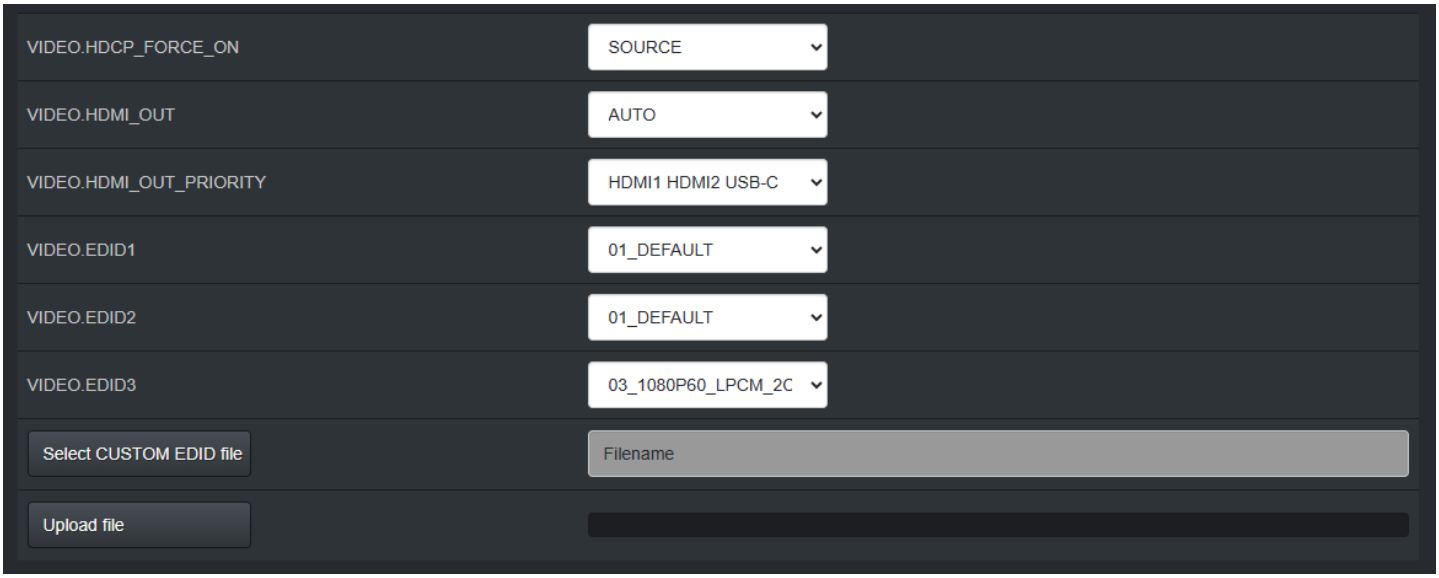
STREAM.QOS_DSCP - Used to set the QoS DSCP tag (default is set to 26)

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

STREAM.VIDEO – Used to set encoder input source select – AUTO, HDMI1, HDMI2, USB-C

STREAM.VIDEO_PRIORITY - Used to set encoder input select priority when STREAM.VIDEO is set to AUTO.

CONFIGURATION TAB (CONT.)



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

VIDEO.HDMI_OUT – Used to set encoder HDMI out (loop out) source select – AUTO, HDMI1, HDMI2, USB-C

VIDEO.HDMI_OUT_PRIORITY - Used to set encoder HDMI out (loop out) select priority when VIDEO.HDMI_OUT is set to AUTO.

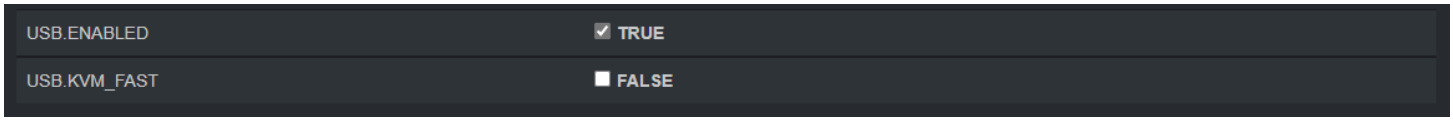
VIDEO.EDID1 – Used to select between different default, prebuilt, and custom EDID files for HDMI1. See section *Multi-Input EDID Management.*

VIDEO.EDID2 – Used to select between different default, prebuilt, and custom EDID files for HDMI2. See section *Multi-Input EDID Management.*

VIDEO.EDID3 – Used to select between different default, prebuilt, and custom EDID files USB-C. See section *Multi-Input EDID Management.*

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

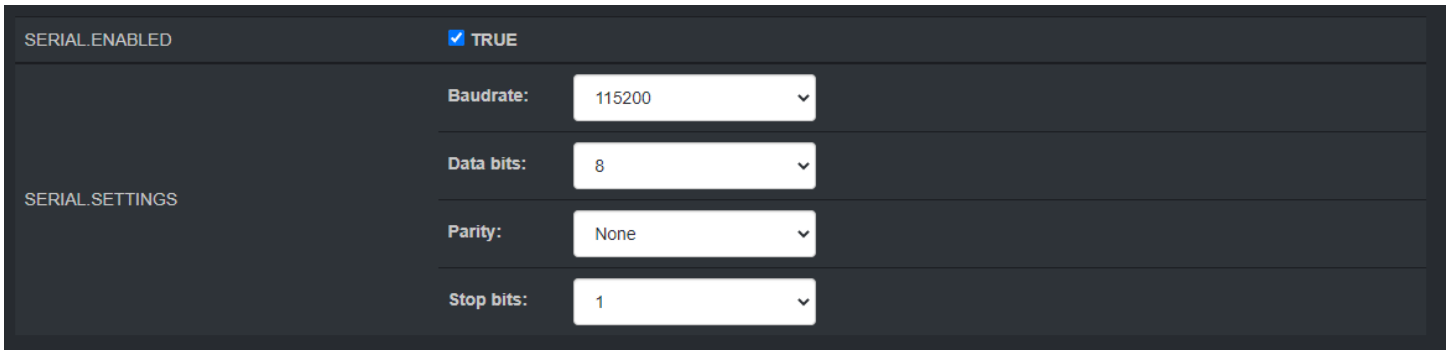
Upload file – Upload the selected custom EDID file. See section *EDID.*



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

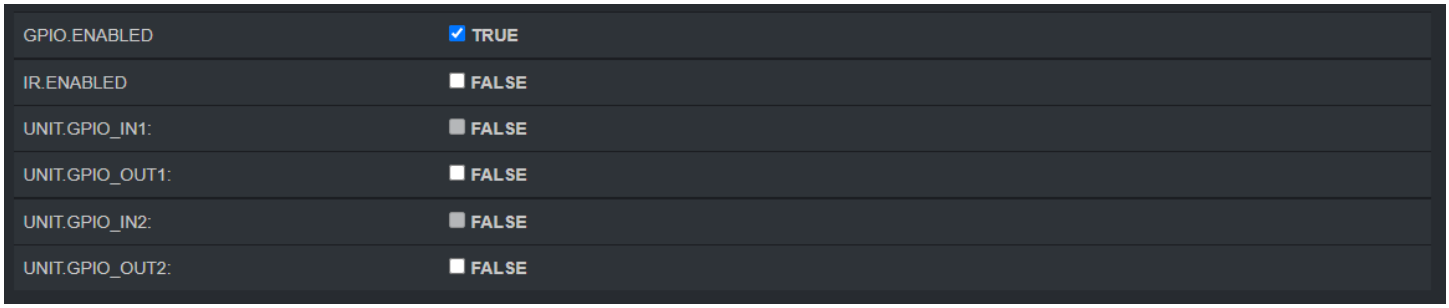
USB.KVM_FAST– Hidden until USB.ENABLED is set to TRUE. See section *USB Over IP (KVM).*

CONFIGURATION TAB (CONT.)



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

SERIAL.SETTINGS – Hidden until SERIAL.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.

IR.ENABLED – Turn on or off IR over IP.

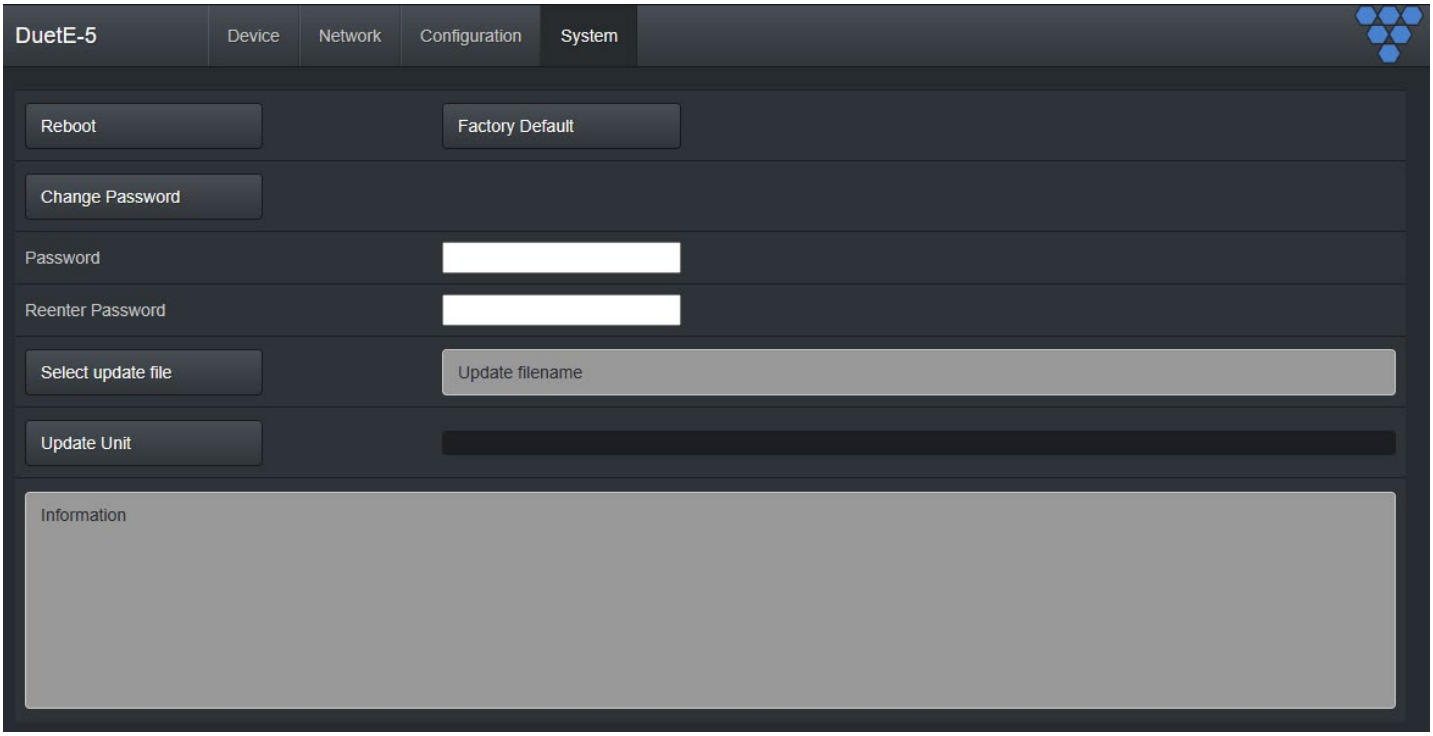
UNIT.GPIO_IN1– Reports if GPIO IN1 status is TRUE or FALSE.

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

UNIT.GPIO_IN2– Reports if GPIO IN2 status is TRUE or FALSE.

UNIT.GPIO_OUT2– Sets GPIO OUT2 to either TRUE or FALSE.

DUETE-5 SYSTEM TAB



Reboot – This button reboots the unit.

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

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

- Password – enter new password
- Reenter Password – reenter new password

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

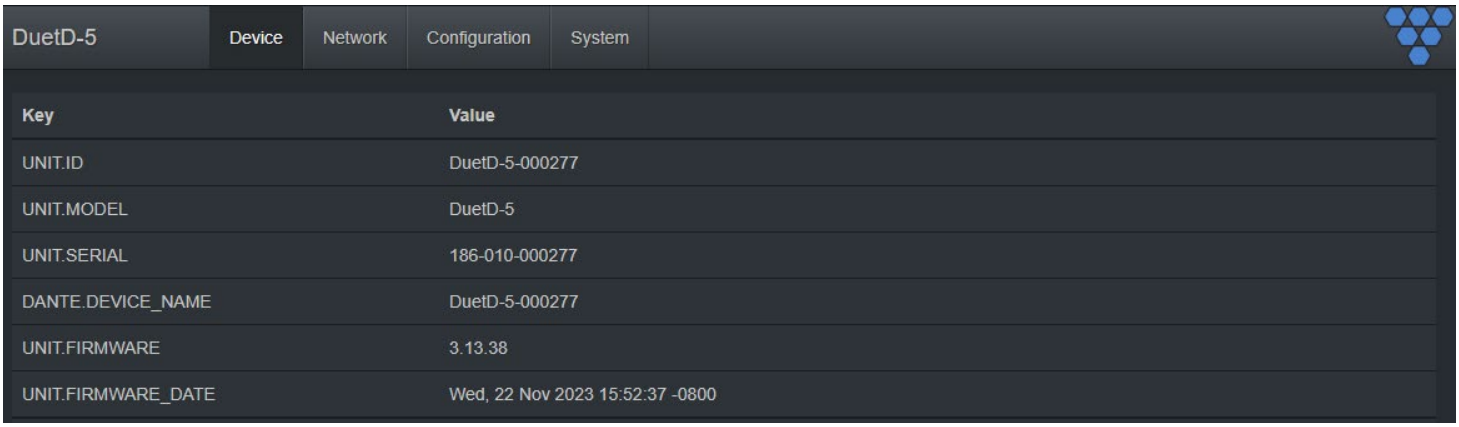
Select update file – Browse to a new firmware file supplied by Visionary Solutions or downloaded from visionary-av.com.

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

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

DECODER OPTIONS

DUETD-5 DECODER DEVICE TAB



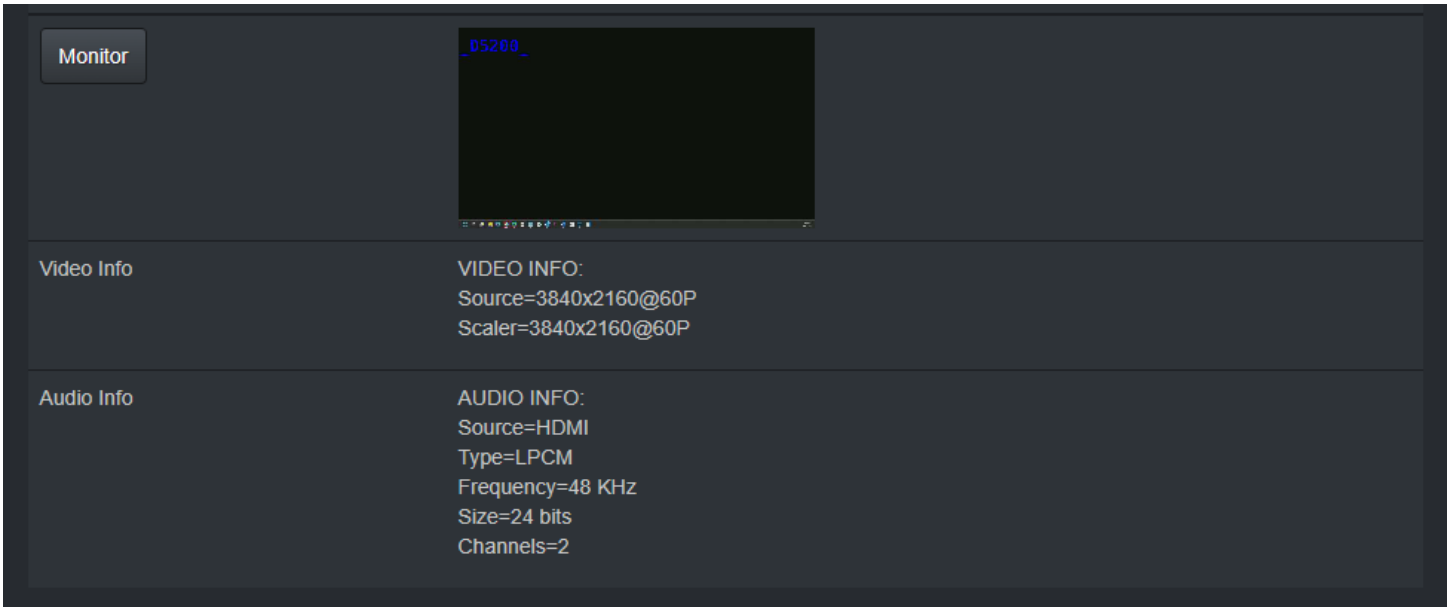
UNIT.ID – By default, the UNIT.ID of the decoder is the Model Number and the serial number (e.g., DuetD-5-000277, serial number: 186-004-000277). The UNIT.ID can be changed by the user on the **Network** tab.

UNIT.MODEL –DuetD-5(decoder).

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

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

UNIT.FIRMWARE_DATE – The date the firmware was released.



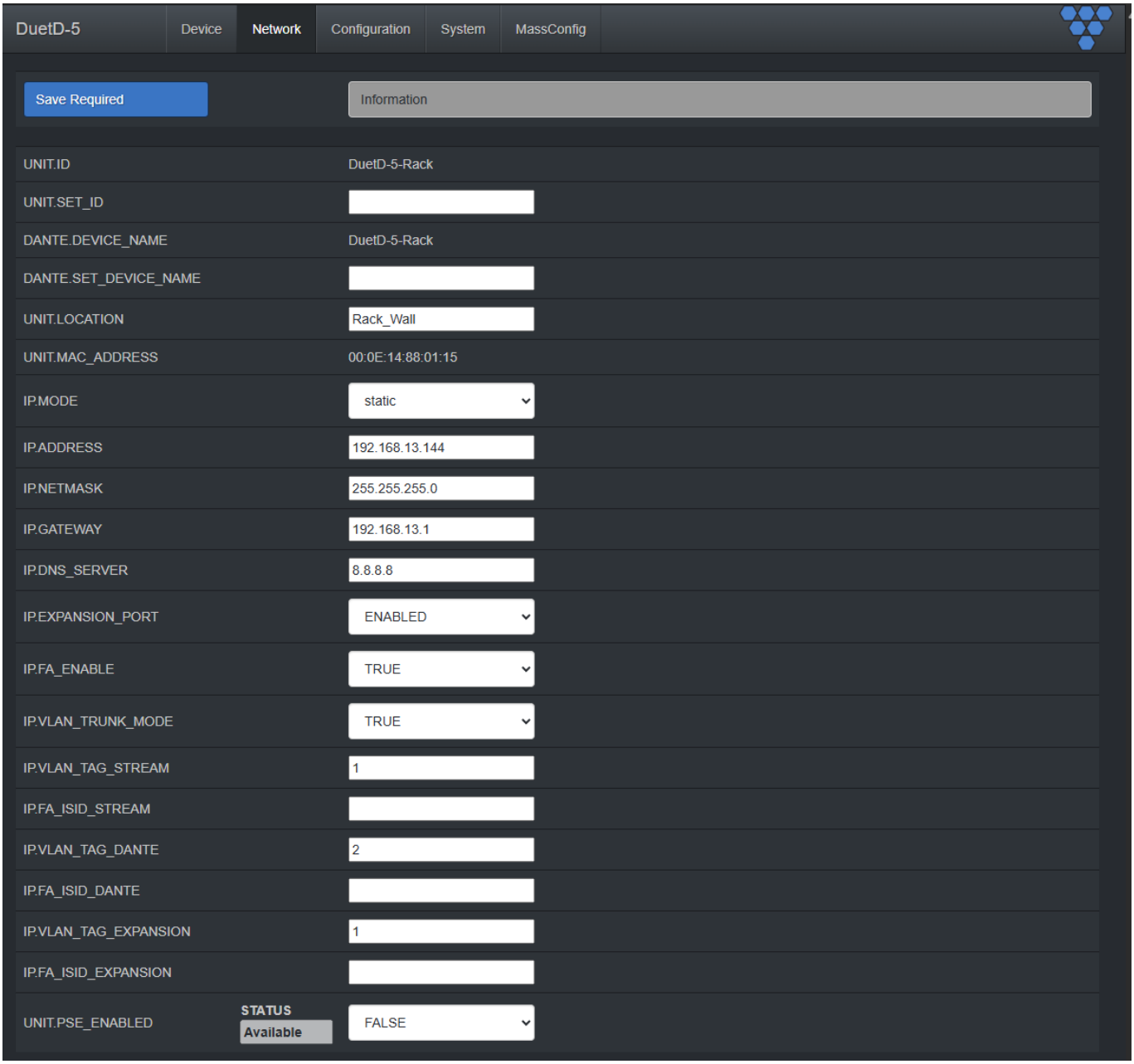
MONITOR BUTTON – Displays the live thumbnail preview of the video being received from the AV stream.

Note: 5 Series encoders and decoders have a live thumbnail preview sub steam that is full motion video only (no audio) up to 720P that is accessible via the following URL: http://<unit_IP_address>/web/preview.html
example: http://192.168.8.101/web/preview.html

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.

DuetD-5 Decoder Network Tab



UNIT.ID – By default, the UNIT.ID of the encoder is the 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).

DANTE.DEVICE_NAME – This is the current Dante Device Name for the unit. This is the name displayed in Dante Controller.

DANTE.SET_DEVICE_NAME – User defined Dante device name. For example: Display-1 or Source-3 (letters, numbers, and dashes 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.xxxxxx 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.xxxxxx 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.xxxxxx 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.xxxxxx fields. See section *Configuring Encoder and Decoder IP Addresses.*

IP.EXPANSION_PORT – Used to set the mode for LNA2 expansion port. See section *Configuring Encoder and Decoder IP Addresses.*

IP.FA_ENABLE – Used to set to enable or disable Fabric Attach (for use with Extreme network switches. See section *Configuring Encoder and Decoder IP Addresses.*

IP.VLAN_TRUNK_MODE – Modes are TRUE and FALSE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.VLAN_TAG_STREAM – Used to assign stream (LAN1) VLAN tag when IP.VLAN_TRUNK_MODE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.FA_ISID_STREAM – Used to assign the stream internal service identifier (LAN1) tag when IP.FA_ENABLE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.VLAN_TAG_DANTE – Used to assign Dante (LAN1) VLAN tag when IP.VLAN_TRUNK_MODE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.FA_ISID_DANTE – Used to assign the Dante internal service identifier (LAN1) tag when IP.FA_ENABLE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

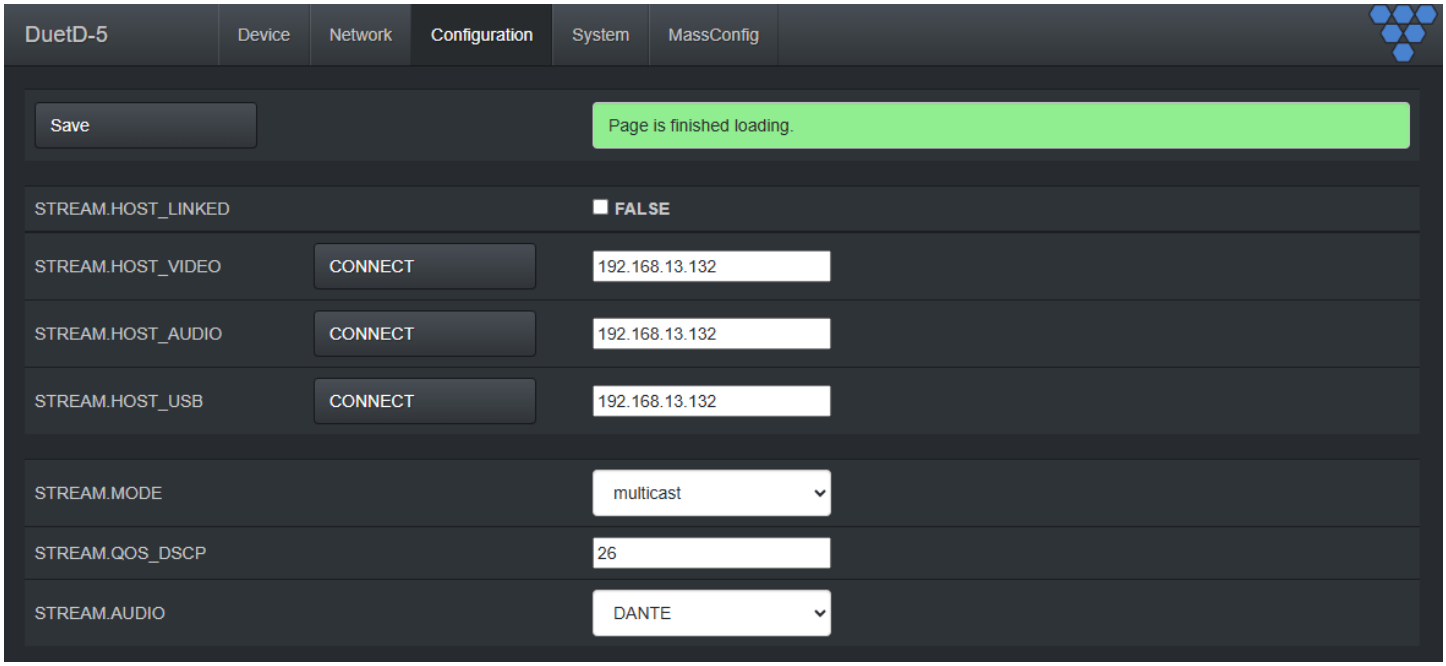
IP.VLAN_TAG_EXPANSION - Used to assign expansion port (LAN2) VLAN tag when IP.VLAN_TRUNK_MODE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

IP.FA_ISID_EXPANSION – Used to assign the expansion port internal service identifier (LAN1) tag when IP.FA_ENABLE is set to TRUE. See section *Configuring Encoder and Decoder IP Addresses.*

UNIT.PSE_ENABLED – Used to enable PoE power transmit out LAN2 expansion port. When the DuetD-5 is supplied PoE+ power from the network switch and UNIT.PSE_ENABLED is set to TRUE, the encoder will transmit PoE power out the LAN2 expansion port.

Note: DuetD-5 must be supplied with PoE+ power from the network switch to transmit PoE power out the LAN2 expansion port.

DuetD-5 Decoder Configuration Tab



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

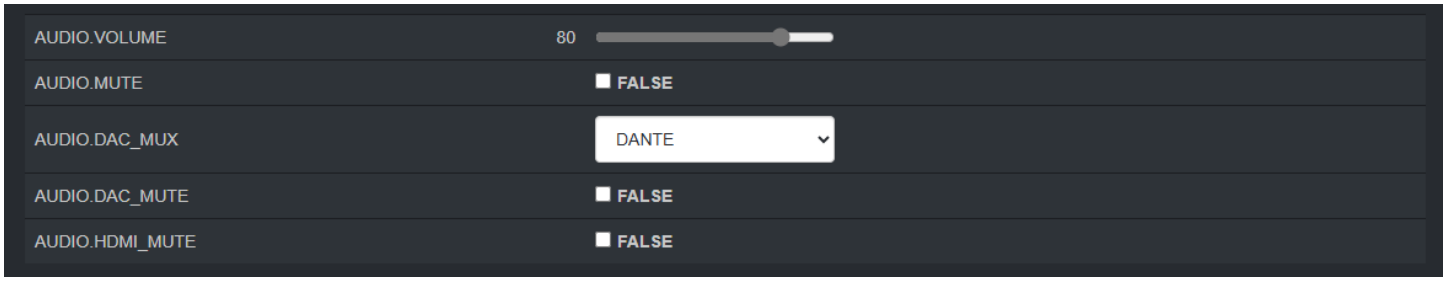
STREAM.HOST – Displays current encoder IP address the decoder is tuned in LINKED mode. See section

Configuring Stream Settings (Manually).

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

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

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



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

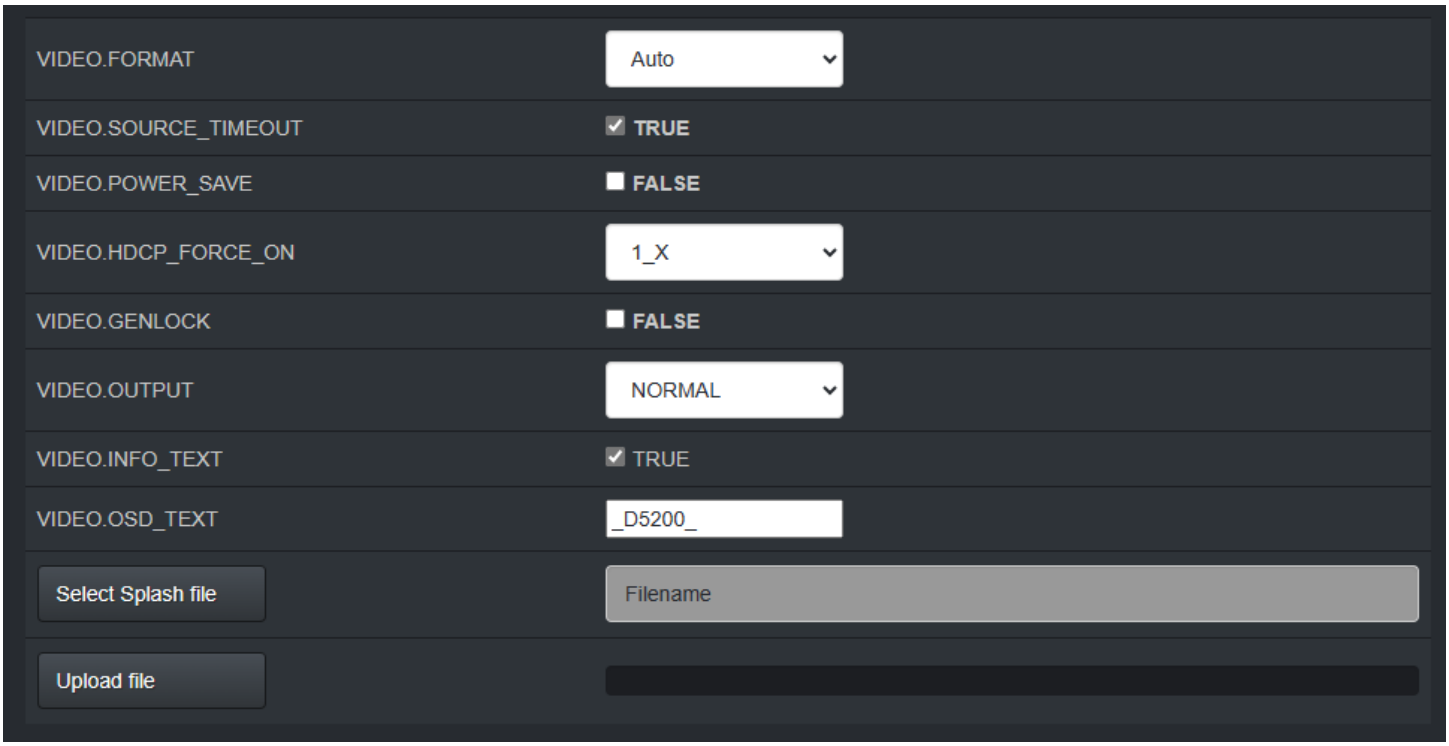
AUDIO.MUTE – Used to mute or unmute AV stream audio. Is a boot parameter, unit must be rebooted for change to be applied. See section *Configuring Stream Settings (Manually).*

AUDIO.DAC_MUX – Select the source of audio for DuetD-5 analog output - STREAM. See section *Audio Settings.*

AUDIO.DAC_MUTE – Used to mute or unmute DuetD-5 analog output. Is a dynamic runtime parameter, may also be set by rebooting decoder. See section *Audio Settings.*

AUDIO.HDMI_MUTE – Used to mute or unmute DuetD-5 HDMI audio output. Is a dynamic runtime parameter, may also be set by rebooting decoder. See section *Audio Settings.*

CONFIGURATION TAB (CONT.)



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).*

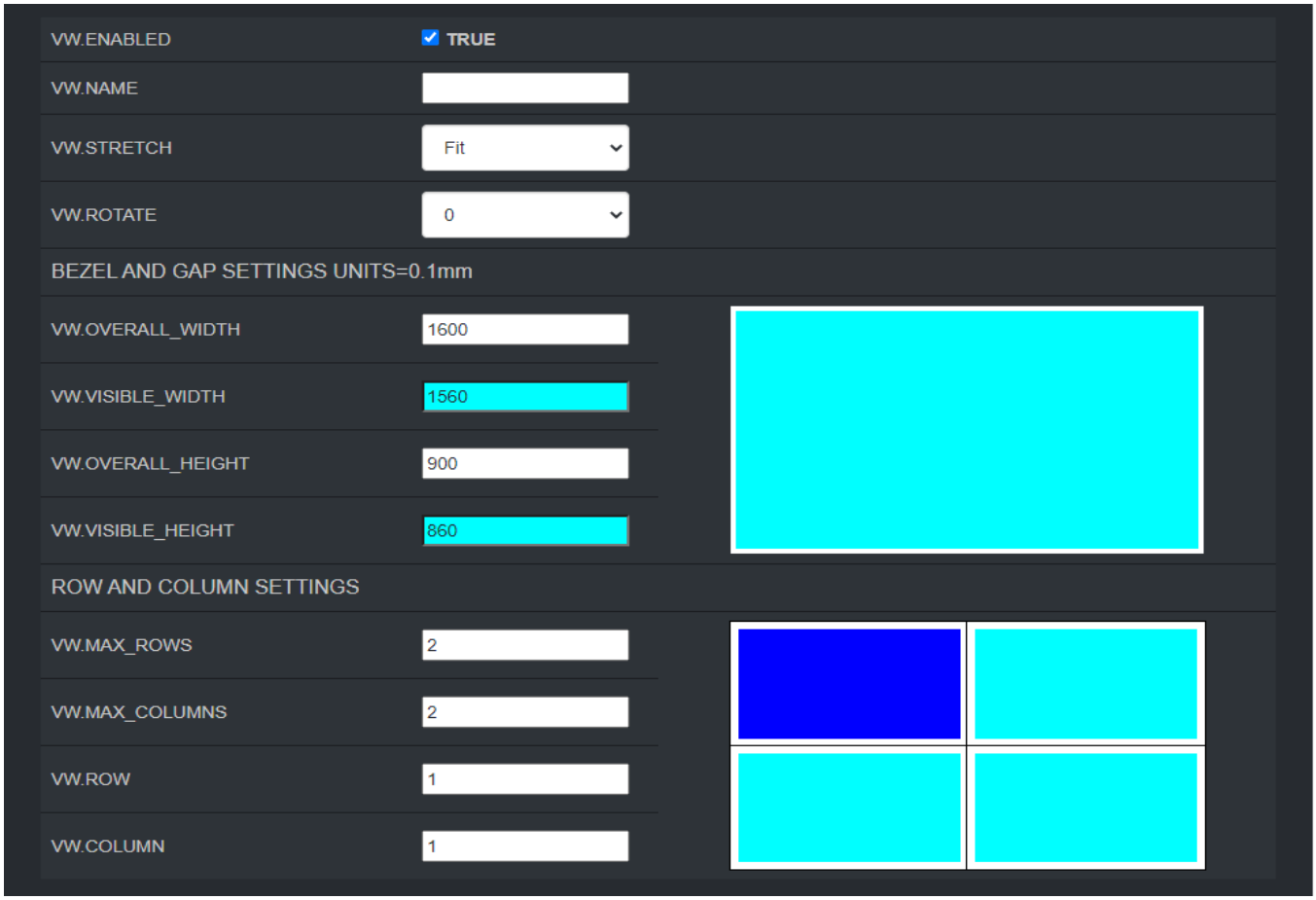
VIDEO.INFO_TEXT - Enables (TRUE) or Disables (FALSE) the showing of IP addresses and connection on display.

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).*

CONFIGURATION TAB (CONT.)



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.*

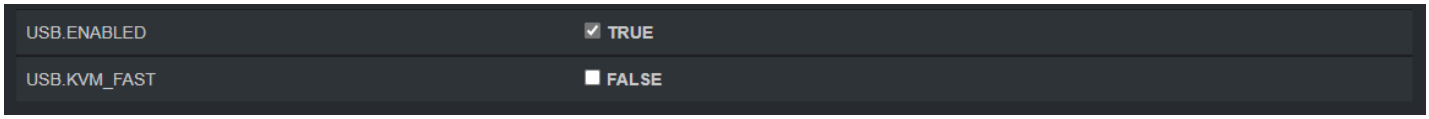
VW.MAX_COLUMNS – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall.*

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.*

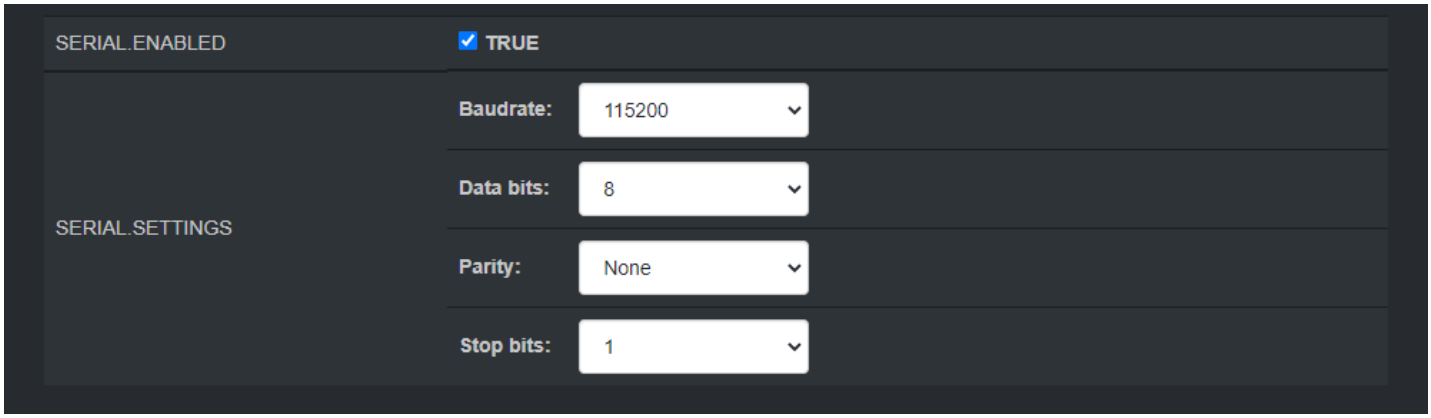
VW.COLUMN – Hidden until VW.ENABLED is set to TRUE. See section *Video Wall.*

CONFIGURATION TAB (CONT.)



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

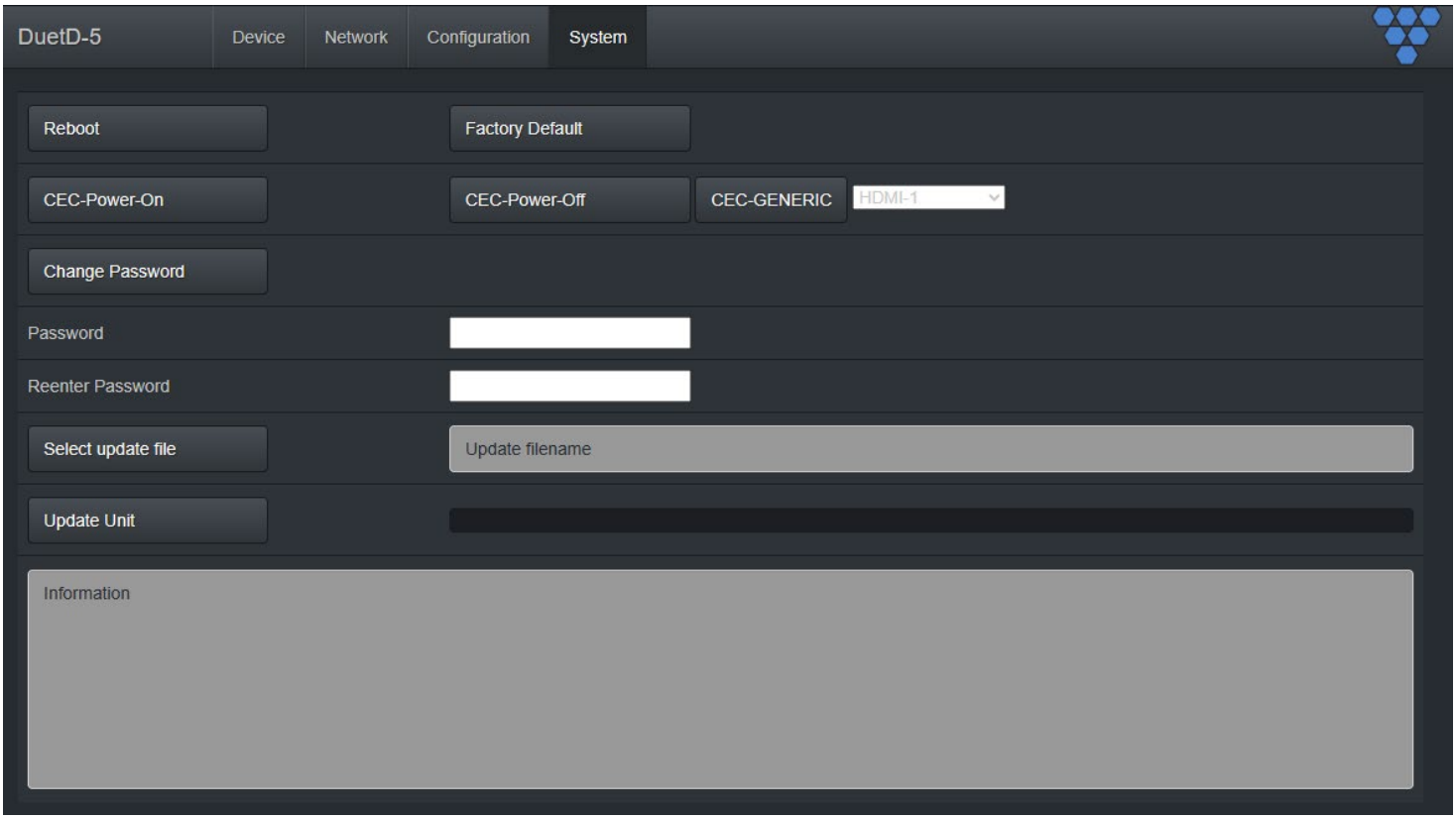
USB.KVM_FAST – Hidden until USB.ENABLED is set to TRUE. See section *USB Over IP (KVM).*



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.

DUETD-5 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

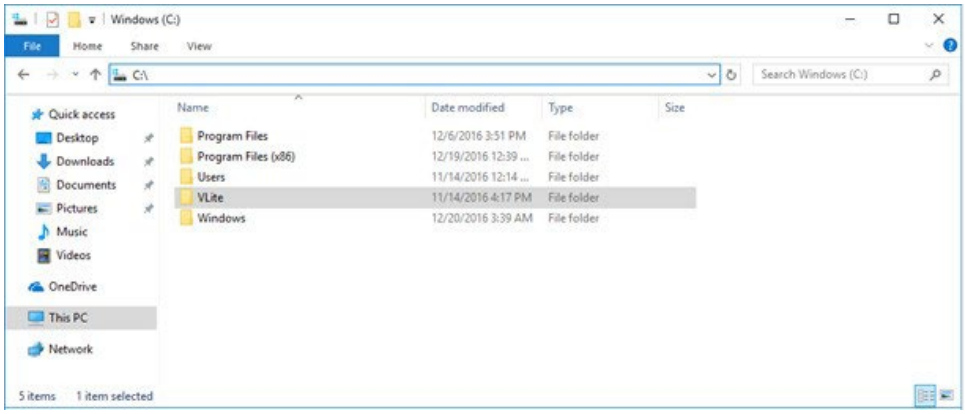
Vision Lite is a 4K Matrix Switching, Video Wall Control, and configuration software for use with our DuetE-5 Encoder and DuetD-5 Decoder endpoints.

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

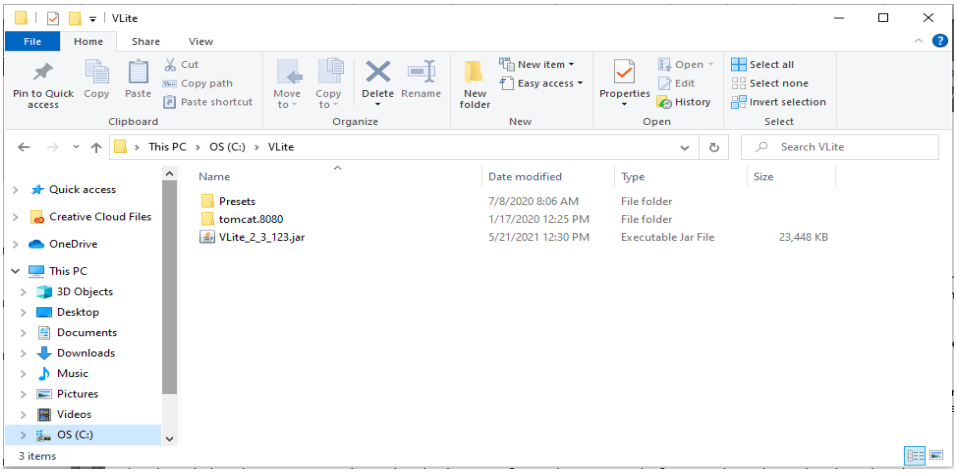
Vision Lite automatically discovers units on your network without any configuration.

Follow these instructions to install the Vision Light software.

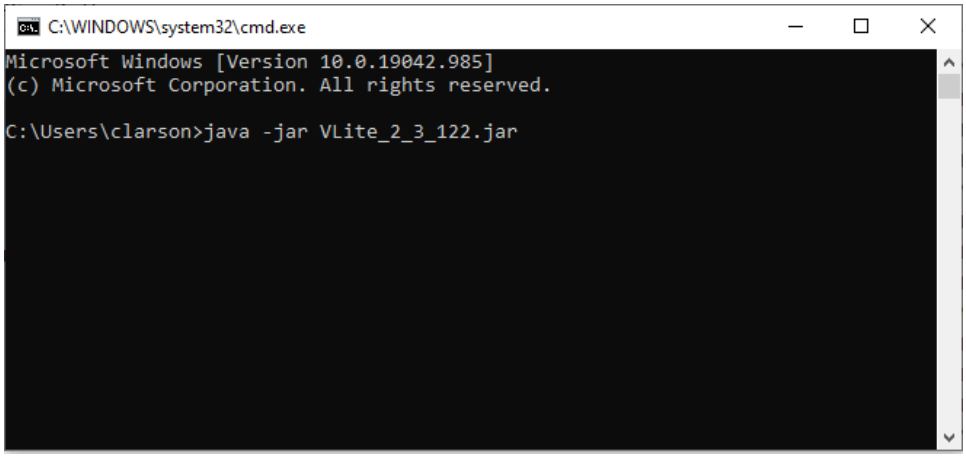
1. The latest Java JRE runtime is a prerequisite on the machine running VLite. The JRE can be found here: http://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html.
2. Download the latest Vision Lite software from visionary-av.com.
3. Manually create a read/write-able folder/directory `C:\VLite` at the root of your C:\ drive. This is the recommended directory to place the downloaded `VLite.jar` file, but you can place the file anywhere on your computer.



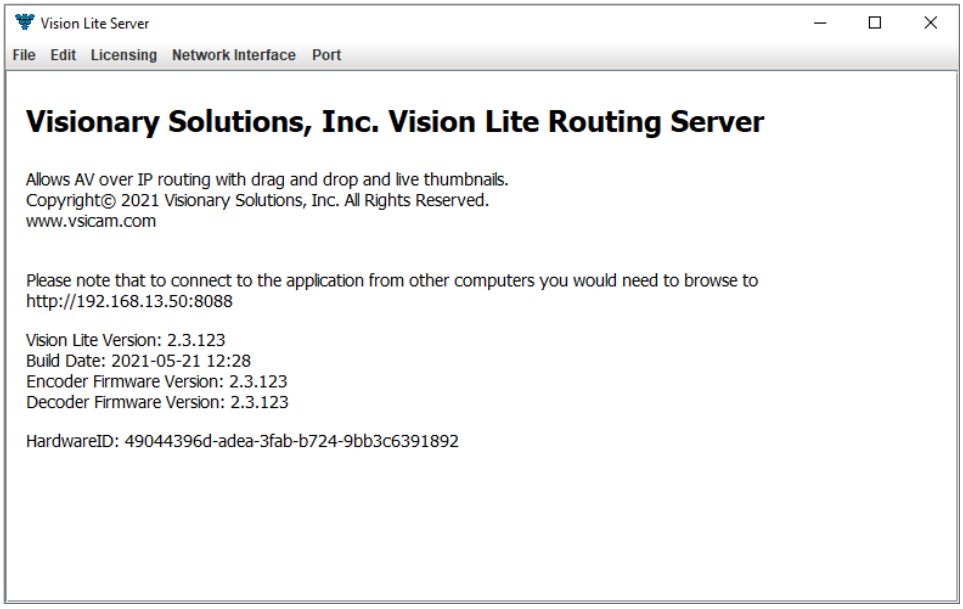
4. Save the `VLite.jar` file that you downloaded to the `\VLite` folder you just created.



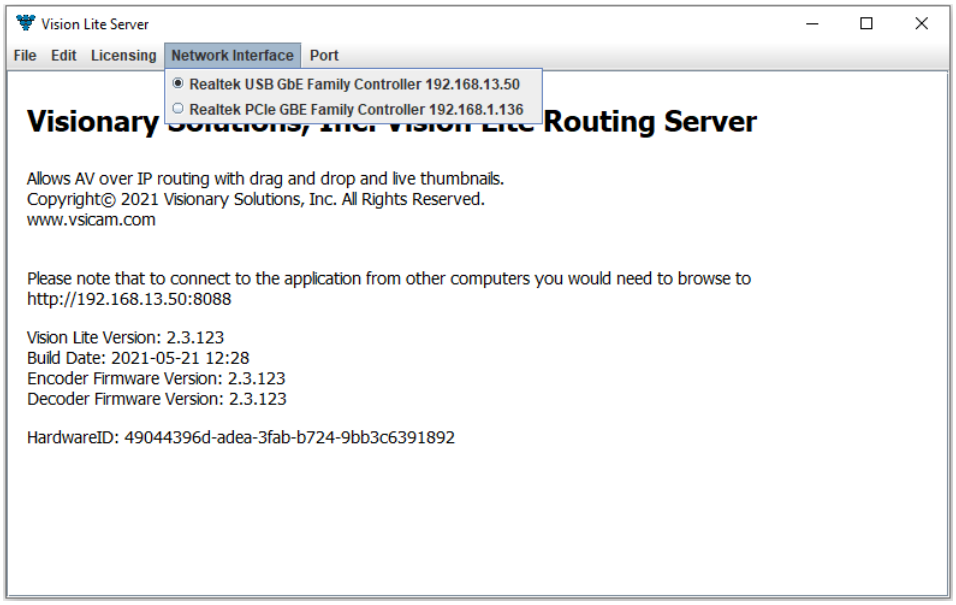
5. Launch the Vision Lite Server application by double clicking the `VLite.jar` file, OR from a command line interface using the following command: `java -jar VLite.jar`.



6. The Vision Lite Server window opens.



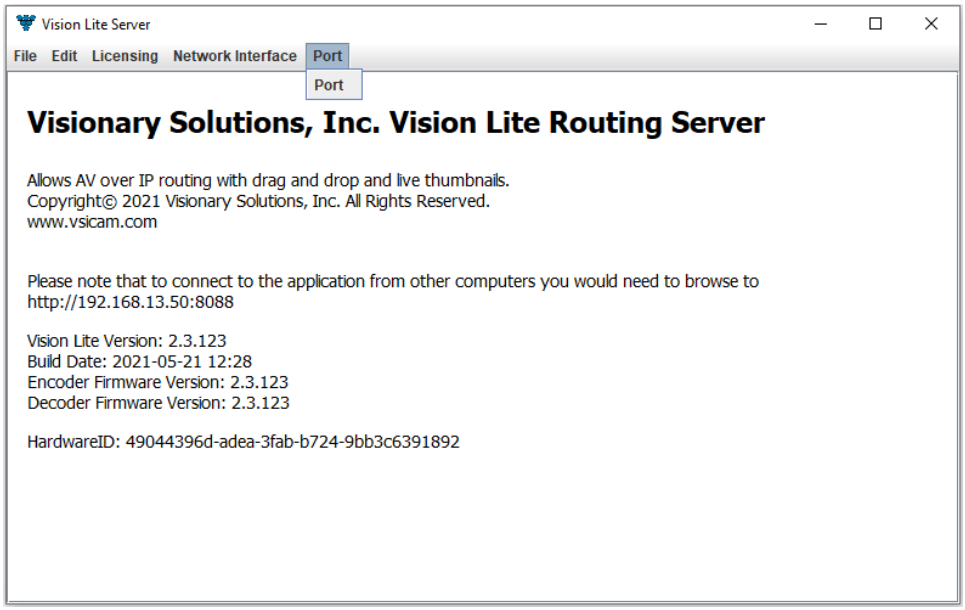
7. Go to the **Network Interface** menu and select the appropriate network interface.

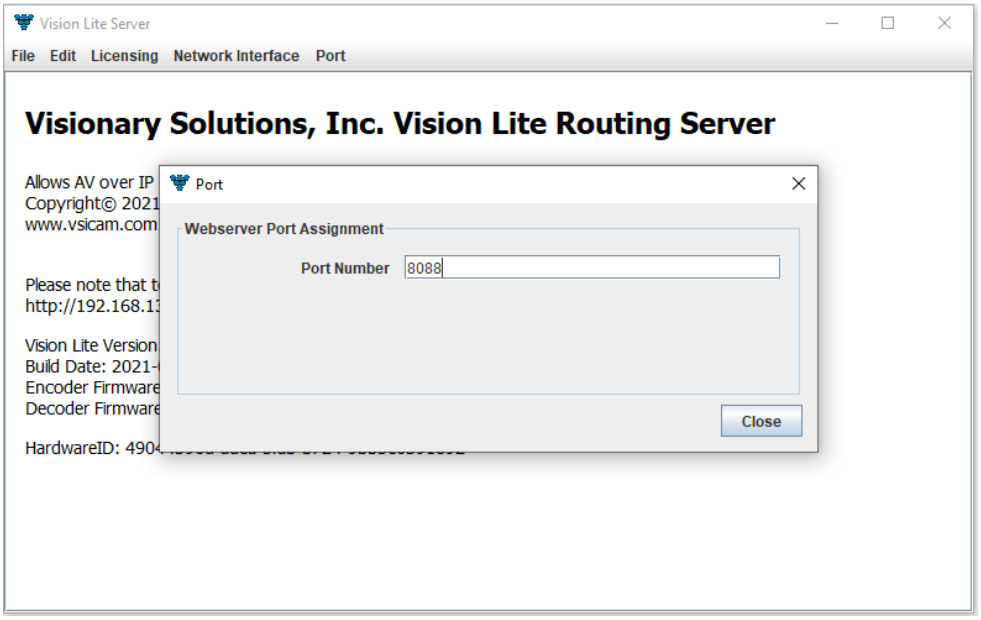


Select the network interface that the Vision Lite Server will be "listening" on. If your machine has more than one network interface, you will need to select the interface that is connected to the same network as the units.

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

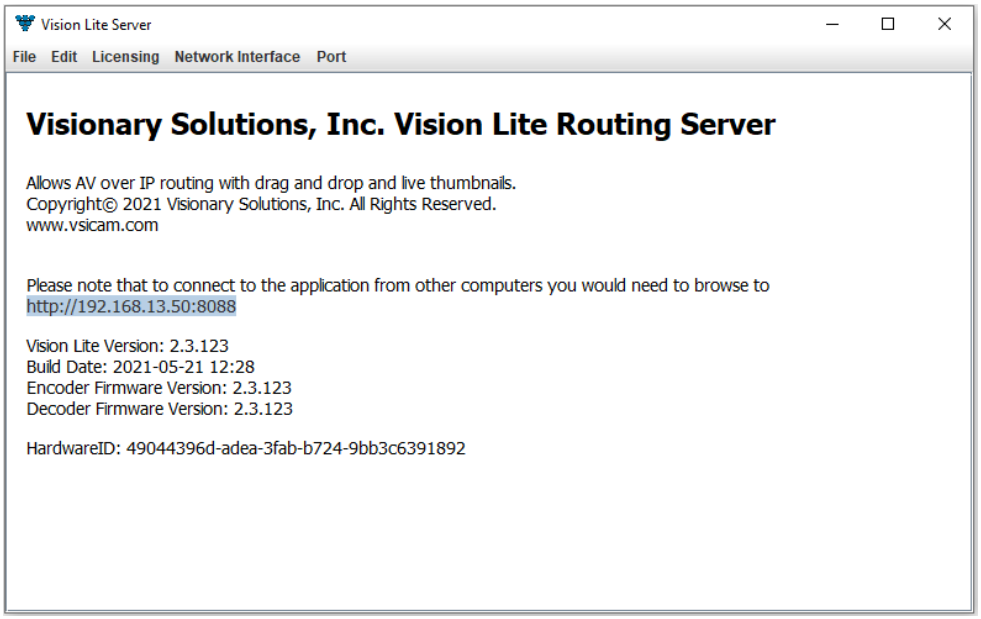
8. The default port assignment for VLite is 8080, other programs running on the computer may be using port 8080. If that is the case, the port for VLite will need to be changed for VLite to open. To change the port assignment, click on "Port" then enter the desired port number.



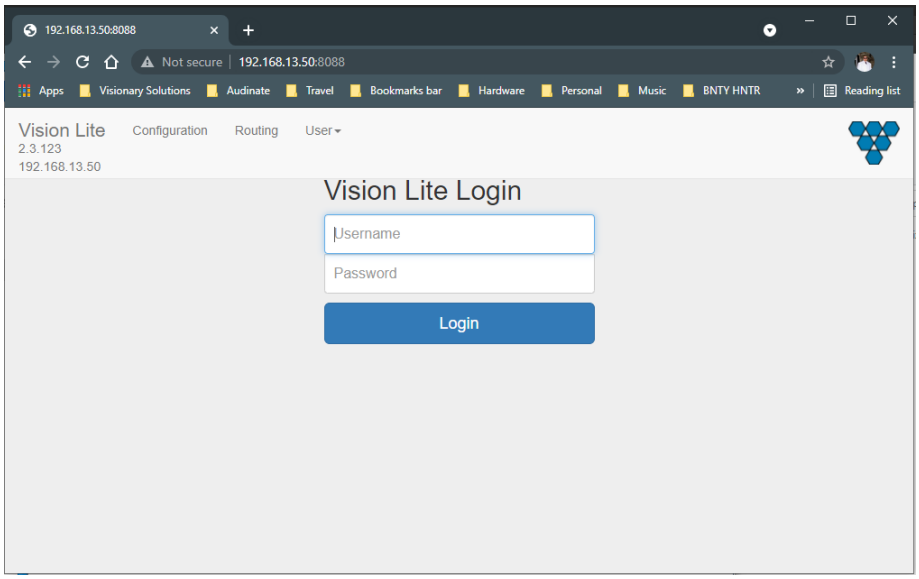


Important: The Vision Lite Server window needs to be closed and then reopened for the new port number to be assigned.

9. Copy the Vision Lite Server IP Address from the Vision Lite Server window to your clipboard.



10. To launch the Vision Lite User Interface, open a browser page and copy the Vision Lite Server IP Address IP Address to the URL.

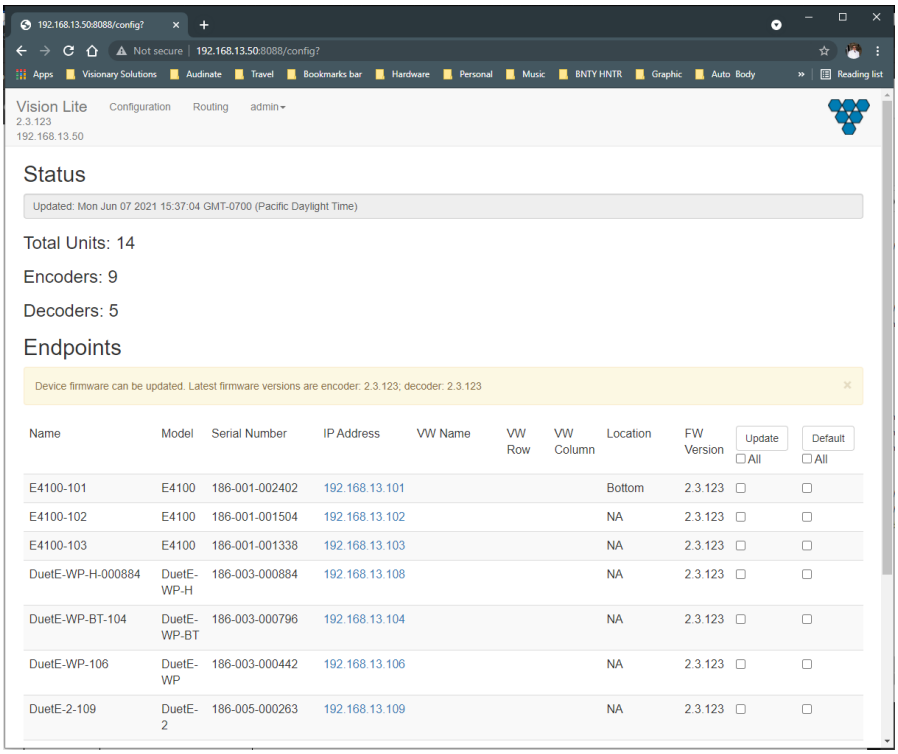


Note: You can log in from any machine on the network.

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

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

12. The **Configuration** page opens. You now have access to configure each unit.

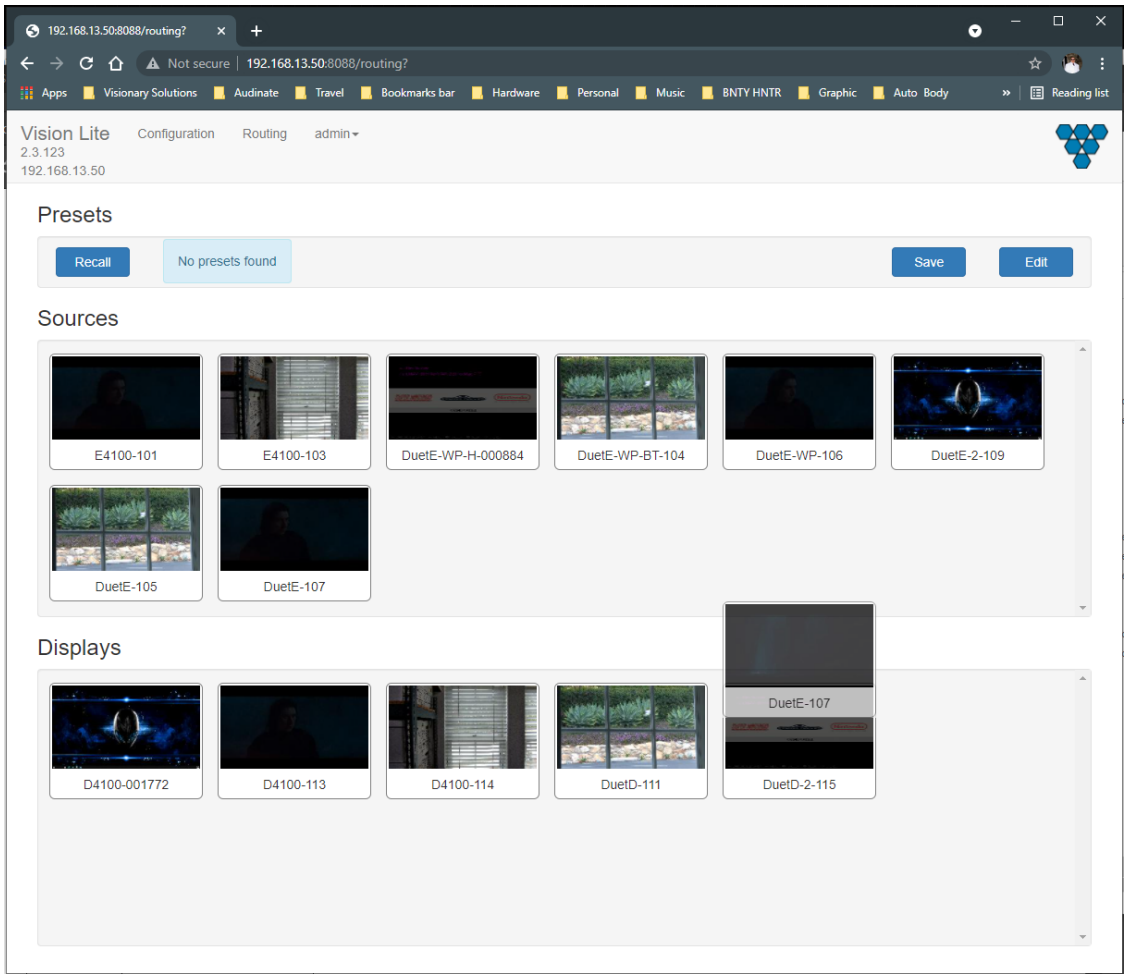


- On the **Configuration** page, you can click on the IP Address (hyperlink) of any endpoint to open the embedded web interface for each unit. On the unit's web interface, you can rename the units and/or set a user defined location.

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

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

- From the **Configuration** page, you can update the firmware for any units that may be out of date. The Vision Lite software displays a message if a newer firmware is available.
- On the **Routing** tab, you can drag-n-drop to route and switch sources to displays.



Note: Double-click the preview of a unit to open that unit's web UI from the **Routing** tab.

THIRD-PARTY CONRTOL 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 Duet-5 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 Duet-5 firmware in order to troubleshoot the unit. To find the firmware version of your Duet-5 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 Duet-5 units back to the factory default settings, which may be necessary or desirable in certain circumstances.

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

Method 1:

1. Access the web interface for the unit that will be factory defaulted.
2. Log in with **username**=admin**password**=admin.
3. Click the **System** tab.
4. Click **Factory Default**.

5. Click **OK** on the pop-up.
6. The unit will reset to its factory default settings.

Method 2:

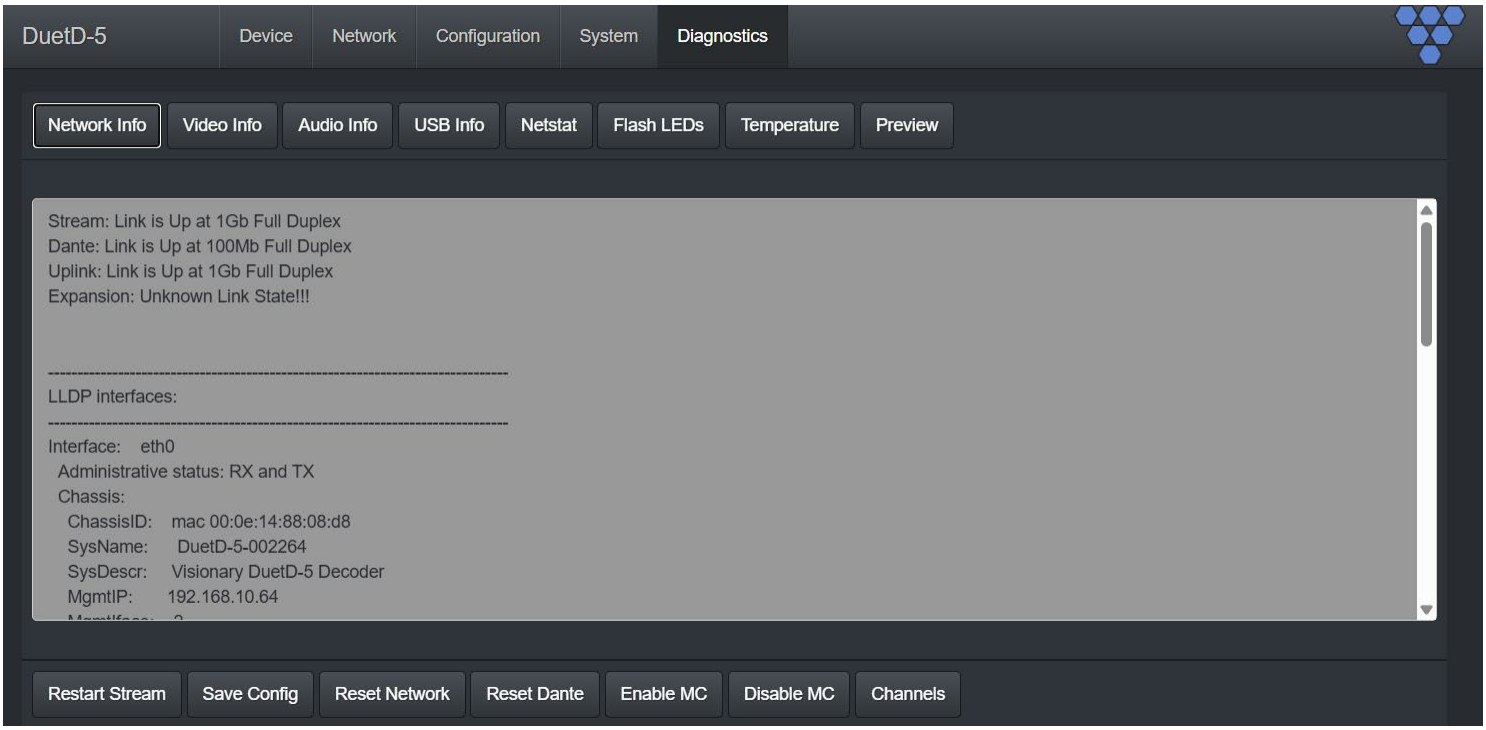
1. Locate the reset button on the bottom side of the Duet-5.
2. Use a paperclip or similar device to press physical reset button.
3. Press and hold the reset button until the LEDs on the front of the Duet-5 indicate the unit has been reset (Fast Link LED).
4. The unit will reset to its factory default settings.

DIAGNOSTICS PAGE

Every encoder and decoder have a diagnostics page that is accessible via the web UI. The diagnostics page provides the following information:

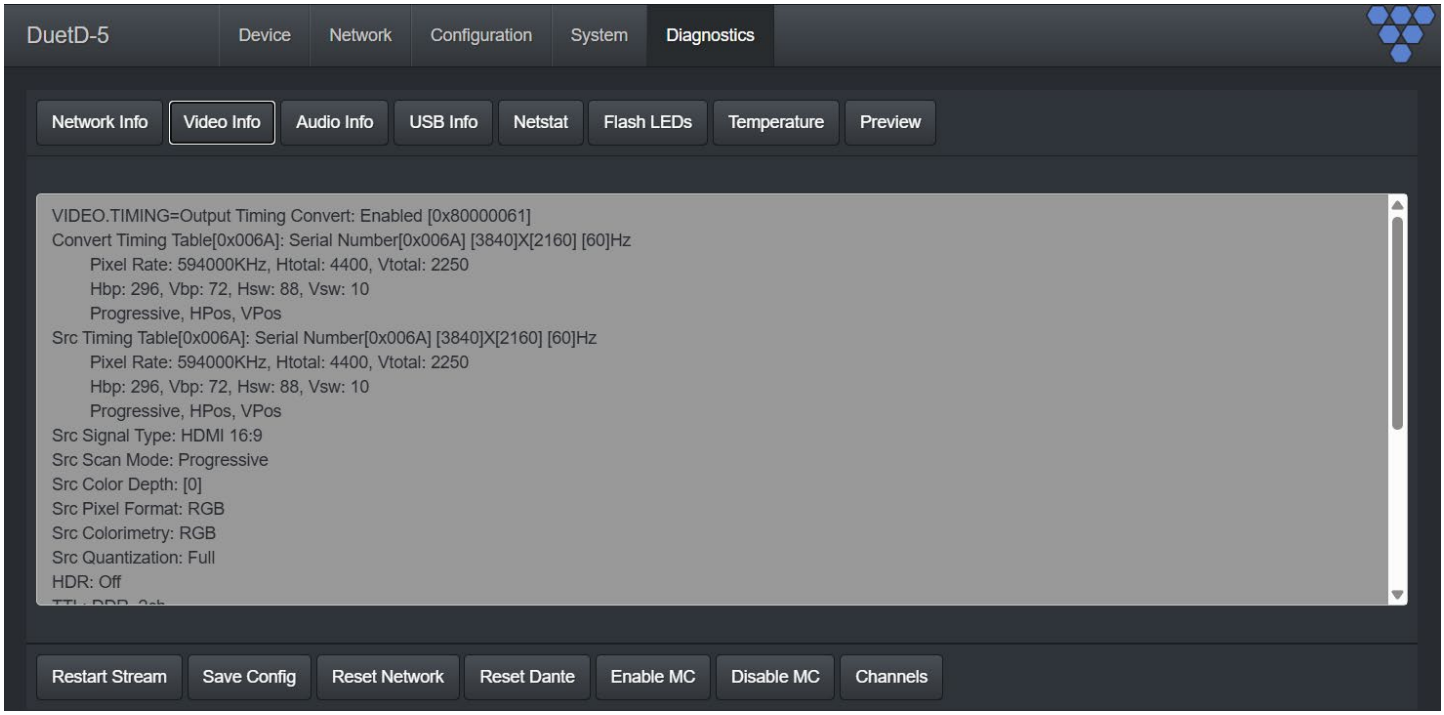
- Restart Stream – reconnects the AV stream
- Save Config – saves the decoder configuration
- Reset Network – resets the unit's internal switch
- Reset Dante – resets the unit's Dante chip
- Enable MC – enables Mass Configuration on the decoder (click Save Config button after enabling to keep enabled after a reboot)
- Disable MC – disables Mass Configuration on the decoder
- Channels – displays available encoder streams the decoder discovered

NETWORK INFO



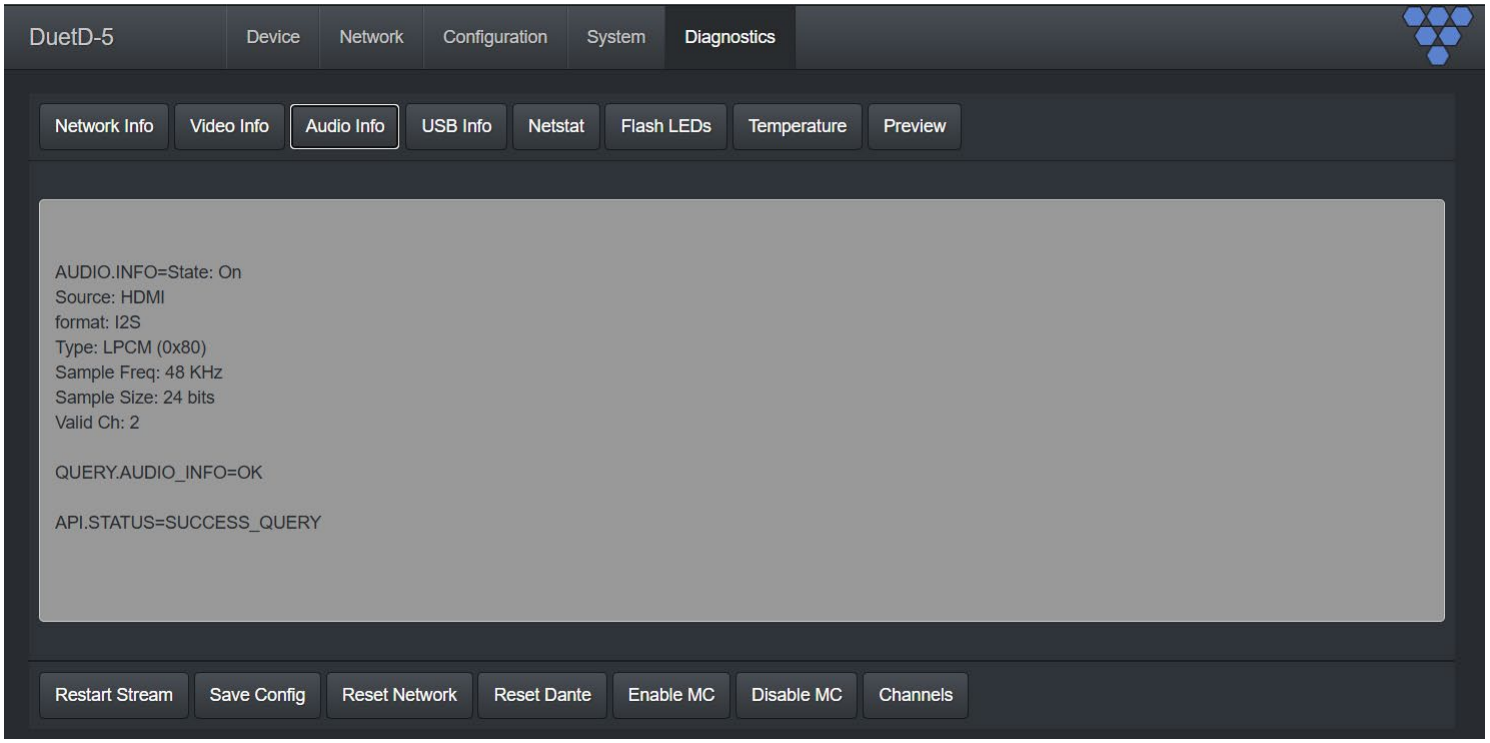
Displays the current network link speed for Stream, Uplink, and expansion port. In addition, the network info displays local and neighbor LLDP information.

VIDEO INFO



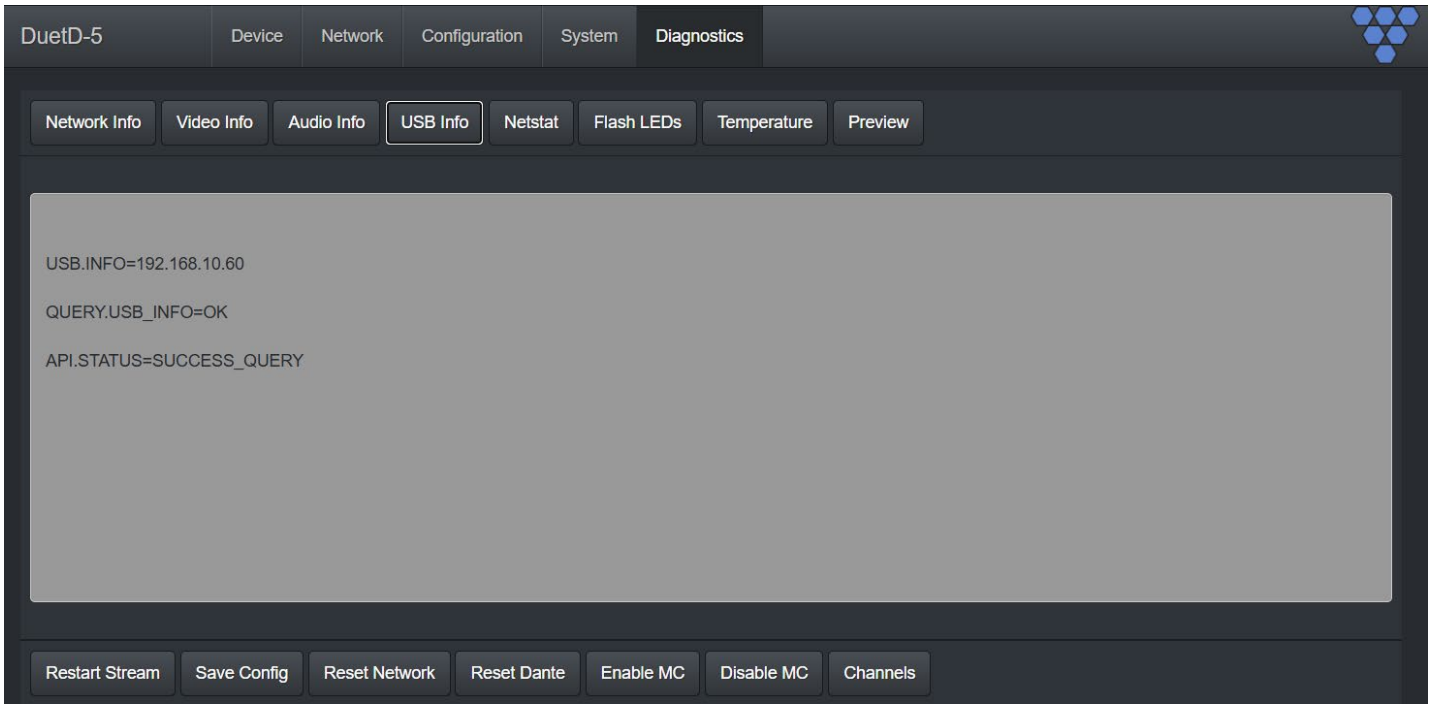
Displays the current video information, containing but not limited to resolution, refresh rate, scan mode, and HDCP.

AUDIO INFO



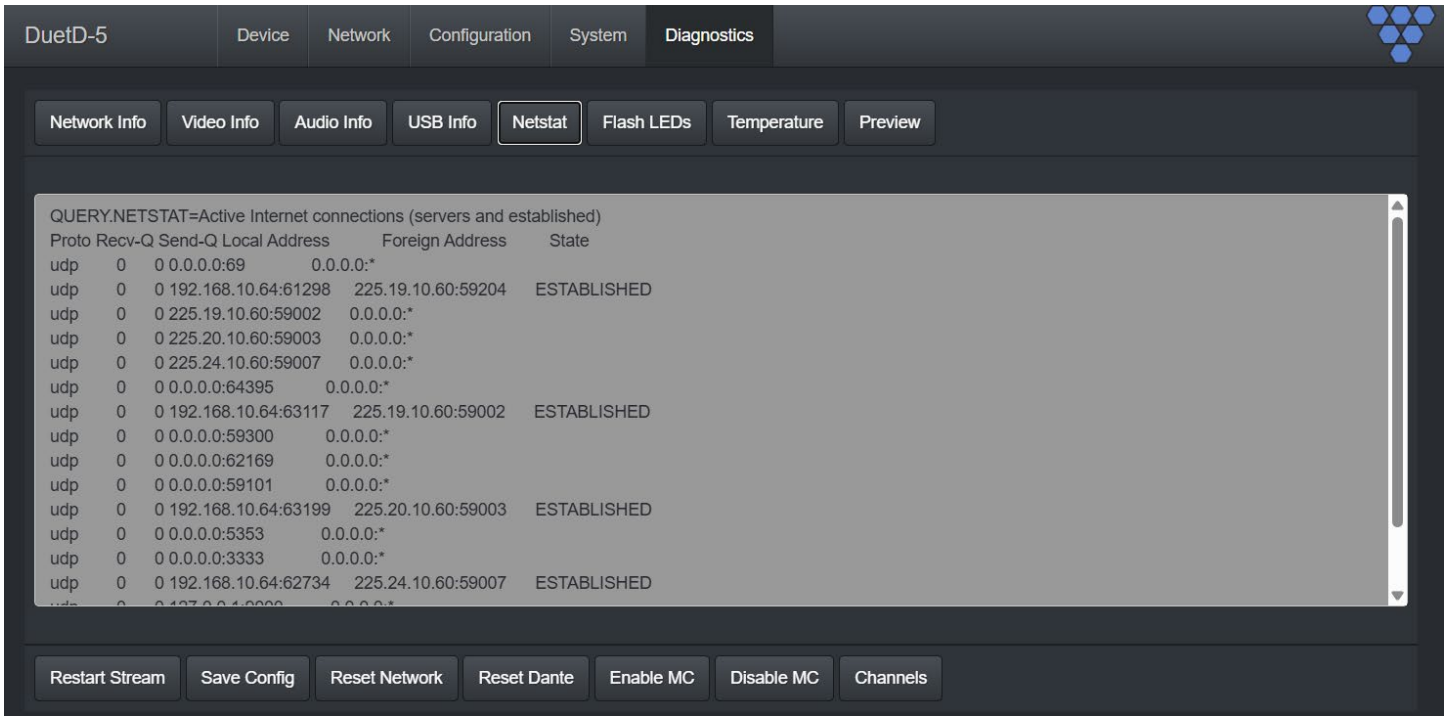
Displays the current audio source codec, type, sample frequency, and sample size information.

USB INFO



Displays the current USB/KVM IP connections.

NETSTAT



Displays the current network connections including current multicast AV streams.

In the example image, the following multicast AV streams are displayed:

- 225.19.10.60 – Video
- 225.20.10.60 – Audio
- 225.24.10.60 – USB

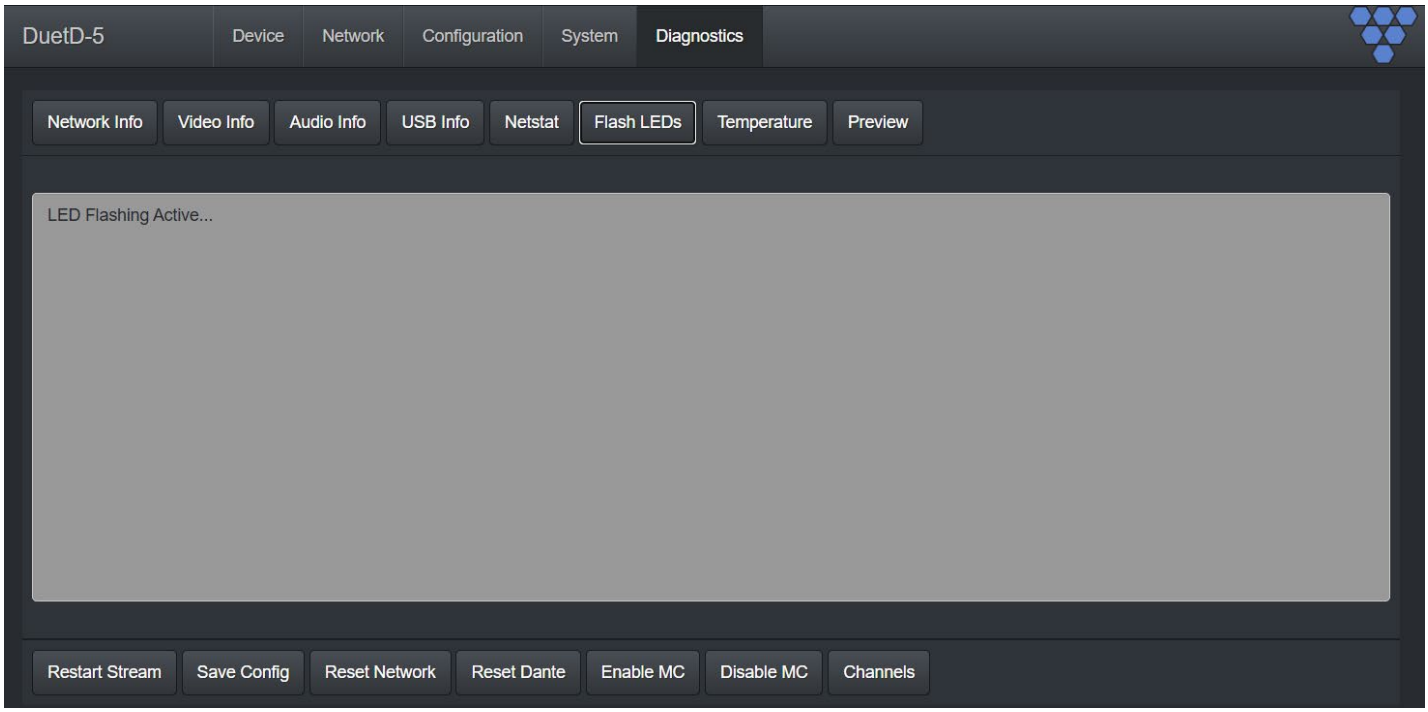
5 Series Multicast Groups:
Multicast stream addresses will be 225.x.xx.xx

- X = second octet mod 25, plus (1- Video, 2- Audio, 6 – USB)
- xx.xx = last 2 octets of the encoder host IP address.

Example:
Encoder with host IP of 192.168.8.101/225.255.255.0

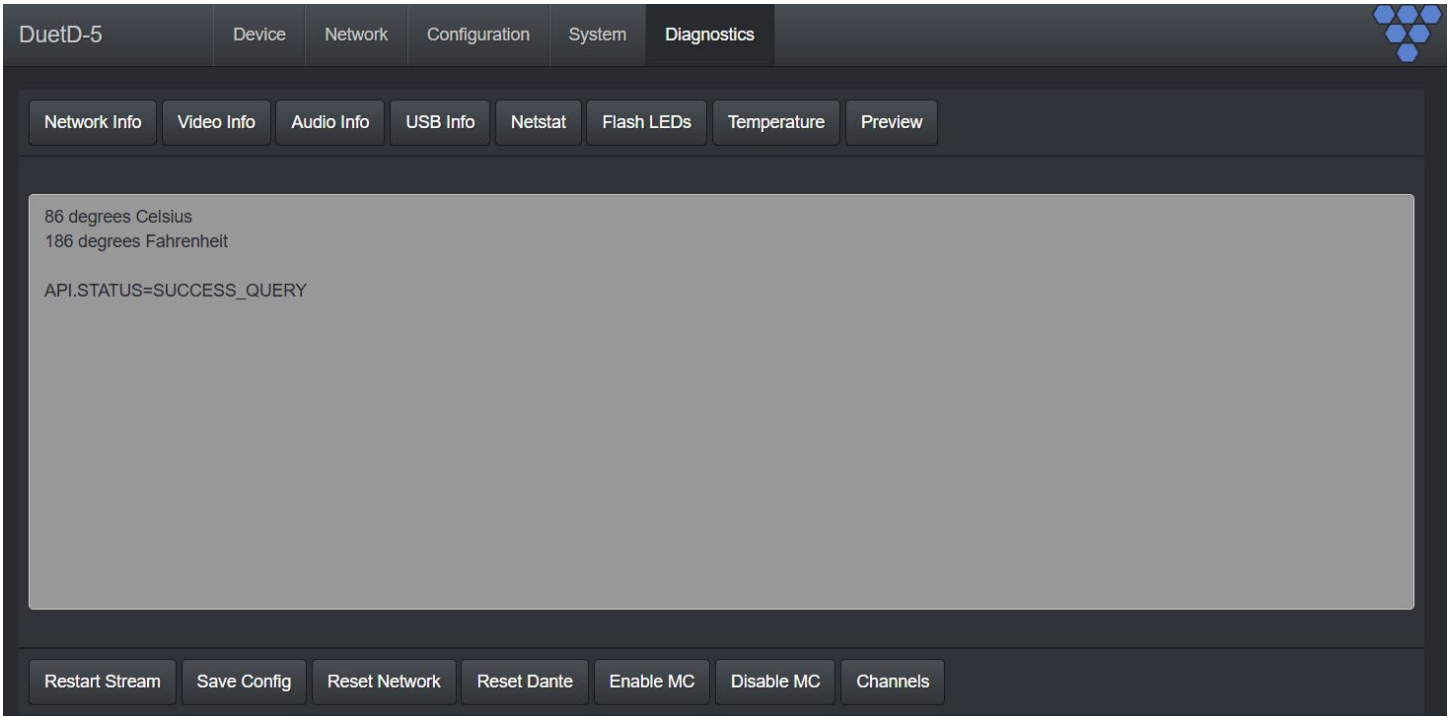
- 225.1.0.0 - Discovery
- 225.1.0.1 – Discovery
- 226.1.2.20 – Central group all units join
- 225.19.8.101 – Video
- 225.20.8.101 – Audio
- 225.24.8.101 – USB

FLASH LEDS



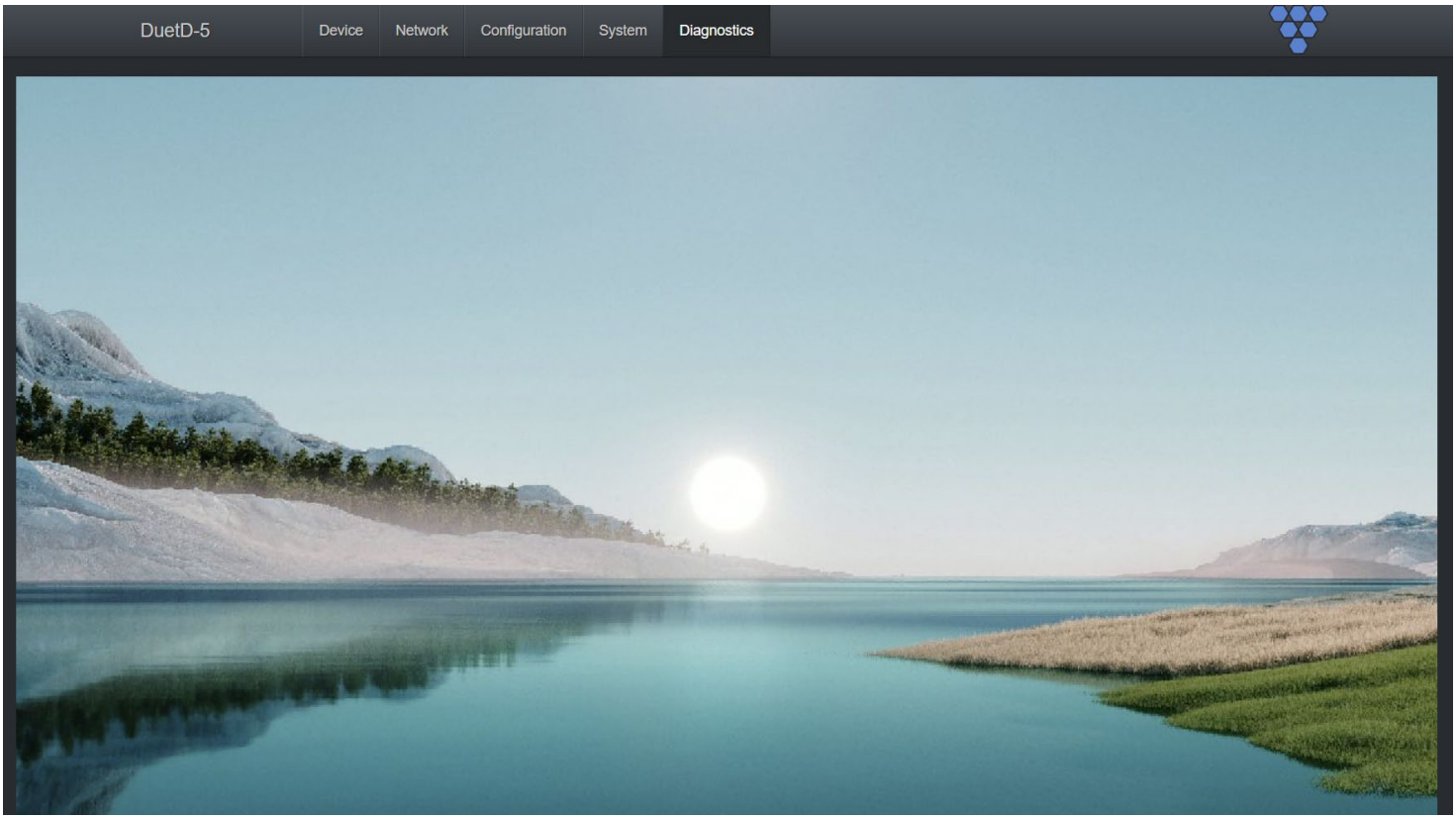
Flashed the front LEDs of the unit.

TEMPERATURE



Displays the current unit temperature in both Celsius and Fahrenheit.

PREVIEW



Displays the decoder Sub Stream Preview. The Sub Stream Preview is a 720P30 MJPEG stream that is video only (no audio).

The Sub Steam Preview may also be accessed via a web browser or VLC using the following links:

- Web browser: http://<decoder_IP>/web/preview.html
  - Example: http://192.168.8.101/web/preview.html
- VLC: http://<decoder_IP>:8600/?preview=video
  - Example: http://192.168.8.101:8600/?preview=video

RACK MOUNT KIT

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

Figure 12. Rack Mount System

PRODUCT SPECIFICATIONS

Encoding / Decoding	
Video Codec	JPEG2000 based visually lossless video compression algorithm
Audio Codec	Dante® / AES67
Bit Rates	50 to 800 Mbps
Latency	Ultra-low Latency (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)	2x HDMI & 1x USB-C capable of receiving source input video formats up to 4K60 4:4:4 (DisplayPort Alt Mode for USB Type-C or Thunderbolt)
Output Signal Types:	Decoder: 1x HDMI capable of scaling and outputting video formats up to 4K60 4:4:4 Decoder: 1x USB-C capable of scaling and outputting video formats up to 1080p60 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 (p to 4 channels) • 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, Dante®/AES67 Network Audio • 1 digital audio output via HDMI • 1 Analog Stereo Audio balanced output • 1 Dante®/AES67 digital output (up to 4 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
Dante®/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 1	8-pin RJ-45 connector, female; 100BASE-TX / 1000BASE-T Ethernet port / PD port POE+ (IEEE 802.3at), POE+ Only required for LAN2 PSE
LAN2	8-pin RJ-45 connector, female; 100BASE-TX / 1000BASE-T Ethernet port / PSE port, POE (IEEE 802.3af)
HDMI INPUT 1 & 2 (Encoder)	(2) HDMI Type A connectors, female; HDMI digital video/audio inputs
HDMI Outputs (Encoder loop- through & Decoder output)	HDMI Type A connectors, female; HDMI digital video/audio inputs
USB-C	Encoder input: (1) USB Type C connector, female; Decoder output: (1) USB Type C connector, female;
1st – 8 pin Euroblock 3.81mm pitch connector	Encoder Stereo Balanced Analog Audio Input Decoder Stereo Balanced Analog Audio Output
2nd - 8 pin Euroblock 3.81mm pitch connector	Shared GPIO / RS-232 / IR 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: 1.1 in. (28 mm) Width: 5.75 in. (146 mm) Depth: Encoder 8.86 in. (225 mm) Decoder 9.05 in. (230 mm)
Weight	1.0 lb (0.45 kg)
Compliance	
	CE, FCC, C-tick, RoHS, WEEE