Using **OmniStream**™ with **Velocity**™ **Device Manager**

Version Information

Version	Release Date	Notes
1	May 2023	Initial release

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Operating Notes

⚠️ **IMPORTANT: The** AT-OMNI-122 does _not_ support VCx mode. Installations that use the AT-OMNI-122 should make sure that all devices in the system are on the same VC-2 mode. Refer to DEVICE INFO page (page 113) for more information.

⚠️ **IMPORTANT:** Visit http://www.atlona.com/ for the latest firmware updates and User Manuals for both OmniStream™ and Velocity™ Device Manager.

Warranty

To view the product warranty, use the following link or QR code:

https://atlona.com/warranty/.

Safety and Certification

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCT THE RISK OF
ELECTRIC SHOCK
DO NOT OPEN ENCLOSURE OR EXPOSE
TO RAIN OR MOISTURE.
NO USER-SERVICEABLE PARTS
INSIDE REFER SERVICING TO
QUALIFIED SERVICE PERSONNEL.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the product.

The information bubble is intended to alert the user to helpful or optional operational instructions in the literature accompanying the product.

1. Read these instructions.

2. Keep these instructions.

3. Heed all warnings.

4. Follow all instructions.

5. Do not use this product near water.

6. Clean only with a dry cloth.

7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8. Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of a polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the product.

11. Only use attachments/accessories specified by Atlona.

12. To reduce the risk of electric shock and/or damage to this product, never handle or touch this unit or power cord if your hands are wet or damp. Do not expose this product to rain or moisture.

13. Unplug this product during lightning storms or when unused for long periods of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the product has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the product, the product has been exposed to rain or moisture, does not operate normally, or has been dropped.

FCC Compliance

FCC Compliance and Advisory Statement: This hardware device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received including interference that may cause undesired operation. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed or used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: 1) reorient or relocate the receiving antenna; 2) increase the separation between the equipment and the receiver; 3) connect the equipment to an outlet on a circuit different from that to which the receiver is connected; 4) consult the dealer or an experienced radio/TV technician for help. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Where shielded interface cables have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulations.

Copyright, Trademark, and Registration

Table of Contents

Introduction to OmniStream

OmniStream 101

OmniStream products are similar in principle to matrix switch endpoints: A/V signals are sent from one point (transmitter) to another point (receiver) over category cable. However, OmniStream stands apart from matrix switchers, in that it is an *IP-based solution*, allowing this data to be sent over a standard IP network. In addition, these endpoints are referred to as *encoders* and *decoders*. Encoders act as "transmitters" and decoders act as "receivers".

DEFINITIONS

Encoder – Compresses source signals before sending them out over a network environment.

Decoder – Receives and decompresses signals from an encoder and sends them to an output device, such as a display or other sink device.

IP Address – A unique numerical label that is assigned to each device connected to a network.

IP Address Assignment

Figure 1.1 below, shows an encoder and a decoder, connected through a network switch. As with all network devices, both the encoder and decoder must have unique IP addresses. OmniStream encoders and decoders are DHCP-enabled, by default. This means that when the encoder/decoder is connected to the network, and a DHCP server is available, the encoder/decoder will automatically be assigned an IP address. If no DHCP server is available, then the unit will use a self-assigned IP address within the range of `169.254.xxx.xxx/16`. OmniStream devices can also be assigned a static IP address, if necessary. Static IP addressing will be covered in a later section.

Figure 1.1 - An encoder and decoder on a network, with assigned IP addresses.

Encoder IP Address: 192.168.1.27

LAN

Ethernet

AT-OMNI-111

PoE Network Switch

Ethernet

Decoder IP Address: 192.168.1.38

AT-OMNI-121
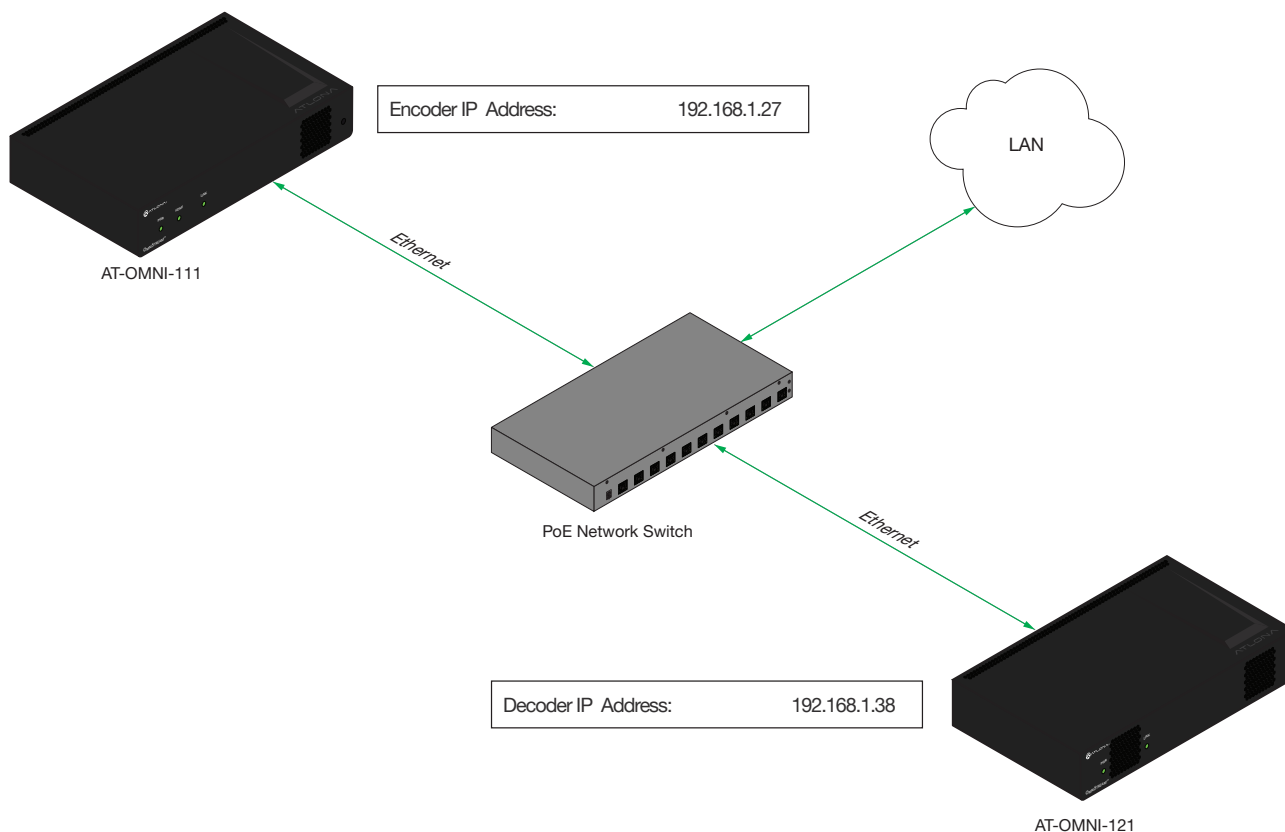
Network Bandwidth and OmniStream Compression

When sending video and audio over a network, the available bandwidth needs to be managed. Gigabit Ethernet switches are very common and can take advantage of installed Category 5e cable. 10-Gigabit Ethernet switches are available, but are more expensive per port and require Category 6A cable or better. The chart below shows uncompressed data rates for common resolutions. These data rates exceed the available bandwidth of Gigabit Ethernet, but using the compression technology in OmniStream, this video can be streamed over cost-effective Gigabit networks.

Resolution	Data Rate*
1920 x 1080p 30 Hz	2.2 Gbps
1920 x 1080p 60 Hz	4.5 Gbps
3840 x 2160p 30 Hz	8.9 Gbps
3840 x 2160p 60 Hz	17.8 Gbps

* Data rate is shown without compression.

OmniStream compresses the source data at the encoder, before it is sent out over the network. This process is known as *encoding*. OmniStream uses VCx and VC-2 compression, which are intermediate compression schemes and is much more desirable than using a interframe compression scheme, such as H.264 or H.265. Interframe codecs are typically used by cable or internet providers and use very aggressive bit rates (low bandwidth) with high latency (delay), which results in lag. VCx and VC-2 provide both high quality (high bit rates) and very low-latency for a much more desirable viewing experience.

Streams

The term *stream* is used throughout this manual, to describe the different types of signals that are transmitted over a network. For example, if a blu-ray player is connected to an encoder, both video and audio are sent to the encoder over an HDMI cable. The term *video stream* is used to identify the video portion of a signal and *audio stream* identifies the audio portion of the signal.

Sessions

A *session* is a way of organizing audio and video streams. The session identifies each stream with a unique *multicast IP address* and *UDP port* assignment. This provides an address to determine where the package of audio and video should be sent. *Figure 1.2* illustrates how a session encapsulates a video and audio stream.

> **NOTE:** Sessions are not limited to only video and audio streams. Control data, such as IR and RS-232, as well as AES67 audio, can also be contained within a session. These topics will be covered in a later chapter.

Figure 1.2 - Video and audio streams contained within a session.

Session

Video Stream	Multicast IP Address	UDP Port
Audio Stream	Multicast IP Address	UDP Port
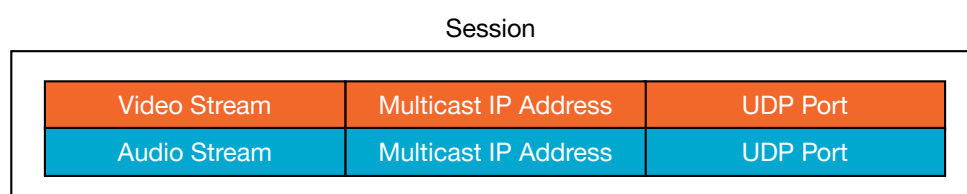
Subscribing to a Stream

To receive information from an encoder, the decoder must *subscribe* to the multicast IP address and UDP port of the stream(s). Note that the decoder does not subscribe to the session, but to the stream(s) within the session. The process of subscribing is similar to changing the channel on a Set-Top Box. For example, in order to view the content on channel 213, the Set-Top Box must be set to channel 213. Similarly, for a decoder to subscribe to an encoder stream, *the multicast IP address and UDP port settings on the decoder must be set to the same values as the encoder to which it is subscribed.* Note that the management IP address of a unit is different than its multicast IP address.

Figure 1.3 - Diagram of a video and audio stream, transmitted over an Ethernet cable, to the subscribing decoder.

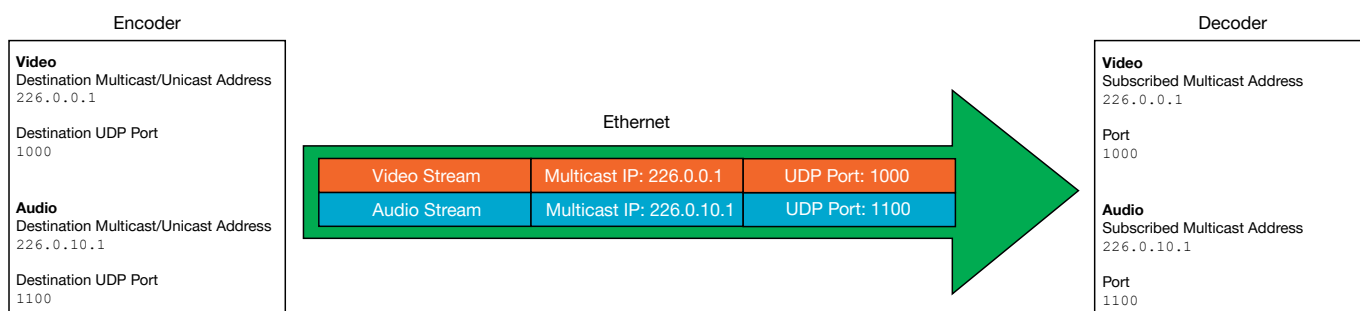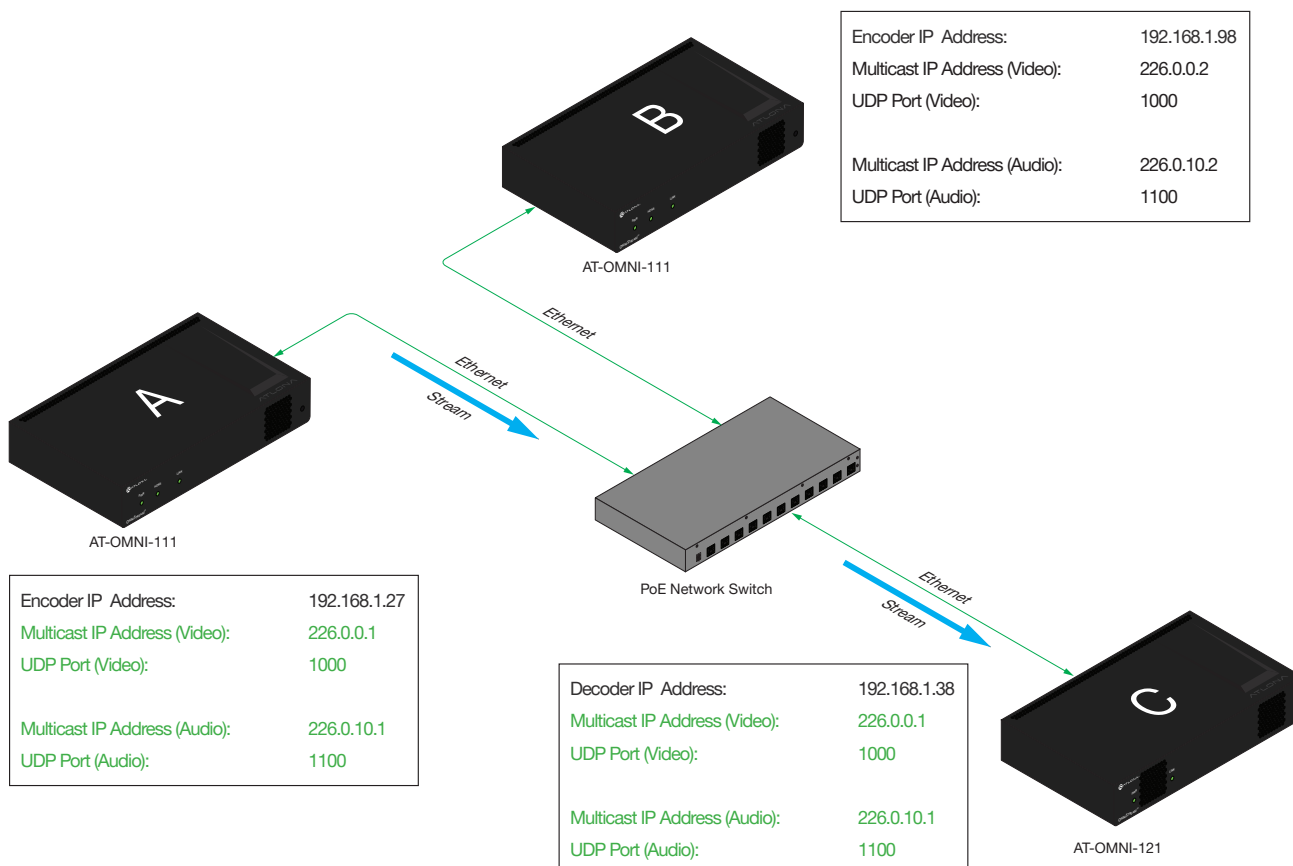*Figure 1.4* shows two encoders and a single decoder connected to a network switch. Decoder "C" is subscribed to encoder "A", since the multicast IP addresses and UDP port numbers for both video and audio are set to the same values as encoder "A".

Figure 1.4 - Decoder "C" subscribed to encoder "A".

> **DEFINITIONS**
>
> *Stream* – Describes the video, audio, or any data that is transmitted from an encoder over the network.
>
> *Multicast IP Address* – A class-D IP address assigned to a stream.
>
> *UDP Port – User Datagram Protocol (UDP) port. Part of the network addressing scheme to send and receive data to the proper destination on a network.*
>
> *Subscribing – The process of selecting the multicast IP address to "listen to", in order to receive one or more encoder streams at the decoder endpoint.*

OmniStream Naming Schema

Each OmniStream model has a different set of inputs and outputs and, depending upon the number of inputs and outputs. The number of supported session will depend upon the encoder model.

Encoders	Description
AT-OMNI-111 AT-OMNI-111-WP	• One HDMI input • One Ethernet output • Supports up to six sessions
AT-OMNI-112	• Two HDMI inputs • Two Ethernet outputs • Supports up to six sessions
AT-OMNI-512	• Two HDMI inputs • Two Ethernet outputs • Supports up to four sessions

Decoders	Description
AT-OMNI-121	• One HDMI output • One Ethernet input
AT-OMNI-122	• Two HDMI outputs • Two Ethernet inputs

The last three numbers of the OmniStream SKU, describe the model version, model type, and number of inputs/outputs. The number of Ethernet ports and HDMI ports will be the same.

For example, the numbering scheme on the AT-OMNI-112 is read as follows:

• AT-OMNI-**112**   **1**= OmniStream Pro ("R-Type" models begin with the number "5").
    1 = Indicates that the device is an *encoder* (*decoders* are identified with the number "2").
    2 = The number of sources (encoder)/sinks (decoder).

Getting Started

Accessing OmniStream Devices

The Velocity Device Manager uses multicast Domain Name Server (mDNS) to automatically discover each encoder on the network.

By default, the OmniStream devices are set to DHCP mode, allowing a DHCP server (if present) to assign the encoder an IP address. Once an IP address has been assigned, Velocity can be used to manage the product on the network. Note that Velocity will only be able to discover encoders if they are on the same VLAN.

In order for Velocity to automatically assign multicast IP addresses to OmniStream devices, the destination IP addresses for the session streams must be cleared.

> **ℹ️ NOTE:** The following steps are required *only if a pre-existing multicast IP address* is assigned to each session and if automatic assignment of these multicast IP addresses, using Velocity, is desired.

1. Launch a web browser and enter the IP address of Velocity, in the address bar.

2. Enter the required login credentials.

3. Click the **LOGIN** button.
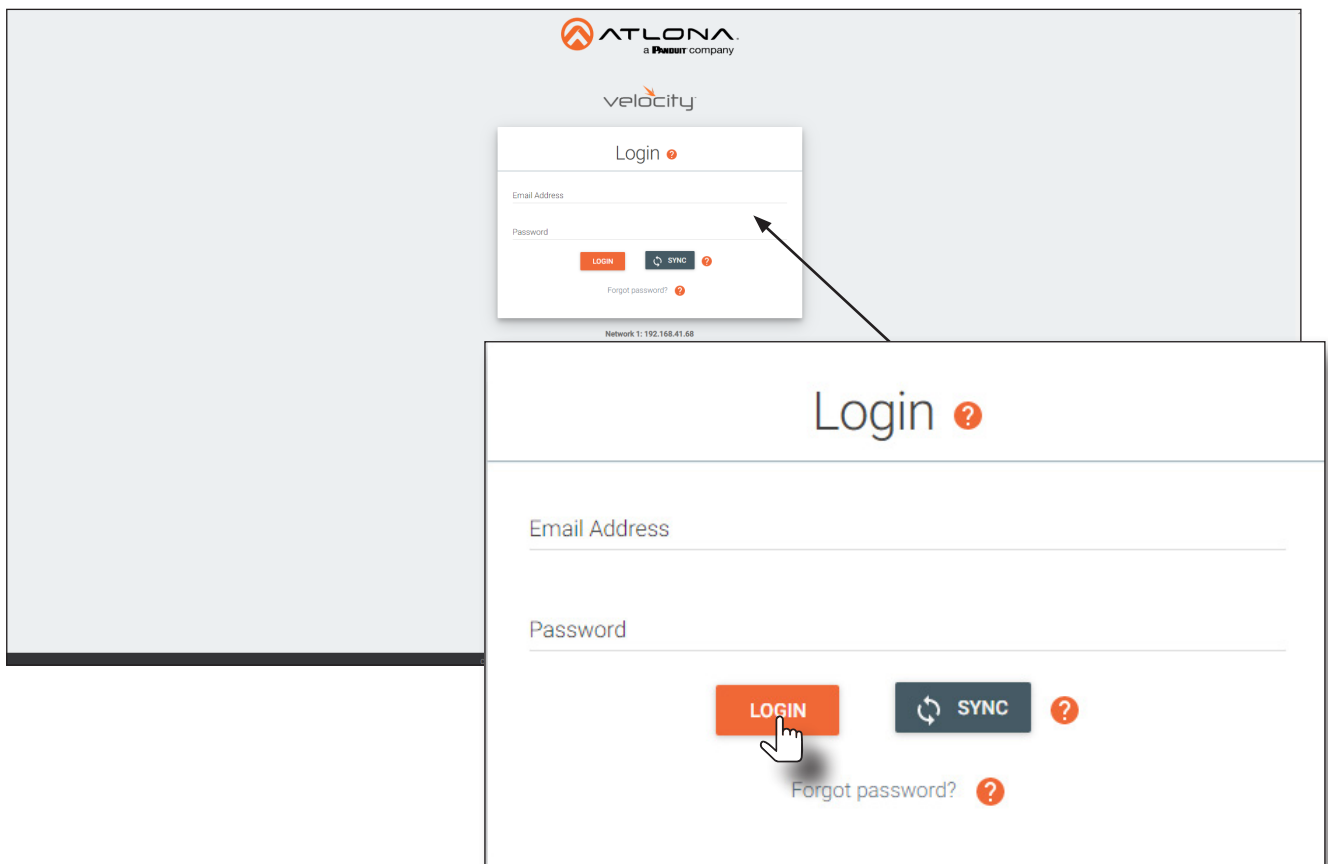
4. The Velocity home screen will be displayed.

5. Click the ☰ icon in the upper-left corner of the screen and select **Management** > **Device Manager**.
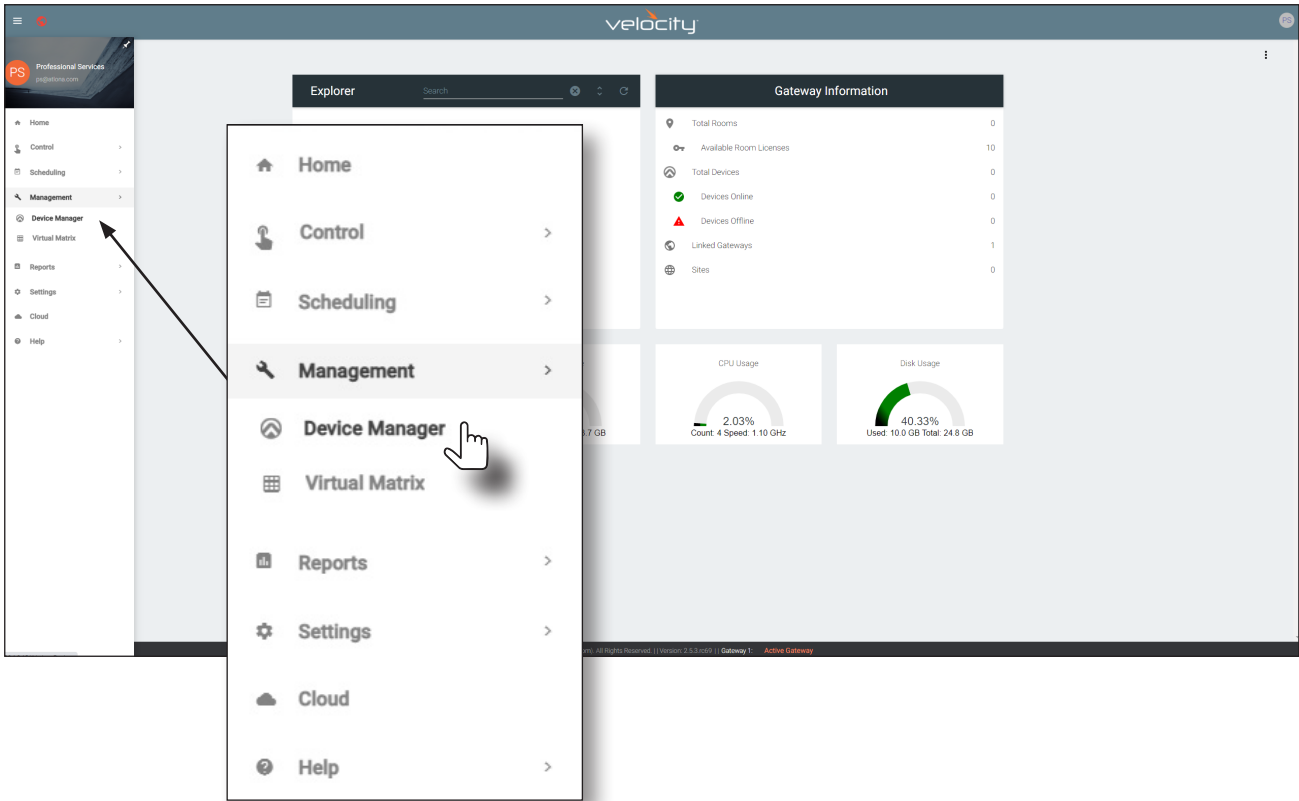
6. All available encoders will be displayed under the **Unassigned** category. When an encoder is unassigned, it means that it has not been assigned to a site, building, and/or room. Refer to the Velocity User Manual for more information on these topics.
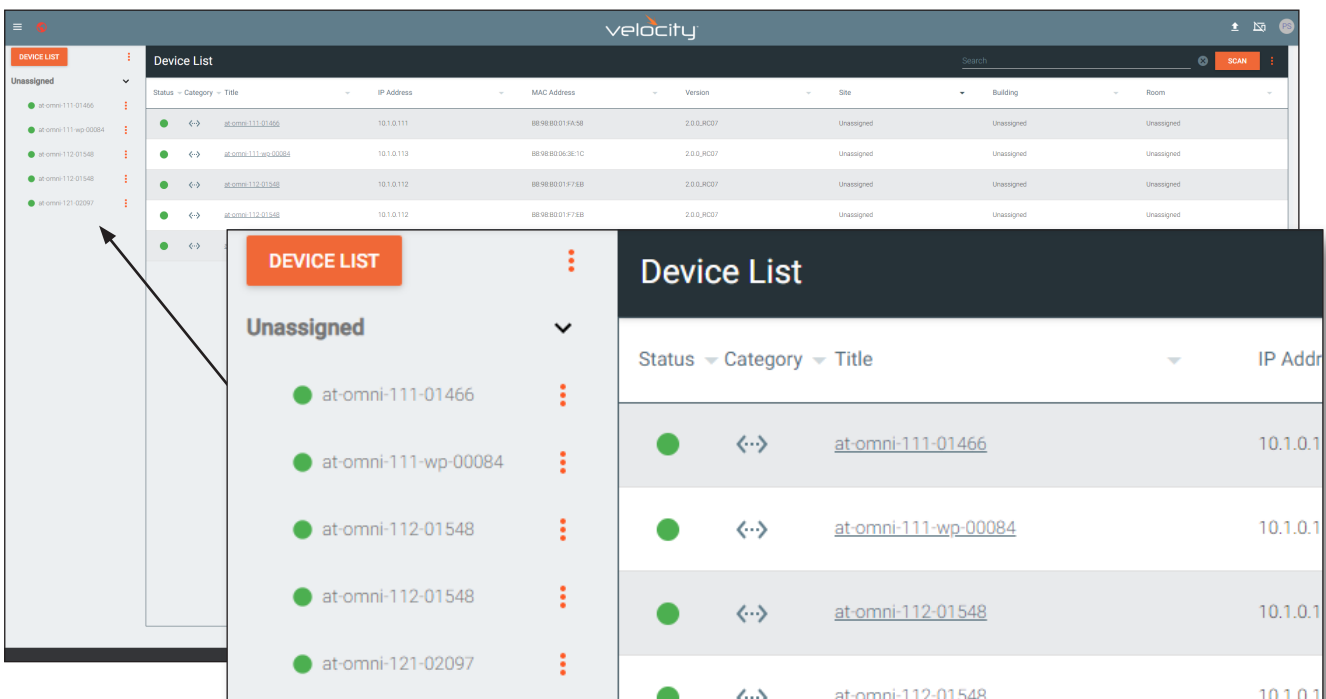
If a DHCP server is not found within 60 seconds, the encoder will be placed in Auto IP (APIPA) mode and assigned an IP address within the range of `169.254.xxx.xxx/16`. If this occurs, configure the network interface of the computer that is running Velocity, located on the same subnet (`169.254.xxx.xxx`, subnet mask `255.255.0.0`). Refer to for more information on configuring an encoder in Auto IP mode.

If no OmniStream encoders are found, then verify the following:

- The computer that is running Velocity must be on the same network as the OmniStream device.

- Remove any network restrictions that may be in place. In order for mDNS to function properly, there must not be any restrictions applied to the network.

7. Click the desired OmniStream device from the **Unassigned** list.

8. The control interface for the device will be displayed and the device can be configured as desired. The illustration below shows the **DEVICE INFO** screen for an AT-OMNI-112 encoder.
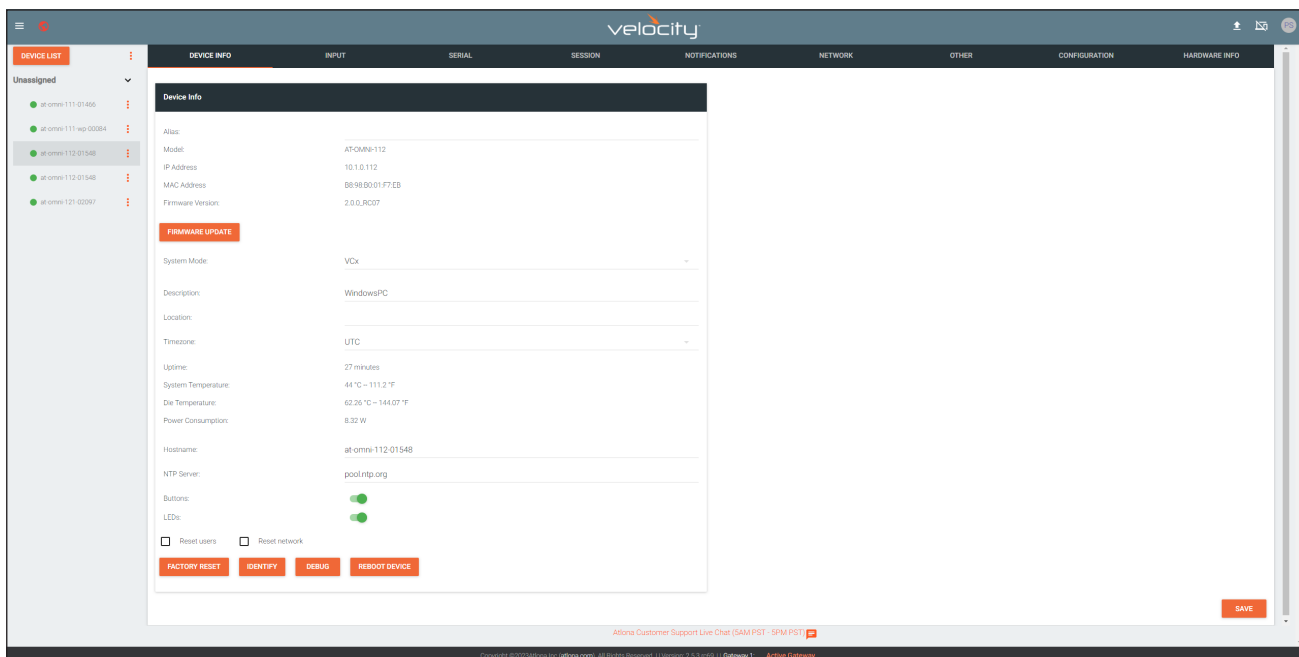
LED Indicators

The following table provides a general overview of the front-panel LED indicators and their status. Depending upon the device (encoder or decoder), some LED indicators may not be present.

LED			Description
PWR	Off	○	• If using a PoE switch, make sure that the port on the switch that is connected to the encoder, has PoE enabled. When the encoder is powered using PoE, the **PWR** indicator will be green. • Check the Ethernet cable for possible damage or loose connections. • Connect the optional 48V DC power supply (available from atlona. com) to the encoder. When using an external power supply, the **PWR** indicator will be green.
	Red	●	• The encoder is booting.
	Amber	●	• The encoder is booting and/or attempting to locate a DHCP server.
	Green	●	• The encoder is ready.
HDMI 1 / 2	Red	●	• No source is connected to the input. • Check the HDMI cable for possible damage or loose connections.
	Green	●	• The link integrity between the source and the encoder is good.
LINK 1 / 2	Red	●	• The optional 48V DC power supply is connected, but no Ethernet cables are connected between the switch and the **ETHERNET** port(s). • Check the Ethernet cable for possible damage or loose connections.
	Amber	●	• The encoder is booting.
	Green	●	• Link integrity is good between the encoder and the network.

Basic Configuration Tutorial

This section provides a tutorial on configuring two AT-OMNI-111 single-channel encoders and one AT-OMNI-121 single-channel decoder. Make sure the encoder is connected to a source device and that the decoder is connected to a display. Both the encoder and decoder should be connected to the same local network.

Physical Connections
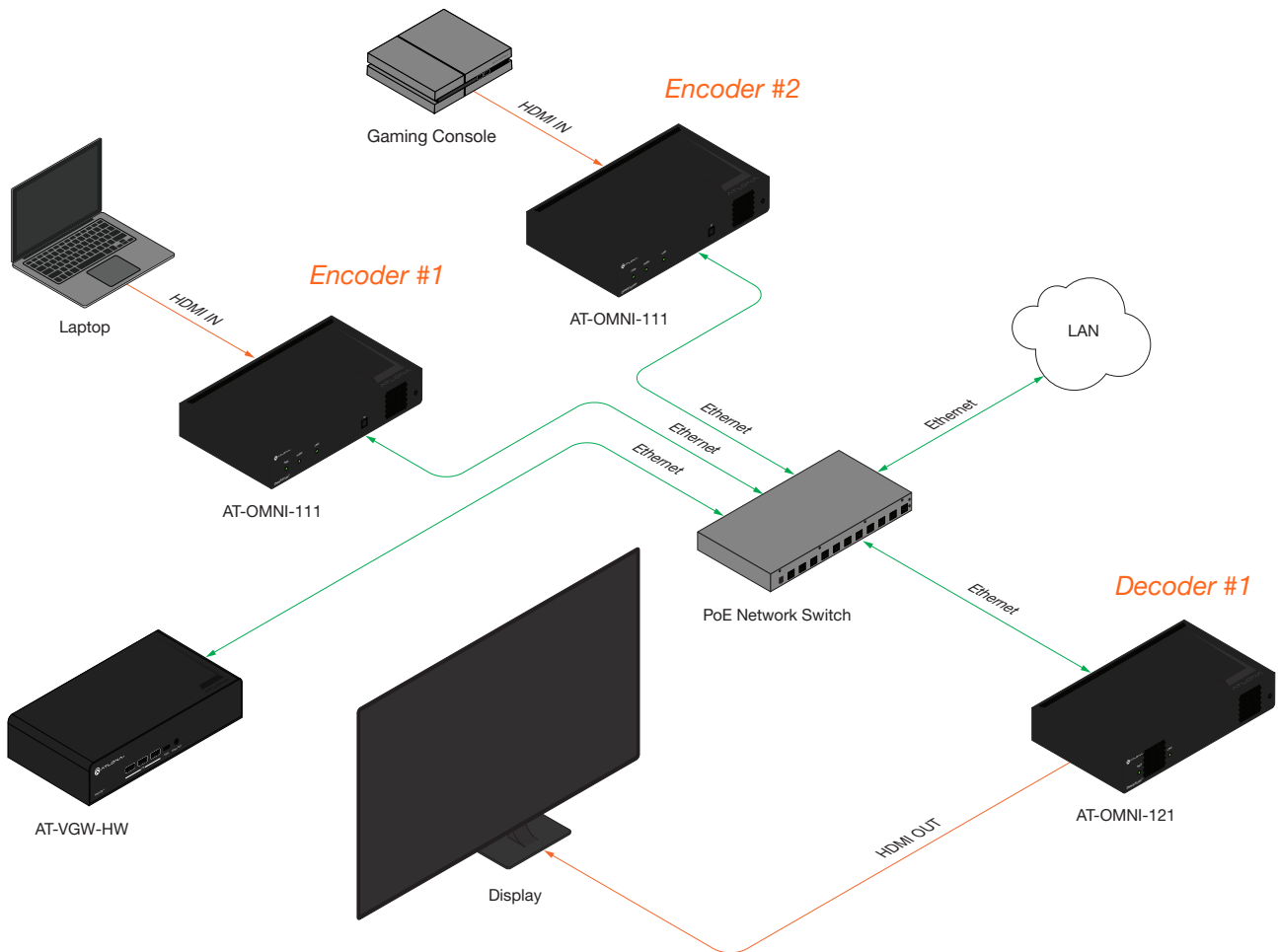
Setting the System Mode

OmniStream offers three system modes. These modes will optimize the video, based on the type of information that is being displayed and/or the desired features.

1. Under **DEVICE LIST**, select the encoder.

2. Click the **System Mode** drop-down list and select VCx. This mode will provide access to all of OmniStream 2.0 features.

Mode	Description
VCx	This is the default mode and represents the latest codec technology from Atlona, with outstanding support for computer graphics and motion video. VCx includes support for 4K60 4:4:4 fast switching, dual streaming from AT-OMNI-111 encoders, and multiview on the decoders.
VC-2 Video	Legacy OmniStream codec that provides the best viewing experience when streaming motion graphics and/or video.
VC-2 PC application	Legacy OmniStream codec that optimizes the image when viewing static images, such as spreadsheets or similar content.

3. Click **SAVE** in the bottom-right corner of the page to commit changes.

4. Repeat this process for the other encoder and the decoder.

Configuring Inputs

The **INPUT** page is used to verify that the encoder recognizes the source device. This page is also used to set the EDID, HDCP version, and provides detailed information about the source signal. *The following procedure should be performed on both AT-OMNI-111 encoders*.

1. Click **INPUT** in the menu bar and locate the **HDMI Input 1** window group. Since a source has been connected to the **HDMI IN** port, the **Cable Present** indicator is green. This indicates that an active source is connected to the HDMI port.

    If these indicators are red, check that each source is connected to an **HDMI IN** port. A red indicator may also describe faulty HDMI cables. If the sources are connected, then try different HDMI cables. If the HDMI cable integrity has been verified, then make sure that the output resolution of the source is at least 720p.

> **TIP:** If no signal is being received on the encoder, then it's always a good practice to check the **INPUT** page on the encoder when performing additional troubleshooting.

2. Click the **EDID** drop-down list to select an EDID. For now, leave this setting at `Default HDR MCH`. This EDID provides general compatibility with most displays.

3. The **HDCP Encrypted** indicator will be green if HDCP content is present. In this example, the source connected to **HDMI IN 1** is not transmitting HDCP content. Therefore, the indicator is red.

4. Click the **HDCP** > **Version** drop-down list to restrict HDCP to a particular version. By default, this is set to 2.2 and this setting should be used for most applications.

5. The **Video** section provides information about the input signal: color depth, subsampling, color space, resolution, frame rate, and HDR (High Dynamic Range). If the HDR indicator is green, this will indicate that HDR content is being transmitted from the source device. Refer to the INPUT page (page 94) for more information.

6. The **Audio** section displays audio information (if present) from the source device: bit depth, the number of audio channels, the audio format, and the frequency. Refer to the INPUT page (page 94) for more information.

7. Click **SAVE** in the bottom-right corner of the **HDMI Input 1** window group to commit changes.

HDMI Input 1

Cable Present:	🟢
EDID:	Default HDR MCH
HDCP Encrypted:	🔴
Supported Version:	❹ 2.2

Video: ❺

Color Depth:	12
Subsampling:	444
Colorspace:	RGB
Resolution:	1920x1080p
Framerate:	59.94
HDR:	🔴

Audio: ❻

Bit Depth:	0
Channel Count:	2
Coding Type:	LPCM
Sampling Frequency:	48kHz

❼ SAVE

Encoder Settings

The **INPUT** page is also used to assign an input to an encoder. The **Encoder** window groups allow video settings, such as the maximum bit rate, bit depth, and chroma subsampling to be set. Video thumbnails of the source device can also be displayed on this page. *The following procedure should be performed on both AT-OMNI-111 encoders*.

1. Under the **Encoder 1** window group, click the **Input** drop-down list and select `HDMI Input 1`.

2. Enter `750` in the **Max bit rate** field. This means 750 Mbps. Maximum bandwidth per port is 900 Mbps. On single-channel encoders, the bandwidth of all enabled sessions should be less than this maximum bandwidth. On dual-channel encoders, 900 Mbps of bandwidth is available on each Ethernet port, and the bandwidth of all enabled sessions assigned to each port should be less than this maximum.

3. Click the **Subsampling** field to set the chroma subsampling value. In this example it will be set to `4:2:2`.

4. The **Force YUV** toggle switch can be set to on to force YUV color space. In this example, it will be disabled (default). If enabled, the toggle switch will be green.

5. Click the **Thumbnail** > **Enable** toggle switch to enable it and display a thumbnail of the source. When enabled, the toggle switch is green and a thumbnail of the source will be displayed. If no thumbnail is displayed when this feature is enabled, verify that the source is connected and powered.

6. Click **SAVE** to commit all changes.

Creating a Session

Before the video and audio (if any) can be sent out over the network, a session must be created on the encoder. The session assigns each strea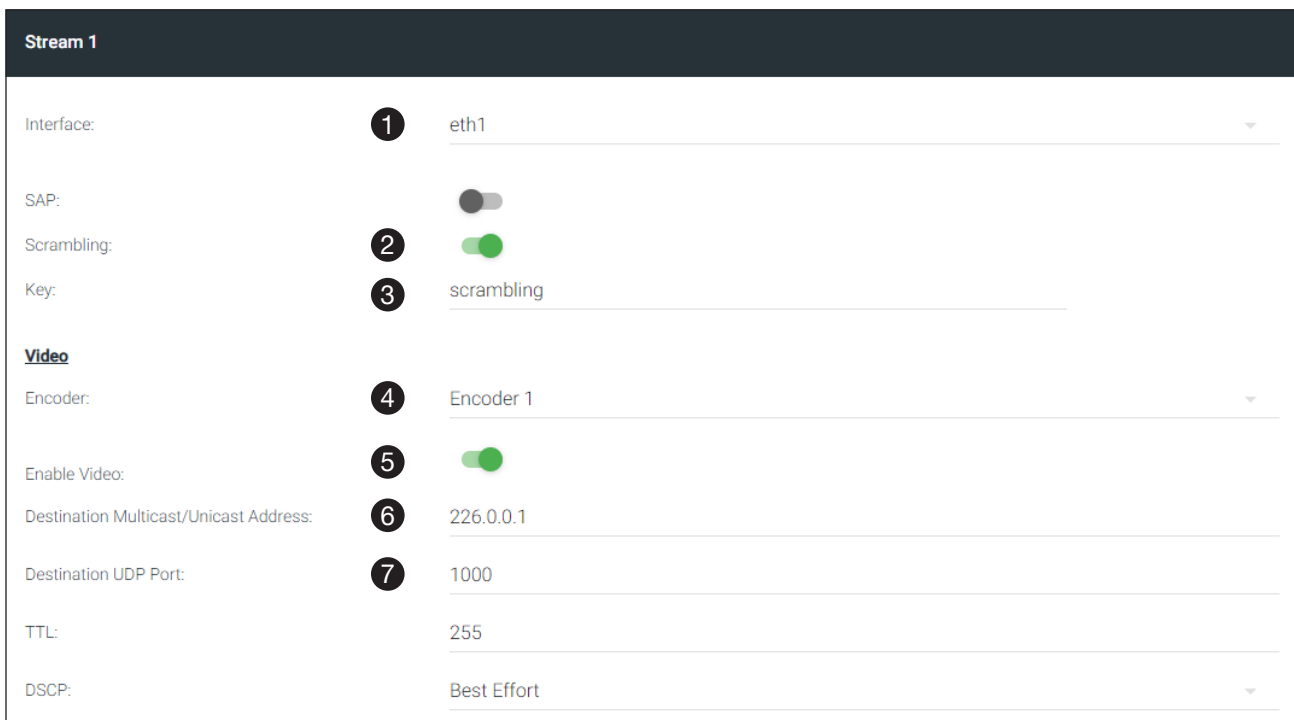m to a unique multicast IP address and UDP port assignment. Sessions are always created on encoders. Refer to SESSION page (page 100) for a detailed description of all settings. *The following procedure should be performed on both AT-OMNI-111 encoders, except where noted*.

1. Click **SESSION** in the menu bar, locate **Stream 1**, and click the **Interface** drop-down list to select the desired interface. This can be changed to `eth1` or `none`. For this example, **Stream 1** will be transmitted over the **ETHERNET 1** port. Therefore, set this to `eth1`.

2. The **Scrambling** toggle switch is enabled by default. When enabled, this toggle will be green. Leave this setting enabled.

3. The **Key** field is set to `scrambling` by default. Scrambling keys can be any combination of alphanumeric characters and it is good practice to use them. For this tutorial, use the default key.

4. Select the encoder for the video stream. In the last section, `HDMI Input 1` was assigned to **Encoder 1**. Therefore, set the **Video** > **Encoder** field to `Encoder 1`.

5. Click the **Video** > **Enable Video** toggle switch and make sure it is enabled for **Stream 1**. When enabled, the toggle switch will be green. If set to disabled, then the encoder video stream will be disabled.

6. Enter the multicast IP address for the video stream in the **Video** > **Destination Multicast/Unicast Address** field. Atlona recommends using multicast IP addresses, as shown in *Table 1.1* on the next page. Enter `226.0.0.1` in the **Video > Destination Multicast/Unicast Address** field for **Stream 1** on *Encoder #1*. For *Encoder #2*, enter `226.0.0.2` in the **Video** > **Destination Multicast/Unicast Address** field for **Stream 1**.

7. Enter the UDP port in the **Video** > **Destination UDP port** field. Although any valid UDP port can be used, Atlona suggests using the UDP port numbers in *Table 2.1*, on the next page. Since this is a video stream, enter `1000` in the **Video** > **Destination UDP port** field for **Stream 1**.

Table 2.1 - Recommended multicast IP address for video, audio, and data streams.

Stream	Video	Audio	Data (Control)
First source	226.0.0.1	226.0.10.1	226.0.20.1
Second source	226.0.0.2	226.0.10.2	226.0.20.2
nth source	226.0.0.n	226.0.10.n	226.0.20.n

Table 2.2 - Recommended UDP ports for video, audio, and data streams.

Stream	Video	Audio	Data (Control)
UDP Port	1000	1100	1200

8. Click the **Audio** > **Source** drop-down list and select the HDMI audio input for the stream. The source is connected to **HDMI IN**. Therefore, set this to HDMI 1.

9. Click the **Audio** > **Enable** toggle switch and make sure it is enabled. When enabled, it will be green. If disabled, no audio will be streamed from the encoder.

10. Enter the multicast IP address for the audio stream in the **Audio** > **Destination Multicast/Unicast Address** field. Refer to *Table 2.1*, above. In this example, enter 226.0.10.1 for **Stream 1** on *Encoder #1*. Enter 226.0.10.2 for **Stream 1** on *Encoder #2*.

11. Enter the audio stream UDP port in the **Audio** > **Destination UDP Port** field. Refer to *Table 2.2*, above. Since this is an audio stream, use UDP port 1100.

12. Click the **SAVE** button to commit all changes to **Stream 1**.
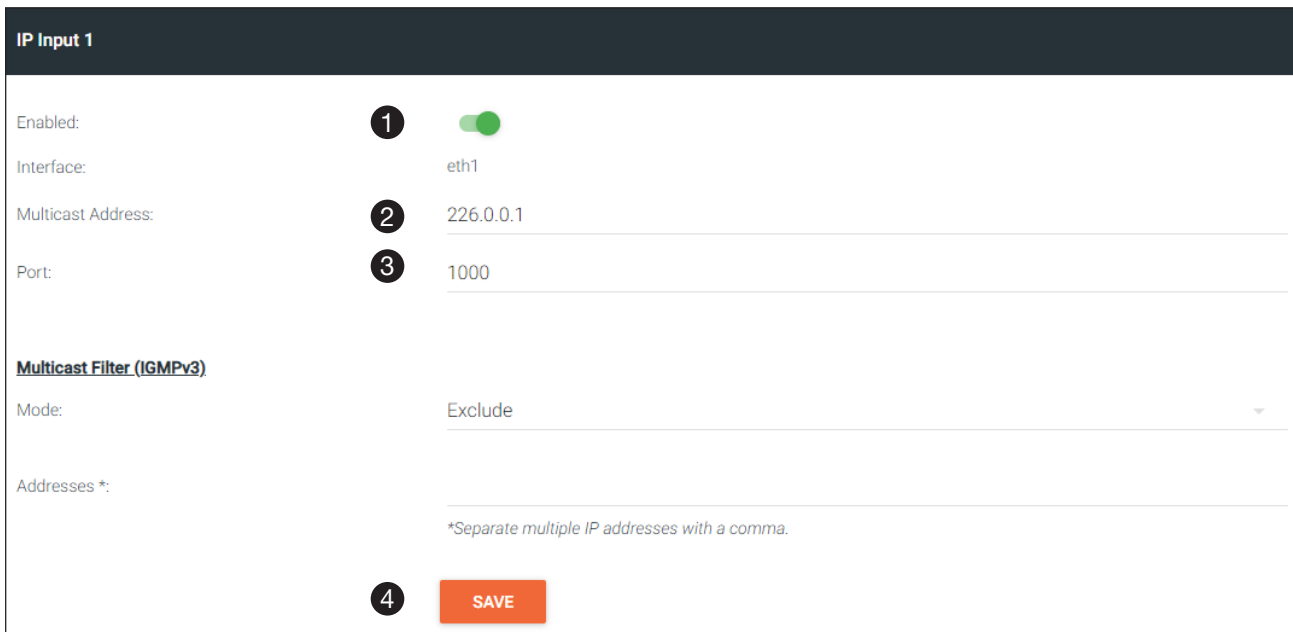
Subscribing to an Encoder

The next step is to configure the decoder so that it is able to receive video, audio, and/or data (control) streams from the encoder. This process is referred to as "subscribing to the encoder".

Video Configuration

1. Go to the decoder, click **IP INPUT** in the menu bar, and locate the IP Input 1 window group. Verify that the **Enable** toggle switch is enabled. When enabled, the toggle switch will be green. Perform the same procedure for the **IP Input 2** window group.

2. Under the **IP Input 1** window group, enter `226.0.0.1` in the **Multicast Address** field. Under the **IP Input 2** window group, enter `226.0.0.2` in this field. These multicast IP address are the same addresses that were specified under the **Video** > **Destination Multicast/Unicast Address** field for the encoders.

3. In the **Port** field, enter `1000` under both **IP Input 1** and **IP Input 2** window groups. These are the same port settings that were entered under the **Video** > **Destination UDP Port** field of the encoder.

4. Click the **SAVE** button, under the **IP Input 1** and **IP Input 2** window groups, to commit changes.
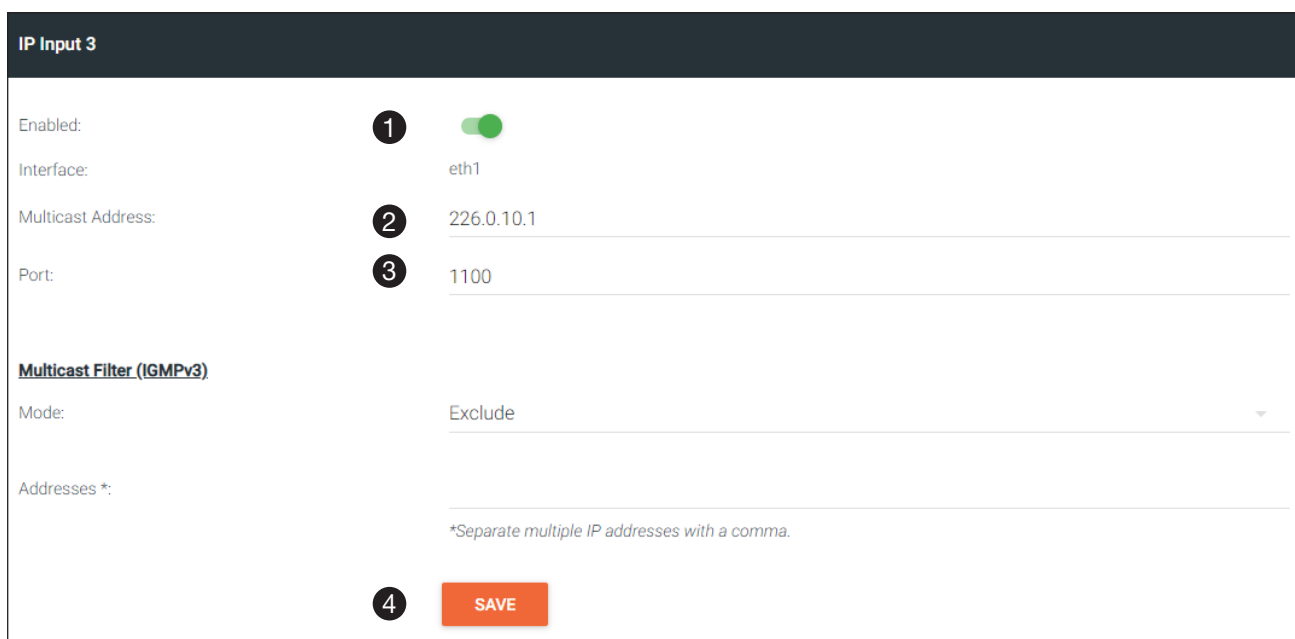
Audio Configuration

1. Locate the **IP Input 3** window group and verify that the **Enable** toggle switch is enabled. When enabled, the toggle switch will be green. Perform the same procedure for the **IP Input 4** window group.

2. Under the **Input 3** window group, enter `226.0.10.1` in the **Multicast Address** field. Under the **IP Input 4** window group, enter `226.0.10.2` in this field. These multicast IP address are the same addresses that were specified under the **Audio** > **Destination Multicast/Unicast Address** field for the encoders.

3. In the **Port** field, enter `1100` under both **IP Input 3** and **IP Input 4** window groups. These are the same port settings that were entered under the **Audio** > **Destination UDP Port** field for the encoders.

4. Click the **SAVE** button, under the **IP Input 3** and **IP Input 4** window groups to commit changes.

Input Configuration Notes

Although there is no hard and fast rule for which **IP Input** window groups should be used for video, audio, and/or control, it can be helpful to visualize the **IP Input** window groups as columns and rows to better organize the IP data. The following tables were used to organize the data.

Table 2.3 - Video and Audio information for Encoder #1 and Encoder #2.

IP Input	Encoder 1 Information		IP Input	Encoder 2 Information
IP Input 1	Video `(226.0.0.1:1000)`		IP Input 2	Video `(226.0.0.2:1000)`
IP Input 3	Audio `(226.0.10.1:1100)`		IP Input 4	Audio `(226.0.10.2:1100)`

Configuring the HDMI Output Stream

1. Click **HDMI OUTPUT** in the menu bar, locate the **HDMI Output 1** window group, and verify that the **Descrambling** > **Enabled** toggle switch is enabled. When enabled, this toggle will be green.

2. The **Descrambling** > **Key** field is set to `scrambling` by default. This is the same key that is being used under the **Scrambling** > **Key** field on the encoder, and will allow the decoder to descramble the signal and send it out over the HDMI output to the display. Leave this key at it's default setting.

3. Click the **HDCP** > **Supported Version** drop-down list and select the HDCP version. `2.2` will work with most sources. However, in this case, an older sink/monitor, which doesn't support HDCP 2.2, is being used. Therefore, the value is set to `1.4`.

4. Click the **Video** > **Video** drop-down list and select the video source. Based on what has been configured, the following options are available:

> ℹ️ **NOTE:** The physical IP address of the OmniStream units that are listed in the table, below, (`10.1.0.111`, etc.) may differ from the units that are connected to your network.

Video > Video
IP Input 1 - 226.0.0.1:1000 | 10.1.0.111
IP Input 2 - 226.0.0.2:1000 | 10.1.0.116
IP Input 3 - 226.0.10.1:1000 | 10.1.0.111
IP Input 4 - 226.0.10.2:1000 | 10.1.0.116

Since this is the **Video** field, a video source should be selected. Referring to _Table 1.3_, on the previous page, `IP Input 1 - 226.0.0.1:1000 | 10.1.0.111` and `IP Input 2 - 226.0.0.2:1000 | 10.1.0.116` are video data, from two different encoders. For this example, this field will be set to `IP Input 1 - 226.0.0.1:1000 | 10.1.0.111`.

5. Scroll down to the **Audio** > **Input** field and select the desired audio stream. Referring to _Table 1.3_ (shown below), the audio stream that is associated with encoder 1 is Input 3. Therefore, `IP Input 3 - 226.0.10.1:1000 | 10.1.0.111` is selected.

   Table 2.3 - Video and Audio information for Encoder #1 and Encoder #2.

IP Input	Encoder #1
Input 1	Video (226.0.0.1:1000)
Input 3	Audio (226.0.10.1:1100)

IP Input	Encoder #2
Input 2	Video (226.0.0.2:1000)
Input 4	Audio (226.0.10.2:1100)

6. Click the **SAVE** button to commit changes.

The decoder should now display the content of the source device connected to **HDMI IN** on the encoder. _Figure 3.1_ shows the completed configuration.

To switch between video sources, click the **Video** > **Input** drop-down list and select the desired stream.
To switch between audio streams, click the **Audio** > **Input** drop-down list to select the desired stream.

Note that separating video and audio data into different streams, allows the flexibility of combining different video and audio sources together.

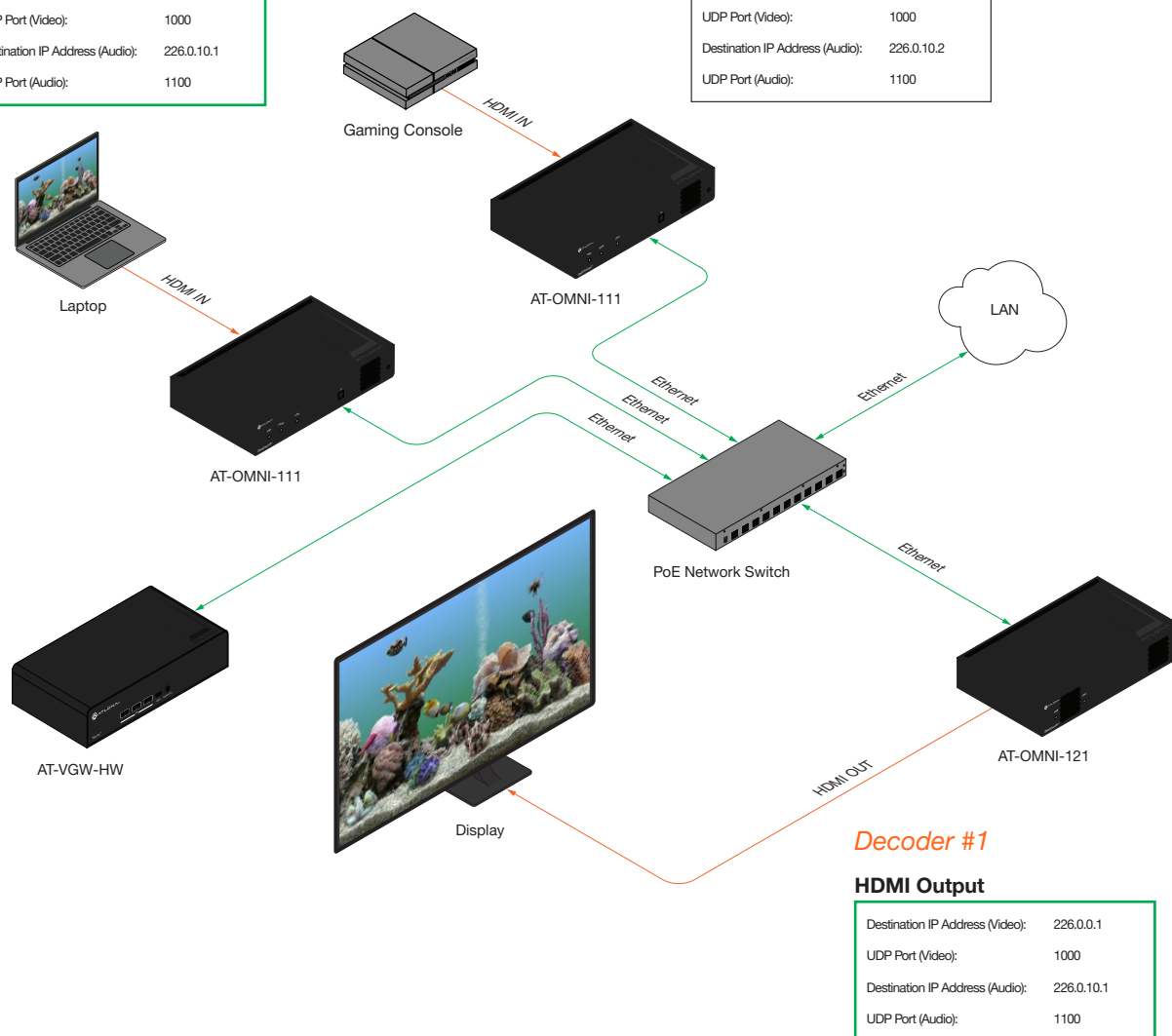_Figure 3.1_ - Basic OmniStream setup with a Decoder #1 subscribed to Encoder #1.

Encoder #1

Stream 1

Destination IP Address (Video):	226.0.0.1
UDP Port (Video):	1000
Destination IP Address (Audio):	226.0.10.1
UDP Port (Audio):	1100

Encoder #2

Stream 1

Destination IP Address (Video):	226.0.0.2
UDP Port (Video):	1000
Destination IP Address (Audio):	226.0.10.2
UDP Port (Audio):	1100

Gaming Console

HDMI IN

Laptop

HDMI IN

AT-OMNI-111

AT-OMNI-111

LAN

Ethernet

Ethernet

Ethernet

Ethernet

Ethernet

PoE Network Switch

AT-VGW-HW

Display

HDMI OUT

AT-OMNI-121

Decoder #1

HDMI Output

Destination IP Address (Video):	226.0.0.1
UDP Port (Video):	1000
Destination IP Address (Audio):	226.0.10.1
UDP Port (Audio):	1100

Troubleshooting

If no video and/or audio is present on the display, check the following:

Encoder Checklist

- Verify that all encoders and decoders are set to the same system mode. In this tutorial, both encoders and the decoder should be set to `VCx`. Refer to Setting the System Mode (page 16).
- Go to the **INPUT** menu and verify the folllowing. Refer to Configuring Inputs (page 17) for more information.
  - » Make sure that the **Cable Present** indicator, under the **HDMI Input 1** window group, is green.
  - » Make sure the **Input** drop-down list is assigned to an input. In this tutorial, the **Input** field for both encoder 1 and encoder 2 are set to `HDMI Input 1`.
  - » Verify that the **Max bit rate** field is set to at least `450`.
  - » Verify that a **Thumbnail** > **Enable** toggle switch is enabled and a thumbnail of the source is displayed. When enabled, the toggle switch will be green.

- Go to the **SESSION** menu and verify the following under the **Stream 1** window group. Refer to Creating a Session (page 20) for more information.
  - » Make sure the **Interface** field for both encoders is set to `eth1`.
  - » Verify that the **Encoder** field is set to `Encoder 1`.
  - » Check that the **Scrambling** toggle switch is enabled (green). Also check that the **Key** field, for this example, is set to `scrambling` for both encoders.
  - » Verify that the **Video** > **Video Enable** toggle switch is set to enabled for both encoders.
  - » Check the **Video** > **Destination Multicast/Unicast Address** field is set to the correct multicast IP address. In the example, `226.0.0.1`. is used on encoder 1 and `226.0.0.2` is used on encoder 2.
  - » Check that the **Video** > **Destination UDP Port** field is set to the proper port. In this example, `1000` should be used on both encoders.
  - » Make sure the **Audio** > **Source** is set to `HDMI 1` on both encoders.
  - » Verify that the **Audio** > **Enable Audio** toggle switch is enabled on both encoders.
  - » Check the **Audio** > **Destination Multicast/Unicast Address** field is set to the correct multicast IP address. In this example, `226.0.10.1` is used on encoder 1 and `226.0.10.2` is used on encoder 2.
  - » Check that the **Audio** > **Destination UDP Port** field is set to the proper port. In this example, `1100` is used for both encoders.

Decoder Checklist

- Verify that all encoders and decoders are set to the same system mode. In this tutorial, both encoders and the decoder should be set to `VCx`. Refer to Setting the System Mode (page 16).

- Go to the **IP INPUT** menu and verify the following. Refer to Subscribing to an Encoder (page 22) for more information.

  » Under both the **IP Input 1** and **IP Input 2** window groups, verify that the **Enabled** toggle switch is enabled (green).

  » Check that the **Multicast Address** field is set to the correct multicast IP address. In this example, `226.0.0.1` for **IP Input 1** and `226.0.0.2` for **IP Input 2**.

  » Check that the **Port** field is set to the proper port. In this example, `1000` for both **IP Input 1** and **IP Input 2**.

  » Under both the **IP Input 3** and **IP Input 4** windows groups, verify that the **Enabled** toggle switch is enabled (green).

  » Check that the **Multicast Address** field is set to the correct multicast IP address. In this example, `226.0.10.1` for **IP Input 3** and `226.0.10.2` for **IP Input 4**.

  » Check that the **Port** field is set to the proper port. In this example, `1100` for both **IP Input 3** and **IP Input 4**.

- Go to the **HDMI OUTPUT** menu and verify the following. Refer to Subscribing to an Encoder (page 22) for more information.

  » Make sure that the **Descrambling** > **Enabled** toggle switch is enabled (green).

  » Verify that the **Descrambling** > **Key** field matches the **Scrambling** > **Key** field in the encoder. For this tutorial, both of these fields should be set to `scrambling`.

  > ⚠️ **IMPORTANT:** The scrambling key on a decoder must be _identical_ to the scrambling key on the encoder which is being subscribed. Scrambling keys are case-sensitive.

  » Check the **HDCP** > **Supported Version** field to make sure the correct version is selected. Also note the color of the **HDCP** > **Encrypted** indicator. If it is red, then a picture may not be displayed and result in a "blue screen" on the display. Change the **HDCP** > **Supported Version** field, if necessary.

  » Make sure that the **Video** > **Video** drop-down list is set to one of the configured video inputs: either `IP Input 1 - 226.0.0.1:1000 | 10.1.0.111` or `Input 1 - 226.0.0.2:1000 | 10.1.0.116`.

  » Make sure that the **Audio** > **Input** drop-down list is set to one of the configured inputs: either `IP Input 3 - 226.0.10.1:1000 | 10.1.0.111` or `Input 4 - 226.0.10.2:1000 | 10.1.0.116`.

Device Operation

EDID Management

OmniStream encoders provide EDID management for each input. The encoder can be assigned one of several included EDID presets or can be assigned a custom EDID. Raw EDID data can be copied from displays or other sink devices, that are connected to OmniStream decoders.

Selecting an EDID Preset

1. Go to the encoder, click **INPUT** in the menu bar, and click the **EDID** drop-down list to select the desired EDID.

2. Click the **SAVE** button within the **HDMI Input** window group to commit changes.
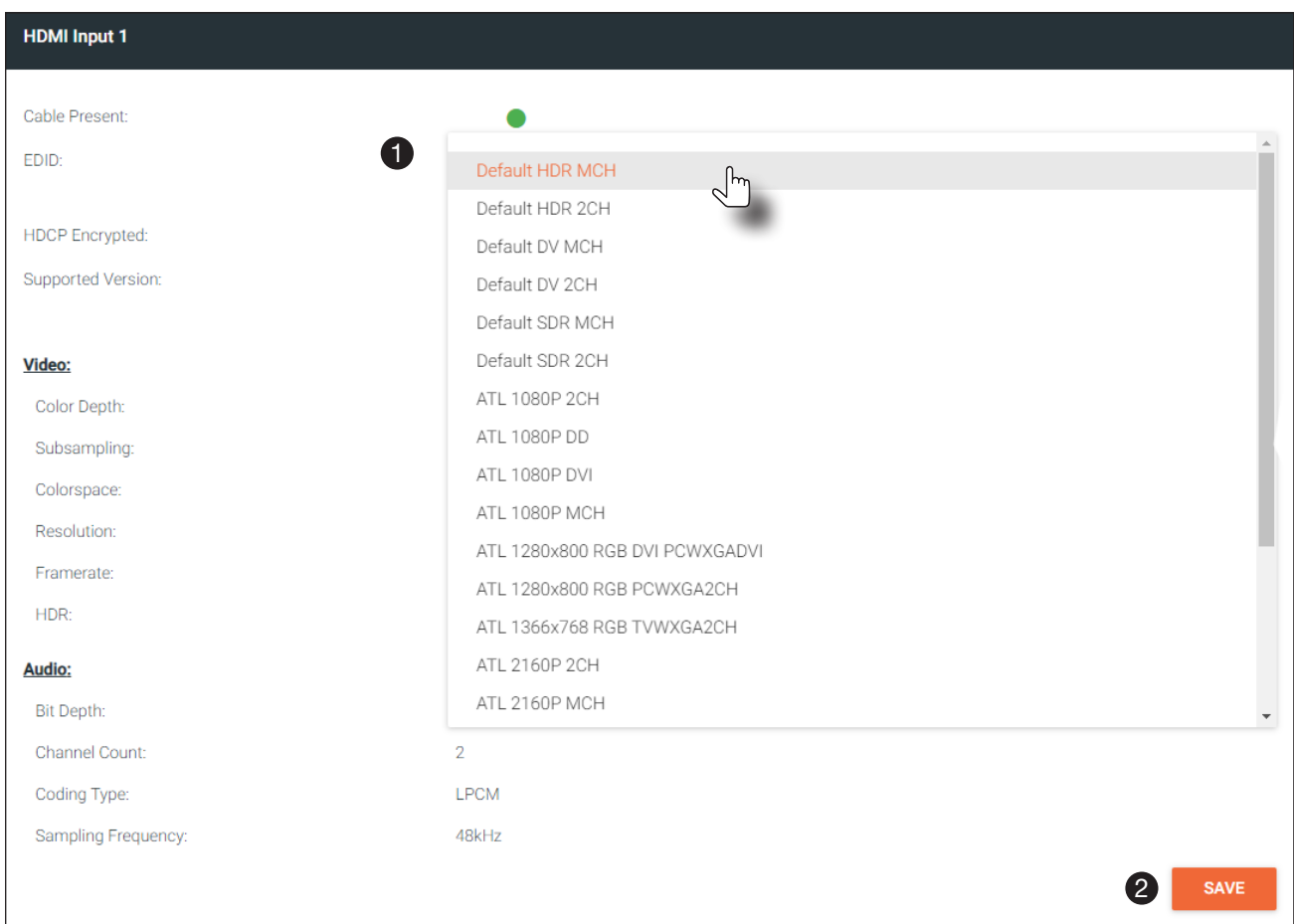
Adding a Custom EDID

Encoders can be loaded with a custom EDID. The raw EDID data must be in hexadecimal format. Commas or spaces are _not_ permitted.

1. Click the **INPUT** menu. Click the **EDID** drop-down list, within the desired **Input** window group, and select the `Add Custom EDID`.
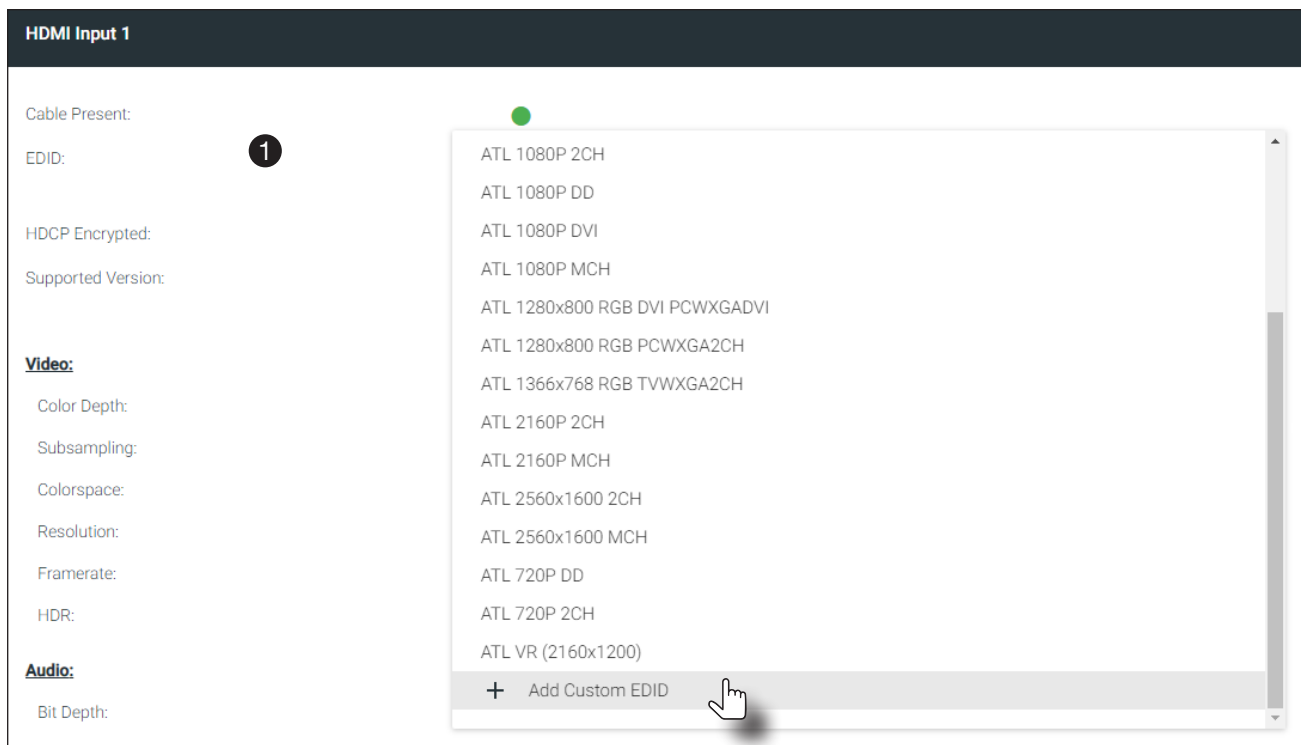
2. The **Add Custom EDID** dialog will be displayed.

3. Enter the name of the EDID in the **Name** field.

4. Enter the EDID data in the **Raw EDID** field. EDID data must be in hexadecimal format and must not contain any spaces or delimters.

5. Click the **SUBMIT** button to commit changes or click **CANCEL** to abort the addition of a custom EDID.
Once a custom EDID is created, it will be added to the drop-down list and can be selected without re-entering the information.

Deleting a Custom EDID

1. Click **INPUT** in the menu bar and click the **EDID** drop-down list, within the desired **Input** window group, and select the EDID to be deleted.

> **NOTE:** Only custom EDID data can be added or deleted. EDID presets cannot be modified.

2. Click the red "trash can" icon next to the EDID to be deleted. Once deleted, the page will refresh, and the EDID will no longer be listed in the **EDID** drop-down list.
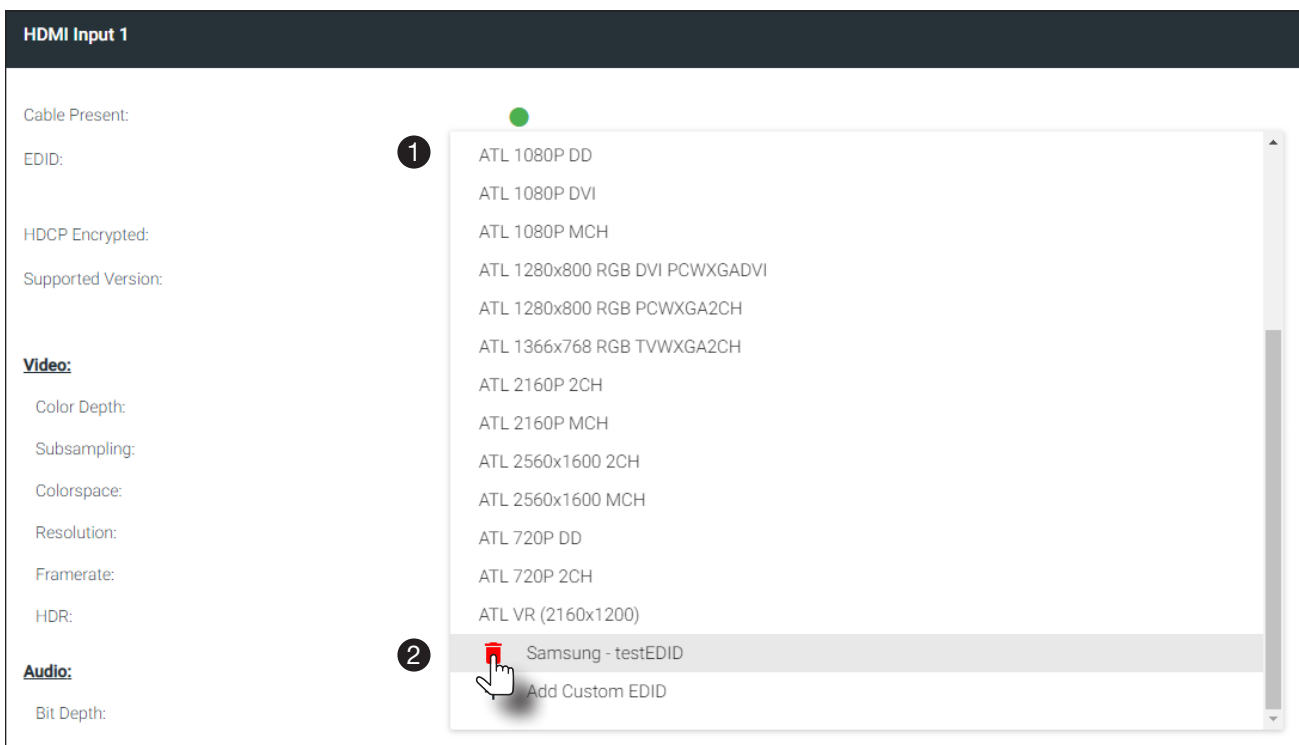
Device Control

Downstream Control using RS-232

Control using RS-232 is converted and transmitted over IP by the encoder. Destination devices can either be the IP address of a display or a decoder.

1. Login to the encoder and click the **SERIAL** menu. Under the **Serial Port 1** window group, click the **Mode** drop-down list and select `Serial`.

2. Click the **SAVE** button.

3. Under the **Serial Configuration 1** window group, click the **Port** drop-down list and select `Not Used`.

4. Click the **SAVE** button.
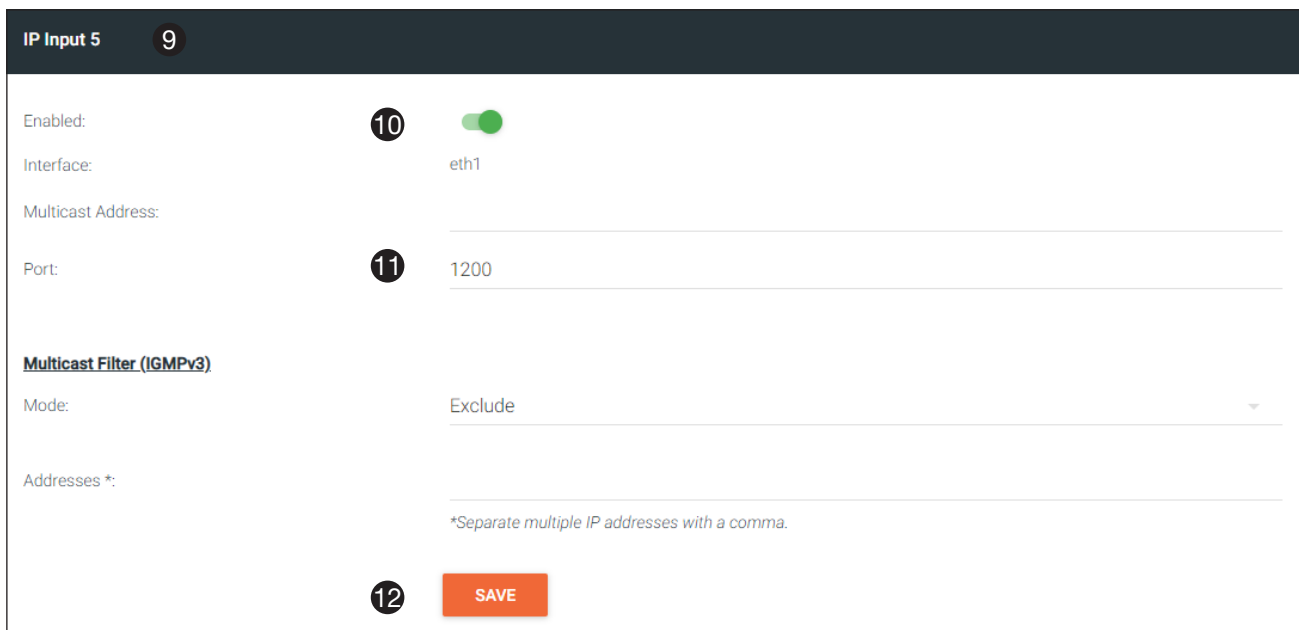
5. Click the **SESSION** menu. Under the desired stream, locate the **Control/Serial** section and click the **Source** drop-down list to select the desired serial port.

6. Click the **Enable Aux** toggle switch to display the additional fields.

7. Enter the destination IP address and UDP port in the **Destination Multicast/Unicast Address** and **Destination UDP Port** fields, respectively.
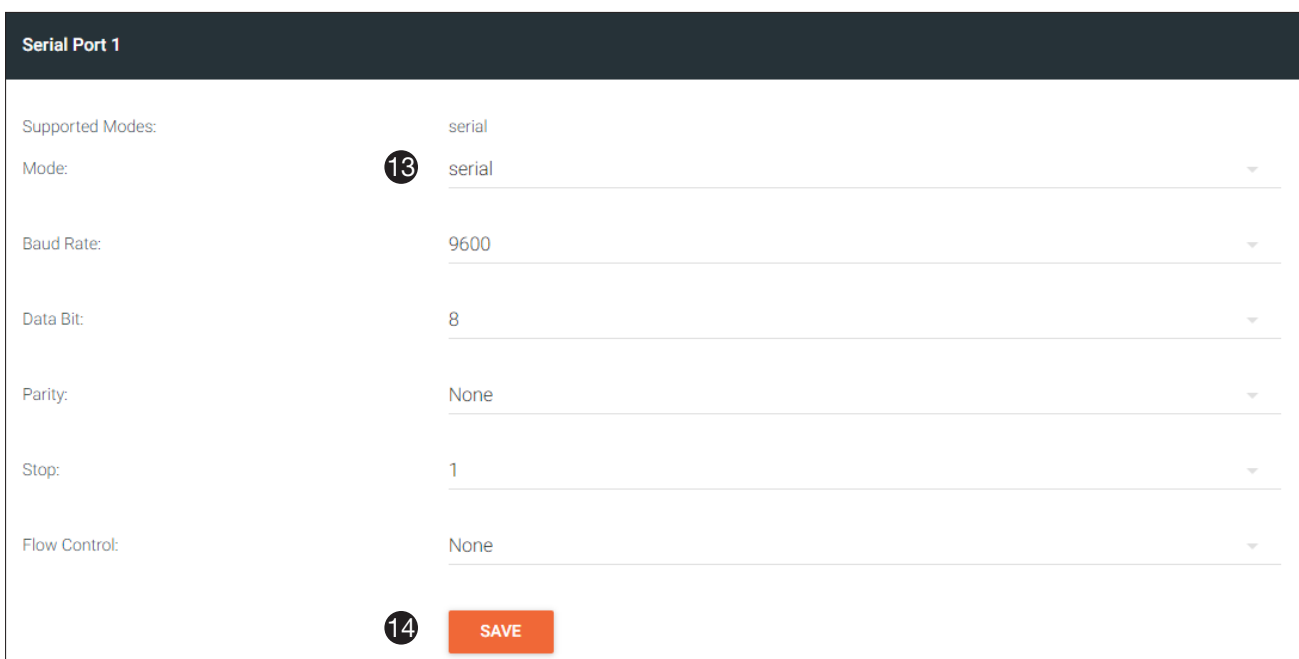
8. Click the **SAVE** button.

    If the destination IP address and UDP port is for a <u>decoder</u>, follow Steps 9 through 20, beginning on the next page.
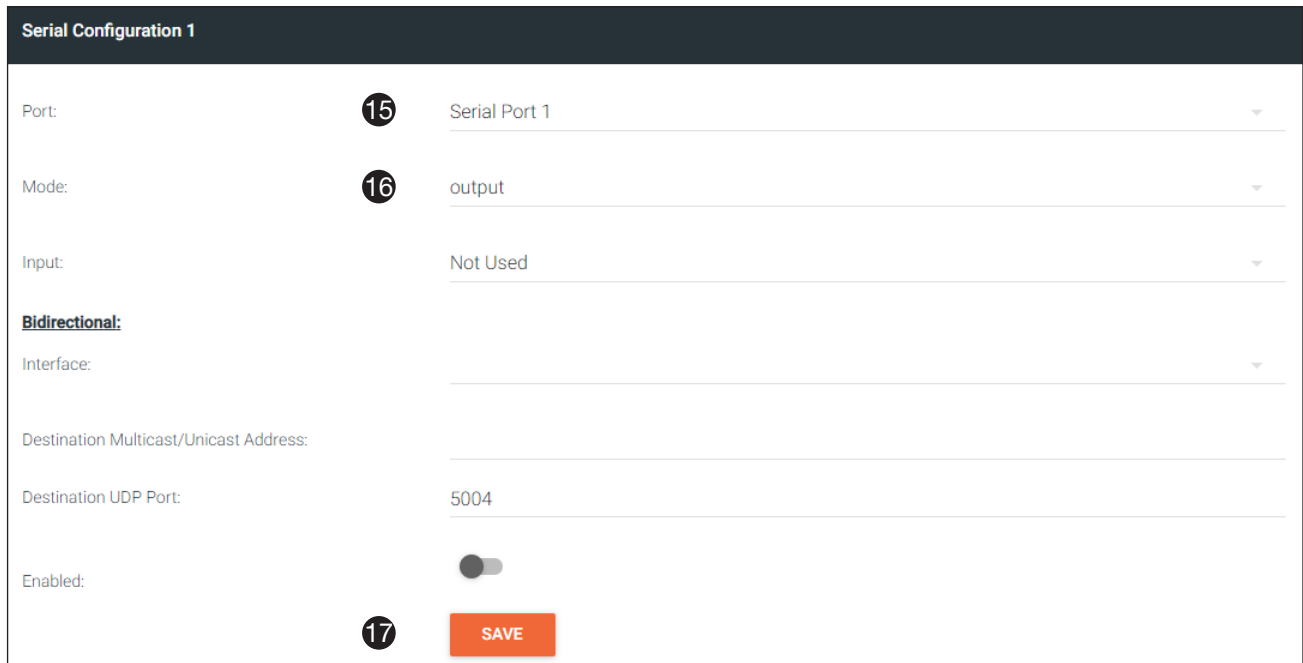
9. Login to the decoder and click the **IP INPUT** menu. Locate an Input that does *not* contain a defined **Multicast Address** field. In this example, **Input 5** will be used. Note that if a multicast address was used in Step 7, then that multicast address must be entered in the **Multicast Address** field under **Input 5**.

10. Click the **Enable** toggle switch to enable the Input. When an Input is enabled, the toggle switch will be green.

11. Enter the UDP port, from Step 9, in the **Port** field.

12. Click the **SAVE** button.

13. Click the **SERIAL** menu, and under **Serial Port 1**, click the **Mode** drop-down list and select `serial`.

14. Click the **SAVE** button.

15. Under the **Serial Configuration 1** window group, click the **Port** drop-down list and select the desired port.

16. Click the **Mode** drop-down list and select `output`.

17. Click **SAVE**.

Serial Configuration 1

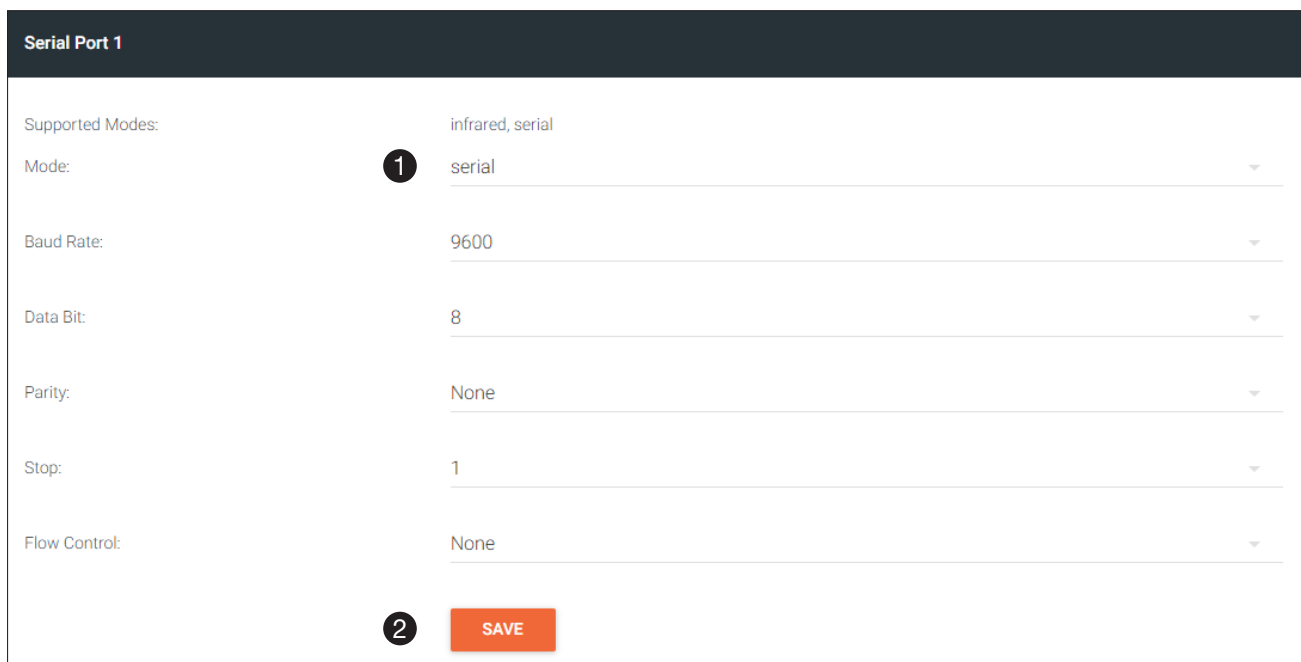|		
Port:	⑮	Serial Port 1
Mode:	⑯	output
Input:		Not Used
Bidirectional:		
Interface:		
Destination Multicast/Unicast Address:		
Destination UDP Port:		5004
Enabled:		⬤
	⑰	SAVE

Control using TCP Proxy

TCP/IP traffic received by an encoder or decoder, on the defined IP:Port socket, are translated to RS-232, allowing both control of source or display. Control is achieved using a control system, where all control commands are stored.

1. Login to the encoder or decoder and click the **SERIAL** menu. Under the **Serial Port Configuration** window group, for the desired serial port, click the **Mode** drop-down list and select `Serial`.

2. Click the **SAVE** button.

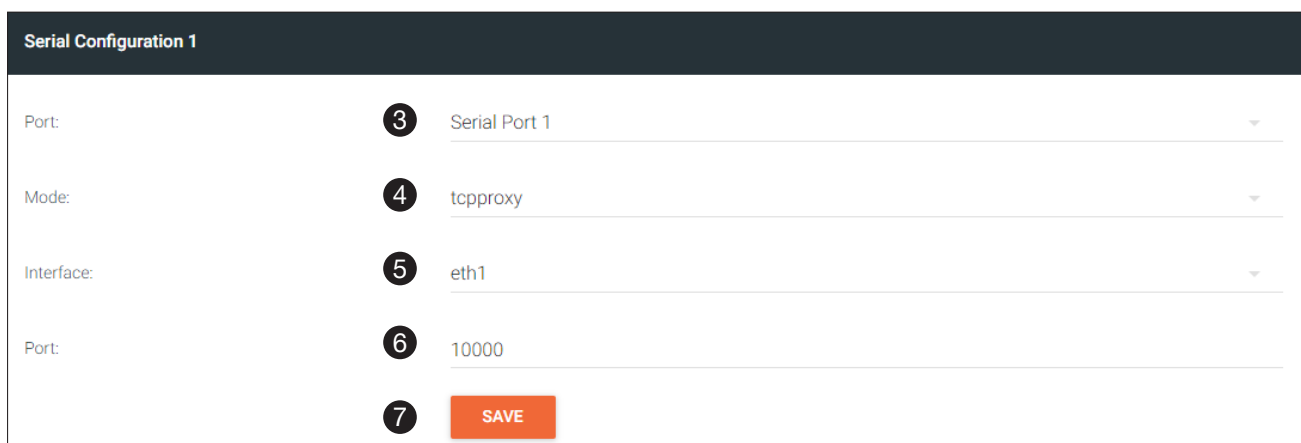| Serial Port 1		
Supported Modes:		infrared, serial
Mode:	**1**	serial
Baud Rate:		9600
Data Bit:		8
Parity:		None
Stop:		1
Flow Control:		None
	2	SAVE

3. Under the **Serial Configuration 1** window group, click the **Port** drop-down list and select the desired serial port.

4. Click the **Mode** drop-down list and select `tcpproxy`.

5. Click the **Interface** drop-down list and select the desired Ethernet interface.

6. Enter the listening port in the **Port** field.

7. Click the **SAVE** button.

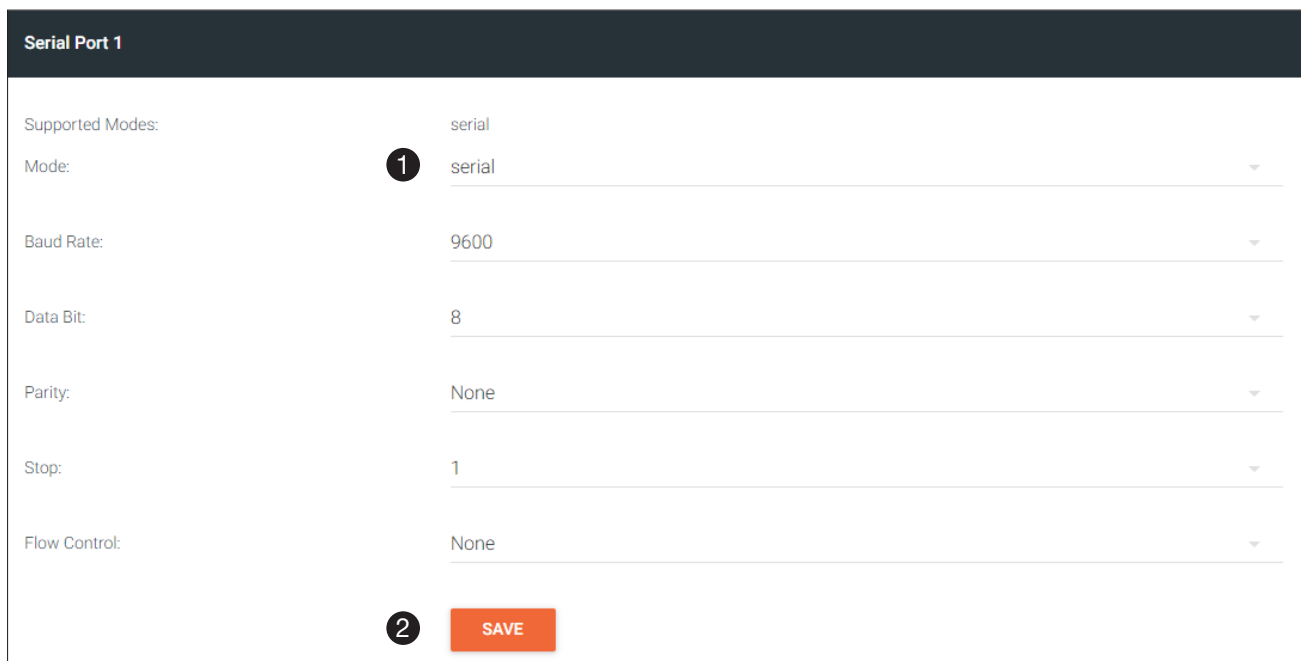| Serial Configuration 1		
Port:	**3**	Serial Port 1
Mode:	**4**	tcpproxy
Interface:	**5**	eth1
Port:	**6**	10000
	7	SAVE

Downstream Control using Triggering

TCP/IP traffic received by an encoder or decoder, on the defined IP:Port socket, are translated to RS-232, allowing both control of source or display. Control is achieved using a control system, where all control commands are stored.

Option 1: Defining Commands on the Decoder

1. Login to the decoder and click the **SERIAL** menu. Under the **Serial Port 1** window group, click the **Mode** drop-down list and select `Serial`.

2. Click the **SAVE** button.

Serial Port 1

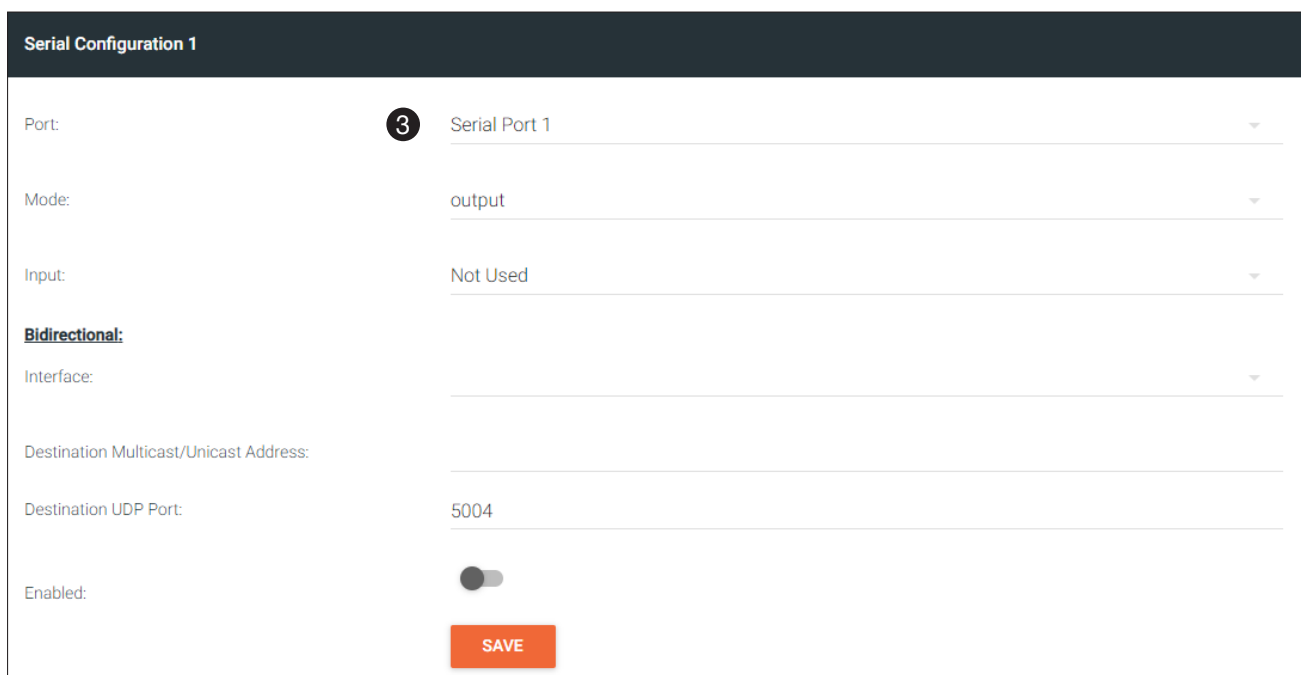|	
Supported Modes:	serial
Mode:	serial
Baud Rate:	9600
Data Bit:	8
Parity:	None
Stop:	1
Flow Control:	None

SAVE

3. Under the **Serial Configuration 1** window group, click the **Port** drop-down list and select the desired serial port.

Serial Configuration 1

Port:	Serial Port 1
Mode:	output
Input:	Not Used
Bidirectional:	
Interface:	
Destination Multicast/Unicast Address:	
Destination UDP Port:	5004
Enabled:	

SAVE

4. Click the **Mode** drop-down list and select `output`.

5. Click the **Input** drop-down list and select `Not Used`.

6. Click the **SAVE** button.

Serial Configuration 1

Port:	Serial Port 1
Mode:	④ output
Input:	⑤ Not Used
Bidirectional:	
Interface:	
Destination Multicast/Unicast Address:	
Destination UDP Port:	5004
Enabled:	
	⑥ SAVE

7. For each of the available commands, click the **Mode** drop-down list and select `raw`.

    The available commands are: **Display On**, **Display Off**, **Volume Up**, and **Volume Down**.

8. Enter the command data in either ASCII or hexadecimal format using the **ASCII** or **HEX** fields.

9. Click the **SAVE** button.

Command: Display Off

Mode:	⑦ Raw
ASCII:	⑧
HEX:	⑧
	⑨ SAVE

10. Open a Telnet/SSH session with the decoder and trigger display control using the following command:

    `TrigRS232X Y`

    where `X` is the number of the serial port: `1`, `2`
    where `Y` is the command: `on`, `off`, `vol+`, or `vol-`.

Option 2: Defining Commands on the Encoder

1. Login to the encoder and click the **SERIAL** menu. For each of the available commands, click the **Interpret on** drop-down list and select `decoder`.

   The available commands are: **Display On**, **Display Off**, **Volume Up**, and **Volume Down**.

   > **NOTE:** Setting the **Interpret on** drop-down list to `encoder` implies that commands are defined/stored on the encoder. If set to `decoder`, commands are defined/stored on the decoder.

2. Enter the command data in either ASCII or hexadecimal format using the **ASCII** or **HEX** fields.

3. Click the **SAVE** button.

4. Click the **SESSION** menu. Under the desired Stream, locate the **Control/Serial** section, click the **Source** drop-down list, and select `Commands`.

5. Click the **Enable Aux** toggle switch to display the additional fields.

6. Enter the destination IP address and UDP port, of the decoder, in the **Destination Multicast/Unicast Address** and **Destination UDP Port** fields, respectively. A multicast address can also be entered in the **Destination Multicast/Unicast IP Address** field.

7. Click the **SAVE** button.

8. Login to the decoder and click the **IP INPUT** menu. Locate an Input that does *not* contain a defined Multicast address field. In this example, **Input 5** will be used. Note that if a multicast address was used in Step 6, then that multicast address must be entered in the **Multicast Address** field under **Input 5**.

9. Click the **Enable** toggle switch to enable the Input. When an Input is enabled, the toggle switch will be green.

10. Enter the UDP port, from Step 6, in the **Port** field.

11. Click the **SAVE** button.

IP Input 5	**8**	
Enabled:	**9**	
Interface:		eth1
Multicast Address:		
Port:	**10**	1200
Multicast Filter (IGMPv3)		
Mode:		Exclude
Addresses *:		
		Separate multiple IP addresses with a comma.
	11	SAVE

12. Click the **SERIAL** menu. Under **Serial Port 1**, set the **Mode** drop-down list to `serial`.

13. Click the **SAVE** button.

Serial Port 1		
Supported Modes:		serial
Mode:	**12**	serial
Baud Rate:		9600
Data Bit:		8
Parity:		None
Stop:		1
Flow Control:		None
	13	SAVE

14. Under **Serial Configuration 1**, select the desired port.

15. Click the **Mode** drop-down list and select `output`.

16. Click the **SAVE** button.

17. Open a Telnet/SSH session with the encoder and trigger display control using any of the following commands:
    `InputBtn X`

    where `X` is the number of the input: `1`, `2`, or `tog`.

    `DisplayBtnX Y`

    where `X` is the number of the HDMI input: `1`, `2`.
    where `Y` is the command: `on`, `off`, or `toggle`.
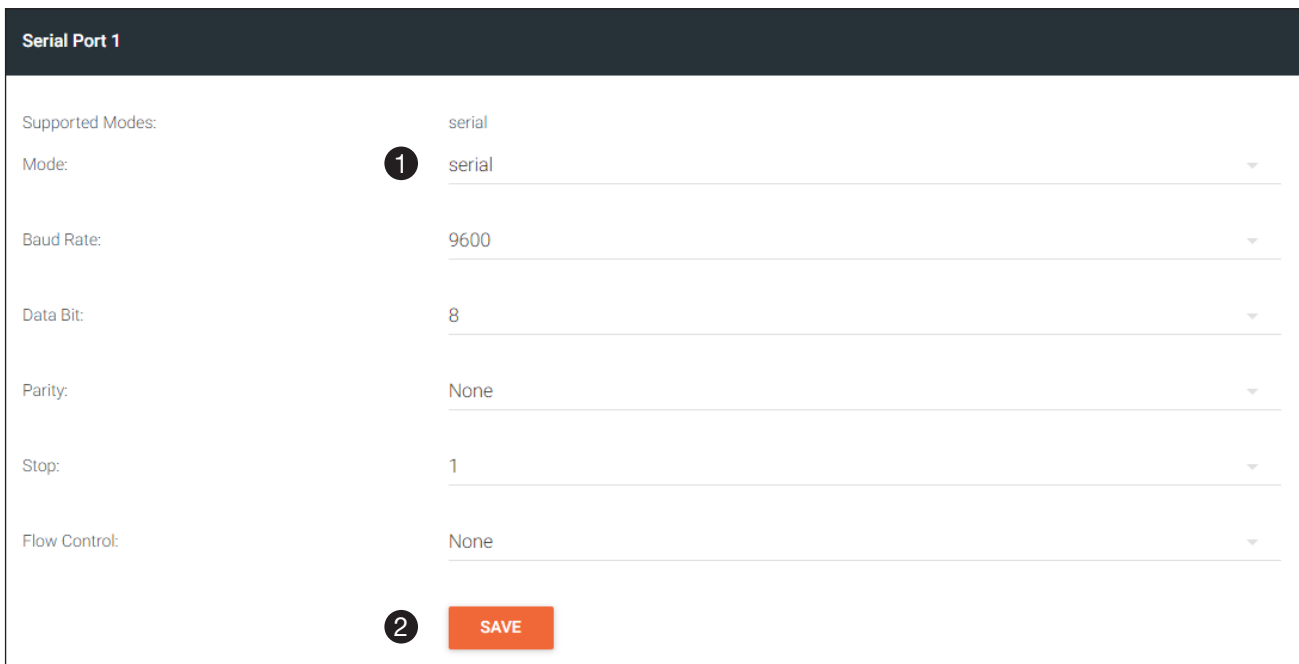

    `VolumeBtn X`

    where `X` is the volume-up or volume-down command.

Upstream Control using RS-232

The serial interface provides RS-232 control of both downstream and upstream devices. Source control is provided by enabling bidirectional communication.

1. Login to the decoder and click the **SERIAL** menu. Under the **Serial Port 1** window group, click the **Mode** drop-down list and select `Serial`.

2. Click the **SAVE** button.

Serial Port 1

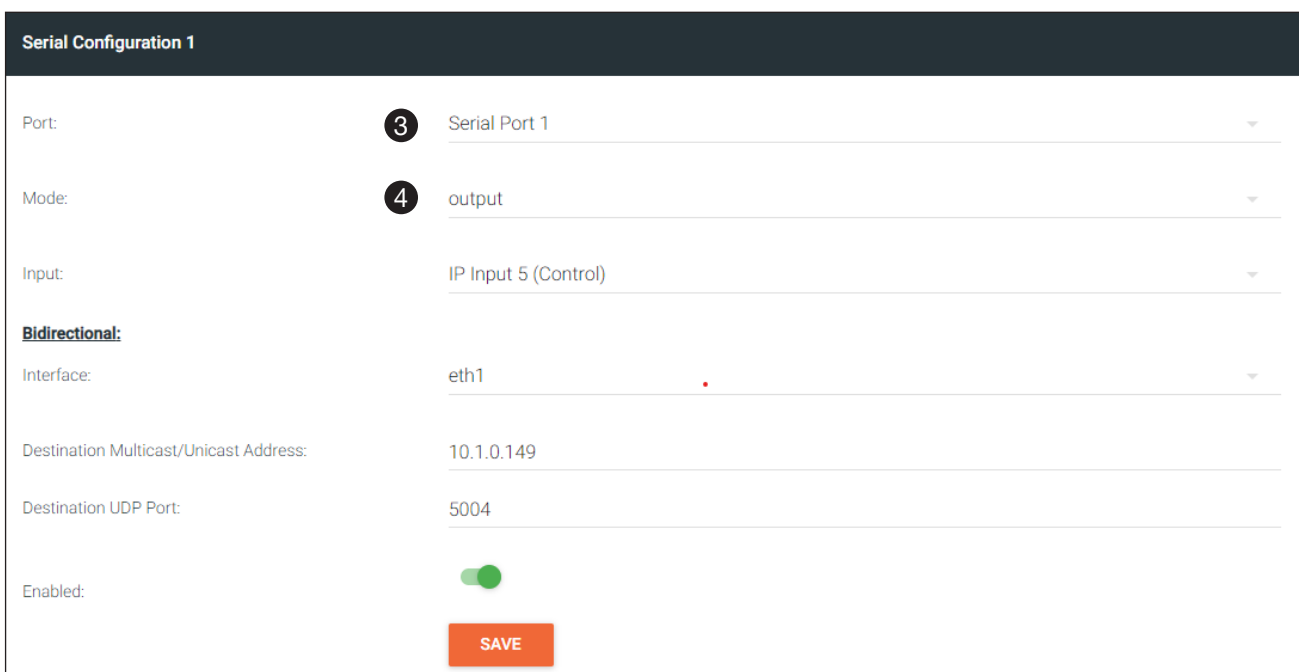Supported Modes: serial
Mode: ❶ serial
Baud Rate: 9600
Data Bit: 8
Parity: None
Stop: 1
Flow Control: None

❷ SAVE

3. Under the **Serial configuration** window group, click the **Port** drop-down list and select the desired serial port.

4. Click the **Mode** drop-down list and select `output`.

Serial Configuration 1

Port: ❸ Serial Port 1
Mode: ❹ output
Input: IP Input 5 (Control)
Bidirectional:
Interface: eth1
Destination Multicast/Unicast Address: 10.1.0.149
Destination UDP Port: 5004
Enabled:

SAVE

5. Click the **Input** drop-down list and select the input.

6. Under the **Bidirectional** section, click the **Interface** drop-down list and select the interface.

7. Enter the destination IP address (the IP address of the encoder) and UDP port in the **Destination Multicast/Unicast Address** and **Destination UDP Port** field, respectively.

8. Click the **Enabled** toggle switch to the enabled position. When enabled, the toggle switch will be green.

9. Click the **SAVE** button.

Serial Configuration 1

Port:	Serial Port 1
Mode:	output
Input:	⑤ IP Input 5 (Control)
Bidirectional:	
Interface:	⑥ eth1
Destination Multicast/Unicast Address:	⑦ 10.1.0.149
Destination UDP Port:	⑦ 5004
Enabled:	⑧
	⑨ SAVE

10. Login to the encoder and click the **SERIAL** menu. Under the **Serial Port 1** window group, click the **Mode** drop-down list and select `Serial`.

11. Click the **SAVE** button.

Serial Port 1

Supported Modes:	infrared, serial
Mode:	⑩ serial
Baud Rate:	9600
Data Bit:	8
Parity:	None
Stop:	1
Flow Control:	None
	⑪ SAVE

12. Under the **Serial Configuration 1** window group, click the **Port** drop-down list and select `Not Used`.

13. Click the **SAVE** button.

Serial Configuration 1

Port: ⑫ Not Used

Mode: cli

⑬ SAVE

14. Click the **SESSION** menu. Under the desired Stream, locate the **Control/Serial** section and click the **Source** drop-down list to select the desired serial port.

15. Click the **Enable Aux** toggle switch to display the additional fields.

16. Enter the destination IP address and UDP port in the **Destination Multicast/Unicast Address** and **Destination UDP Port** fields, respectively.

17. Click the **Bidirectional** toggle switch to enable it. When enabled, the toggle switch will be green.
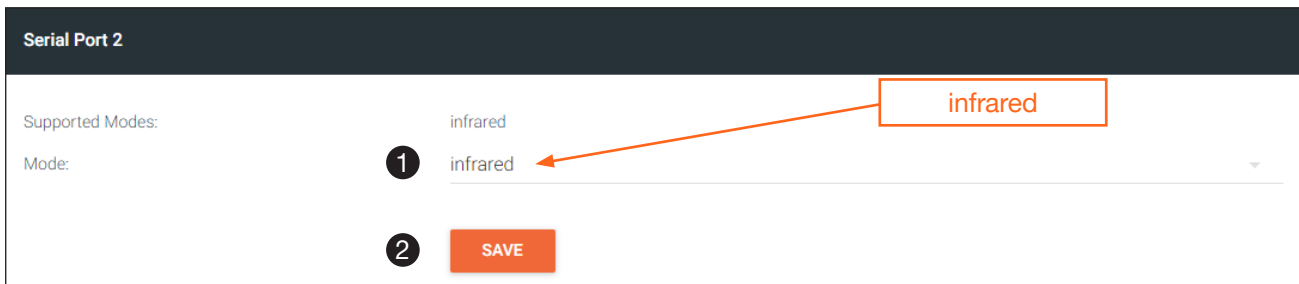
18. Click the **SAVE** button.

Control/Serial:

Source: ⑭ Serial Port 1

Enable Aux: ⑮

Destination Multicast/Unicast Address: ⑯ 10.1.0.138

Destination UDP Port: ⑯ 1200

TTL: 255

DSCP: Best Effort

Bidirectional: ⑰ Bidirectional

Listen Port: 1204

Encoder Groups

Enable Encoder Group:

⑱ SAVE

Upstream Control using IR

To control of headend source from downstream, refer to . Once configured, make sure that the serial port is configured for infrared, as shown.

> ⚠️ **IMPORTANT:** Depending on the hardware, IR _may_ also be supported on **RS-232** port 1. Verify the OmniStream hardware version to determine its capabilities. For decoders, IR is _only_ suppored on **RS-232** port 2.

Multiview Nomenclature

General Overview

A *multiview* is comprised of a canvas (display area) containing at least two, but no more than four subframes, where each subframe has the following parameters:

> **ℹ️ NOTE:** Multiview cannot be used in conjunction with fast switching and/or with video walls.

> 📖 **DEFINITIONS:**
>
> *Subframe* - The stream multicast IP address for the video.
>
> *Anchor point* - A fixed point on a subframe. The anchor point can be set to top-left, top-right, bottom-left, bottom-right, or center. Each anchor point is defined by an x and y coordinate.
>
> *Z-order* - Determines whether a frame appears in-front-of or behind another subframe. Subframes with a larger z-order value will appear in front of a subframe with a smaller z-order value.

The images below shows the different anchor point options on a particular subframe. For any given subframe, only one of these will be selected as the anchor point.

If the incoming stream changes resolution, the size of the subframe will change on the screen if scaling is not configured on the encoder. While the decoder HDMI output can be scaled, there is no per-subframe scaling. This is because the incoming stream is not scaled in the decoder. To illustrate this, consider the following examples.

In this first example, the multiview is configured as a P-i-P view, where the P-i-P subframe has its anchor point configured as bottom right. The incoming stream is 640 x 360.
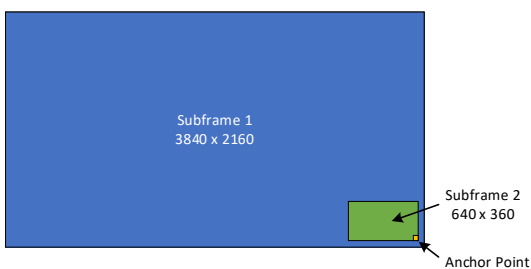

By contrast, consider the same multiview layout, but with the P-i-P subframe having a top left anchor point.
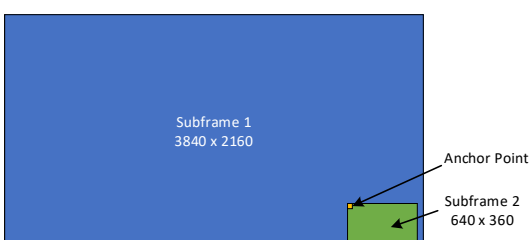
If the incoming stream changes resolution to 1280x720, then the subframe will grow in size, but it will still fit on-screen, because its bottom right Anchor point has not changed position.

Subframe 1
3840 x 2160

Subframe 2
Expands to
1280 x 720
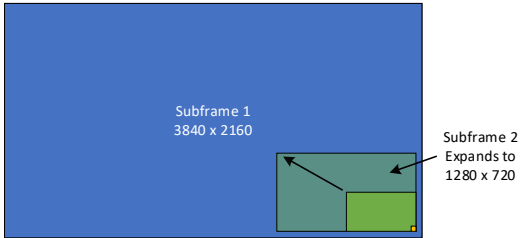
In this case, when the stream changes to 1280 x 720, the subframe will grow in size and be cropped by the display, because the top left anchor point has not change position

Subframe 1
3840 x 2160

Anchor Point

Subframe 2
Expands to 1280 x 720
(cropped)
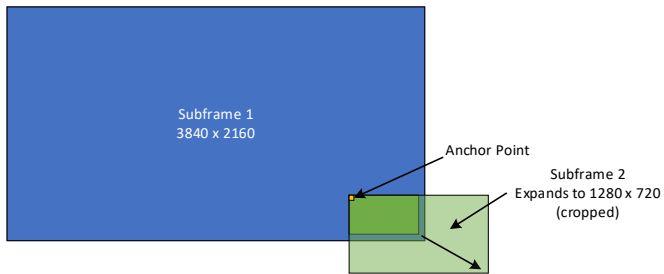
Anchor Points

Anchor points will be placed on the canvas at the x and y coordinates of that canvas. If the decoder output is not scaled, then this will correspond to the actual coordinates on the display. If the decoder output is scaled, then the Anchor point will be rendered on the canvas at the specified coordinates, and then the entire output image will be scaled.

Because of the way the VCx codec works, anchor points must be placed on coordinates where the x value is divisible by 32 and the y value is divisible by 8. If a coordinate is entered that does not meet this requirement, then the decoder will automatically snap the coordinates and notify the user of the change.

Top Left

Top Right

Center

Bottom Left

Bottom Right
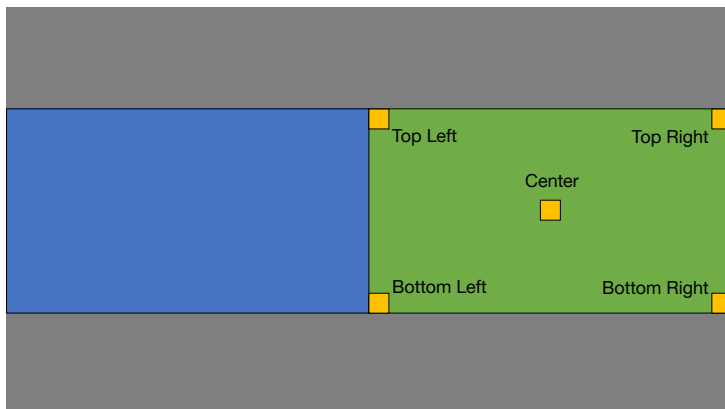
Multiview and Dual-Streaming Tutorial

This section provides a tutorial on configuring a multiview setup. In addition, the concept of dual-streaming will be introduced. Review the diagram and the table below for a summary of how this setup will function. All encoders and the decoders should be connected to the same local network.

Physical Connections
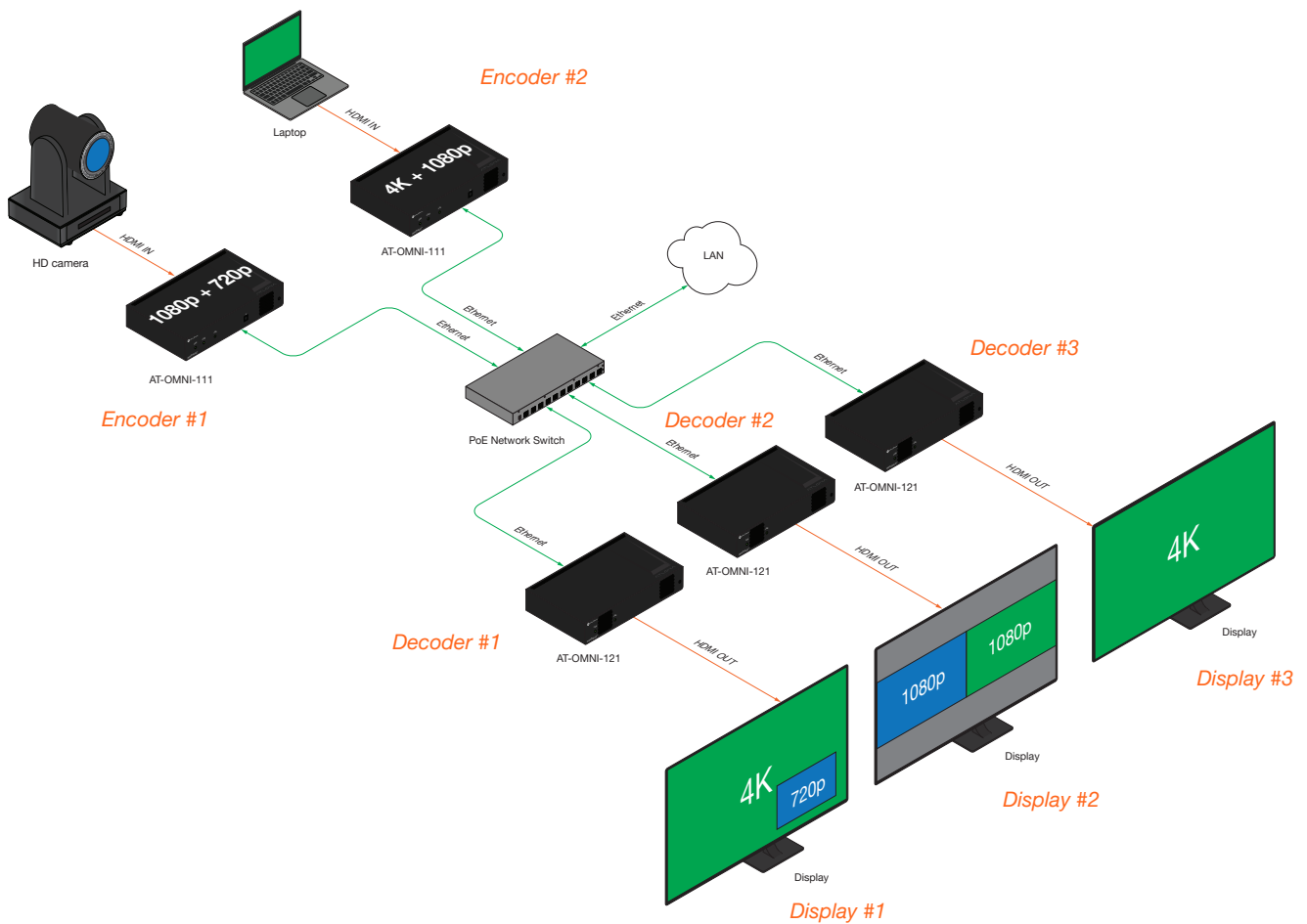
OmniStream Device	Description
Encoder #1 (AT-OMNI-111)	• Dual-streaming configuration. • Transmits both 1080p and 720p streams.
Encoder #2 (AT-OMNI-111)	• Dual-streaming configuration. • Transmits both 4K and 1080p streams.
Decoder #1 (AT-OMNI-121)	• Multiview configuration (picture-in-picture). • Subscribes to the 4K and 720p streams in multiview.
Decoder #2 (AT-OMNI-121)	• Multiview configuration (side-by-side). • Subscribes to two 1080p streams in multiview.
Decoder #3 (AT-OMNI-121)	• Subscribes to a single 4K stream.

Dual-Streaming Encoder Configuration

Encoder #1

This encoder is used with the HD camera and will be configured to dual-stream 1080p and 720p.

1. Click **DEVICE INFO** in the menu bar, then click the **System Mode** drop-down list and select `VCx`. Click the **SAVE** button, in the lower-right corner of the screen, to commit changes.

> ⚠️ **IMPORTANT: VCx** must be enabled in order to use the Multiview feature.

2. Click the **INPUT** menu.

3. Under the **HDMI Input 1** window group, select `Default HDR MCH` from the **EDID** drop-down list.

4. Click the **Supported Version** drop-down list and select `2.2`. Click the **SAVE** button, under the **HDMI Input 1** window group, to commit changes.

5. Under the **Encoder 1** window group, click the **Input** drop-down list and select `HDMI Input 1`.

6. Set the **Max Bit Rate** field to `450`.

7. Click the **Scaler** drop-down list and select `1920x1080`.

8. Click the **Thumbnail** > **Enable** toggle switch to enable thumbnails of the source. This will verify that the input source is configured correctly and will provide a visual reference for the encoder stream. Thumbnails are updated every 2 seconds.

> ℹ️ **NOTE:** Thumnails can also be accessed at: `http://<encoder-ip-address>/thumbnail/thumbnail1.jpg`. For dual-channel encoders, the secondary thumbail can be accessed at: `http://<encoder-ip-address>/thumbnail/thumbnail2.jpg`.

9. Click the **SAVE** button, under the **Encoder 1** window group, to commit changes.

10. Under the **Encoder 2** window group, select `HDMI Input 1` from the **Input** drop-down list.

11. Set the **Max bit rate** field to `150`.

12. Click the **Scaler** drop-down list and select `1280x720`.

13. Click the **SAVE** button, under the **Encoder 2** window group, to commit changes.

14. Click **SESSION** in the menu bar and configure each video stream using the information in the table bellow. Audio streams will not be configured for this tutorial.

Stream	Interface	Encoder	Destination Multicast/Unicast Address	Destination UDP Port
Stream 1	`eth1`	`Encoder 1`	`226.0.0.1`	`1000`
Stream 2	`eth1`	`Encoder 2`	`226.0.0.2`	`1000`

15. Click the **SAVE** button, under both **Stream 1** and **Stream 2** window groups, to commit changes.

Encoder #2

This encoder is used with a 4K source and will be configured to dual-stream 4K and 1080p.

1. Click **DEVICE INFO** in the menu bar, then click the **System Mode** drop-down list and select `VCx`. Click the **SAVE** button to commit changes.

2. Click the **INPUT** menu.

3. Under the **HDMI Input 1** window group, select `Default HDR MCH` from the **EDID** drop-down list.

4. Click the **Supported Version** drop-down list and select `2.2`. Click the **SAVE** button, under the **HDMI Input 1** window group, to commit changes.

5. Under the **Encoder 1** window group, click the **Input** drop-down list and select `HDMI Input 1`.

6. Set the **Max bit rate** field to `750`. This will cover resolutions up to 4K60 4:4:4.

7. Click the **Scaler** drop-down list and select `3840x2160`.

> ⚠️ **IMPORTANT:** When configuring streams above 1920x1080p, **Encoder 1** must be used.

8. Click the **Thumbnail** > **Enable** toggle switch to enable thumbnails of the source. This will verify that the input source is configured correctly and will provide a visual reference for the encoder stream. Thumbnails are updated every 2 seconds.

9. Click the **SAVE** button, under the **Encoder 1** window group, to commit changes.

10. Under the **Encoder 2** window group, select `HDMI Input 1` from the **Input** drop-down list.

11. Set the **Max Bit Rate** field to `150`.

12. Click the **Scaler** drop-down list and select `1920x1080`.

13. Click the **SAVE** button, under the **Encoder 2** window group, to commit changes.

14. Click **SESSION** in the menu bar and configure each video stream using the information in the table bellow. Audio streams will not be configured for this tutorial.

Stream	Interface	Encoder	Destination Multicast/Unicast Address	Destination UDP Port
Stream 1	eth1	Encoder 1	226.0.0.3	1000
Stream 2	eth1	Encoder 2	226.0.0.4	1000

15. Click the **SAVE** button, under both **Stream 1** and **Stream 2** window groups, to commit changes.

Decoder Configuration

Dual-streaming has been successfully configured on both encoders. This provides a total of four streams which are listed in the tables, below, for reference.

Encoder #1 (source: HD camera)

Stream	Encoder	Resolution	Stream	Multicast IP Address	Port
1	Encoder 1	1920x1080	Stream 1	226.0.0.1	1000
2	Encoder 2	1280x720	Stream 2	226.0.0.2	1000

Encoder #2 (source: Laptop)

Stream	Encoder	Resolution	Stream	Multicast IP Address	Port
3	Encoder 1	3840x2160	Stream 1	226.0.0.3	1000
4	Encoder 2	1920x1080	Stream 2	226.0.0.4	1000

The next step is to configure each decoder to subscribe to these streams. Although, in the tutorial diagram, each decoder is subscribed to no more than two streams, we will configure all three decoders to access all four streams. This will allow us to change the output on the displays, if desired.

Decoder #1, Decoder #2, and Decoder #3

1. Go the the decoder and click **IP INPUT** in the menu bar.

2. Configure the following fields, under each **IP Input** window group, as follows:

IP Input	Multicast Address	Port
IP Input 1	226.0.0.1	1000
IP Input 2	226.0.0.2	1000
IP Input 3	226.0.0.3	1000
IP Input 4	226.0.0.4	1000

3. Click the **Enabled** toggle switch for each **IP Input** window group. When enabled, the toggle switch will be green.

4. Click **SAVE**, under each **IP Input** window group, to commit changes.

5. Click the **HDMI OUTPUT** menu.

6. Verify that each source can be displayed, independently. To do this, locate the **Video** section and click the **Video** drop-down list.   Alternate between the following selections to display each source.

    ```
    IP Input 1 - 226.0.0.1:1000
    IP Input 2 - 226.0.0.2:1000
    IP Input 3 - 226.0.0.3:1000
    IP Input 4 - 226.0.0.4:1000
    ```

    If any of these sources are not displayed, return to the encoder **IP INPUT**, **SESSION**, and **ENCODING** menus to verify that the configuration is correct.

Multiview Configuration

The final step is to configure the decoders to display the proper stream(s), as outlined in the tutorial diagram (shown below).
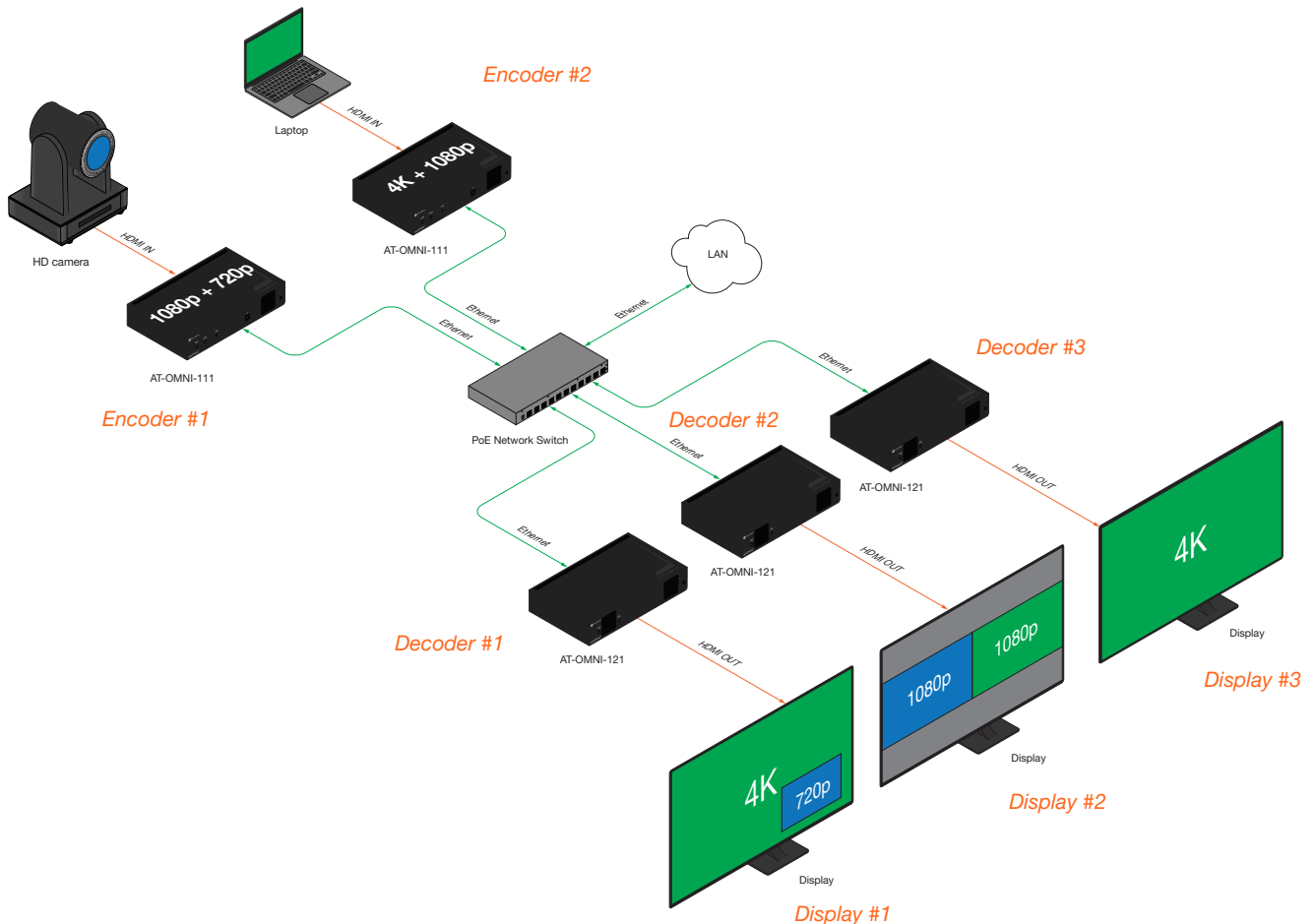
Decoder #1

1. Click **MULTIVIEW** in the menu bar.

2. Click the **ADD NEW MULTIVIEW** button.

3. The **New Multiview** dialog box will be displayed.

4. Enter a name for the multiview configuration in the **Name** field. Since this decoder will be a picture-in-picture layout, use the name `multiviewpip`.

> **NOTE:** Multiple multiview configurations can be created and saved. To display a different multiview, go to the **HDMI Output** menu, locate the **Video** section and click the **Input** drop-down list to select the desired multiview configuraiton.

5. Click the **Resolution** drop-down list and select `3840x2160`.

6. Click the **Layout** drop-down list to view the available layouts, and select `pip-bottom-right`.

7. Click the **main (3840x2160)** drop-down list and select `IP Input 3 - 226.0.0.3:1000`.

8. Click the **bottom_right (1280x720)** drop-down list and select `IP Input 2 - 226.0.0.2:1000`.

9. Click the **SAVE** button.

10. Click **HDMI OUTPUT** in the menu bar.

11. Locate the **Video** section, click the **Video** drop-down list, and select `multiviewpip`. This is the name of the multiview that was created in Step 4. The name `multiview` will always be used as a prefix, indicating that the selection is a multiview.

12. Click the **SAVE** button at the bottom of the **HDMI Output 1** window group.

Decoder #2

1. Click **MULTIVIEW** in the menu bar.

2. Click the **ADD NEW MULTIVIEW** button.

3. The **New Multiview** dialog box will be displayed.

4. Enter a name for the multiview configuration in the **Name** field. Since this decoder will be a side-by-side layout, use the name `multiviewsbs`.

5. Click the **Resolution** drop-down list and select `3840x2160`.

6. Click the **Layout** drop-down list to view the available layouts, and select `side-by-side`.

7. Click the **left (1920x1080)** drop-down list and select `IP Input 1 - 226.0.0.1:1000`.

8. Click the **right (1920x1080)** drop-down list and select `IP Input 4 - 226.0.0.4:1000`.

9. Click the **SAVE** button.

10. Click **HDMI OUTPUT** in the menu bar.

11. Locate the **Video** section, click the **Video** drop-down list, and select the name of the side-by-side multiview configuration that was created.

12. Click the **SAVE** button at the bottom of the **HDMI Output 1** window group.

Decoder #3

1. Since no multiview is used on this decoder, click **HDMI OUTPUT** in the menu bar.

2. Locate the **Video** section, click the **Video** drop-down list, and select `IP Input 3 - 226.0.0.3:1000`.

3. Click the **SAVE** button at the bottom of the **HDMI Output 1** window group.

This completes the dual-streaming and multiview tutorial. Additional multiview features are documented in the following pages.

Positioning Subframes

Each subframe in a multiview can be repositioned on the screen based on its anchor point. The anchor point (0, 0) represents the top left corner of the multivew canvas. For example, in the picture-in-picture example that was created on *Decoder #1*, the settings for each subframe are as follows:

Input	Anchor	x	y
ip_input2 (226.0.0.2:1000)	bottom right	3808	2128
ip_input3 (226.0.0.3:1000)	top left	0	0

To move ip_input2 (camera source) to the left, decrease the x value.

1. Click the **Multiview** menu.

2. Locate the **Subframe** sections and adjust the x and y values as desired, based on the anchor point.

> ⚠️ **IMPORTANT:** X-values must be specified in increments of 32. Y-values must be specified in increments of 8. If these increments are not used, then the decoder will automatically be assigned the closest "correct" coordinate value and display a message of the change.

3. Click the **SAVE** button to commit changes.

Changing the Background Color

The background color can be seen if any portion of the canvas is not covered by a subframe. Refer to the illustration below. For example, in this PiP configuration, subframe 1 contains no image. Instead of a blank background, the background color is displayed. The default background color is black: (RGB) 0,0,0.
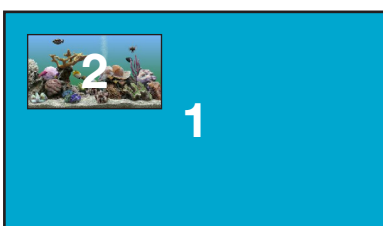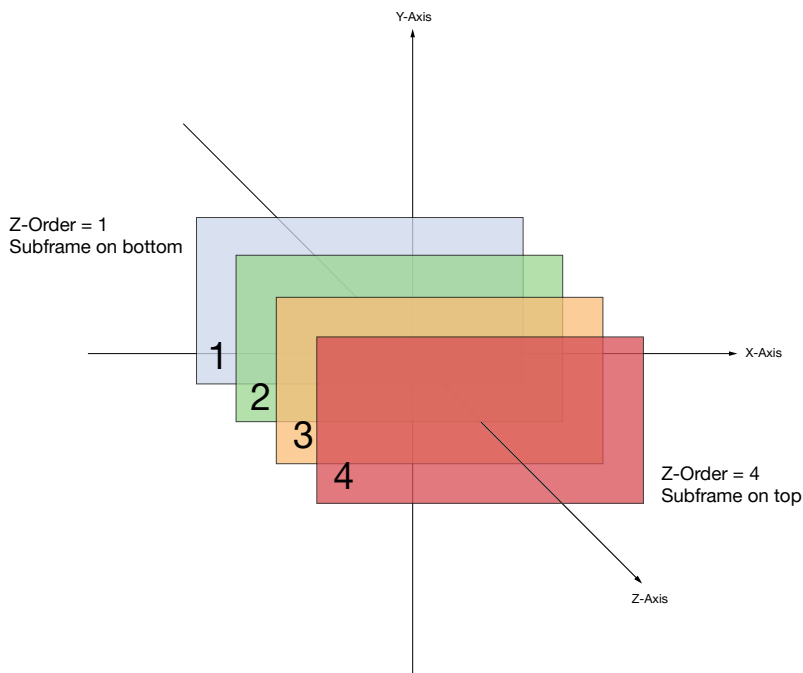

1. Click the **MULTIVIEW** menu, then click the Available Multivew drop-down list to select the desired multiview.

2. Click the **Background Color** swatch.

3. Click and drag the mouse across the palette to select the desired color. Alternatively, values can be entered directly in the **R**, **G**, **B**, and **Hex** fields.

4. Click the **SAVE** button to commit changes.
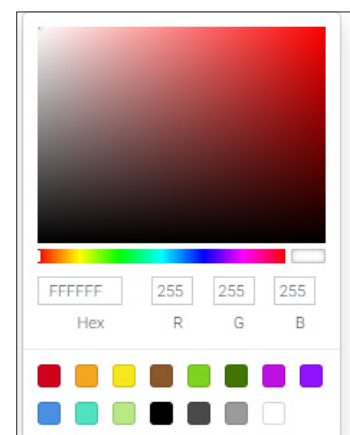
Changing the Z-Order

The ordering of overlapping subframes in two-dimensional space is referred to as the *z-order*. In the illustration below, the red window is set to priority 4 and will be displayed on top of all other subframes. Assigning a subframe to z-order 1 (the blue window) will move the subframe behind the other subframes. The larger the z-order value, the higher the subframe priority will be. Subframes cannot share the same z-order value.

Note that subframes do not support transparency. This is only used in the diagram to illustrate how overlapping subframes can be placed behind or in front or one another.

1. Click **MULTIVIEW** in the menu bar.

2. Click the **Available Multiview** drop-down list and select the desired multiview to be modified.

3. Click the name of the desired subframe to modify. Depending on the layout type, the name of each subframe will vary (e.g. **LEFT**, **RIGHT**, **BOTTOM_RIGHT**, **MAIN**, etc).

4. Enter the z-order value in the **Z-order** field.

5. Click the **SAVE** button to commit changes.

Adding Subframes

Multiview supports a maximum of 4 subframes. As long as the maximum number of subframes is not exceeded, additional subframes can be added. This provides for customization of existing layouts.

1. Click the **MULTIVIEW** menu.

2. Click the **Available Multiview** drop-down list to select the multiview to be changed.

3. Click the **ADD SUBFRAME** button.

4. The **New Subframe** dialog will be displayed.

5. Enter the title of the new subframe in the **Name** field.

6. Click the **Input** drop-down list to select the desired input. Only a list of currently configured IP inputs will be available from this list. If a new IP input is desired, it will need to be configured.

7. Enter the desired values in the **X** and **Y** fields, relative to the anchor point.

8. Click the **Anchor** drop-down list and select the desired anchor point.

9. Enter the z-order value in the **z-order** field.

10. Click the **SAVE** button to commit changes.

Deleting a Subframe

1. Click the **MULTIVIEW** menu.

2. Click the **Available Multiview** drop-down list to select the multiview to be changed.

3. Under the name of the subframe (**LEFT**, **RIGHT**, **TOP_LEFT**, etc.), click the **DELETE** button. The subframe will be immediately removed from the multiview.

Deleting a Multiview

1. Click the **MULTIVIEW** menu.

2. Click the **Available Multiview** drop-down list to select the multiview to be deleted.

3. Under the **CONTAINER** submenu, click the **DELETE** button.

> ⚠️ **IMPORTANT:** In order to delete a Multiview, the Multiview to be deleted must not be in use by the decoder. Click the **HDMI OUTPUT** menu, then click the **Video** > **Input** drop-down list to select another IP input or a different Multiview.

Using Audio in Multiview

When using multiview, a decoder can only subscribe to a single audio stream. To use an audio stream in multiview, simply configure the audio as part of the session (**Audio** > **Source** > `hdmi_input1`, for example). Refer to Creating a Session (page 20) for more information.

Configuring Audio Output

⚠️ **IMPORTANT:** When using analog audio inputs on the OmniStream decoder, the decoder must be powered using the 48V power supply (AT-PS-48083-C). This power supply is sold separately and can be purchased from Atlona.

In addition to passing audio directly from the encoder to the decoder, both the AT-OMNI-121 and AT-OMNI-122 provide two additional audio options

- HDMI audio can be de-embedded and output to two-channel analog audio.
- Two-channel analog audio can be embedded and output over HDMI.

This section covers both methods. If using a single-channel decoder, only a single **AUDIO IN** and **AUDIO OUT** port will be available.

De-embedding Audio

De-embedding audio will extract the HDMI audio and automatically downmix to two-channel analog audio, using the included captive-screw connectors.

1. Connect the power supply to the DC 48V connector on the decoder.

2. Connect the included 5-pin captive screw connectors to the **AUDIO OUT** ports. Refer to the OmniStream User Manual for wiring information.

3. Login to the decoder and click **HDMI Output** in the menu.

4. Scroll down to the **Audio** section and click the **Analog Power** toggle switch to enable it. When enabled, the toggle switch will be green. The **Analog Power Status** indicator, above the toggle switch, will be green. This indicates that the external power supply is connected to the decoder.

   Audio from the source will now be heard on the **ANALOG OUT** port of the decoder. Note that when audio is de-embedded, it will not longer be audible using the HDMI OUT ports on the decoder.

Embedding Audio

Embedding audio will replace the existing HDMI audio source, normally heard on the output of the decoder. The analog audio will be heard on the **HDMI OUT** port of the decoder.

1. Connect the power supply to the DC 48V connector on the decoder.

2. Connect the audio source to the **AUDIO IN** ports, using the included 5-pin captive screw connectors. Refer to the OmniStream User Manual for wiring information.

3. Go to the decoder.

4. Click **HDMI Output** in the menu bar.

5. Scroll down to the **Audio** section and click the **Analog Power** toggle switch to enable it. When enabled, the toggle switch will be green. The **Analog Power Status** indicator, above the toggle switch, will be green. This indicates that the external power supply is connected to the decoder.

   Audio from the source will now be heard on the **HDMI OUT** ports on the decoder.

Creating Video Walls

The following section assumes familiarity with site and room management within Velocity. Refer to the *Velocity User Manual* for more information on these topics.

1. Click **Control** > **Sites** in the menu bar to expand the list of buildings and rooms.

2. Click the desired room from the **Site** list.

> **NOTE:** It is assumed that the selected room has already been populated with enough displays to construct a video wall, along with required number of OmniStream encoders and decoders. Refer to the Velocity User Manual for more information on adding displays and OmniStream units to a room.

3. The **Modify Room** screen will be displayed. Click the **Edit Room Technology** icon.

4. Click the **Add Technology** icon.

5. Click the **Miscellaneous** > **Atlona** > **Velocity Video Wall: VELOCITY-VIDEO-WALL**. The video wall technology will be added to the room.

6. Click the **Edit Room Device** icon in the video wall technology window.

7. The **Video Wall / Pixel Space Dimensions** dialog will be displayed. This dialog will automatically be displayed when the video wall driver is edited for the first time. The name of the video wall can be modified in the **Alias** field, if desired. Close this dialog.

    The default video wall dimensions are set to 3840 x 2160. To modify the video wall size, follow Steps 7a through 7e. To continue with the default video wall dimensions, click the **CLOSE** button and go to step 8.

    a. Click the **Lock Pixel Space** toggle switch to disable it. When disabled, the toggle switch will turn gray.

    b. Under **Pixel Space Dimensions**, click the drop-down list to select the desired video wall dimensions.

    c. To create a custom size for the video wall, enter the desired dimensions under the **Custom** section. Enter the width and height directly, or use the spinner controls at the far end of each field, to adjust the values.

    d. Save the video wall dimensions by clicking the **Lock Pixel Space** toggle switch to enable it.

    e. Click the **CLOSE** button to dismiss the dialog.

Before continuing, refer to the **Pixel Space** tool bar at the top of the screen. The following identifies each icon:

a   b   c   d   e   f   g   h   i   j   k   l

Pixel Space
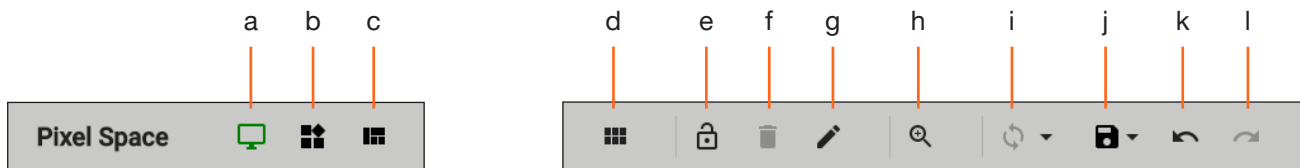
a. Displays
Click to icon to show the Displays window on the left side of the screen. In this mode, displays can be edited.

b. Presets
Click this icon to display the Presets window on the left side of the screen. In this mode, presets can be edited, added, or deleted.

c. Drop Zones
Click this icon to display the Drop Zones window on the left side of the screen. Refer to Creating and Using Drop Zones (page 65) for more information.

d. Auto Arrange
Click this icon to auto-arrange the number of displays in the **Pixel Space** window into the selected number of rows and columns.

e. Lock
When locked, this icon will turn red, and prevent accidental repositioning of displays or changing presets. To unlock the displays (for adjustment purposes), click this icon again.

f. Delete All
Click this icon to delete all displays within the **Pixel Space** window. This icon will only be available if displays are present in the **Pixel Space** window. This icon is only enabled if displays have been added to the Pixel Space window.

g. Pixel Space
Click this icon to display the **VideoWall** dialog box, allowing modification of both the Video Wall and Pixel Space settings.

h. Zoom
Click this icon to display the zoom fly-out slider control. Click and drag the slider to adjust the zoom factor of the **Pixel Space** window.

i. Apply Preset
Click this icon to apply the current preset. Click the down arrow next to this icon to display the Apply Preset fly-out menu. This control defines when Velocity automatically applies a preset: 1) Auto apply preset on save; 2) Auto apply preset on source change.

j. Save
Click this icon to save the current layout/settings. Click the down-arrow, next to this icon, to display the Save fly-out menu option, allows enabling or disabling of auto-saving.

k. Undo
Click this icon to undo the last operation.

l. Redo
Click this icon to redo the last operation. Clicking this icon after an undo operation will restore the previous setting.

8. Under the **Displays** window, on the left side of the screen, drag and drop the desired displays to the to **Pixel Space** window.

Alternatively, to add all displays to the **Pixel Space** windows without manually using drag-and-drop, click **ADD REMAINING**, at the bottom of the **Displays** window. This will automatically populate the **Pixel Space** window with all available displays. Note that if all displays have been dragged to the **Pixel Space** window, then this option will be grayed out.

9. Click the **Auto Arrange** icon in menu bar at the top of the **Pixel Space** window. Move the mouse within the **Auto Arrange** pop-up dialog to adjust the size of the video wall. Click the lower right-most blue square of the video wall to commit the selection.

Landscape Orientation

If any displays have been mounted upside-down, the orientation can be corrected, without having to remount the displays in the correct orientation.

a. Click the **Edit** icon (pencil icon) in the upper-right corner of the display that requires adjustment.

b. The dialog for the selected decoder will be displayed.

c. Click the Rotation drop-down list and select the desired rotation. If the image on the display is upside-down, select `180 degrees`.

d. Click the **CLOSE** button to commit changes.

Portrait Orientation

> ⚠️ **IMPORTANT:** Portrait Mode is only supported on single-channel decoders.

If any displays have been mounted upside-down, the orientation can be corrected, without having to remount the displays in the correct orientation.

a. Click the **Edit** icon (pencil icon) in the upper-right corner of the display that requires adjustment.

b. The dialog for the selected decoder will be displayed.

c. Click the Rotation drop-down list and select the desired rotation. If the image needs to be rotated from landscape to portrait, select `90 degrees`. If the display is mounted upside-down AND requires rotation from landscape to portrait, select `270 degrees`.

d. Click the **CLOSE** button to commit changes.

Once **Auto Arrange** has been applied, the **Pixel Space** window will appear. It should be noted that each display can be rearranged if necessary. To reposition displays, click and drag them to the appropriate places, within the **Pixel Space** window. Note that each display is identified with a name and an IP address, in the upper-left corner. Refer to the *Velocity User Manual* for more information on naming devices.

10. Click the **Lock Displays** icon in the menu bar of the **Pixel Space** window. This is optional. However, enabling this feature will prevent accidental repositioning of the displays, during the configuration procedure. When locked, this icon will turn red. Both the **Trash** and **Auto Arrange** icons will be disabled. To unlock the displays (for adjustment purposes), click the **Lock Displays** icon again.

11. Click the **Save** icon in the upper-right corner of the **Pixel Space** window. This will save the current layout.

Creating Presets

Presets are used to save window layouts, within the **Pixel Space** window. Once a preset is created it can be recalled at any time.

1. Click the **Presets** icon. When clicked, this icon will turn green and the Presets window will be displayed on the left side of the screen.

2. Click **Add**, under **Presets**.

3. Enter than name of the preset in the **Preset Edit** dialog, then click **CLOSE** to save the preset name and dismiss the dialog.

4. Under the **Sources** window, on the left side of the screen, drag and drop the desired source(s) to each display in the **Pixel Space** window. Note that the same source can be mapped to other displays.

    Sources can also be re-sized "on the fly" to achieve the desired presentation. To re-size a source, click and drag the source window horizontally, vertically, or diagonally. Release the mouse to commit the changes. Refer to the *Velocity User Manual* for more information on manipulating source windows.

> **(i)** **NOTE:** When source windows are resized, they will "snap" to the nearest vertical or horizontal border, depending upon the direction that the mouse cursor is being moved. Source windows cannot occupy fractions of a display window.

Preset Orientation

There may be some situations in which content that is spread across multiple displays must be rotated. Two examples are shown below.

Example 1: Content requiring rotation.

In the following example, a single source is spread across three vertical displays. The source content (shown on the left) is rotated -90 degrees. In order for the content to be displayed correctly, the source must be rotated.

Figure 1.1 - Source content
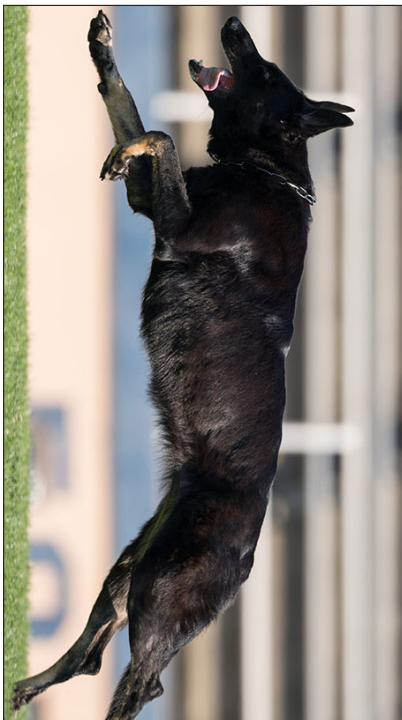
Figure 1.2 - Source content properly rotated to span three vertically rotated displays.
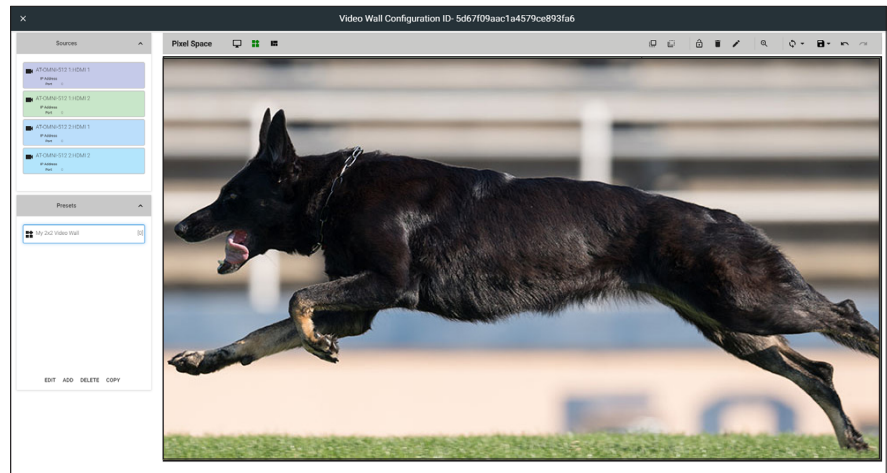
1. Click the ✎ icon in the upper-right corner of the screen.   The source dialog will be displayed.

2. Locate the **Disable Rotation** toggle switch at the bottom of the dialog.

3. Verify that the toggle switch is set to the far-left position. The toggle switch will be gray when rotation is *enabled*.

4. Click **CLOSE** to commit changes and dismiss the dialog box.

Example 2: Content that does not require rotation.

In this example, three sources are spread across three vertical displays. The content (shown on the left) was created to be displayed horizontally. In this case, rotating the source is not required.

Figure 1.1 - Source content

Source 1

Figure 1.2 - Source content properly rotated to span three vertically rotated displays.
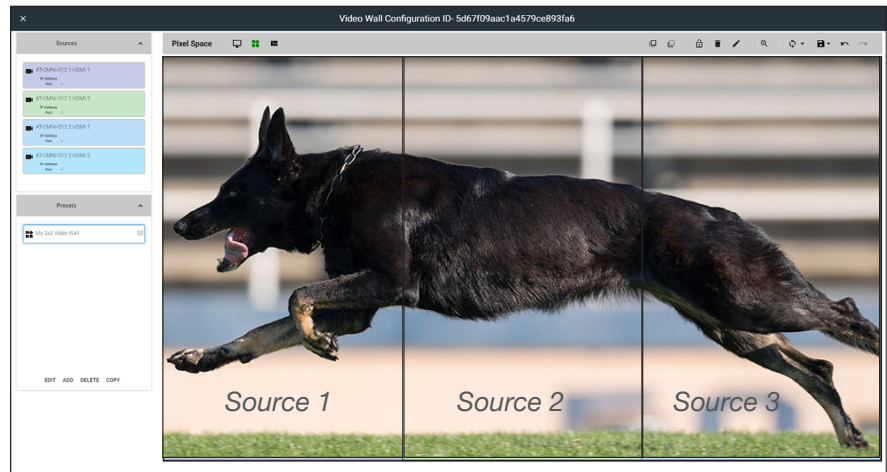
Source 2

1. Click the icon in the upper-right corner of the source window. The source dialog will be displayed.

2. Locate the **Disable Rotation** toggle switch at the bottom of the dialog.

3. Verify that the toggle switch is set to the far-left position. The toggle switch will be green when rotation is *disabled*.

4. Click **CLOSE** to commit changes and dismiss the dialog box.

5. Repeat steps 1 through 4 for each source.

Source 3
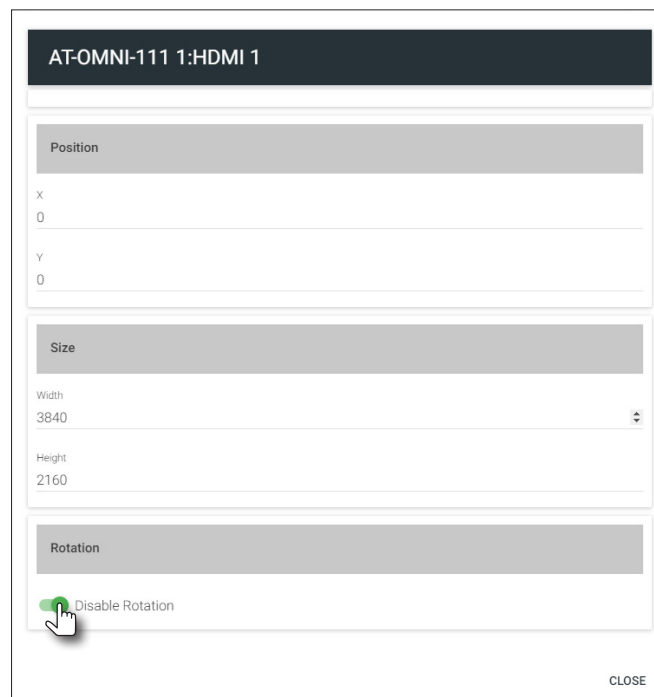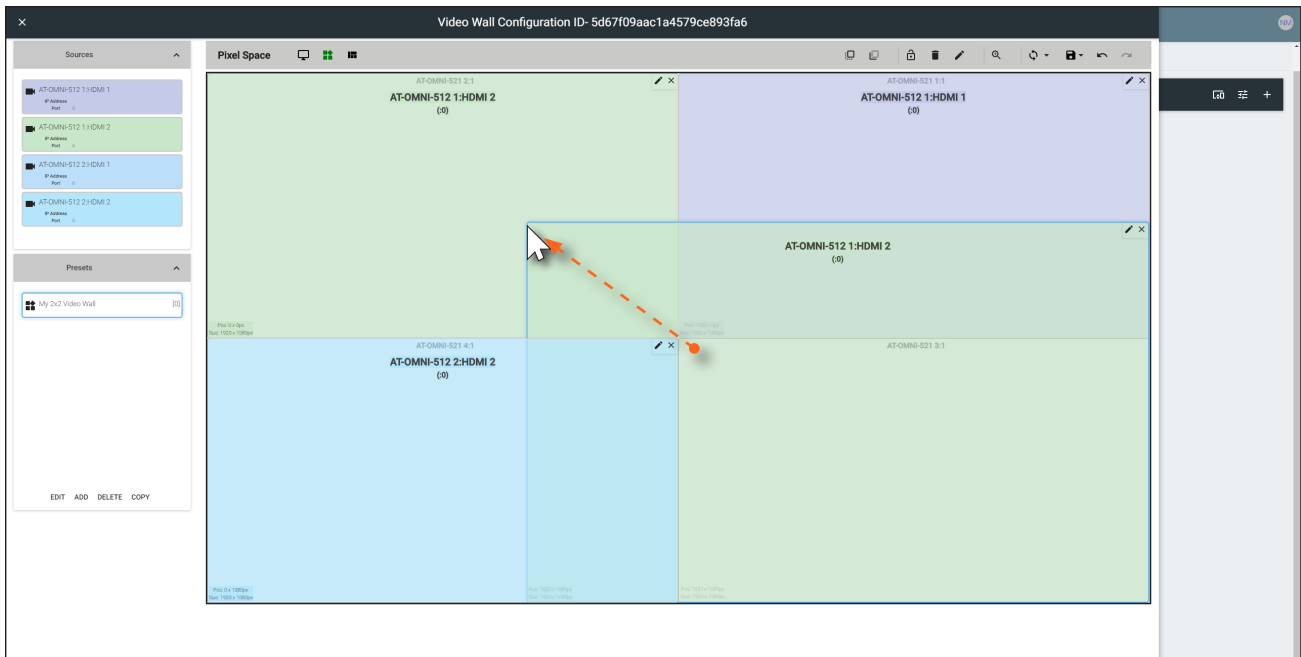
5.   Repeat steps 2 through 4 to create additional presets. Once the desired presets have been created, click the preset name to recall it. The video wall will be updated with the selected preset.

     Refer to the *Atlona Velocity User Manual* for more information on using and recalling presets.
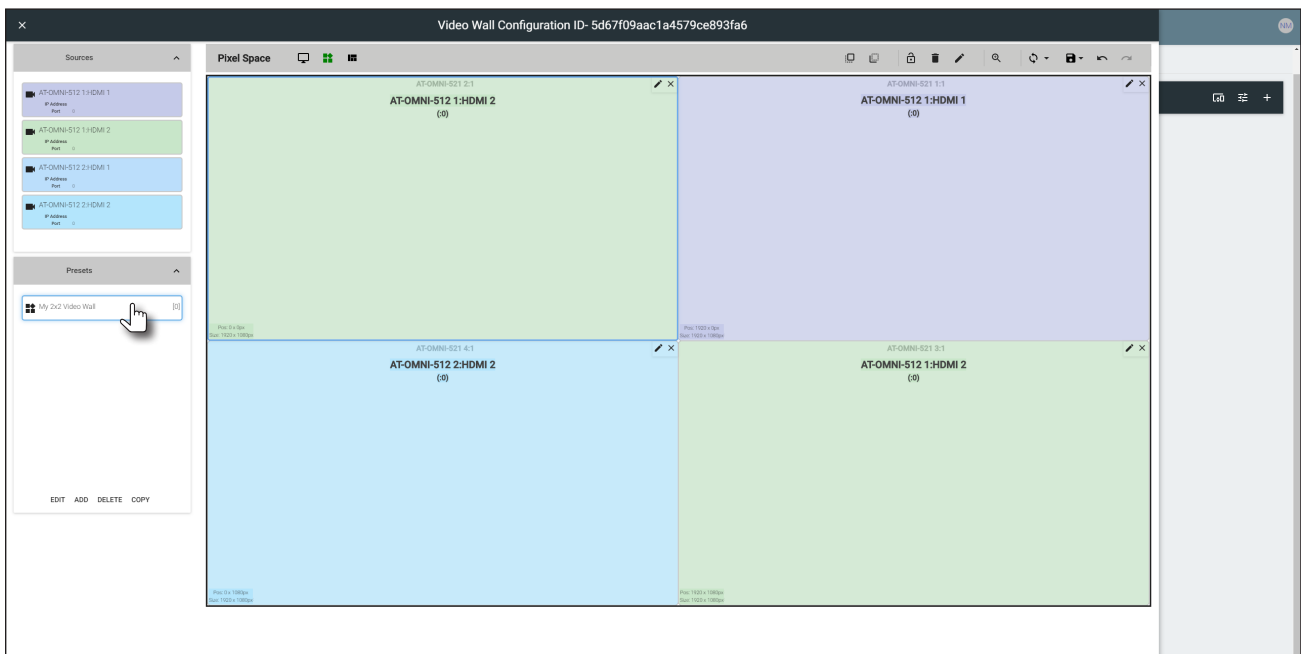
Creating and Using Drop Zones

Drop Zones are "containers", allowing sources to be placed ("dropped") in real-time on a video wall. Drop Zones are similar to presets except that, unlike presets, Drop Zone content can be changed on-the-fly within the Video Wall Control Screen.

1. Populate the **Pixel Space** window with the desired devices.

2. Click the **Lock Displays** icon to lock the devices in place.

3. Click the **Drop Zones** icon in the **Pixel Space** menu bar.

4. Click **ADD**, under the **Drop Zones** window, on the left side of the screen. This will create the Drop Zone *preset*.
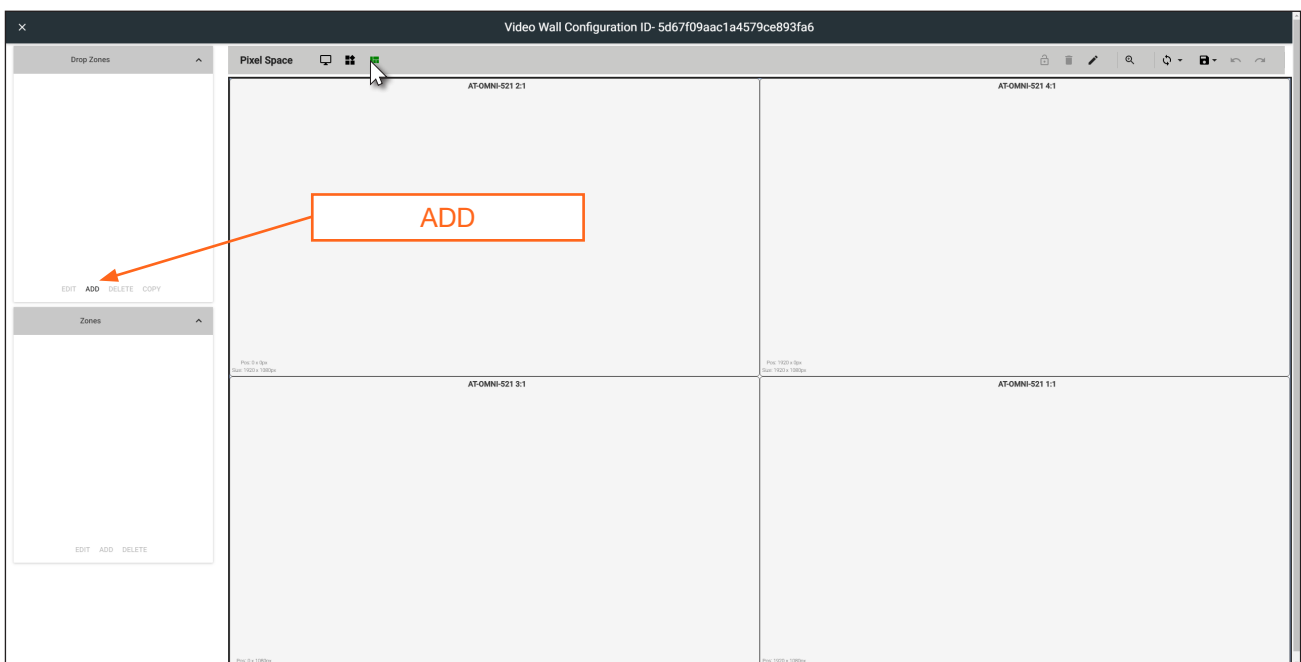
5. Click **EDIT** and provide a name for the Drop Zone in the **Drop Zone Edit** dialog box.

6. Click the **CLOSE** button to commit the change.
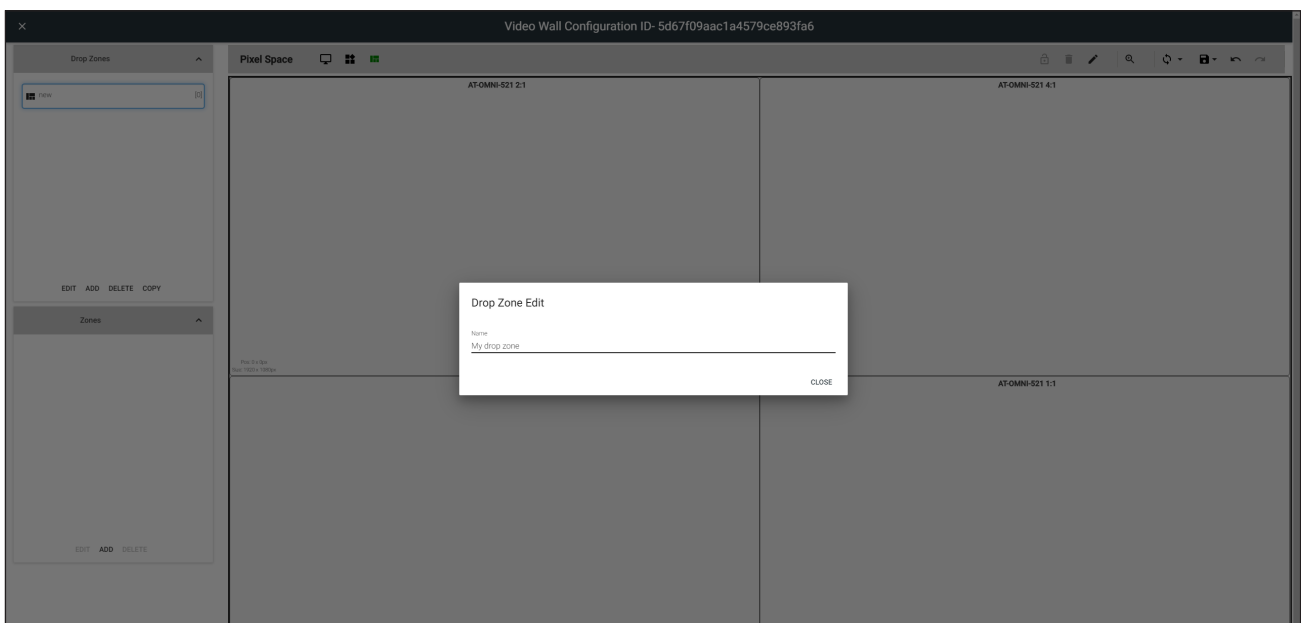
7.   Click **ADD**, under the **Zones** window.
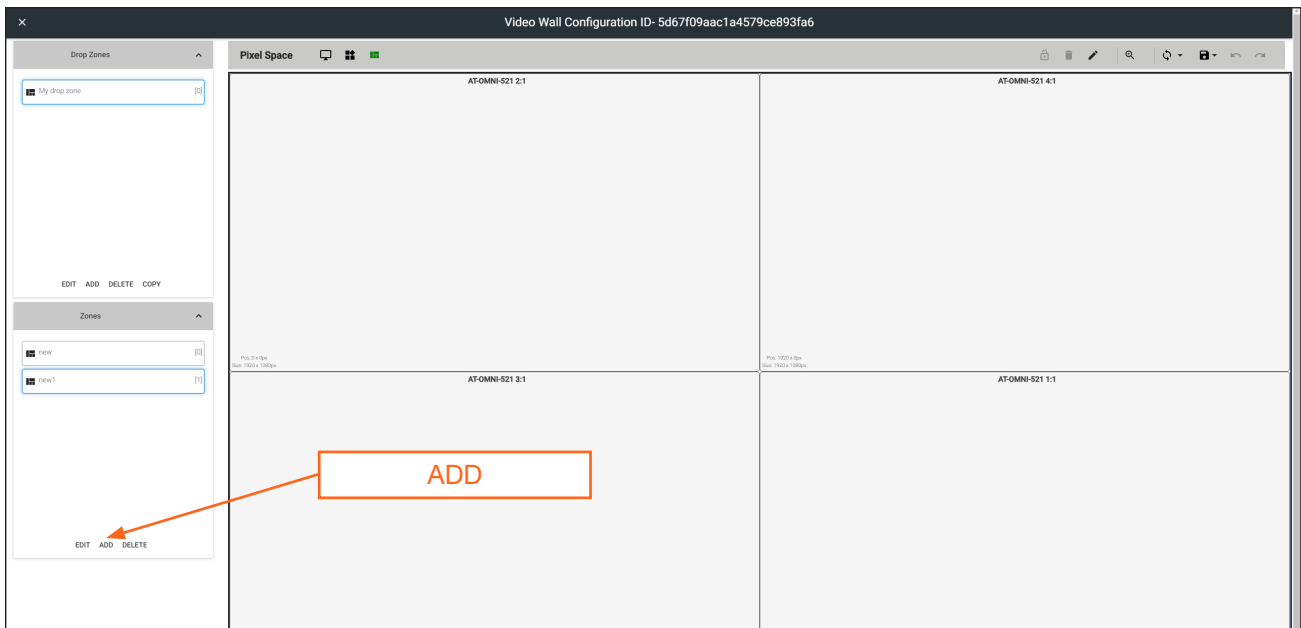
8.   Click **EDIT** and provide a name for the Zone, in the **Edit Zone** dialog box. Click **Close** to save the change.
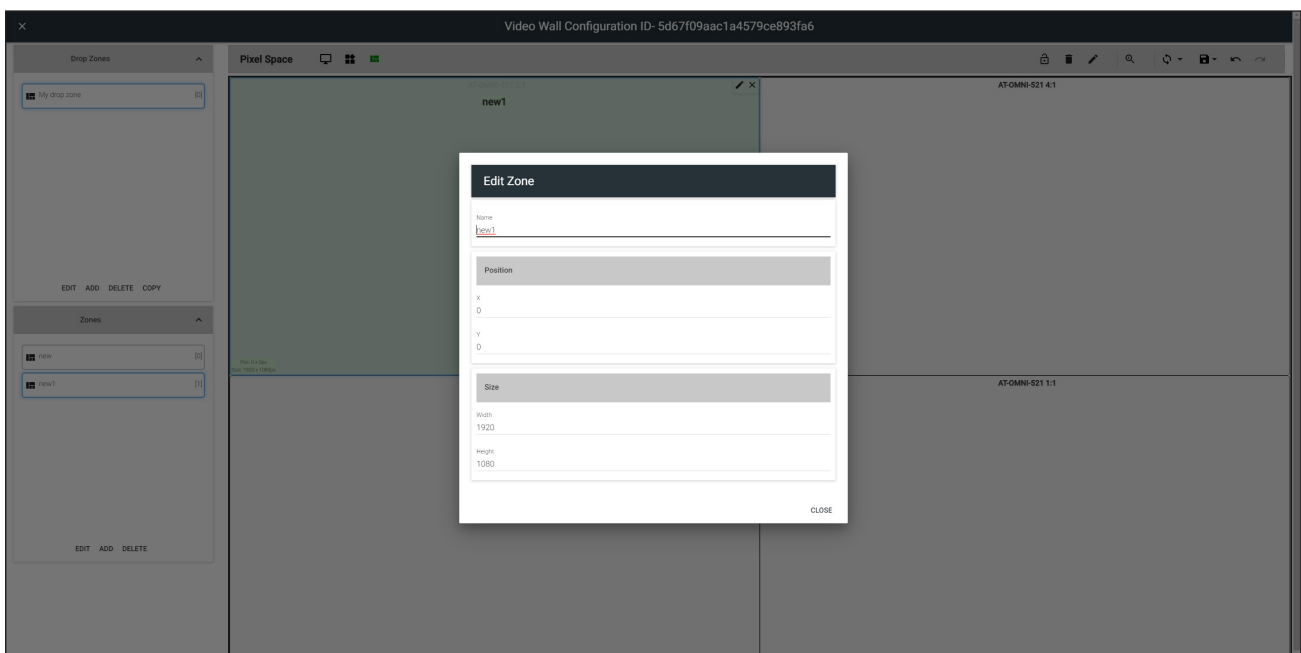
Note that each time the **ADD** button is clicked, a new Drop Zone *container* is created. In this first example, two Drop Zone containers are created. When adding containers, note that the position of each container is created in the same position, within the **Pixel Space** window.

9. Drag each container to the desired area on the video wall. To place a container on each device, left-click and drag, then release when a majority of the window is placed over the device.
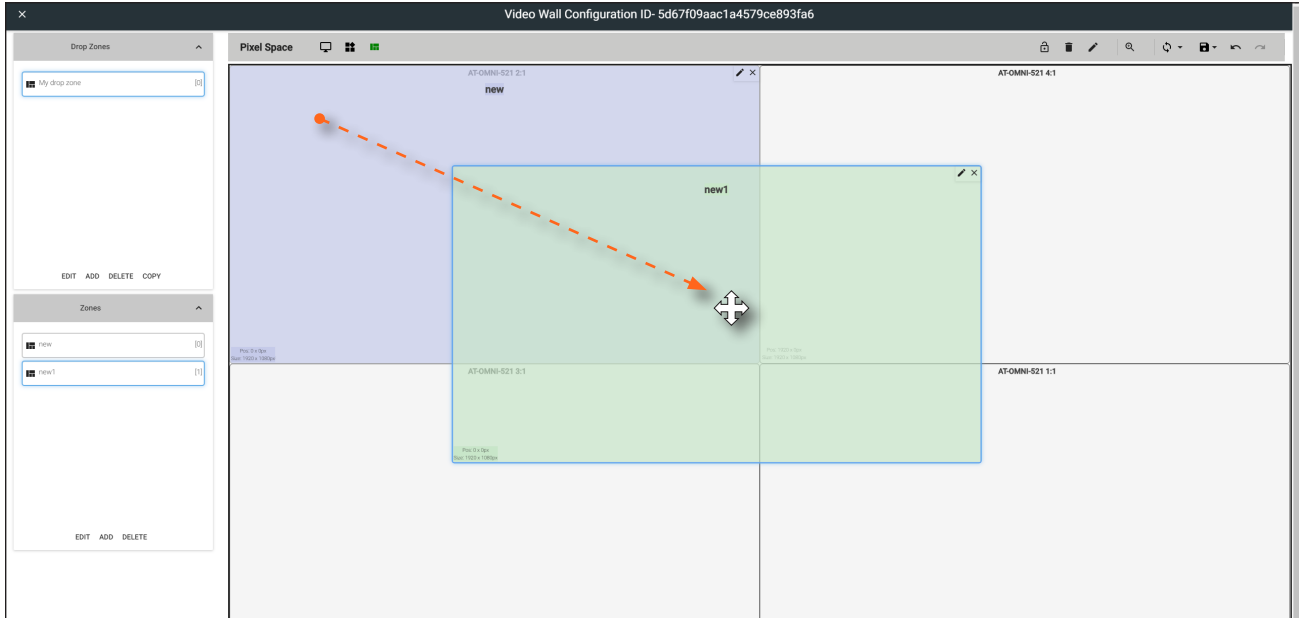
If a container is positioned over the intersection of two windows, then it will automatically be resized to accommodate both devices, as shown below. If placed over the corner intersection of more than two windows, then the container will be resized to cover all devices occupying that space.

Window Intersection

Container automatically resized
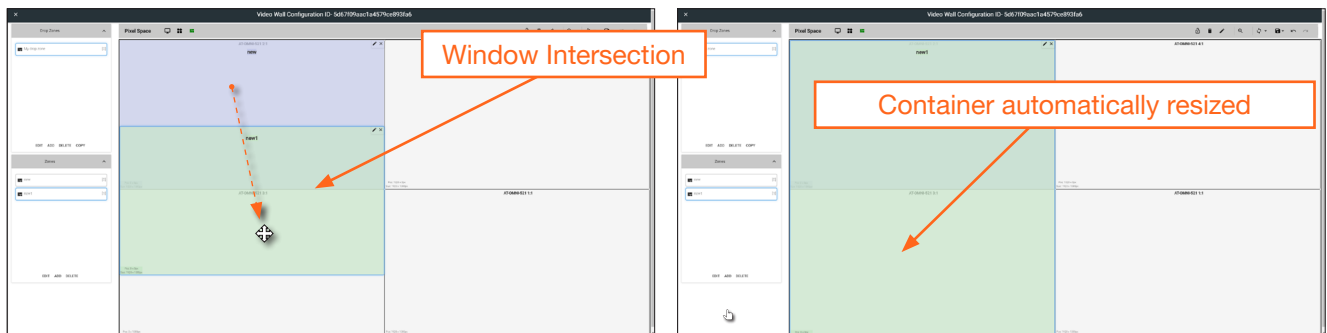
10. Click the **Lock Preset** button, one the containers have been placed in the desired positions.

Lock Preset

Save
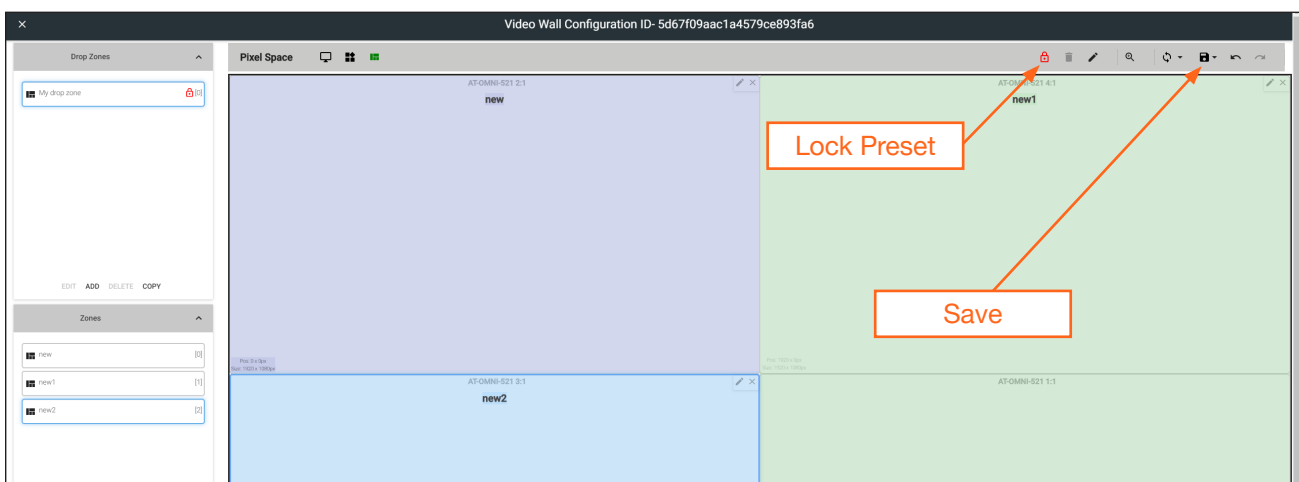
11. Repeat the above steps to create additional Drop Zone presets. Each Drop Zone preset can have a different number of containers. However, the number of containers that are created should not exceed the number of devices within the **Pixel Space** window.

12. Click the **Save** icon to commit all changes.

13. Close the **Video Wall Configuration** window, by clicking the **X**, in the upper-left corner of the screen.

14. Click the **Launch Control** icon, in the far-left corner of the **Modify Room** screen.
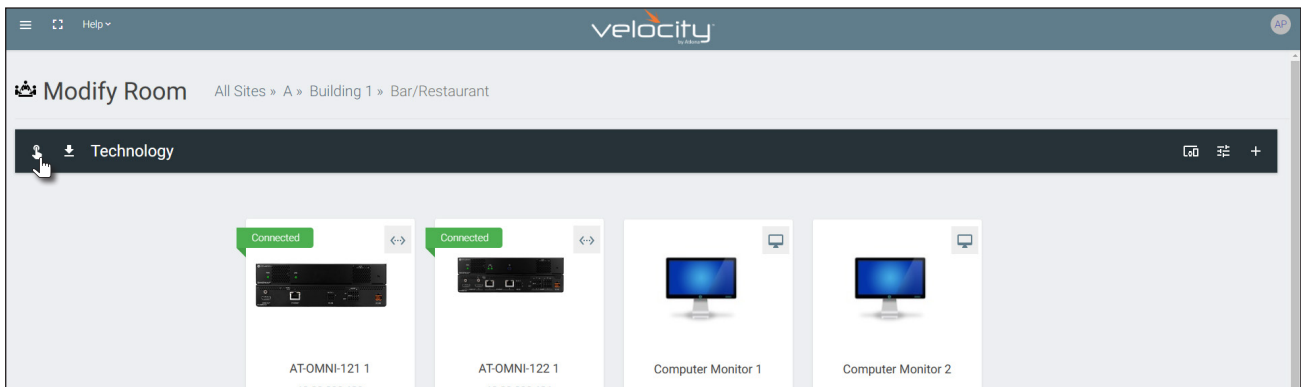
15. Click the **VIDEO WALL** icon.
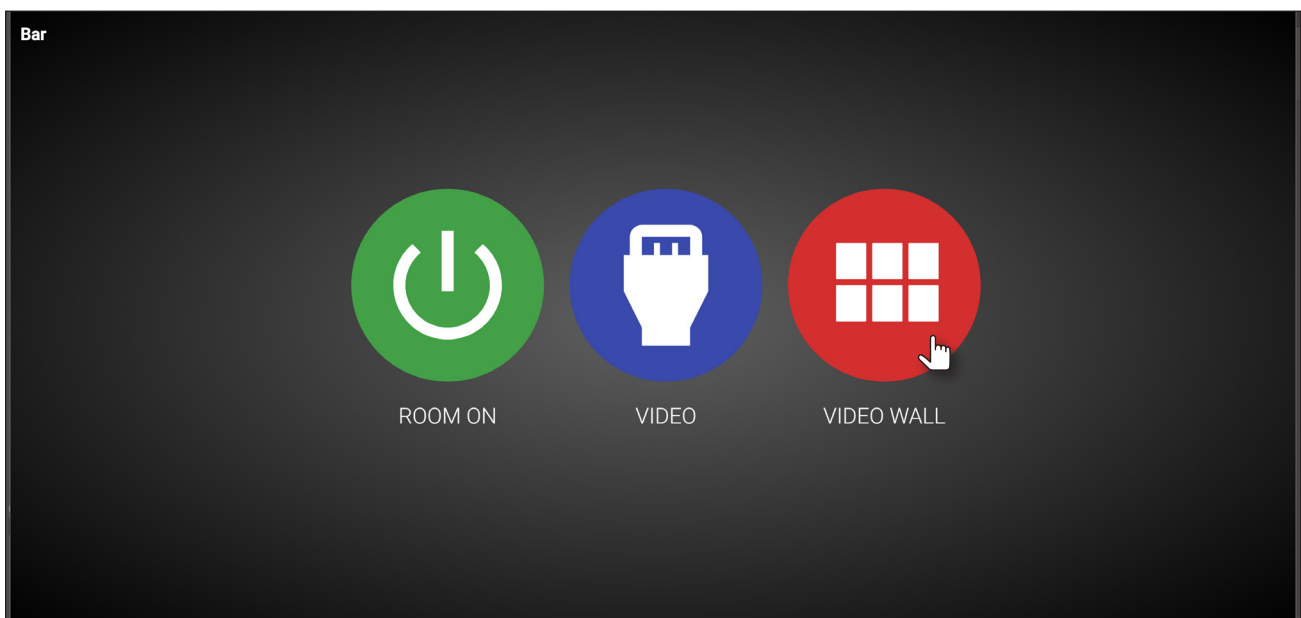
16. The **Presets** portion of the control screen will be displayed. All presets that were created, will be listed on the left-hand side of the screen, as shown below. Note in this example, only one preset was created. Click the desired preset to recall it.


17. Click **Zones**, in the lower-left corner of the screen to access the Drop Zones, which were created earlier. In the example example below, two Drop Zones were created.
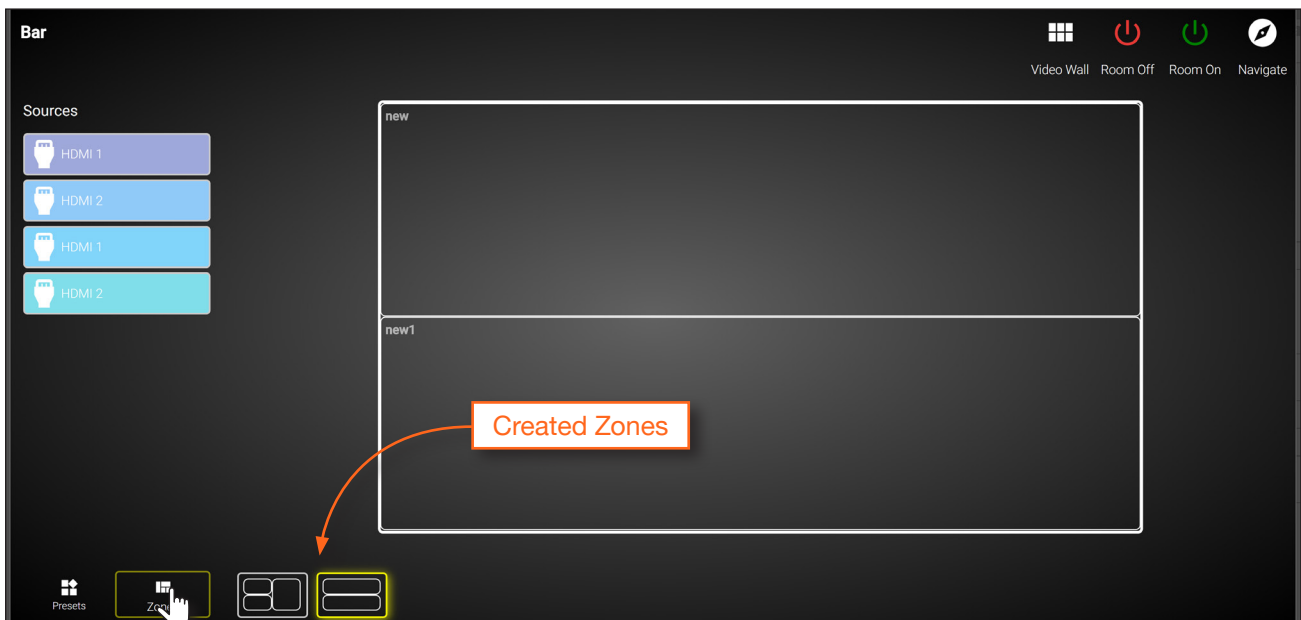

The first Drop Zone that was created, shows two containers on the left, and a single container on the right. The second Drop Zone, only uses two containers: one on the top and one on the bottom. The Preset which we created is a 2x2 video wall and represents the physical layout of the displays. Drop Zones are containers and act as a "map" to where the video sources will be applied. Refer to the next page for an example.

The first Drop Zone will can dynamically apply sources to the preset, which is a 2x2 video wall, to the top-left, bottom-left, and both or only one display(s) on the right-hand side. Some possible combinations are shown below. Drop Zone containers have been labeled alphabetically, for reference.
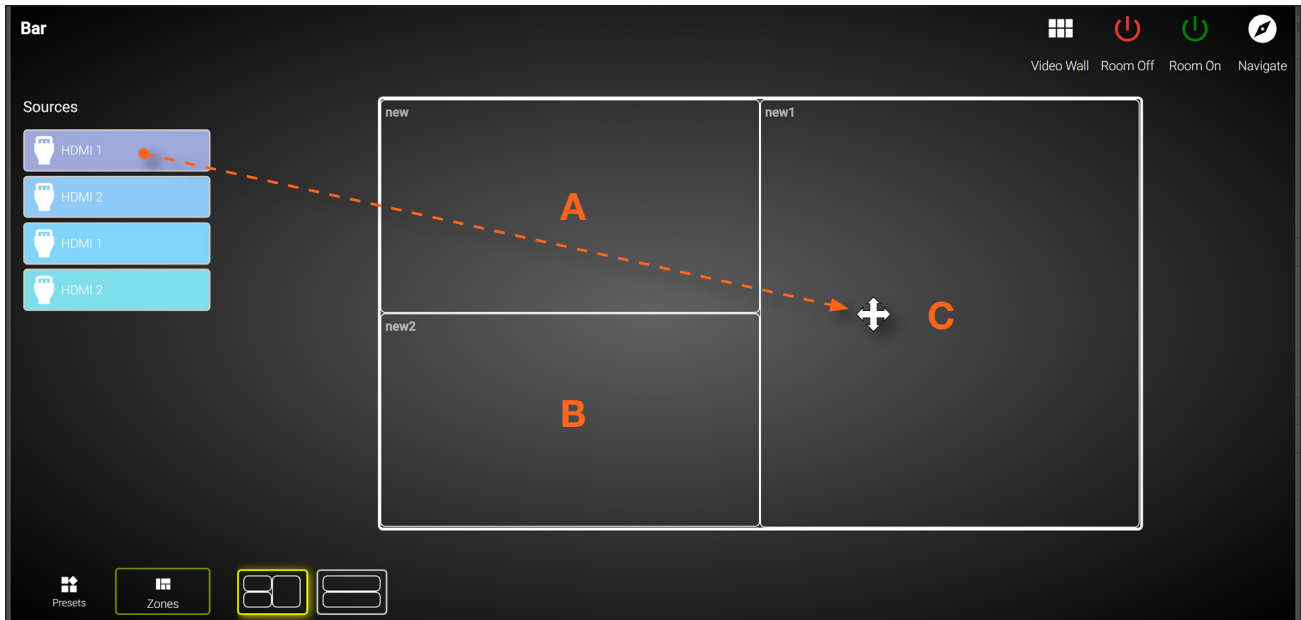
Note that although the top-right and bottom-right displays are physically separate, dragging and dropping a source from the left-hand side of the screen to Drop Zone container "C", will "map" the source to both displays.
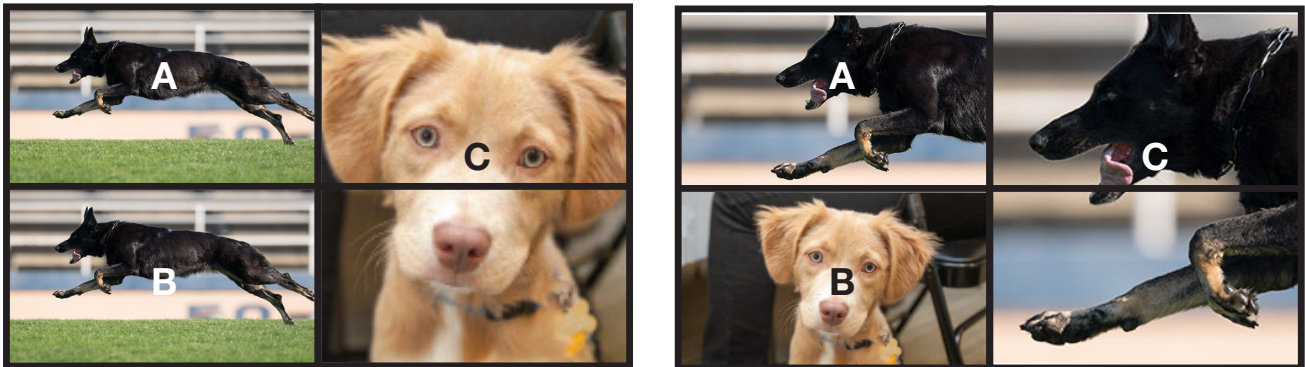
To change to a different source, drag and drop a source from the left-hand side of the screen to the source to be replaced.

Custom Drop Zones

In addition to creating user-defined Drop Zones, the Velocity Video Wall also includes a Custom Drop Zone. This unique type of Drop Zone allows dynamic re-sizing of sources to be mapped across any of the decoders.

1. Return to the **Video Wall Configuration** screen and click the **Pixel Space** icon, in the **Pixel Space** menu bar.
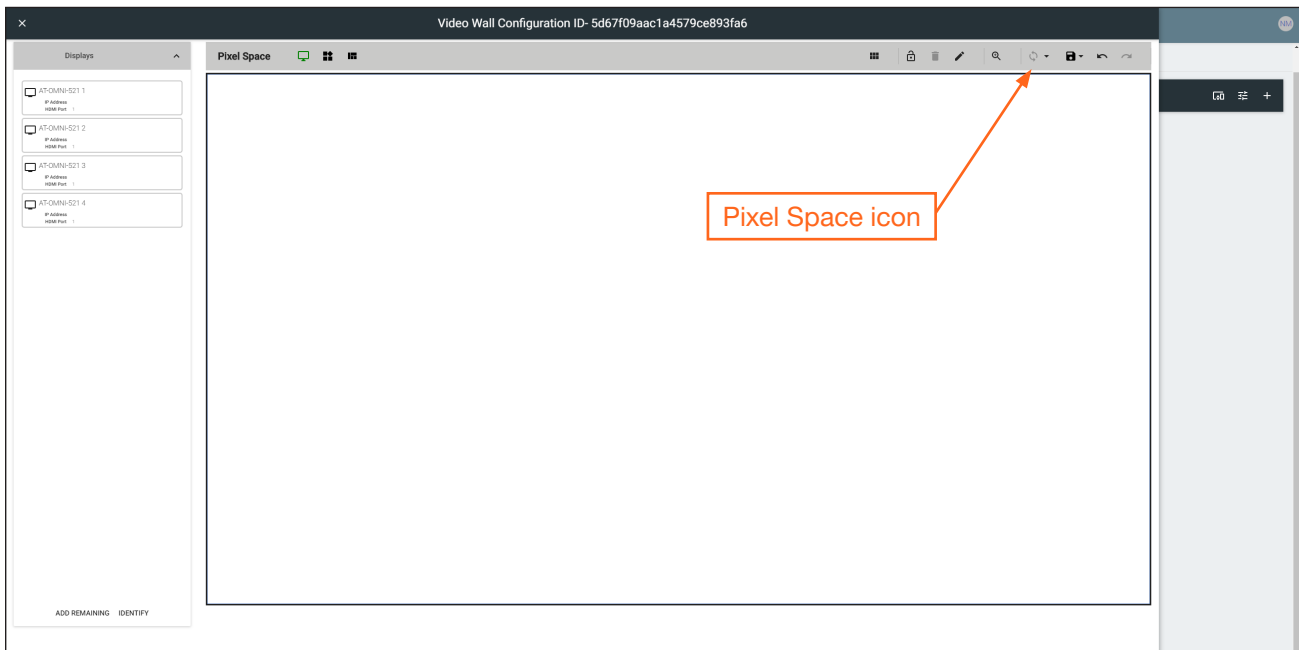

2. Click the **Allow custom drop zone** toggle switch to enable it. When enabled, this toggle switch will be green.
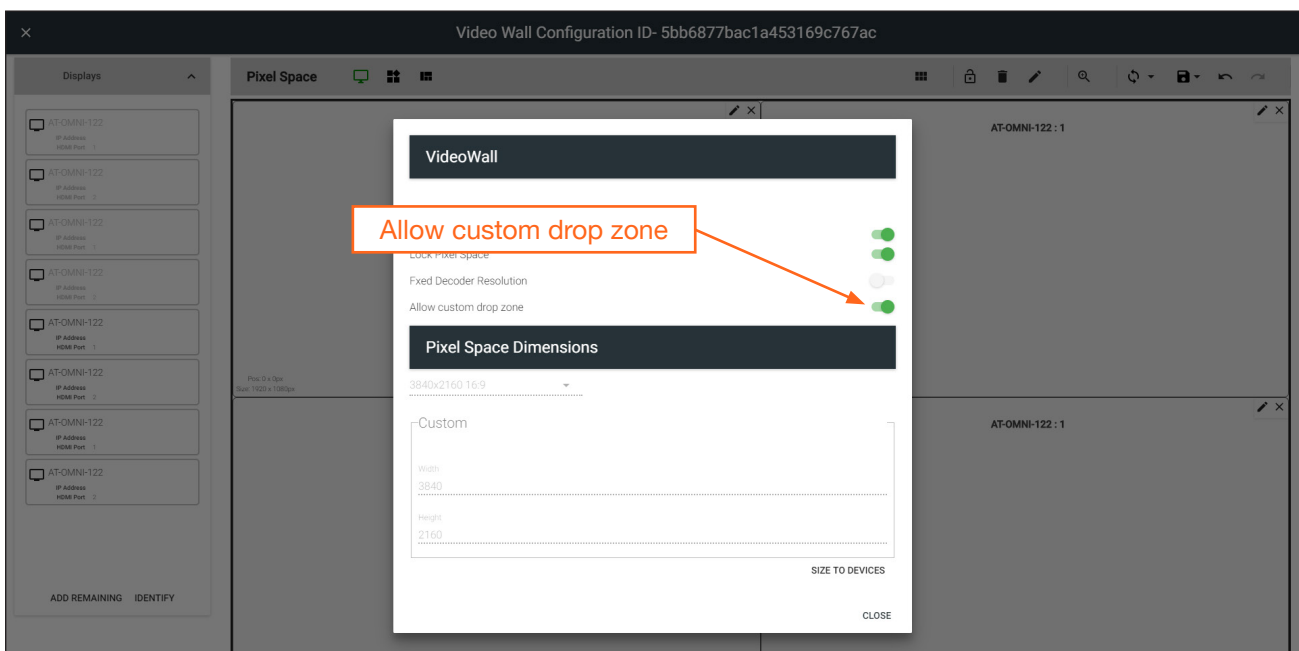

3. Click **CLOSE** to save changes and dismiss the dialog box.

4. Click the **Save** icon in the top-right portion of the **Video Wall Configuration** screen to commit changes.

5. Close the **Video Wall Configuration** screen and then click the **Launch Control** icon on the **Modify Room** screen.

6. Click the **VIDEO WALL** icon to enter video wall control screen.

7. Click **Zones** at the bottom of the screen, then click the **Custom Drop Zone** icon.
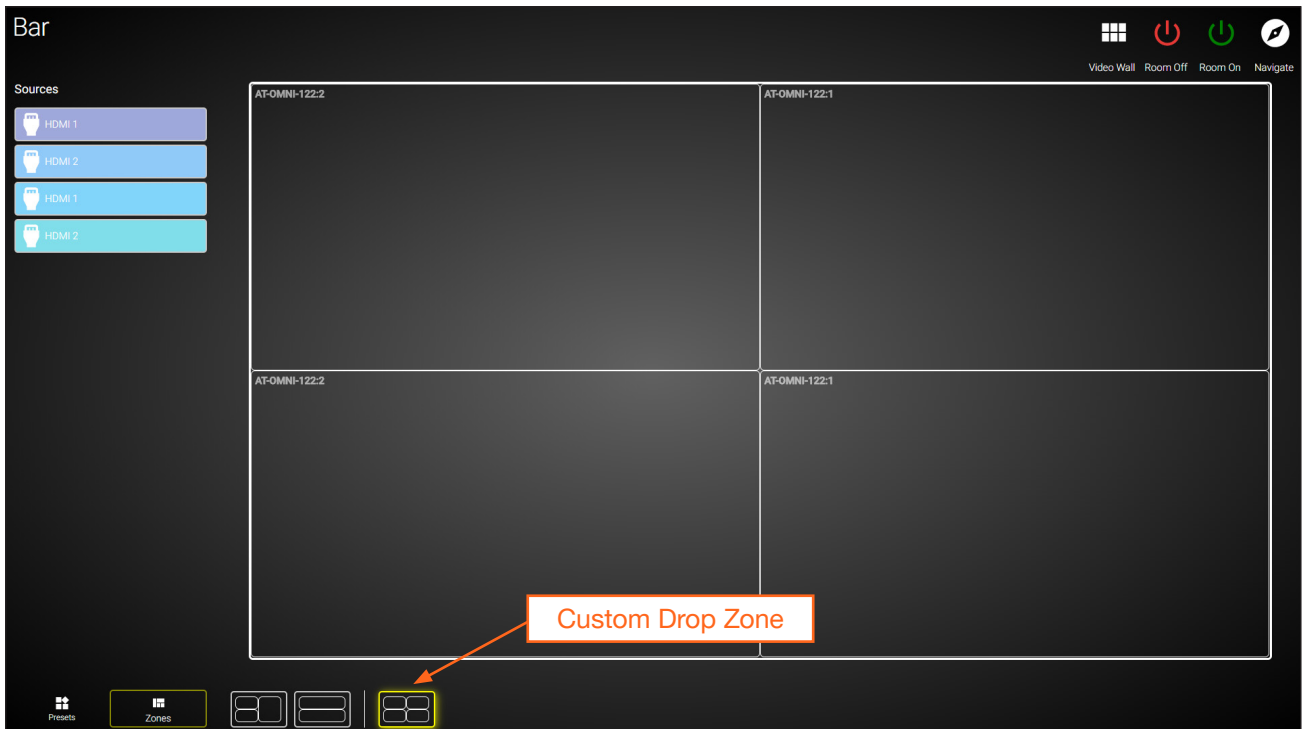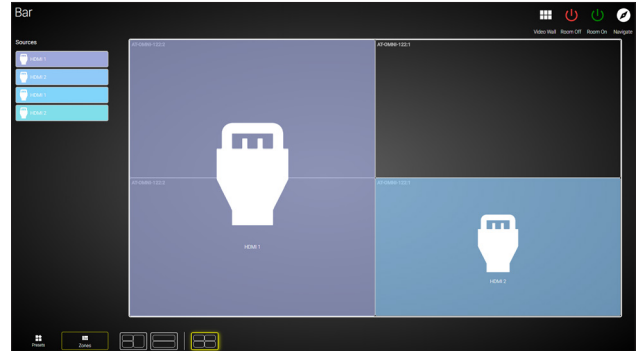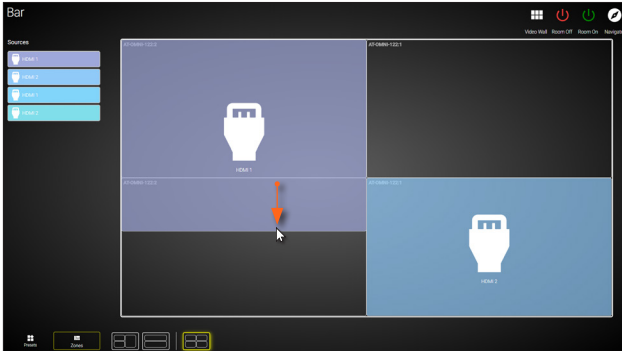

8. Drag-and-drop sources from the left side of the screen, as performed with normal Drop Zones.
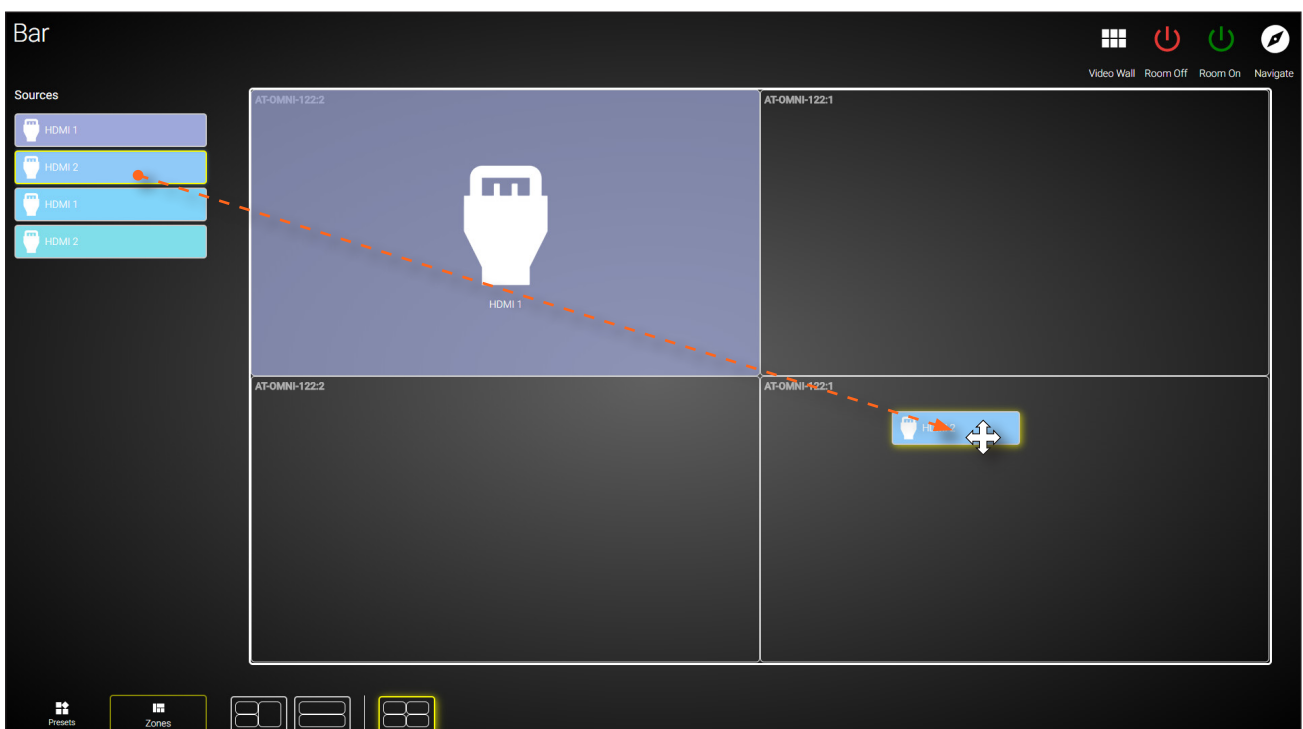
9. Resize or reposition windows by clicking and dragging the edges of each source, horizontally / vertically, to the desired area of a container.

    To reposition the source to a different container(s), click in the middle of a source, then drag and drop to the desired container(s).

If the source is dropped at the intersection of two containers, the source will automatically be resized to fill both containers. In the example below, the source will be displayed on all four screens.
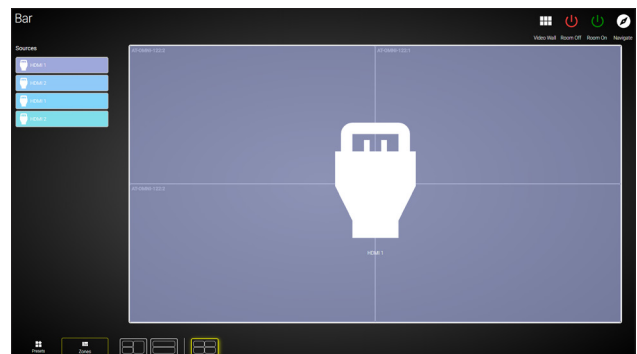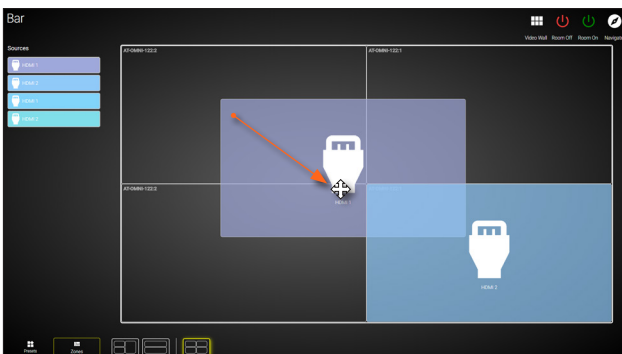
Configuring Redundant Streams

OmniStream decoders have the ability to identify missing streams, should an input be disconnected from the encoder, and will recover the image almost instantaneously. The decoder can access the same stream from two separate multicast addresses and switch between them, when necessary.

1.   Go to the decoder.

2.   Click **HDMI OUTPUT** in the menu bar.

3.   Under the **Video** section, click the **Backup Mode** drop-down list to select the desired mode.

Mode	Description
Off	Redundancy off; output will never switch to the backup stream.
Join Active	The decoder sends a join request only when the primary stream is lost or if the decoder is manually switched to the backup stream. Switch time will not exceed 5 seconds.*
Join Always	The decoder joins both the Primary and Backup stream at the same time. Switch time will not exceed 0.5 seconds.

Switching time will be dependent upon the network switch that is used, as well as the number of hops between encoders and decoders on the network.

4.   Click the **SAVE** button, at the bottom of the **HDMI Output** window group.

Redundancy Grace Period

During use, the decoder can be switched to another multicast stream. However, if the decoder encounters a missing stream, during the switch and when redundancy is enabled, then this will cause the decoder to automatically failover to the multicast source configured as the backup. To prevent the decoder from automatically making the redundancy switch, when redundancy is enabled, a grace period can be entered. By default, the grace period is set to 0 seconds. If set to 0 seconds, automatic failover will occur if the stream is interrupted, for any reason.

1.   Go to the decoder.

2.   Click **HDMI OUTPUT** in the menu bar.

3.   Under the **Video** section, locate the **Configuration Grace Period** field and enter the desired value, in seconds. By default, this value is set to 0 (zero).

4.   Click the **SAVE** button, at the bottom of the **HDMI Output** window group.
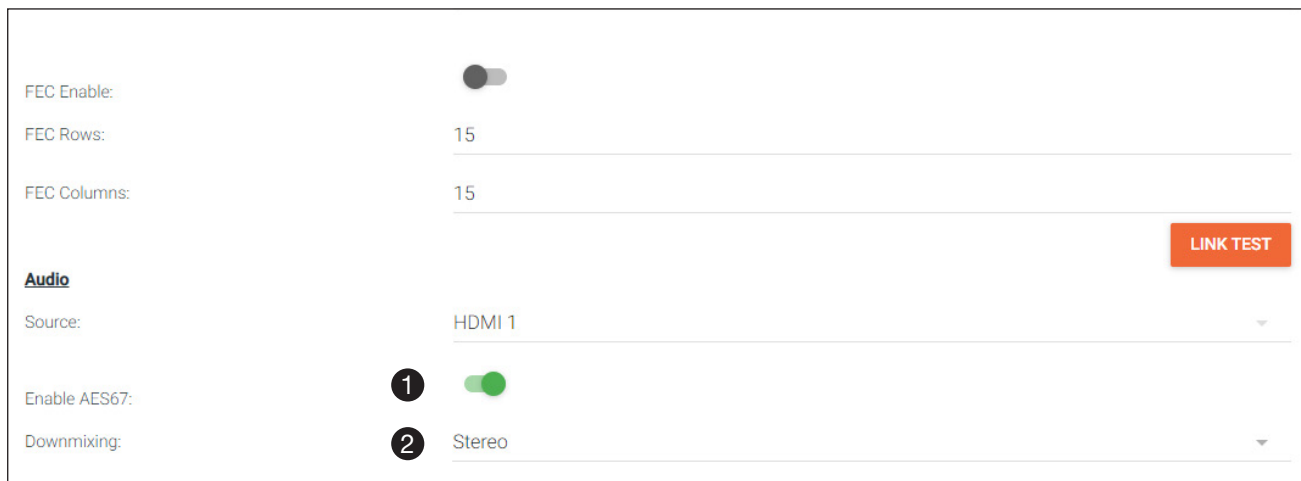
AES67 Audio

AES67 audio is a standard for high-performance audio streaming over IP, providing several features such as synchronization, media clock identification, and connection management. AES67 does not support bitstream/compressed audio formats, such as Dolby® Digital, and others. Source audio must be transmitted as LPCM up to eight channels at 192 kHz / 24-bit.

1. Go to the encoder, click **SESSION** in the menu bar, then locate the **Audio** section under the desired stream. Click the **Enable AES67** toggle switch to enable this feature. When enabled, the toggle switch will be green.

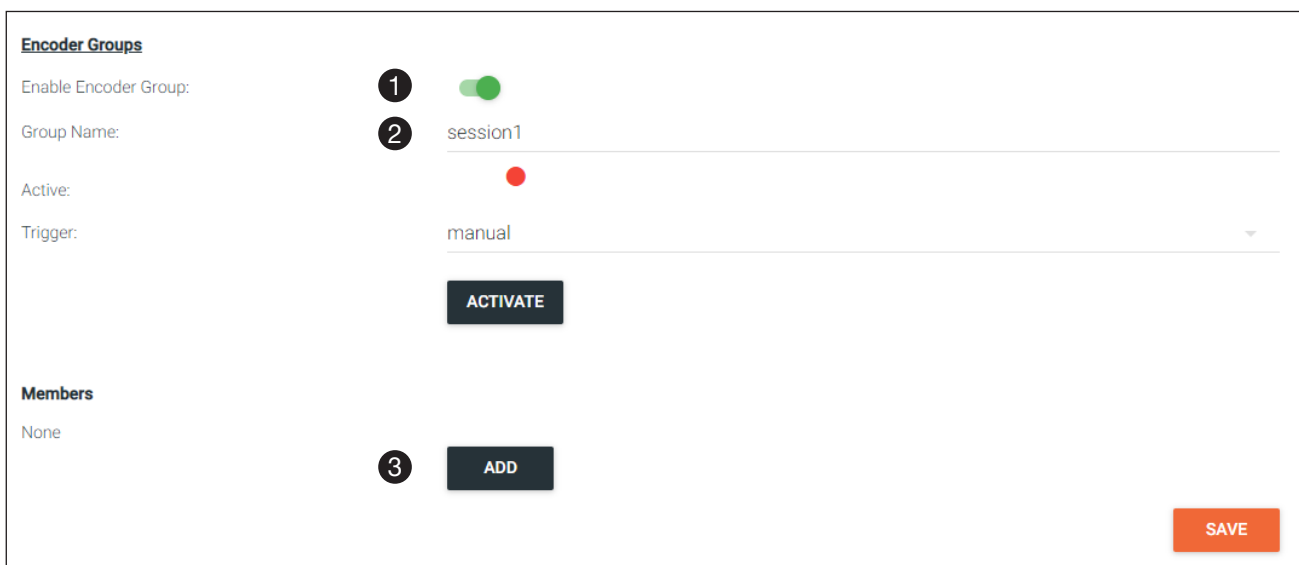> **NOTE:** If the Enable AES67 toggle switch is enabled, the SAP will also be enabled.

2. Select the type of downmixing from the **Downmixing** drop-down list, if desired. Available options are: `None`, `Mono`, and `Stereo`.

3. Click the **SAVE** button within the **Stream** window group.

4. Go to the decoder interface and click **OTHER** in the menu bar.

5. Click **SAP** in the left menu bar.

6. Click the **Enable** toggle switch to enable SAP. When enabled, the toggle switch will be green. If the decoder, Dante controller, or DSP is to receive AES67 audio, this step is *required*.

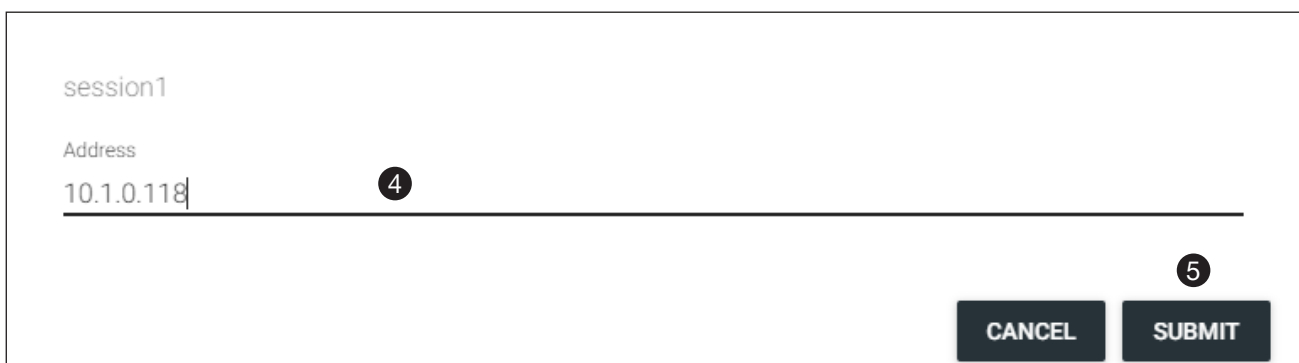7. Click the **SAVE** button in the **SAP** window group.

Encoder Grouping

Grouping encoders allows a group of encoders to feed a single decoder, simultaneously. The stream will be displayed by the decoder using either manual or automatic input-selection, based on the presence of a source signal.

1. Go to the encoder, click **SESSION** in the menu bar, and locate the **Encoder Groups** section. Click the **Enable Encoder Groups** toggle switch. When enabled, the toggle switch will be green.

2. Locate **Encoder Groups** and enter a name for the group in the **Group Name** field. The default group names for **Stream 1** and **Stream 2** are `session1` and `session2`, respectively.

3. Under **Members**, click the **ADD** button.

4. Enter the IP address of the encoder to be added to the group.
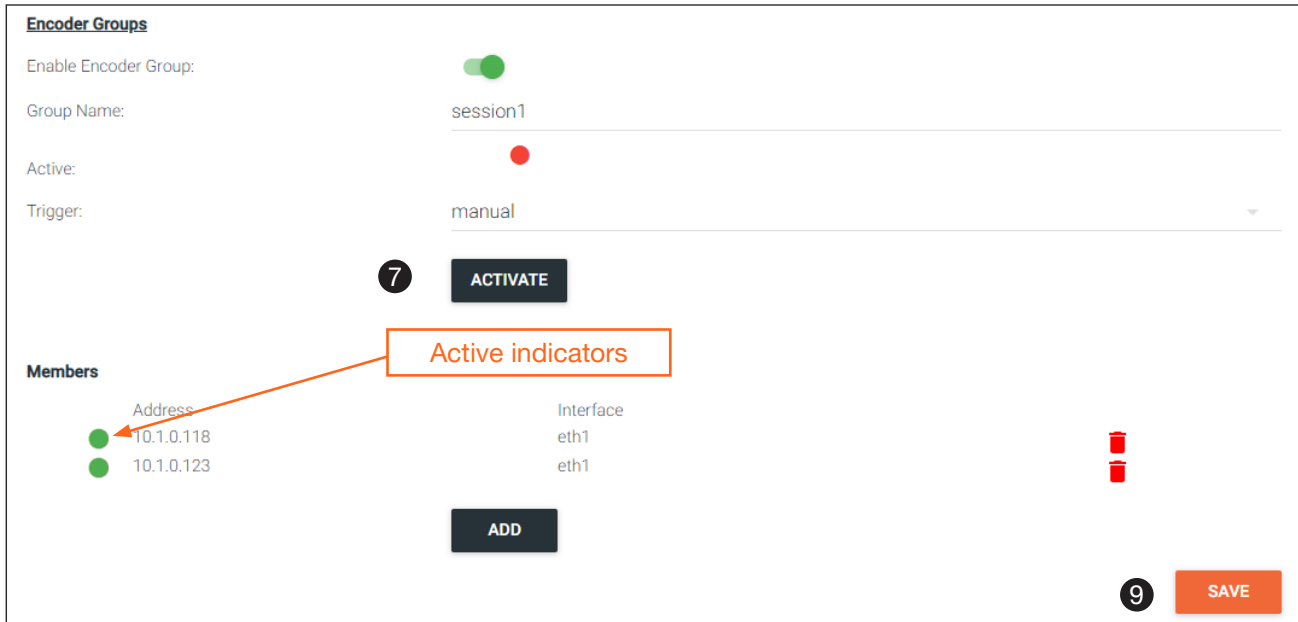

5. Click the **SUBMIT** button.

6. Repeat steps 3 through 5 for each encoder to be added to the encoder group.

> ⚠️ **IMPORTANT:** The IP address for each encoder must be added to the group. This includes the IP address of the encoder that is being used to create the group.

7. Click the **Activate** button to enable encoder grouping. When enabled, the **Active** indicator(s) will be green.

8. Click the **Trigger** drop-down list and select the desired trigger mode.

Mode	Description
manual	Use this setting to manually enable the input. When set to manual, click the **Activate** button to perform the input switching.
input connected	Use this setting to allow the encoder group to use automatic input detection. Once a new source is connected, that source becomes the active source.

> **NOTE:** Setting **Trigger** to `input connected` should not be used when **Slate Mode** is set to `Auto`. Doing so will cause the slate to be displayed when switching inputs. If encoder auto-switching is being used, set the **Slate Mode** to `Auto`, on the decoder. Refer to Slate / Logo Insertion (page 83) for more information.

9. Click the **SAVE** button, at the bottom of the **Stream** window group to commit changes.

Daisy-Chaining Encoders

Encoders can be daisy-chained to one another. This is particularly useful when only a single distribution point and one display exists in a room. Daisy-chaining transforms multiple encoders into a single multiple-input encoder with a single multicast IP address.

In the diagram below, three dual-channel OmniStream encoders are connected to a switch. In order to daisy-chain them, they must be reconnected in a different configuration. Each encoder has been labeled with an arbitrary IP address, for identification purposes.
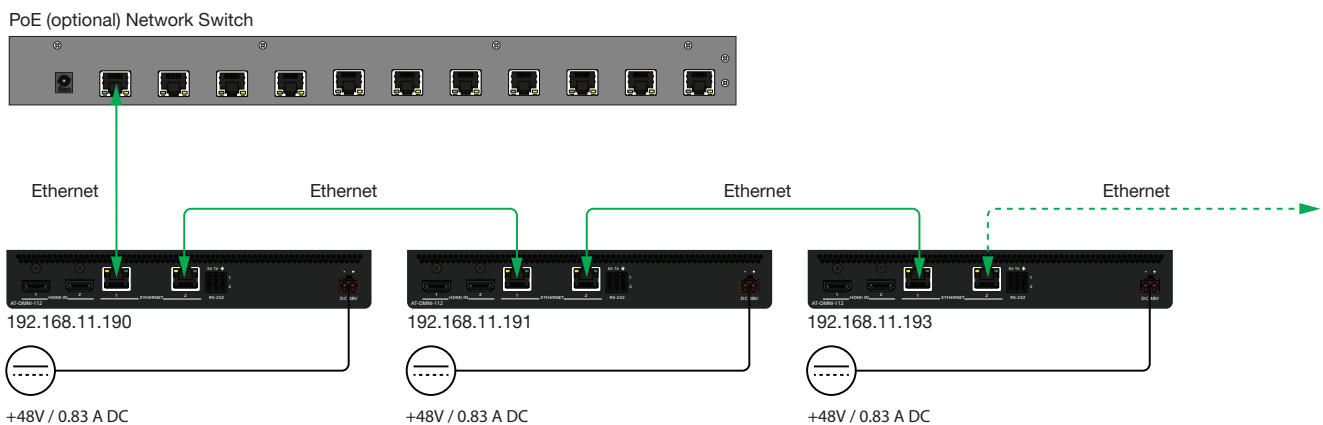
> **(i)** **NOTE:** Single-channel encoders do not support daisy-chaining. In addition, the OmniStream R-Type Encoder (AT-OMNI-512) does not support daisy-chaining and *cannot* be combined with OmniStream Pro daisy-chain configurations.

1. Reconnect the encoders to one another, and to the switch, as shown in the illustration below.

2. Connect the optional OmniStream power supply (AT-PS-48083-C) to each encoder in the chain.

> **⚠** **IMPORTANT:** The optional OmniStream power supply (AT-PS-48083-C) must be connected to each encoder that is daisy-chained, in order to supply the required power. Note that since each encoder must use an external power supply, connection to a PoE switch is not required.

PoE (optional) Network Switch

Ethernet   Ethernet   Ethernet   Ethernet

192.168.11.190   192.168.11.191   192.168.11.193

+48V / 0.83 A DC   +48V / 0.83 A DC   +48V / 0.83 A DC

3. Login to the encoder.

4. Click **SESSION** in the menu bar.

5. Create an encoder group for using each encoder in the chain. Refer to Encoder Grouping (page 76) for more information. Since there are three encoders in this example, each encoder will be listed under the **SESSION** page, as shown. Encoders can be added to an encoder group in any order.

    To delete an encoder from the **Members** list, click the icon to the right of its IP address.

Figure 1. Daisy-chained encoders with single decoder and display (sink).
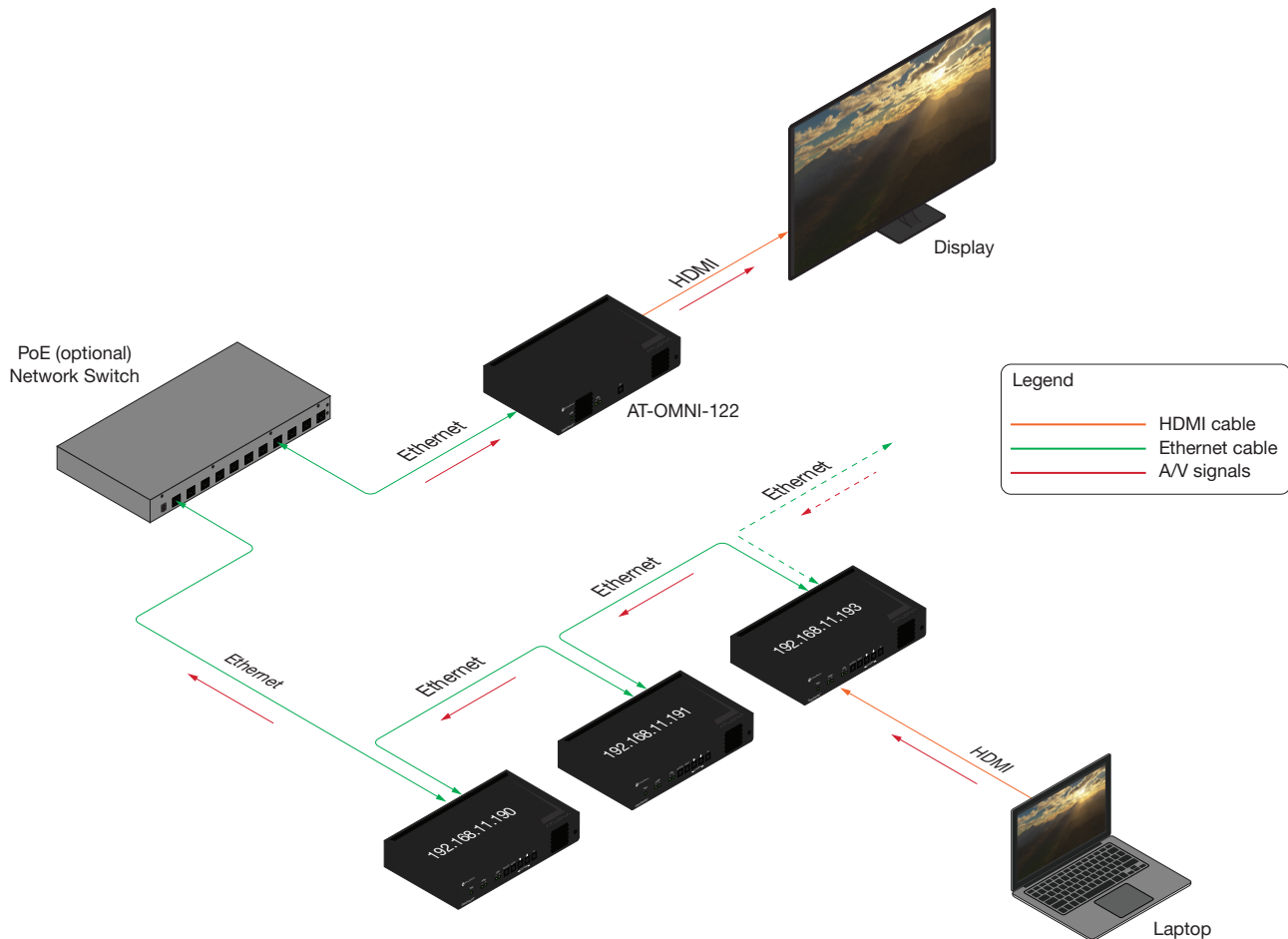
6. Click the **Trigger** drop-down list to select the trigger mode. Selecting the trigger mode will set how the OmniStream encoder will respond when a source is disconnected/connected.

The diagram above shows a basic daisy-chain setup. The path of the A/V signal is identified with red arrows. When encoders are daisy-chained, they function as one single encoder. In this example, daisy-chaining three dual-channel encoders, creates a single "logical" encoder with six HDMI inputs.

When daisy-chaining encoders, the following rules apply:

• All encoders will stream content using the same multicast IP address. Therefore, the decoder must be subscribed to this multicast IP address in order to display the content.

• Daisy-chained encoders can only display one source at a time. Click the **Trigger** drop-down list to determine how the encoder will handle switching between sources.

• The last source that is connected will be the one that is displayed. However, this is only occurs if the **Trigger** mode is set to `input connected`.

• Pressing the **INPUT** button, on the front panel of an encoder, will toggle between HDMI inputs.

Scrambling

OmniStream supports 128-bit Advanced Encryption Standard (AES) scrambling and is required for HDCP-encrypted video streams. Scrambling can be enabled or disabled and is applied to individual sessions. In order to function properly, *scrambling* must be enabled on the *encoder* and *descrambling* must be enabled on the *decoder*. The scrambling and descrambling key on both the decoder and all subscribed encoders must be identical. The default scrambling/descrambling key is `scrambling`.

1.   Login to the encoder.

2.   Click **SESSION** in the menu bar.

3.   Click the **Scrambling** toggle switch under the desired **Stream** window group. Once enabled, the toggle switch will be green.

4.   Enter the desired scrambling key in the **Key** field.

5.   Click the **SAVE** button at the bottom of the **Stream** window group to commit the changes.

Descrambling

1.   Login to the decoder.

2.   Click **HDMI OUTPUT** in the menu bar.

3.   Locate the **Descrambling** section and click the **Descrambling** > **Enable** toggle to enable descrambling. Once enabled, the toggle switch will be green.

4.   Enter the descrambling key in the **Key** field. This key must match the key specified on the subscribed encoder, under the **Scrambling** section.

5.   Click the **SAVE** button at the bottom of the **HDMI Output** window group to commit the changes.

> ⚠️ **IMPORTANT:** *Applies to both encoder and decoder:* If a user-defined key is specified, then it must be a minimum of eight alphanumeric characters. Special characters and spaces are not permitted. Also note that if a key is generated, the same generated key (on the encoder) must also be used on the decoder, in order to de-scramble the signal.

Fast Switching

The VCx codec provides fast switching at resolutions up to 4K YUV 4:4:4 @ 60 Hz. This is an improvement over the VC-2 codecs that limited fast switching up to 1920x1200. When the decoder resolution and frame rate are set to `Auto`, VCx fast switching operates at the preferred resolution and frame rate of the display. In some cases, this preferred resolution and frame rate might not be the maximum supported by the display. If fast-switching is desired at a supported resolution and/or frame rate other than the preferred resolution and frame rate, the decoder can be manually configured for those resolutions.

The fast switching time depends primarily on three things, when switching between streams: resolution, frame rate, and bitrate. For example, a 4K60 stream operating at 750 Mb/s requires ~250 ms to switch. On the other hand, a 1080p stream operating at 750 Mb/s requires less than 50 ms to switch. The time it takes to switch is determined by the amount of time it takes for all the data for a complete frame to be received by the decoder. To improve the fast switching time, decrease the resolution, lower the frame rate, or increase the bitrate.

IMPORTANT: If Fast Switching is enabled, latency increases from 0.5 frames to 1.5 frames.

1. Login to the decoder and click **HDMI OUTPUT** in the menu.

2. Click the **Fast Switching Enable** toggle switch to enable this feature. When enabled, the toggle switch will be green.

3. Enter the timeout interval, in seconds, in the **Fast Switching Timeout(s)** field. If fast switching is enabled and the decoder is switched to a different stream, but the stream is not present, then the decoder will hold the last image on the screen. This image will continue to be displayed until either a new stream appears or the decoder is switched to a different stream. Once the timeout interval has expired, the screen will go black. Setting the timeout interval to `0` disables this feature and the last image will be displayed indefinitely.

NOTE: The following table is only applicable when using the VC-2 codec.

Input Resolution (from Encoder)	Output Resolution (AT-OMNI-121)	Output Resolution (AT-OMNI-122)
1280 x 720p	1280 x 720p	1280 x 720p
1920 x 1080p @ 60 Hz	1920 x 1080p @ 60 Hz	1920 x 1080p @ 30 Hz
> 1920 x 1080p (up to UHD)	1920 x 1080p @ 60 Hz	1920 x 1080p @ 30 Hz

Fast Switching FAQs

Question: Does fast switching work between streams of different resolutions?

Answer: Yes. Fast switching can be used between streams with different resolutions and frame rates.

Question: Does fast switching work between HDR and SDR streams?

Answer: Yes, fast switching can be used between HDR and SDR streams; however, it's important to note that some color artifacts may appear during the switch.

Question: Does fast switching work between single streams and multiviews or between multiviews?

Answer: No. Due to the way multiviews work, fast switching is not supported. However, it is not necessary to change the fast switching setting – the decoder will switch as fast as possible between multiviews and return to fast switching when single streams are used.

Question: Does fast switching work on video walls?

Answer: No. Fast switching is not supported when using video walls.

Slate / Logo Insertion

Slate / logo insertion is managed from within Velocity. The difference between a "slate" and "logo" is in the size of the image and how it is used: Logos are classified as smaller, low-resolution images that can be positioned at specified locations on the screen. Slates occupy the entire screen. Note that while logos may be used as slates, the image quality will be degraded, as the image will be scaled to fill the screen.

Slate / logo insertion can be performed on both the encoder and decoder. When configured on the encoder, the image that is displayed on the output (decoder) will be from the encoder IP address(es) to which each decoder is subscribed. When configured on the decoder, the image is unique to the specified HDMI output.

Adding Slates / Logos

1. Login to the encoder.

2. Click **OTHER** in the menu bar and then select **Logo** in the left menu.

3. Under the **New logo** window group, enter the name of the logo in the **Name** field. If a name is not specified, then the **UPLOAD** button will be disabled.

4. Click the **Choose File** button and select the desired image. Only `.png` or `.svg` files are valid selections.

5. Click the **UPLOAD** button to upload the file.

6. A new window group will be created with the name of the logo that was provided in Step 3.

7. Perform one of the following:

   • If the selected image will be used as a *logo*, then proceed with Steps 8 through 13.

   • If the image will be used as a *slate*, skip to Step 14 on the next page.

8. Under the **Encoder Logo** window group, click the **Select Logo** drop-down list and select the desired logo. To prevent the image from being displayed, select the `Not used` option.

9. Click the **Aspect Ratio** drop-down list to set the aspect ratio of the image. Selecting `Keep` will maintain the aspect ratio. Select `Stretch` to scale the image to the defined size.

10. Enter the horizontal and vertical position of the logo, based on the resolution of the video stream, in the **Horizontal** and **Vertical** fields, respectively.

11. Enter the width and height of the logo, based on the resolution of the video stream, in the **Width** and **Height** fields, respectively.

12. Click the **Enabled** toggle switch to activate the logo/slate feature. When enabled, this toggle switch will be green.

13. Click the **SAVE** button to commit changes.

14. Click the **INPUT** menu.

15. Click the **Slate Mode** drop-down list, and select `Off`, `Manual`, or `Auto`.

Slate mode	Description
`Off`	Disables the image from being displayed.
`Manual`	The image will always be displayed, superimposed on the source signal, and will remain even if the source signal is lost.
`Auto`	The image will only be displayed when the source signal is lost. For example, this mode is useful in conference room applications for displaying system instructions when no sources are connected.

16. Click the **Slate Logo** drop-down list and select the desired image. If **Slate Mode** is set to `Off`, then this field will not be visible.

17. Click the **SAVE** button to apply all changes.

Deleting Slates

1. Click **INPUT** in the menu bar.

2. Under the **Encoder** window group(s), click the **Slate Mode** drop-down list and select `Off`.

3. Click the **SAVE** button at the bottom of the window group to commit changes.

4. Click **OTHER** in the menu bar, then click **Logo** in the side menu.

5. Click the **DELETE** button for the logo to be removed.

Deleting Logos

1. Click **OTHER** in the menu bar, then click **Logo** in the side menu.

2. Under the **Logo Insertion** window group(s), click the **Enable** button (if enabled) to disable the feature.

3. Click the **SAVE** button at the bottom of the window group to commit changes.

4. Click the **DELETE** button for the logo to be removed.

Text Insertion

1. Go to the encoder, click **OTHER** in the menu bar, then click **Text** in the side menu bar. Click the **Enabled** toggle switch under the desired **HDMI Input Text** window group. When enabled, this toggle switch will be green.

2. In the **Text** field, enter the desired text.

3. Specify the speed of the scrolling text in the **Scroll Speed** field. Values from -255 to 255 are valid. Negative numbers will scroll the text from left to right. Positive numbers will scroll text from right to left.

4. Enter the number of iterations in the **Iteration** field. Set this field to 0 (zero) to set the number of iterations to infinity.

5. Click the **Color** drop-down list to select the color of the text. The **Red**, **Green**, and **Blue** fields can be changed to further modify the color of the text. Adjust the **Alpha** field to control the transparency of the text. A value of 255 is opaque and a value of 0 is transparent. Numbers from 0 to 255 are valid for each of these fields.

6. Specify the location of the text in the **Horizontal (%)** and **Vertical (%)** fields. Each of these values is based on the resolution of the video stream.

7. Specify the size of the text in the **Width (%)** and **Height (%)** fields. Each of these values is based on the resolution of the video stream.

8. Click the **SAVE** button to commit all changes.
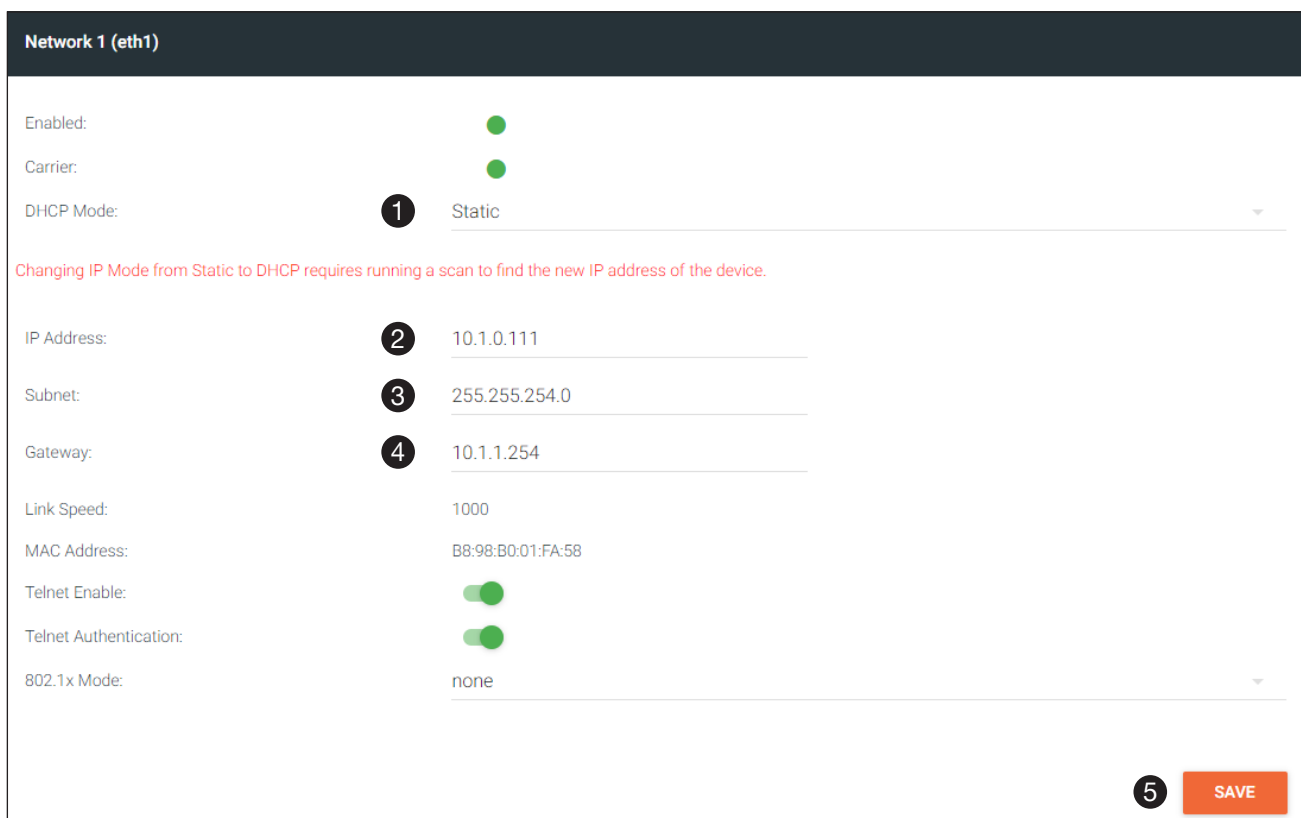
Configuring a Static IP Address

There will be situations where it is desirable for the encoder to be assigned a static IP address. Some IT environments prefer this method, as opposed to having a DHCP server dynamically assign IP addresses. If the decoder is unable to detect a DHCP server within 15 seconds, then Automatic Private IP Addressing (APIPA) will be used to assign the encoder an address within the IPv4 address block `169.254.xxx.xxx/16`. If this occurs, connect an Ethernet cable directly from the **ETHERNET** port of the encoder to the LAN port of a computer, then follow the instructions below.

1. Go to the encoder/decoder, click **NETWORK** in the menu bar, then click the **DHCP Mode** drop-down list and select `Static`.

2. Enter the desired IP address in the **IP address** field.

3. Enter the subnet mask in the **Subnetmask** field.

4. Enter the gateway (switch/router) address in the **Gateway** field.
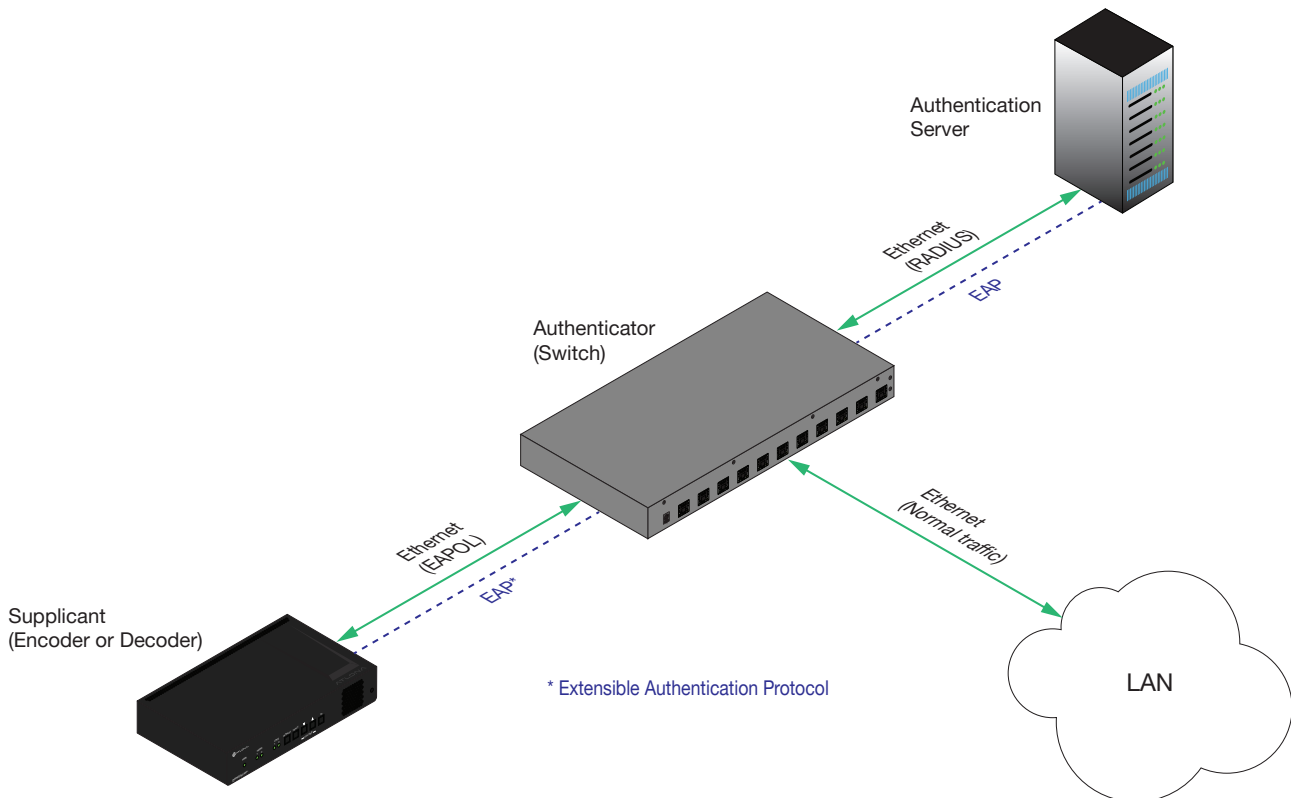
5. Click the **SAVE** button to commit all changes.

802.1X Authentication

802.1X is a server-based port authentication which restricts unauthorized (rogue) clients from connecting to a Local Area Network. In its simplest form, 802.1X usually involves three parties: supplicant (client device), authenticator (Ethernet switch or WAP), and an authentication server. Before the device is permitted on the network, port communication is restricted to Extensible Authentication Protocol over LAN (EAPOL) traffic. If the device passes the authentication process, the authentication server notifies the switch, allowing the client to access the LAN. The illustration below shows the basic architecture.

> ⚠️ **WARNING:** Connecting an 802.1X-enabled encoder to a network without an active or operational authentication server, will result in an encoder that does not function until the expected message is returned from a RADIUS server. If it is unclear as to whether the network uses 802.1X authentication, consult the IT administrator for assistance.

Authentication Server

Ethernet (RADIUS)

EAP

Authenticator (Switch)

Ethernet (Normal traffic)

Ethernet (EAPOL)

EAP*

Supplicant (Encoder or Decoder)

* Extensible Authentication Protocol

LAN

Three options are available on both the OmniStream encoder and decoder.

Protocol	Description
none	802.1X protocol disabled
PEAP/MSCHAPv2	Protected EAP; requires basic credentials in addition to a CA (certificate authority) certificate.
EAP-TLS	EAP Transport Layer Security; requires a client certificate, client private key, and CA (certificate authority) certificate.

1. Go to the encoder/decoder, click **NETWORK** in the menu bar, then click the **802.1x Mode** drop-down list and select the desired authentication method. In the example below, `PEAP/MSCHAPv2` is selected.

> **ⓘ** **NOTE:** If using dual-channel encoders, both **Network 1 (eth1)** and **Network 2 (eth2)** will need to be set up, depending upon the system requirements.

2. Once a method is selected, the required fields for that method will be displayed. Enter the required information in each field. For the `PEAP/MSCHAPv2` option, the fields are described as follows:

Field	Description
Identity	Enter the identity of the authentication server in this field. PEAP uses this field to identify the correct authentication server which will process the credentials. For example, if `foo@authserv.com` is entered, then this identifies AUTHSERV as the RADIUS (authentication) server.
Password	Enter the password in this field.
CA certificate	Select the certification authority (CA) certificate.

Refer to the table below for a list of available authentication methods. An orange dot indicates that this field will be displayed as part of the method.

Authentication Method	Identity	Password	CA Certificate	CA Certificate	Client Private Certificate
PEAP/MSCHAPv2	●	●	●		
EAP-TLS			●	●	●

Network 1 (eth1)

Enabled:	●
Carrier:	●
DHCP Mode:	Static

Changing IP Mode from Static to DHCP requires running a scan to find the new IP address of the device.

IP Address:	10.1.0.111
Subnet:	255.255.254.0
Gateway:	10.1.1.254
Link Speed:	1000
MAC Address:	B8:98:B0:01:FA:58
Telnet Enable:	(on)
Telnet Authentication:	(on)
802.1x Mode:	① PEAP/MSCHAPv2
Identity:	② foo@authserver.com

3. Enter the password in the **Password** field.

4. Enter the certificate authority certificate in the **CA certificate** field.
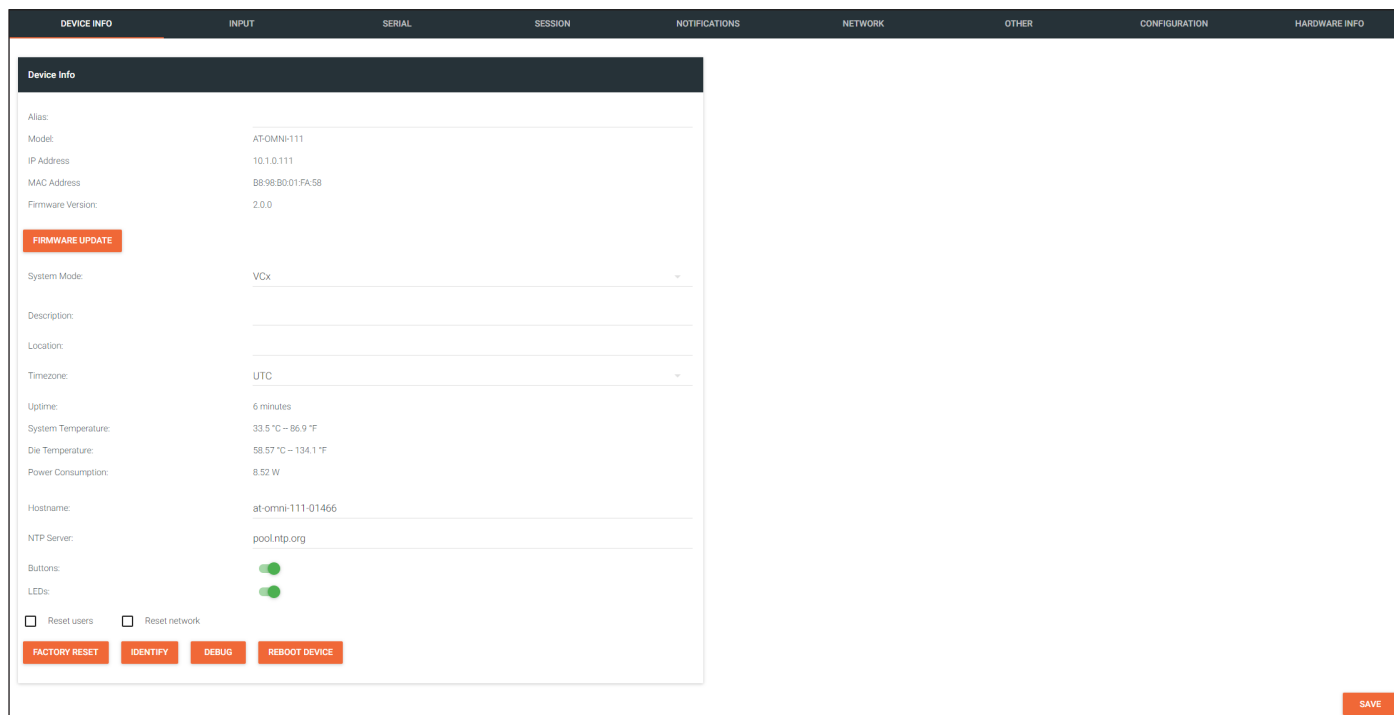
5. Click **SAVE** to commit changes.

The Velocity/OmniStream Interface

Encoders

> **NOTE:** This section assumes that the **System mode** is set to `VCx`. If `VC-2 Video` or `VC-2 PC Application` is used, some features on these pages will not be available.

DEVICE INFO page

Alias
Enter a name for the unit in this field. This is optional.

Model
The model number of the unit.

Encoders	Decoders
AT-OMNI-111	AT-OMNI-121
AT-OMNI-112	AT-OMNI-122
AT-OMNI-512	AT-OMNI-521

IP Address
Displays the IP address of the encoder.

MAC Address
Displays the MAC address of the encoder.

Firmware Version
The version of firmware that the OmniStream device is running. Always make sure the latest version of firmware is installed.

FIRMWARE UPDATE
Click this button to update the firmware.

System Mode
Click this drop-down list to select the system mode. The default setting is `VCx`.

Mode	Description
`VCx`	This is the default mode and represents the latest codec technology from Atlona, with outstanding support for computer graphics and motion video. VCx includes support for 4K60 4:4:4 fast switching, dual streaming from AT-OMNI-111 encoders, and multiview on the decoders.
`VC-2 Video`	Legacy OmniStream codec that provides the best viewing experience when streaming motion graphics and/or video.
`VC-2 PC application`	Legacy OmniStream codec that optimizes the image when viewing static images, such as spreadsheets or similar content.

Description
Provides the option of assigning descriptive name to the unit.

Location
Provides the option of assigning a description of where the unit is located.

Timezone
Displays the time zone format. Click the **SET TIMEZONE** button, to assign the time zone.

Date/Time
Displays the current date and time. Click the **SET DATE/TIME** button to set these values.

Uptime
Displays the elapsed time since the unit was powered-on or rebooted.

System Temperature
Displays the ambient enlosure temperature.

Die Temperature
Displays the value returned from the die temperature sensor (DTS) on the chip of the PCB.

Power Consumption
Displays the precise power consumption of the encoder.

Hostname
Displays the hostname of the encoder. OmniStream encoders and decoders are assigned a default hostname, which can be changed.

NTP Server
Displays the NTP server. This field is set to `pool.ntp.org` by default. Click this field to enter the desired NTP server address.

Buttons
Click this toggle switch to enable or disable the front-panel buttons. If the buttons are disabled, their backlight turns off. When enabled, the toggle switch will be green.

LEDs
Click this toggle switch to enable or disable _all_ front-panel LED indicators and button backlight indicators.

FACTORY RESET
Click this button to reset the encoder to factory-default settings. When performing a factory reset, the following options can be selected, by clicking the check box. If no options are selected, then the encoder is reset with no factory-default settings.

Option	Description
None Checked	Resets the encoder with no factory-default settings.
Reset User	Resets the encoder to factory-default settings and resets custom user information.
Reset Network	Resets the encoder to factory-default settings and resets network information.

IDENTIFY
Click this button to physically identify a unit on the network. Clicking this button will cause all front-panel LED indicators to flash for 10 seconds.

DEBUG
Click this button to instruct the unit to create a debug file. This file is used by Atlona Technical Support Engineers to diagnose internal issues with the unit.

REBOOT DEVICE
Click this button to perform a soft reboot of the OmniStream device.

SAVE
Click this button to commit changes to the settings on this page.

INPUT page

The **INPUT** page provides signal information for each channel (input). The following fields apply to both the **HDMI Input 1** and **HDMI Input 2** window groups. Single-channel encoders only have a single **HDMI Input** window group.

Encoder window group

Input
The selected input.

Max Bit Rate
Click this field to enter the maximum bit rate. The default setting is `750` Mbps. 4K60 4:4:4 streams should be at least 700 Mb/s, 4K30 4:4:4 streams should be at least 350 Mb/s, and 1080p streams should be at least 150 Mb/s. Setting this field below these recommended values will result in lower-quality video.

Subsampling
Click this drop-down list to select the chroma subsampling value. Available values are: `4:4:4`, `4:4:2`, and `4:2:0`.

Force YUV

When this toggle switch is enabled (green), the encoder will stream YUV content over the network, regardless of which color space is used by the HDMI source. When the decoder receives the YUV stream, it will output YUV on the HDMI output. However, if the decoder is connected to a display that requires RGB, as determined by the EDID of the display, then the decoder will convert the video signal to RGB on the HDMI output. In order for the chroma scaling to work on RGB inputs, this option must be enabled.

> ⚠️ **IMPORTANT:** If decoders are configured to be used in a video wall application, then Force YUV must be enabled.

Scaler

This feature is only available on the AT-OMNI-111 and AT-OMNI-111-WP. Click this drop-down list to select the desired output resolution.

Encoder 1	Encoder 2
disable	N/A
3840x2160	N/A
2880x1584	N/A
2592x1440	N/A
2560x1440	N/A
1920x1104	N/A
1920x1080	1920x1080
1920x1072	1920x1072
1792x960	1792x960
1728x960	1728x960
1440x816	1440x816
1280x736	1280x736
1280x720	1280x720
960x544	960x544
960x528	960x528
864x480	864x480
640x368	640x368
640x360	640x360
480x272	480x272

Thumbnail

Click this toggle switch to enable to disable a thumbnail of the input stream.   When enabled, this toggle switch will be green and an image of the input stream will be displayed. Thumbnails are updated every 2 seconds.

> ℹ️ **NOTE:** Thumnails can also be accessed at: `http://<encoder-ip-address>/thumbnail/thumbnail1.jpg`. For dual-channel encoders, the secondary thumbail can be accessed at: `http://<encoder-ip-address>/thumbnail/thumbnail2.jpg`.

SAVE

Click this button to commit changes to the settings on this page.

HDMI Input window group

Cable present
This indicator will be red if the encoder is unable to detect the source signal. This may indicate a damaged HDMI cable. If this indicator is green (shown), then the cable integrity is good, and additional fields for both the Video and Audio sections will be displayed.

EDID
Click this drop-down list to select the desired EDID. The default setting is `Default HDR MCH`.

EDID	Description
Default HDR MCH	Default EDID with HDR (3840x2160p30) and multichannel audio
Default HDR 2CH	Default EDID with HDR (3840x2160p30) and two-channel audio
Default DV MCH	Default EDID with Dolby Vision (3840x2160p30) and multichannel audio
Default DV 2CH	Default EDID with Dolby Vision (3840x2160p30) and two-channel audio
Default SDR MCH	Default EDID with SDR (3840x2160p30) and multichannel audio
Default SDR 2CH	Default EDID with SDR (3840x2160p30) and two-channel audio
ATL 1080P 2CH	1920x1080p60 with two-channel PCM audio
ATL 1080P DD	1920x1080p60 with Dolby Digital
ATL 1080P DVI	1920x1080p60 formatted as DVI
ATL 1280x800 RGB DVI PCWXGADVI	1280x800 formatted as DVI
ATL 1280x800 RGB PCWXGA2CH	1280x800p60 PC format with two-channel PCM audio
ATL 1280x800 RGB TVWXGA2CH	1280x800p60 TV format with two-channel PCM audio
ATL 2160P 2CH	3840x2160p30 with two-channel PCM audio
ATL 2160P MCH	3840x2160p30 with multichannel PCM audio
ATL 2560x1600 2CH	2560x1600p60 with two-channel PCM audio
ATL 2560x1600 MCH	2560x1600p60 with multichannel PCM audio
ATL 720P DD	1280x720p60 with Dolby Digital audio
ATL 720P 2CH	1280x720p60 with Dolby Digital two-channel audio
ATL VR (2160x1200)	2160x1200p90 (Compatible with HTC VIVE® VR system)

HDCP Encrypted
Indicates if the content being transmitted from the source is HDCP-encrypted. If using HDCP-enctrypted content is being used, then this indicator will be green.

Supported Version
Click this drop-down list to select the version of HDCP to be supported: `2.2`, `1.4`, or `None`. If `None` is selected, then HDCP-enctrypted content cannot be passed-through.

The following **Video** fields will only be displayed if the **Cable present** indicator is green.

Color Depth
Displays the color depth of the source content.

Subsampling
Displays the chroma subampling value of the source content.

Colorspace
Displays the color space of the source content.

Resolution
Displays the resolution of the source content.

Framerate
Displays the frame rate of the source content.

HDR
This indicator displays the presence of HDR source content. If the indicator is green, then the source is outputting HDR content. If the indicator is red, then no HDR content is detected. **Bit Depth**
Displays the bit depth of the source audio.

Channel count
Displays the number of audio present that are present in

The following **Audio** fields will only be displayed if the **Cable present** indicator is green.

Bit Depth
Displays the bit depth of the source audio.

Format
Displays the audio format of the source content.

Channel count
Displays the number of audio present that are present in the source audio.

Frequency
Displays the audio frequency of the source content.

SAVE
Click this button to commit changes to the **HDMI Input** window group.

Video Generator window group

This signal can be used to test the video capability of the network. Single-channel encoders will have one **Video generator** window group.

Color Depth
Click this drop-down list to select the color depth. Available values are `8`, `10`, and `12`.

Colorspace
Click this drop-down list to select the color space. Available values are `YUV` and `RGB`.

Framerate
Click in this field to change the frame rate (in Hz) of the video generator signal. The default value is `60`.

Subsampling
Click this drop-down list to select the chroma subsampling value. Available values are `4:4:4`, `4:4:2`, and `4:2:0`.

Resolution width
Click in this field to change the horizontal resolution of the signal.

Resolution height
Click in this field to change the vertical resolution of the signal.

SAVE
Click this button to save all changes under the **Video generator** window group.

SERIAL page

The **Serial** page provides serial port configuration when using control signals.

Serial Port window groups

The following fields apply to both **Serial Port** window groups.

Supported Modes
Lists the supported protocols for the serial port.

Mode
Click this drop-down list to select the desired serial mode. Available values will be reflected in the **Supported Modes** field.

Baud Rate
Click this drop-down list to select the desired baud rate: `19200` or `9600`.

Data Bit
Click this drop-down list to select the number of data bits: `6`, `7`, or `8`.

Parity
Click this drop-down list to select the parity bit: `None`, `Odd`, `Even`, `Mark`, or `Space`.

Stop
Click this drop-down list to select the stop bit: `1`, `1.5`, or `2`.

SAVE
Click this button to save all changes under the **Serial Port** window group.

Serial Configuration window groups

The following fields apply to both **Serial configuration** window groups. The single-channel encoder will only have one **Serial configuration** window group.

Port
Click this drop-down list to select the desired serial port.

Mode
Click this drop-down list to select the desired control mode. Available values are: `cli` and `tcpproxy`. Decoders also have an `output` option. Select `tcpproxy` to translate received IP control traffic to RS-232 output. Selecting the `cli` option will force the serial port to function as a Command-Line Interface (CLI) for control of the encoder. Refer to Device Control (page 32) for more information.

SAVE
Click this button to commit all changes within the **Serial configuration** window group.

Command window groups

By default, window groups for the following commands are created: `Display Off`, `Display On`, `Volume Down`, and `Volume Up`.

Interpret on
Click this drop-down list to select the endpoint where the command will be processed: `encoder` or `decoder`.

ASCII
Enter the ASCII representation of the command string in this field.

HEX
Enter the hexadecimal representation of the command in this field.

> **ⓘ** **NOTE:** When entering the command string, it is not required to enter the string under both the ASCII and HEX fields. The encoder requires that one field be completed.

SAVE
Click this button to commit all changes within the **Command** window group.

SESSION page

The following fields apply to all **Stream** window groups. Both the dual-channel and single-channel encoders have support for up to six **Stream** window groups.

Interface
Click this drop-down list to select the desired interface.

Interface	Description
eth1	ETHERNET 1 port
eth2	ETHERNET 2 port *(AT-OMNI-112 only)*

SAP
Click this switch to enable or disable the Session Announcement Protocol. When enabled, the toggle switch will be green.

Interval
Sets the announcement interval.

Name
The name of the SAP session. By default, this is the same as the session name.

Description
The SAP description.

Originator
The ID of the SAP message originator.

Categorization
The SAP category. This field can be changed, if desired.

Scrambling
Click this toggle switch to enable or disable scrambling on the encoder. Atlona recommends enabling scrambling for security purposes. When enabled, the toggle switch will be green.

Key
This field is only displayed if the **Scrambling** toggle switch is enabled (green). Enter the scrambling key in this field. The scrambling key must be ASCII and must contain a minimum of eight characters. Special characters and spaces are not permitted.

Video

Encoder
Click this drop-down list to select the encoder input.

Enable Video
Click this toggle switch to enable or disable the video signal. When enabled (green), video will pass from the encoder to the decoder.

Destination Multicast/Unicast Address
Enter the IP address that will be used to stream the content.

Destination UDP Port
Enter the destination UDP port in this field.

TTL
Set the TTL (Time-To-Live) duration, from 1 to 255 seconds, in this field. The default value is 255 seconds.

DSCP
Click this drop-down list to select the DSCP value. Refer to Differentiated Services Code Point (page 146) for more information on this topic.

FEC Enable
Click this toggle switch to enable (green) or disable Forward Error Correction (FEC). This feature can be used when transporting streams over a network that is suspected to be unreliable, due to noise or other factors. By default, this feature is enabled. Refer to FEC Details (page 144) for more information.

FEC Rows
Specify the number of FEC rows in this field. Refer to FEC Details (page 144) for more information.

FEC Columns
Specify the number of FEC columns in this field. Refer to FEC Details (page 144) for more information.

LINK TEST
Click this button to perform a link integrity test. This feature validates the quality of the link between the encoder and decoder. Link tests are initiated at an encoder, and any decoders that are configured to join that encoder's video multicast address will return packet loss statistics to the encoder, which displays the combined results under the **Notifications** tab. Refer to Performing a Link Test (page 141) for more information.

Audio

Source
Click this drop-down list to select the desired input.

Enable AES67
Click this toggle switch to enable AES67. When this feature is enabled, the toggle switch will be green.

Downmixing
This field will only be available when AES67 is enabled. Available values are: `none`, `mono`, and `stereo`.

Enable Audio
Click this toggle switch to enable or disable the audio signal. When enabled (green), audio will pass from the encoder to the decoder.

Destination Multicast/Unicast Address
Enter the IP address that will be used to stream the content.

Destination UDP Port
Enter the destination UDP port in this field.

TTL
Set the TTL (Time-To-Live) duration, from 1 to 255 seconds, in this field. The default value is 255 seconds.

DSCP
Click this drop-down list to select the DSCP value. Refer to Differentiated Services Code Point (page 146) for more information on this topic.

FEC Enable
Click this toggle switch to enable (green) or disable Forward Error Correction (FEC). This feature can be used when transporting streams over a network that is suspected to be unreliable, due to noise or other factors. By default, this feature is disabled. Refer to FEC Details (page 144) for more information.

FEC Rows
Specify the number of FEC rows in this field. Refer to FEC Details (page 144) for more information.

FEC Columns
Specify the number of FEC columns in this field. Refer to FEC Details (page 144) for more information.

Control/Serial

Source
Click this drop-down list to select the method of how commands are transmitted.

Source	Description
Not Used	Serial control is disabled
Commands	Commands are sent using CEC (over HDMI)
Serial Port 1	Commands are transmitted using Serial Port 1
Serial Port 2	Commands are transmitted using Serial Port 2

Enable Aux
Click this toggle switch to enable or disable the AUX signals. When enabled (green), control signals will pass from the encoder to the decoder.

Destination Multicast/Unicast Address
Enter the IP address of the decoder that will be receiving the control signals.

Destination UDP Port
Enter the destination UDP port in this field.

TTL
Set the TTL (Time-To-Live) duration, from 1 to 255 seconds, in this field. The default value is 255 seconds.

DSCP
Click this drop-down list to select the DSCP value. Refer to Differentiated Services Code Point (page 146) for more information on this topic.

Bidirectional
Click this toggle switch to enable or disable bidirectional control. When enabled (green), control signals will be able to pass from encoder to decoder, or from decoder to encoder.

Listen Port
Enter the listening port in this field.

Encoder Groups

Enable Encoder Group
Click this toggle switch to enable (green) or disable encoder grouping.

Group Name
Enter the name of the encoder in this field. Only available if encoder grouping is enabled.

Active
Indicates if the encoder group is active. If active, then this indicator will be green. Only available if encoder grouping is enabled.

Trigger
Click this drop-down list to select the trigger type: `manual` or `input connected`. Only available if encoder grouping is enabled.

Mode	Description
`manual`	Use this setting to manually enable the input. When set to `manual`, click the **Activate** button to perform the input switching.
`input connected`	Use this setting to allow the encoder group to use automatic input detection. Once a new source is connected, that source becomes the active source.

ACTIVATE
Click this button to make the encoder video stream the *active* stream for the encoder group.

Members
This field lists all members (encoder IP addresses) that have been added to the group. Use the **Add** button to add members to the group.

ADD
Click this button to add the IP address of an encoder to the group. Note that when adding encoders to the group, the IP address of the encoder, which is being used to create the group, must be included.
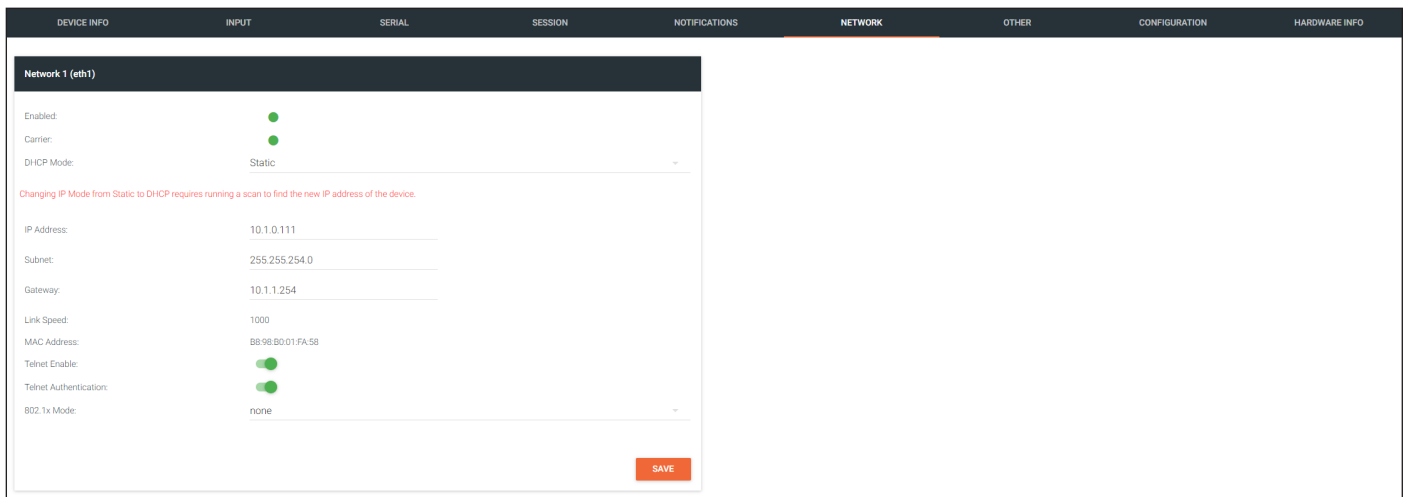
SAVE
Click this button to commit all changes within the **Stream** window group.

NETWORK page

The **NETWORK** page provides the ability to enable or disable DHCP mode for each video channel. When DHCP mode is disabled, the IP address, subnet mask, and gateway must be provided. If using the dual-channel version, then the information on both Channel 1 and Channel 2 are provided. This screen is identical to the **NETWORK** page for the decoder.

Enabled
This indicator displays whether or not the video stream for this channel is active. If the indicator is green, then the video stream is active.

Carrier
If this indicator is green, then an active link exists. Otherwise, if no link exists, this indicator will be red.

DHCP Mode
Click this drop-down list to select the desired IP mode. Select `DHCP` to let the DHCP server (if present) assign the encoder the IP settings. When `static` is selected, the information for the **IP Address**, **Subnetmask**, and **Gateway** fields must be entered.

IP Address
Displays the IP address used by the channel. This field can only be changed if **Mode** is set to `static`.

Subnet
Displays the subnet mask for the channel. This field can only be changed if **Mode** is set to `static`.

Gateway
Displays the gateway (router) address for the channel. This field can only be changed if **Mode** is set to `static`.

Link speed
Displays the Ethernet interface link speed in Mbps. This field cannot be modified.

MAC address
Displays the MAC address of the Ethernet interface.

Telnet Enable

Click this toggle switch to enable or disable Telnet. If disabled, then Telnet sessions to the encoder cannot be established.

Telnet Authentication

Click this toggle switch to enable or disable Telnet authentication. If enabled, then the toggle switch will be green. Once enabled, connecting to the encoder using Telnet will require login credentials. The default credentials are:

Username: admin
Password: Atlona

802.1x Mode

Click this drop-down list to select the desired authentication mode.

Protocol	Description
none	802.1X protocol disabled
PEAP/MSCHAPv2	Protected EAP; requires basic credentials in addition to a CA (certificate authority) certificate.
EAP-TLS	EAP Transport Layer Security; requires a client certificate, client private key, and CA (certificate authority) certificate.

SAVE

Click this button to commit all changes within the **Network** window group.

OTHER > LOGO page

The **Other** page provides logo/slate, text, and PTP management. Click the menu in the upper-left corner of the Velocity screen to switch between **Logo**, **Text**, and **PTP** screens.

The **Logo** page provides the ability to upload a custom logo. This logo will be displayed when no video signal is detected. Separate logos can be uploaded: one for each channel. Refer to Slate / Logo Insertion (page 83) for more information on these settings.

New Logo window group

Name
Enter a name for the logo in this field.

Browse...
Click this button to select the logo file to be uploaded. Files must be in `.png` or `.svg` format and must not exceed 5 MB (5120000 bytes) in size. When an image file is uploaded, it will appear in the **Logo** drop-down list.

UPLOAD
Click this button to upload the logo file to the encoder.

HDMI Input Logo window group

Enabled
Click the toggle switch to enable or disable the logo. If the toggle switch is green, then the logo will be enabled.

Logo
Click this drop-down list to select the desired logo. To disable the use of a logo, set to **Not Used**.

Aspect Ratio
Click this drop-down list to select the type of aspect ratio to be applied to the logo.

Horizontal (%)
Enter the horizontal position of the logo based on the resolution of the video stream.

Vertical (%)
Enter the vertical position of the logo based on the resolution of the video stream.

Width (%)
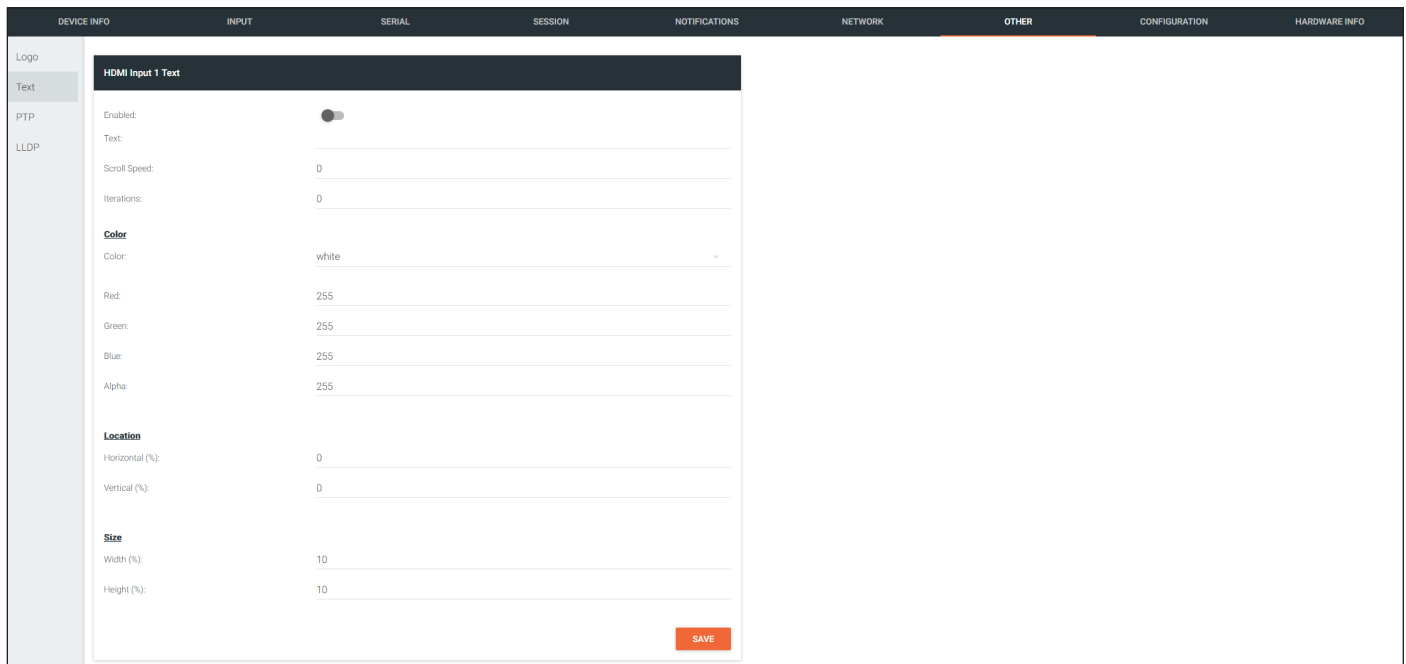Enter the width of the logo. This value is based on the horizontal resolution of the video stream.

Height (%)
Enter the height of the logo. This value is based on the vertical resolution of the video stream.

SAVE
Click this button to commit all changes within the **HDMI Input** window group.

OTHER > TEXT page

HDMI Input Text window group

Enabled
Click this toggle switch to enable or disable the text. When the toggle switch is green, the text will be enabled.

Text
Enter the desired text in this field.

Scroll Speed
Enter the scrolling speed in this field. Integer values from -255 to 255 are valid. Negative numbers will scroll the text from left to right. Positive numbers will scroll text from right to left.

Iterations
Enter the number of iterations in the **Iteration** field. Set this field to 0 (zero) to set the number of iterations to infinity.

Color
Click this drop-down list to select a solid color preset: red, green, black, white, yellow, or blue.

Red, Green, Blue, Alpha
Click these fields to fine tune the color of the text. Integer values from 0 to 255 are valid for all fields. Adjust the **Alpha** field to control the transparency of the text. An alpha value of 255 is opaque and a value of 0 is transparent.

Horizontal
Enter the horizontal position of the text, based on the resolution of the video stream.

Vertical
Enter the vertical position of the text, based on the resolution of the video stream.

Width
Enter the width of the text. This value is based on the horizontal resolution of the video stream.

Height
Enter the height of the text. This value is based on the vertical resolution of the video stream.

SAVE
Click this button to commit all changes within the **HDMI Input Text** window group.
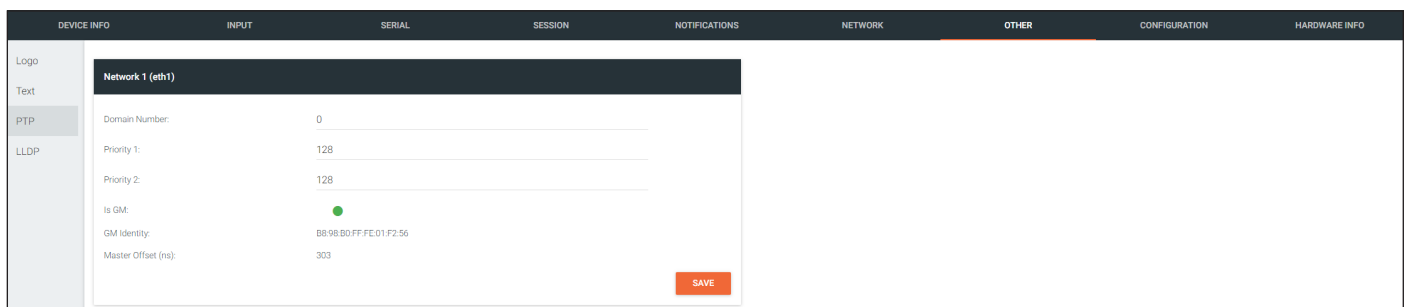
OTHER > PTP page

The **PTP** page provides options for adjust Precision Time Protocol (PTP) for AES67 audio streams. PTP is used by AES67 to keep all audio streams synchronized.

For a system utilizing PTP, all devices undergo an automatic self-election process to choose the device to be used as the PTP grandmaster (GM) clock, based on the accuracy of the device's clock and the device's configured priority. A lower priority number means the device is more likely to get selected as the GM. OmniStream runs 1 PTP daemon per Ethernet interface.

> ⚠️ **IMPORTANT:** If a new device is added to the network and the GM changes, a brief outage will be experienced while all connected devices synchronize with the new clock. Because of this, Atlona recommends that one unit gets manually defined as the GM and have both **Priority 1** and **Priority 2** fields be set to 1.

DEVICE INFO	INPUT	SERIAL	SESSION	NOTIFICATIONS	NETWORK	OTHER	CONFIGURATION	HARDWARE INFO

Network 1 (eth1)

Domain Number:	0
Priority 1:	128
Priority 2:	128
Is GM:	🟢
GM Identity:	B8:9B:B0:FF:FE:01:F2:56
Master Offset (ns):	303

SAVE

Logo
Text
PTP
LLDP

Network window group

Domain Number
Enter the domain number in this field. Valid entries are 0 through 127.

Priority 1
Enter the priority number in this field.

Priority 2
Enter the priority number in this field.

Is GM
If the indicator is green, then this interface is the PTP GM.

GM Identity
The grandmaster clock identity.

Master Offset
Displays the grandmaster clock offset.

SAVE
Click this button to commit all changes the **Network** window group.

OTHER > LLDP page

The Link Layer Discovery Protocol (LLDP) page returns information about the switch that the encoder is connected to.   If both interfaces from a dual-channel encoder are connected to the switch, then two **eth** window groups will be displayed.

> **NOTE:** LLDP must be enabled on the switch that the encoders are connected to, in order for the switch information to be displayed.

eth window group

Via
The discovery protocol being used.

RID
The router ID.

Age
Up-time of the interface.

Chassis ID
The MAC address of the interface.

Chassis Capability
Indicates the device function, such as bridge (switch), router, etc.

Port ID
The port ID.

TTL
The Time-To-Live value.

CONFIGURATION page

Copy configuration

Export Configuration
Click this button to export the current encoder system configuration to a .json file.

COPY CONFIG TO DEVICE(S)
Click this button to copy the current configuration to other OmniStream devices. OmniStream devices must be of the same type to perform this operation.

Import Configuration

Browse...
Click this button to select the desired configuration file to be uploaded.

Overwrite Hostname
Click this box to overwrite the hostname of the destination device. Leaving this box unchecked will preserve the destination hostname.

IMPORT CONFIGURATION
Click this button to upload the selected configuration file to the encoder. The hostname, specific to the configuration filename, will be ignored.

Upload SSL certificate

Browse... (Certificate PEM)
Click these buttons to select the desired certificate.

Browse... (Private Key PEM)
Click these buttons to select the desired private key.

UPLOAD SSL CERTIFICATE
Click this button to upload the certificate/private key to the encoder.

REVERT
Click this button to restore the previous configuration.

HARDWARE INFO page

Connection Status
Indicates the connection status of the device.

Alias
Displays the alias name.

Manufacturer
Displays the manufacturer name.

Model
Displays the model number.

IP Address
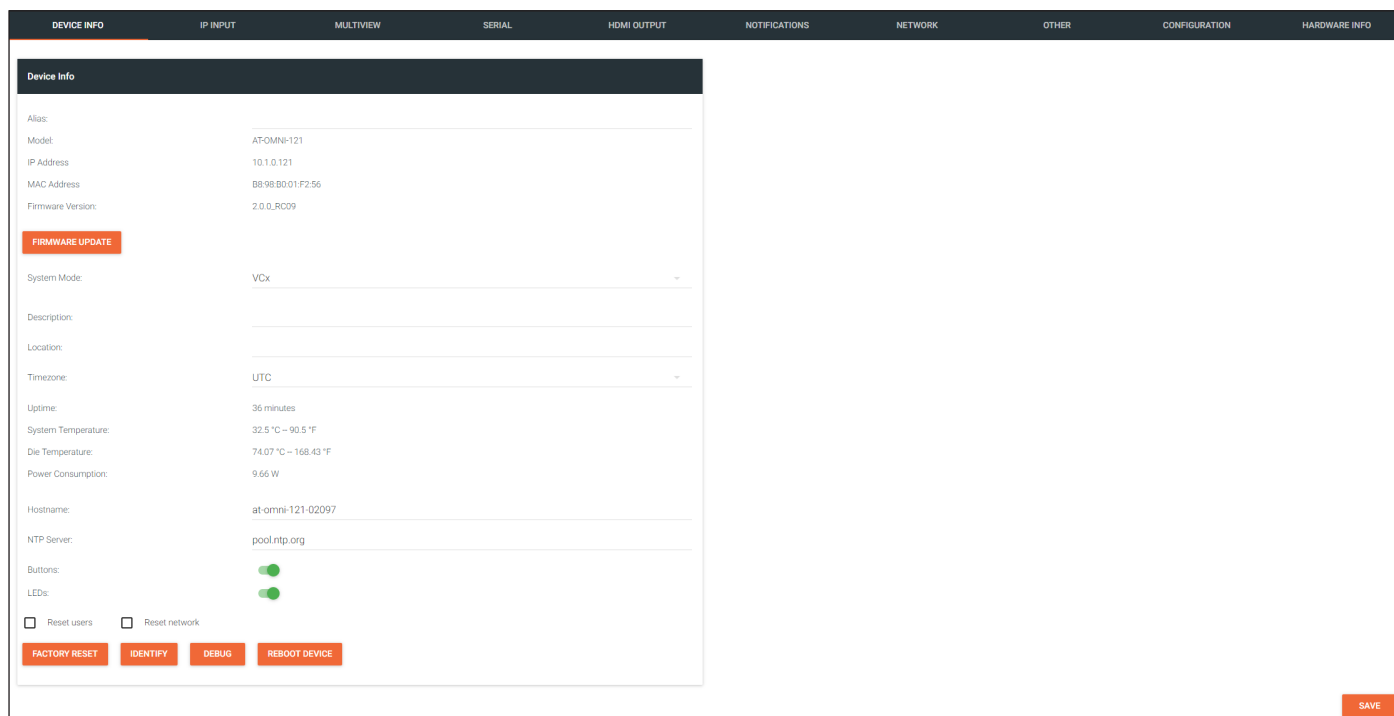Displays the IP address of the unit.

Serial Number
Displays the serial number of the unit.

Decoders

┌───┐
│ **NOTE:** This section assumes that the **System mode** is set to `VCx`. If `VC-2 Video` or `VC-2 PC` │
│ `Application` is used, some features on these pages will not be available. │
└───┘

DEVICE INFO page

Alias
Enter a name for the unit in this field. This is optional.

Model
The model number of the unit.

Encoders	Decoders
AT-OMNI-111	AT-OMNI-121
AT-OMNI-112	AT-OMNI-122
AT-OMNI-512	AT-OMNI-521

IP Address
Displays the IP address of the encoder.

MAC Address
Displays the MAC address of the encoder.

Firmware Version
The version of firmware that the OmniStream device is running. Always make sure the latest version of firmware is installed.

FIRMWARE UPDATE
Click this button to update the firmware.

System Mode
Click this drop-down list to select the system mode. The default setting is `VCx`.

Mode	Description
`VCx`	This is the default mode and represents the latest codec technology from Atlona, with outstanding support for computer graphics and motion video. VCx includes support for 4K60 4:4:4 fast switching, dual streaming from AT-OMNI-111 encoders, and multiview on the decoders.
`VC-2 Video`	Legacy OmniStream codec that provides the best viewing experience when streaming motion graphics and/or video.
`VC-2 PC application`	Legacy OmniStream codec that optimizes the image when viewing static images, such as spreadsheets or similar content.

Description
Provides the option of assigning descriptive name to the unit.

Location
Provides the option of assigning a description of where the unit is located.

Timezone
Displays the time zone format. Click the **SET TIMEZONE** button, to assign the time zone.

Date/Time
Displays the current date and time. Click the **SET DATE/TIME** button to set these values.

Uptime
Displays the elapsed time since the unit was powered-on or rebooted.

System Temperature
Displays the ambient enlosure temperature.

Die Temperature
Displays the value returned from the die temperature sensor (DTS) on the chip of the PCB.

Power Consumption
Displays the precise power consumption of the encoder.

Hostname
Displays the hostname of the encoder. By default, OmniStream decoders are assigned a default hostname.

NTP Server
Displays the NTP server. This field is set to `pool.ntp.org` by default. Click this field to enter the desired NTP server address.

Buttons
Click this toggle switch to enable or disable the front-panel buttons. If the buttons are disabled, their backlight turns off. When enabled, the toggle switch will be green.

LEDs
Click this toggle switch to enable or disable _all_ front-panel LED indicators and button backlight indicators.

FACTORY RESET
Click this button to reset the encoder to factory-default settings. When performing a factory reset, the following options can be selected, by clicking the check box. If no options are selected, then the encoder is reset with no factory-default settings.

Option	Description
None Checked	Resets the encoder with no factory-default settings.
Reset User	Resets the encoder to factory-default settings and resets custom user information.
Reset Network	Resets the encoder to factory-default settings and resets network information.

IDENTIFY
Click this button to physically identify a unit on the network. Clicking this button will cause all front-panel LED indicators to flash for 10 seconds.

DEBUG
Click this button to instruct the unit to create a debug file. This file is used by Atlona Technical Support Engineers to diagnose internal issues with the unit.

REBOOT DEVICE
Click this button to perform a soft reboot of the OmniStream device.

SAVE
Click this button to commit changes to the settings on this page.

IP INPUT page

The following fields apply to all **IP Input** window groups.

Enabled
Click this toggle switch to enable or disable the IP input.

Interface
Click this drop-down list to select the desired Ethernet interface. This is only available on dual-channel decoders.

Multicast Address
Enter the multicast IP address of the subscribed encoder in this field.

Port
Enter the port number of the subscribed encoder in this field.

Multicast filter (IGMPv3) > Mode
Click this drop-down list to select the multicast filtering mode. Available options are `exclude` or `include`.

Multicast filter (IGMPv3) > Addresses
Enter the desired address(es) in this field. Separate multiple multicast IP addresses with a comma delimiter.

SAVE
Click this button to commit all changes in the **Input** window group.
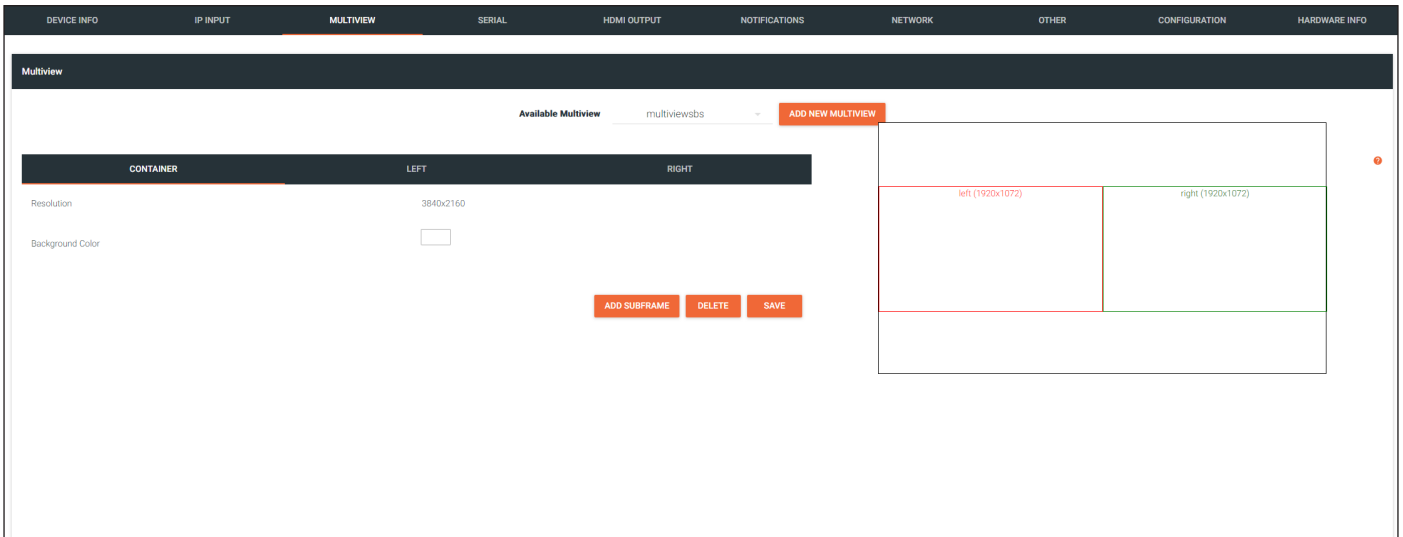
MULTIVIEW page

Multiview window group

Available Multiview
When a multiview is created, the name of the multiview will be displayed here. If more than one multiview configuration exists, then click this drop-down list to select the desired multiview.

ADD NEW MULTIVIEW
If a multiview has not been configured, this will be the only button displayed on this page. Click this button to create a multiview. For details on configuring a multiview refer to Multiview and Dual-Streaming Tutorial (page 48) for more information.

CONTAINER window group

Resolution
Displays the output resolution of the multiview.

Background Color
The background color is set using RGB values between 0 and 255. The default setting is black (0,0,0). Click this box to display the color swatch and to change the background color.

Subframe window groups

The name of these window groups will change, based on the multiview layout that is selected. However, the information contained within the window group will be the same.

Name
The name of the subframe and the resolution of the subframe. This field cannot be modified.

Input
Click this drop-down list to select the desired IP input.

X
Enter the x-position of the anchor point in this field.

Y
Enter the y-position of the anchor point in this field.

Anchor
Click this drop-down list to select the anchor point for the subframe. Anchor points are: `top left`, `top right`, `bottom left`, `bottom right`, and `center`.

Z-order
Enter the z-order value in this field. Subframes with a higher z-order value will be moved to the front (on top of) subframes with lower z-order values.

Input Status
Displays the status and resolution of the input, if it is active. If it is not active, then `No Video` will be displayed.

Output Status
Displays the status and resolution of the output, if it is active. If it is not active, then `No Video` will be displayed.

DELETE
Deletes the subframe from the multiview window group.
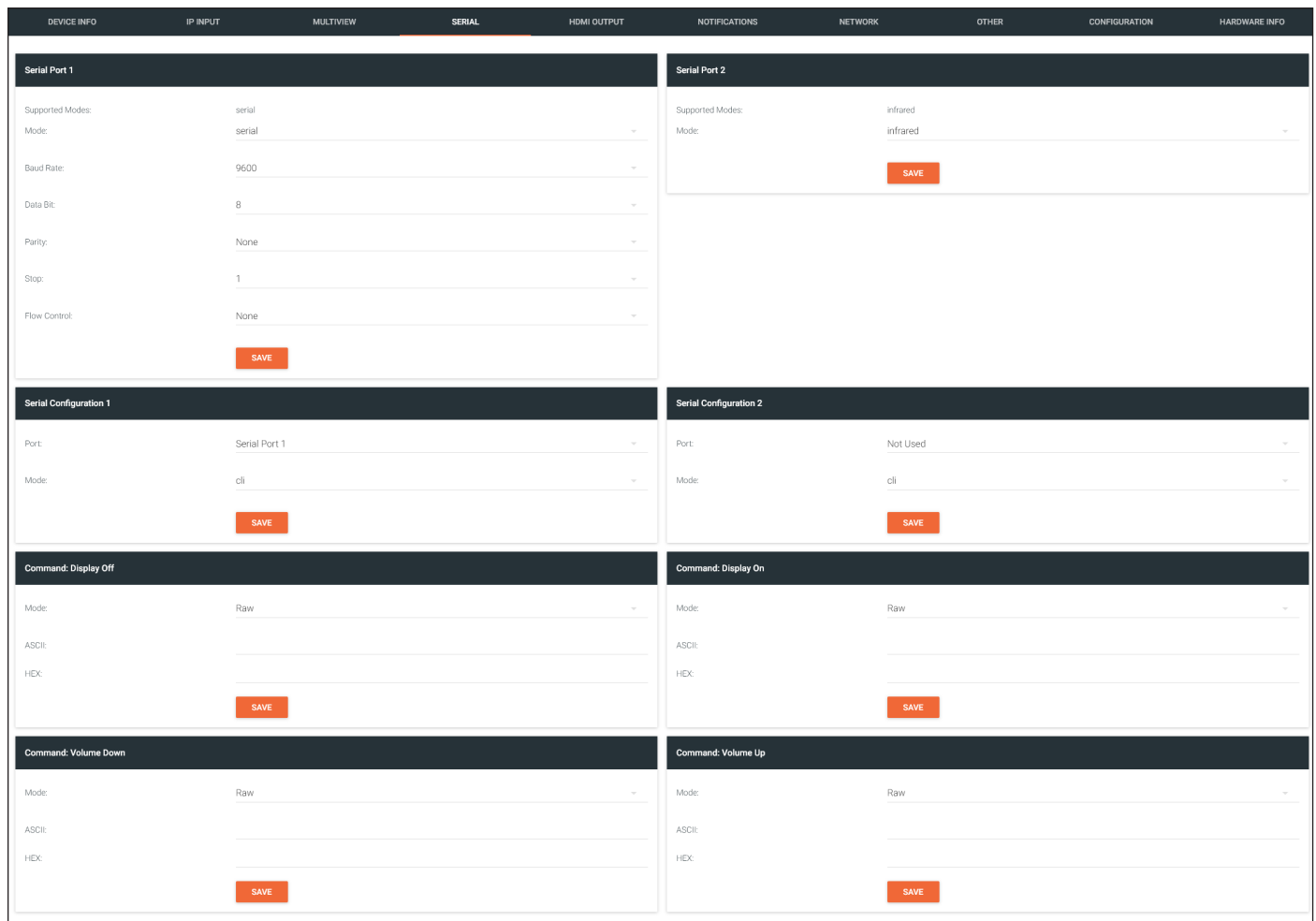
SAVE
Click this button commit changes to the subframe window group.

SERIAL page

The **Serial** page provides serial port configuration when using control signals.

Serial Port window groups

The following fields apply to both **Serial Port** window groups.

Supported Modes
Lists the supported protocols for the serial port.

Mode
Click this drop-down list to select the desired serial mode. Available values will be reflected in the **Supported Modes** field.

Baud Rate
Click this drop-down list to select the desired baud rate: `19200` or `9600`.

Data Bit
Click this drop-down list to select the number of data bits: `6`, `7`, or `8`.

Parity
Click this drop-down list to select the parity bit: `None`, `Odd`, `Even`, `Mark`, or `Space`.

Stop
Click this drop-down list to select the stop bit: `1`, `1.5`, or `2`.

SAVE
Click this button to save all changes under the **Serial Port** window group.

Serial Configuration window groups

The following fields apply to both **Serial configuration** window groups. The single-channel encoder will only have one **Serial configuration** window group.

Port
Click this drop-down list to select the desired serial port.

Mode
Click this drop-down list to select the desired control mode. Available values are: `cli`, `tcpproxy`, and `output`. Select `tcpproxy` to translate received IP control traffic to RS-232 output. Selecting the `cli` option will force the serial port to function as a Command-Line Interface (CLI) for control of the encoder. Refer to Device Control (page 32) for more information.

SAVE
Click this button to commit all changes within the **Serial configuration** window group.

Command window groups

By default, window groups for the following commands are created: `Display Off`, `Display On`, `Volume Down`, and `Volume Up`.

Interpret on
Click this drop-down list to select the endpoint where the command will be processed: `encoder` or `decoder`.

ASCII
Enter the ASCII representation of the command string in this field.

HEX
Enter the hexadecimal representation of the command in this field.
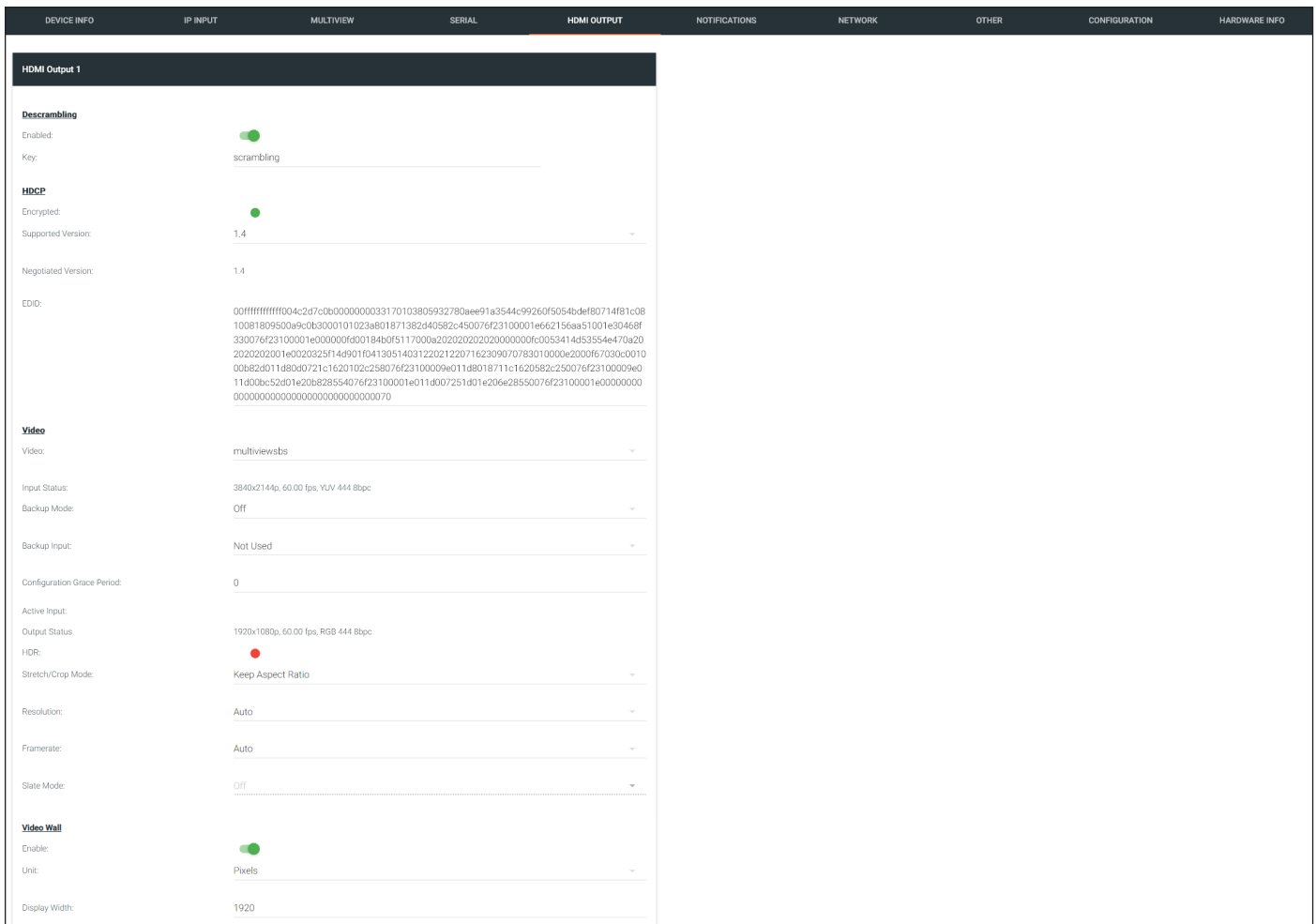
> ℹ️ **NOTE:** When entering the command string, it is not required to enter the string under both the ASCII and HEX fields. The encoder requires that one field be completed.

SAVE
Click this button to commit all changes within the **Command** window group.

HDMI OUTPUT page

Descrambling

Enabled
Click this toggle switch to enable or disable scrambling. If a scrambling key is used on the subscribed encoder, then descrambling must be enabled on the decoder in order for the source signal to reach the sink device.

Key
Enter the descrambling key in this field. This key must match the scrambling key on the subscribed encoder.

HDCP

Encrypted
This indicator will be green if the stream content is HDCP-encrypted.

Supported Version
Click this drop-down list to select the supported version of HDCP.

Negotiated Version
Displays the version of HDCP used by the stream.

EDID
This field will display the EDID of the connected display. This raw data can be copied and stored under the EDID page, if desired.

Video

Video
Click this drop-down list to select the desired IP input. Available options are `ip_input1` - `ip_input12`, `none`, `generator`, and `multiview` (if configured).

Input Status
Displays the input status. If no video stream is detected, then "No active video" will be displayed.

Backup Mode
Click this drop-down list to select the backup mode. Both Video and Audio provide the Backup Mode feature.

Mode	Description
Off	Backup source is disabled; join request not sent.
Join Active	The decoder sends a join request only when the decoder decides to switch between video sources. Switch time will not exceed 5 seconds.
Join Always	The decoder always joins to the backup video source. Switch time will not exceed 0.5 seconds.

Backup Input
Select the secondary video backup IP input from this drop-down list. If the primary IP input is down, then the decoder will automatically switch to this input. Refer to the **Backup Mode** option, above, for setting the conditions for switching inputs. Both Video and Audio provide the Backup Input feature.

Configuration Grace Period
To prevent the decoder from automatically making the redundancy switch, when redundancy is enabled, a grace period can be entered. By default, the grace period is set to zero seconds. If set to zero seconds, automatic failover will occur, if the stream is interrupted for any reason. Refer to Configuring Redundant Streams (page 74) for more information.

Active Input
Displays the active video input.

Output Status
Displays details about HDMI ouput video after scaling, frame rate conversion, etc. If no input is active or detected, then this field will display "No active video".

HDR
This indicator will be green if the HDMI output video contains HDR content.

Stretch / Crop Mode
Click this drop-down list to select the aspect ratio.

Mode	Description
Keep Aspect Ratio	Aspect ratio is preserved; the output on the decoder will be the same as the input on the encoder.
Full Screen	Stretches the image to fill the screen. In some cases this can distort ("stretch") the image.
16:9	Sets the aspect ratio to 16:9 "widescreen" format, usually associated with HDTV formats.
16:10	Sets the aspect ratio to 16:10 "widescreen" format, usually associated with computer displays and smart devices.
4:3	Sets the aspect ratio to 4:3 "pan-and-scan" format, usually associated with SDTV.

Resolution
Click this drop-down list to select the desired output resolution. This is a scaler feature which can either upscale or downscale the output on the decoder. If `Input` is selected, then no scaling will be applied to the output. Select `Auto` to use the EDID of the sink device to determine the output resolution.

Resolutions	
Input	1400x1050
Auto	1440x900
4096x2160	1280x1024
3840x2160	1280x800
1920x1200	1280x768
1920x1080	1280x720
1680x1050	1024x768
1600x900	

> **NOTE:** When working with VESA resolutions 1360x768p60 and 1366x768p60, the **Resolution** drop-down list must be set to `Auto`.

Framerate
Sets the output frame rate. Available options are `auto`, `60 Hz`, `50 Hz`, and `30 Hz`, except for the OMNI-122 where the options are `auto` and `30 Hz`.

Slate Mode
Click this drop-down list to select the slate mode. Refer to Slate / Logo Insertion (page 83) for more information.

Mode	Description
Off	Disables the image from being displayed.
Manual	Stretches the image to fill the screen. In some cases this can distort ("stretch") the image.
Auto	The image will only be displayed when the source signal is lost. For example, this mode is useful in conference room applications for displaying system instructions when no sources are connected.

Video Wall

Enable
Click this toggle switch to enable or disable the video wall option. Refer to Creating Video Walls (page 58) for more information on using video walls.

Unit
Click this drop-down list to specify the units. Available options are `pixels`, `mm`, and `inches`.

Display Width
Specifies the width of the decoder's video output, which is a subset of the large video wall.

Display Height
Specifies the height of the decoder's video output, which is a subset of the large video wall.

Horizontal
The offset from the (0,0) reference point, of the defined width (see **Display Width**, above).

Vertical
The offset from the (0,0) reference point, of the defined height (see **Display Height**, above).

Rotation
Adjusts the rotation angle of the image. Available options are `0`, `90`, `180`, and `270`. Dual-channel decoders are restricted to values `0` and `180`.

Edge Compensation
Adjusts edge compensation. Available options are `none`, `bezel compensation`, and `edge blending`.

Top
Offset value for adjusting the top portion of the image. Units are specified in the **Unit** field.

Bottom
Offset value for adjusting the bottom portion of the image. Units are specified in the **Unit** field.

Left
Offset value for adjusting the left portion of the image. Units are specified in the **Unit** field.

Right
Offset value for adjusting the right portion of the image. Units are specified in the **Unit** field.

Fast Switching Enable
Click this toggle switch to enable or disable fast-switching. When enabled, the fast-switching timeout interval can also be adjusted. Refer to Fast Switching (page 81) for more information.

Fast Switching Timeout (s)
Sets the timeout interval for fast switching. Only available if fast switching is enabled.

TO PRIMARY
Click this button to assign as the Primary IP Input. Both Video and Audio support this feature.

TO BACKUP
Click this button to force the audio stream to fall over to the Backup IP Input (if redundancy is configured).
Both Video and Audio support this feature.

Audio

Input
Click this drop-down list to select the primary audio IP input. Select the `Not Used` option to leave the audio input unassigned.

Backup Mode
Click this drop-down list to select the backup mode. Both Video and Audio provide the Backup Mode feature.

Mode	Description
`Off`	Backup source is disabled; join request not sent.
`Join Active`	The decoder sends a join request only when the decoder decides to switch between audio sources. Switch time will not exceed 5 seconds.
`Join Always`	The decoder always joins to the backup audio source. Switch time will not exceed 0.5 seconds.

Backup Input
Select the secondary audio backup IP input from this drop-down list. If the primary IP input is down, then the decoder will automatically switch to this input. Refer to the **Backup Mode** option, above, for setting the conditions for switching inputs. Both Video and Audio provide the Backup Input feature.

Configuration Grace Period
To prevent the decoder from automatically making the redundancy switch, when redundancy is enabled, a grace period can be entered. By default, the grace period is set to zero seconds. If set to zero seconds, automatic failover will occur, if the stream is interrupted for any reason. Refer to Configuring Redundant Streams (page 74) for more information.

Active Input
Displays the active audio input.

Downmixing
Click this drop-down list to select how LPCM audio will be down-mixed. Note that lossless audio formats cannot be down-mixed.

Enable AES67
Click this toggle switch to enable or disable AES67. When enabled, the toggle switch will be green. Refer to AES67 Audio (page 75) for more information.

Status
Displays the active audio input. If no input is active or detected, then this field will display "No active audio".

Mute
Click this toggle switch to enable or disable the audio output. If enabled, the toggle switch will be green.

Volume
Click the speaker icon on the left to decrease volume. Click the speaker icon on the right to increase volume. Range: 0 to 15.

Analog Power Status
This indicator will be green when the decoder is powered by the optional external 48 V DC power supply.

Analog Power
If analog output is connected to the decoder, then click this toggle switch to use the analog audio output. When enabled, this toggle switch will be green.

TO PRIMARY
Click this button to assign as the Primary IP Input. Both Video and Audio support this feature.

TO BACKUP
Click this button to force the audio stream to fall over to the Backup IP Input (if redundancy is configured). Both Video and Audio support this feature.

AUX (CEC)
Click this drop-down list to select the desired IP input for CEC control. The available options will be based on which IP Input has been enabled on the decoder.

Auto On
Click this toggle switch to enable or disable power-on. When enabled this toggle switch will be green and the power-on command will be sent to the display when an A/V signal is detected.

Projector Cooldown (s)
Enter the time interval, in seconds, before the projector can be powered-off. This time interval prevents the decoder from sending additional commands until the projector has had time to complete its cool-down process.

Standby Timeout
Enter the time interval, in seconds, before the next command can be accepted by the display.

Type

Click this drop-down list to select the display mode.

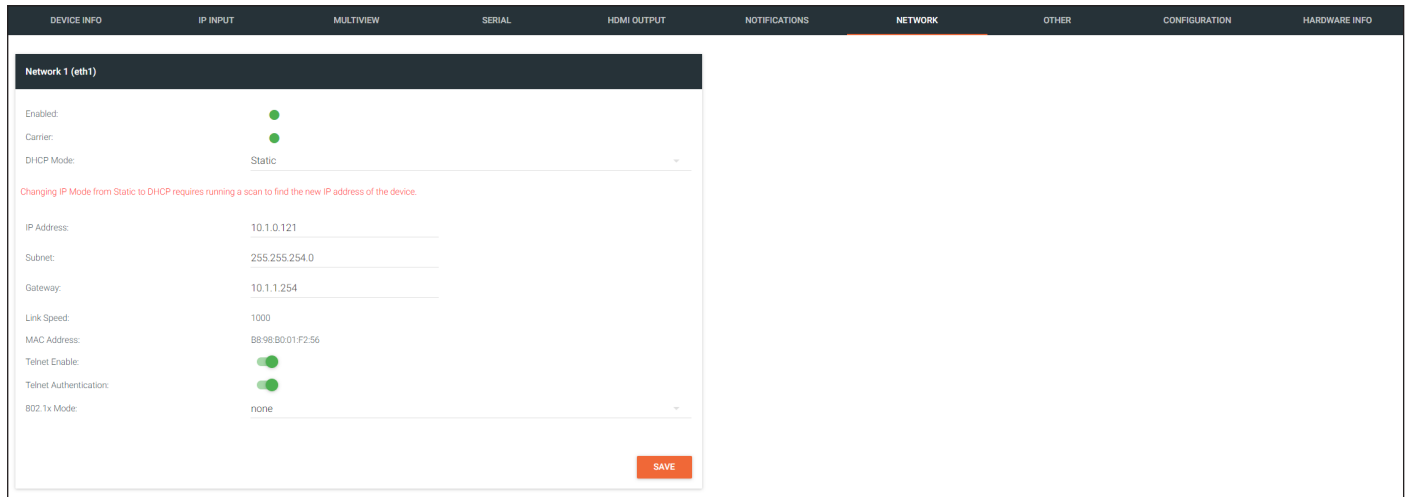| Type	Description
DispSW AVon	Display switches on/off, source audio/video signal always on.
DispSW AVSW	Display switches on/off, source audio/video signal switches on/off.
AV SW	Display is always on, source audio/video signal switches on/off
Always on	Display is always on, source audio/video signal always on.

SAVE

Click this button to commit all changes within the **HDMI Output** window group.

NETWORK page

This screen is identical to the **NETWORK** page for the encoder. If using the dual-channel version, then the information on both **Network 1** and **Network 2** are provided.

Enabled
This indicator displays the state of the Network Interface Card (NIC). If the indicator is green, then the NIC is in the up/up state.

Carrier
If this indicator is green, then an active link exists. Otherwise, if no link exists, this indicator will be red.

DHCP Mode
Click this drop-down list to select the desired IP mode. Select `DHCP` to let the DHCP server (if present) assign the encoder the IP settings. When `static` is selected, the information for the **IP Address**, **Subnetmask**, and **Gateway** fields must be entered.

IP Address
Displays the IP address used by the channel. This field can only be changed if **Mode** is set to `static`.

Subnet
Displays the subnet mask for the channel. This field can only be changed if **Mode** is set to `static`.

Gateway
Displays the gateway (router) address for the channel. This field can only be changed if **Mode** is set to `static`.

Link speed
Displays the Ethernet interface link speed in Mbps. This field cannot be modified.

MAC address
Displays the MAC address of the Ethernet interface.

Telnet Enable
Click this toggle switch to enable or disable Telnet. If disabled, then Telnet sessions to the encoder cannot be established.

Telnet Authentication
Click this toggle switch to enable or disable Telnet authentication. If enabled, then the toggle switch will be green. Once enabled, connecting to the encoder using Telnet will require login credentials. The default credentials are:

Username: `admin`
Password: `Atlona`

802.1x Mode
Click this drop-down list to select the desired authentication mode.

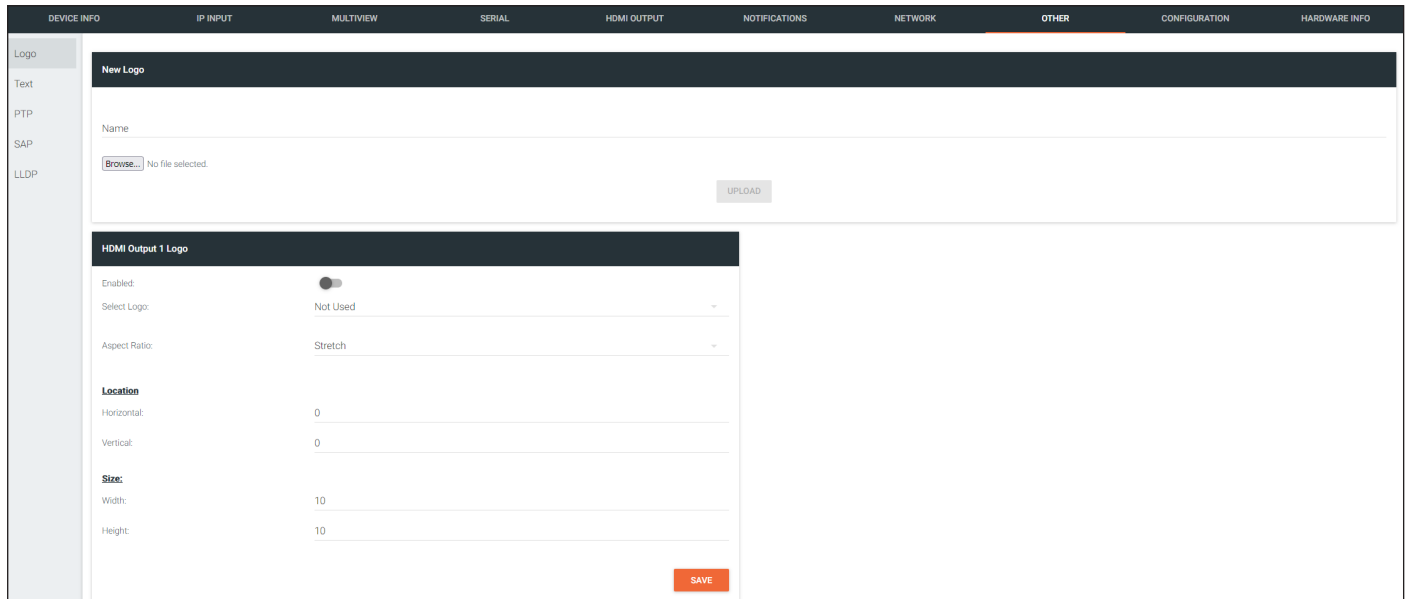| Protocol	Description
`none`	802.1X protocol disabled
`PEAP/MSCHAPv2`	Protected EAP; requires basic credentials in addition to a CA (certificate authority) certificate.
`EAP-TLS`	EAP Transport Layer Security; requires a client certificate, client private key, and CA (certificate authority) certificate.

SAVE
Click this button to commit all changes within the **Network** window group.

The Velocity/OmniStream Interface

OTHER > LOGO page

The **Other** page provides logo/slate, text, and PTP management. Click the menu in the upper-left corner of the Velocity screen to switch between **Logo**, **Text**, **PTP**, **SAP**, and **LLDP** screens.

The **Logo** page provides the ability to upload a custom logo and is similar to the LOGO page on the encoder. Refer to Slate / Logo Insertion (page 83) for more information on these settings.

New Logo window group

Name
Enter a name for the logo in this field.

Browse...
Click this button to select the logo file to be uploaded. Files must be in `.png` or `.svg` format and must not exceed 5 MB (5120000 bytes) in size. When an image file is uploaded, it will appear in the **Logo** drop-down list.

UPLOAD
Click this button to upload the logo file to the encoder.

HDMI Output Logo window group

Enabled
Click the toggle switch to enable or disable the logo. If the toggle switch is green, then the logo will be enabled.

Logo
Click this drop-down list to select the desired logo. To disable the use of a logo, set to `Not Used`.

Aspect Ratio
Click this drop-down list to select the type of aspect ratio to be applied to the logo.

Horizontal (%)
Enter the horizontal position of the logo based on the resolution of the video stream.

Vertical (%)
Enter the vertical position of the logo based on the resolution of the video stream.

Width (%)
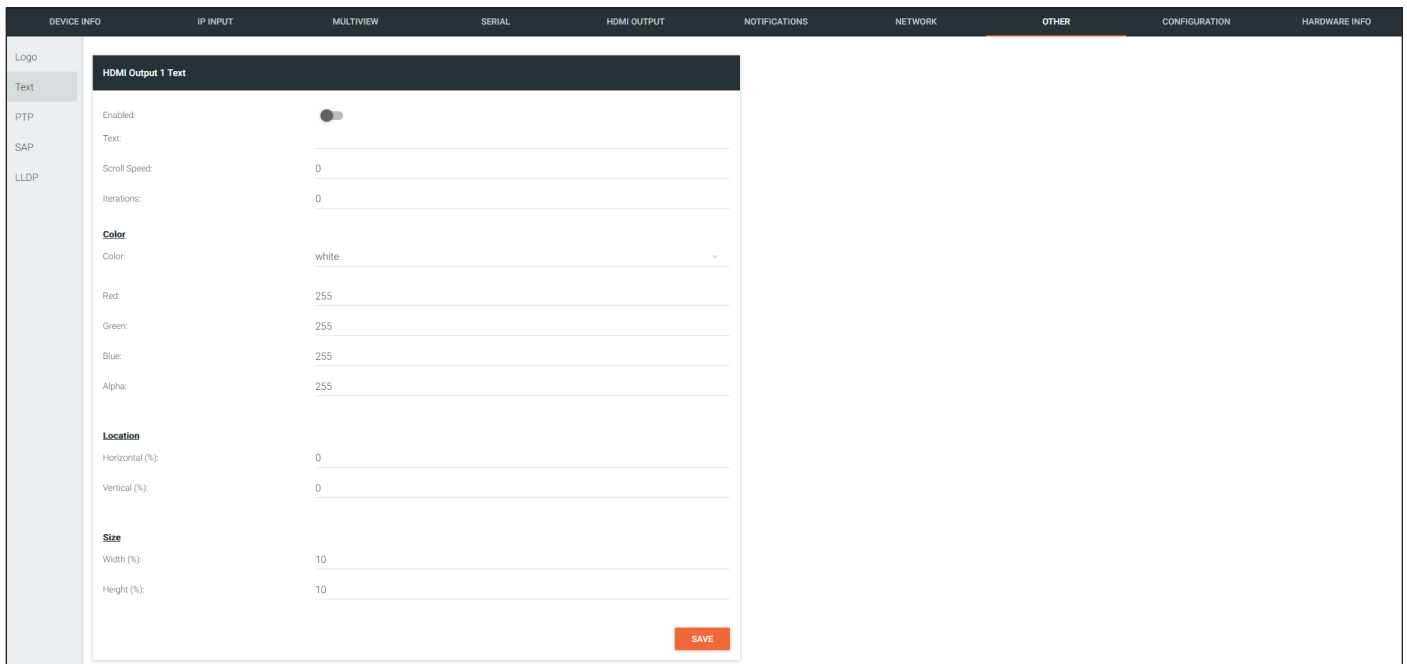Enter the width of the logo. This value is based on the horizontal resolution of the video stream.

Height (%)
Enter the height of the logo. This value is based on the vertical resolution of the video stream.

SAVE
Click this button to commit all changes within the **HDMI Input** window group.

OTHER > TEXT page

HDMI Output Text window group

Enabled
Click this toggle switch to enable or disable the text. When the toggle switch is green, the text will be enabled.

Text
Enter the desired text in this field.

Scroll Speed
Enter the scrolling speed in this field. Integer values from -255 to 255 are valid. Negative numbers will scroll the text from left to right. Positive numbers will scroll text from right to left.

Iterations
Enter the number of iterations in the **Iteration** field. Set this field to 0 (zero) to set the number of iterations to infinity.

Color
Click this drop-down list to select a solid color preset: `red`, `green`, `black`, `white`, `yellow`, or `blue`.

Red, Green, Blue, Alpha
Click these fields to fine tune the color of the text. Integer values from 0 to 255 are valid for all fields. Adjust the **Alpha** field to control the transparency of the text. An alpha value of 255 is opaque and a value of 0 is transparent.

Horizontal (%)
Enter the horizontal position of the text, based on the resolution of the video stream.

Vertical (%)
Enter the vertical position of the text, based on the resolution of the video stream.

Width (%)
Enter the width of the text. This value is based on the horizontal resolution of the video stream.

Height (%)
Enter the height of the text. This value is based on the vertical resolution of the video stream.

SAVE
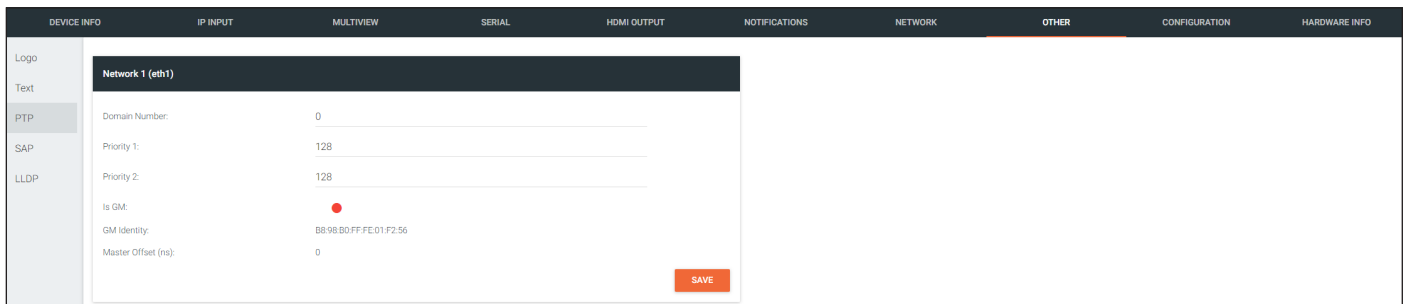Click this button to commit all changes within the **HDMI Input Text** window group.

OTHER > PTP page

The **PTP** page provides options for adjust Precision Time Protocol (PTP) for AES67 audio streams. PTP is used by AES67 to keep all audio streams synchronized.

For a system utilizing PTP, all devices undergo an automatic self-election process to choose the device to be used as the PTP grandmaster (GM) clock, based on the accuracy of the device's clock and the device's configured priority. A lower priority number means the device is more likely to get selected as the GM. OmniStream runs 1 PTP daemon per Ethernet interface.

> ⚠️ **IMPORTANT:** If a new device is added to the network and the GM changes, a brief outage will be experienced while all connected devices synchronize with the new clock. Because of this, Atlona recommends that one unit gets manually defined as the GM and have both **Priority 1** and **Priority 2** fields be set to 1.

Network window group

Domain Number
Enter the domain number in this field. Valid entries are 0 through 127.

Priority 1
Enter the priority number in this field.

Priority 2
Enter the priority number in this field.

Is GM
If the indicator is green, then this interface is the PTP GM.

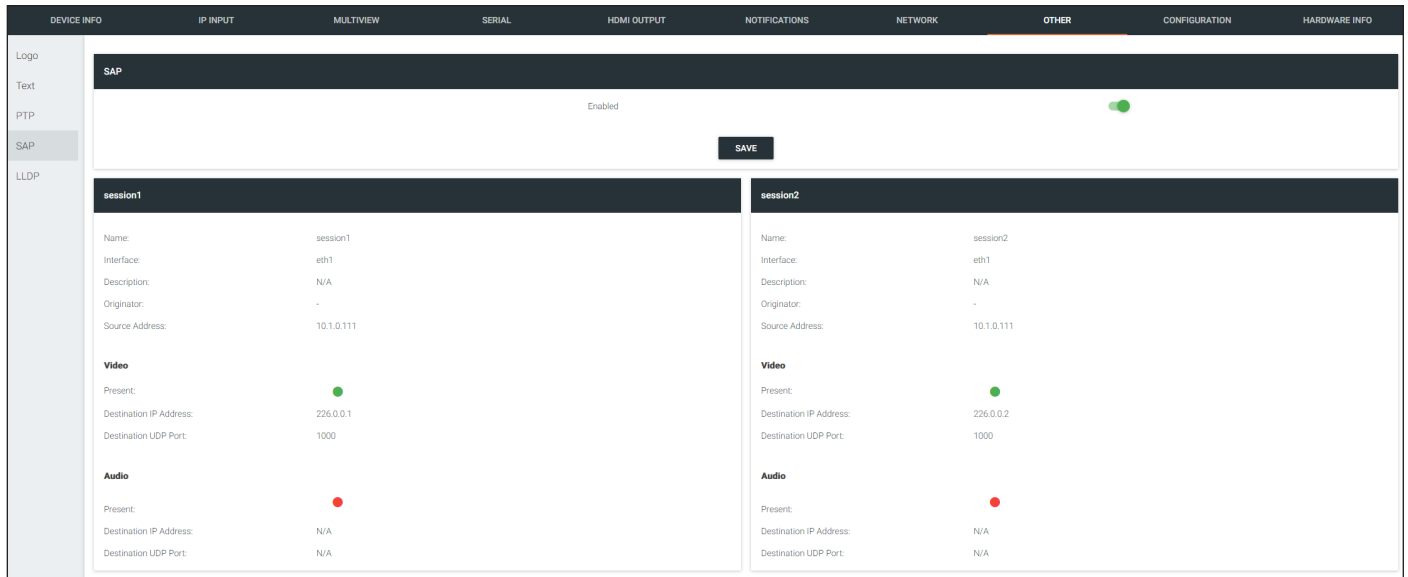**GM Identity**
The grandmaster clock identity.

Master Offset
Displays the grandmaster clock offset.

SAVE
Click this button to commit all changes the **Network** window group.

OTHER > SAP page

SAP window group

Enable
Click this toggle to enable or disable SAP. This feature is enabled when the toggle switch is orange. This is the default setting. If an SAP announcement is picked up, it will be displayed below the **SAP** window group.

session window groups

If SAP is enabled, seesion windows will appear on this page and display information about each session.

OTHER > LLDP page

The Link Layer Discovery Protocol (LLDP) page returns information about the switch that the encoder is connected to. If both interfaces from a dual-channel encoder are connected to the switch, then two **eth** window groups will be displayed.

> **NOTE:** LLDP must be enabled on the switch that the encoders are connected to, in order for the switch information to be displayed.

eth window group

Via
The discovery protocol being used.

RID
The router ID.

Age
Up-time of the interface.

Chassis ID
The MAC address of the interface.

Chassis Capability
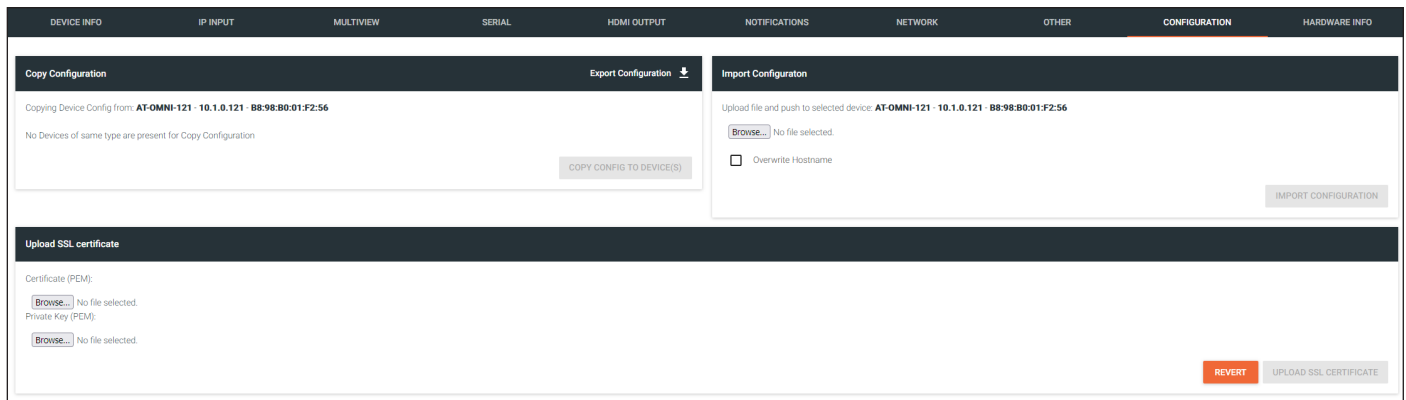Indicates the device function, such as bridge (switch), router, etc.

Port ID
The port ID.

TTL
The Time-To-Live value.

CONFIGURATION page

Copy configuration

Export Configuration
Click this button to export the current decoder system configuration to a .json file.

COPY CONFIG TO DEVICE(S)
Click this button to copy the current configuration to other OmniStream devices. OmniStream devices must be of the same type to perform this operation.

Import Configuration

Browse...
Click this button to select the desired configuration file to be uploaded.

Overwrite Hostname
Click this box to overwrite the hostname of the destination device. Leaving this box unchecked will preserve the destination hostname.

IMPORT CONFIGURATION
Click this button to upload the selected configuration file to the encoder. The hostname, specific to the configuration filename, will be ignored.

Upload SSL certificate

Browse... (Certificate PEM)
Click these buttons to select the desired certificate.

Browse... (Private Key PEM)
Click these buttons to select the desired private key.

UPLOAD SSL CERTIFICATE
Click this button to upload the certificate/private key to the encoder.

REVERT
Click this button to restore the previous configuration.

HARDWARE INFO page

| DEVICE INFO | IP INPUT | MULTIVIEW | SERIAL | HDMI OUTPUT | NOTIFICATIONS | NETWORK | OTHER | CONFIGURATION | HARDWARE INFO |

Hardware Info

Connection Status:	ONLINE
Alias:	
Manufacturer:	Atlona
Model:	AT-OMNI-121
IP Address:	10.1.0.121
Serial Number:	

Connection Status
Indicates the connection status of the device.

Alias
Displays the alias name.

Manufacturer
Displays the manufacturer name.

Model
Displays the model number.

IP Address
Displays the IP address of the unit.

Serial Number
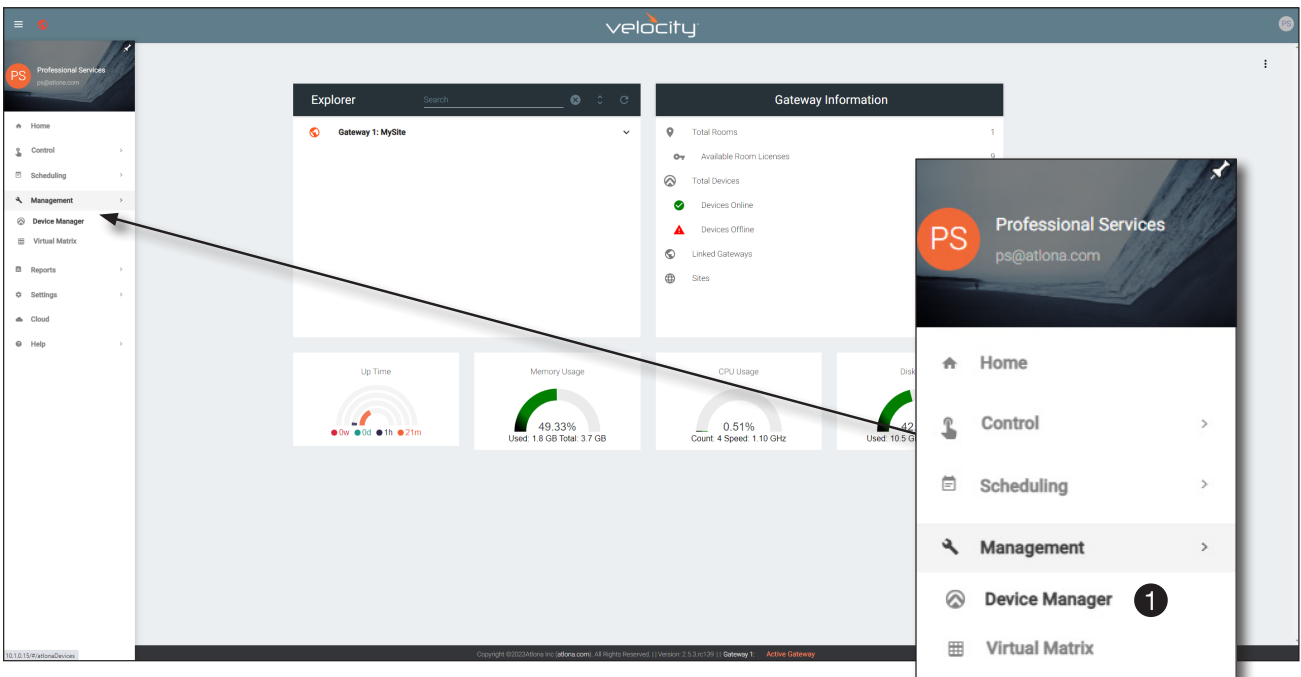Displays the serial number of the unit.

Appendix

Updating the Firmware

⚠️ **IMPORTANT:** To ensure compatibility with OmniStream firmware version 2.0.0 and above, Velocity Device Manager must be running version 2.5.3 or greater.
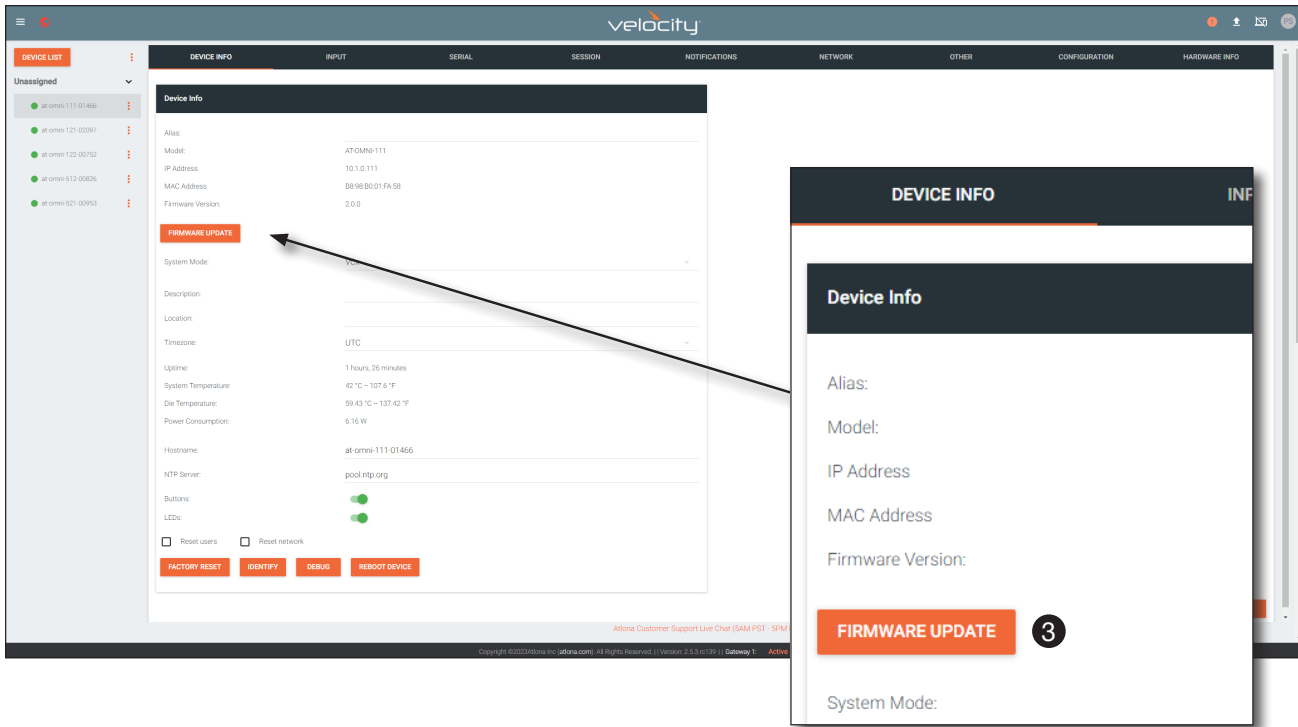
1. Go to the side menu bar and click **Manager** > **Device Manager**.

2. Under **Device List**, click the desired OmniStream device. The OmniStream device can also be selected under the large window pane, to the right.
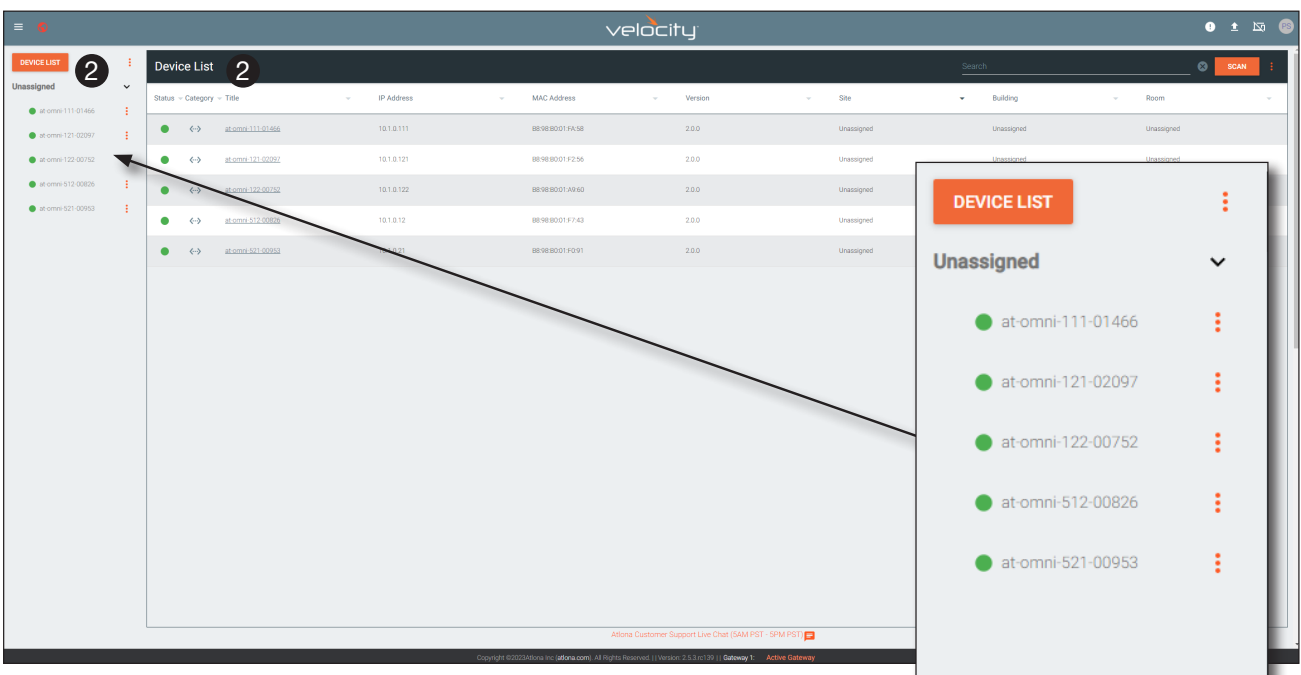
3. Click the **FIRMWARE UPDATE** button.

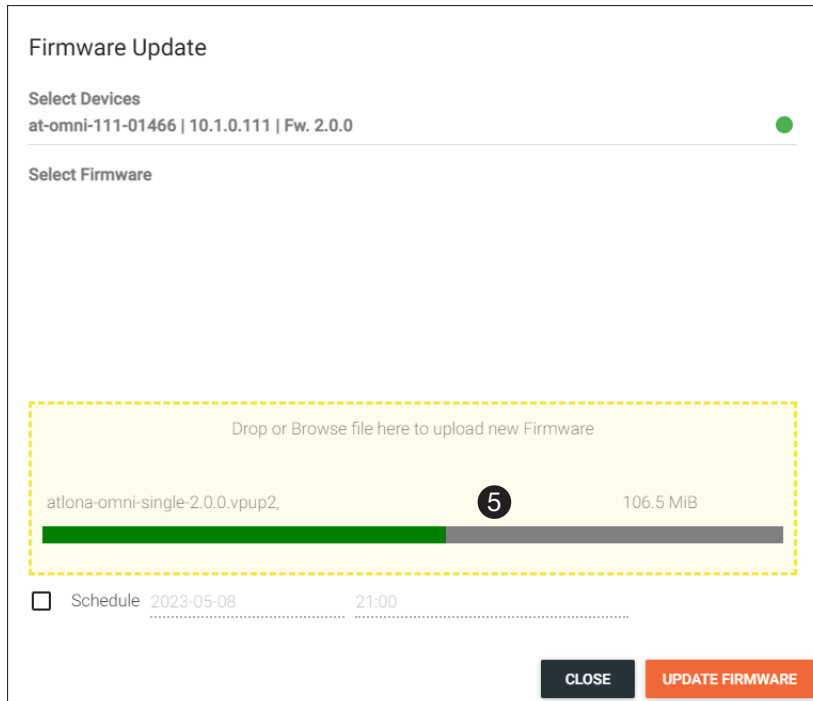4. The Firmware Update dialog will be displayed. Click and drag the correct firmware file to the yellow box. Refer to the table, below.

OmniStream SKU	Firmware File
AT-OMNI-111 AT-OMNI-121 AT-OMNI-111-WP	at-omni-single-upgrd-os-[version].vpup2
AT-OMNI-112 AT-OMNI-122	at-omni-dual-upgrd-os-[version].vpup2
AT-OMNI-512 AT-OMNI-521	at-omni-residential-upgrd-os-[version].vpup2
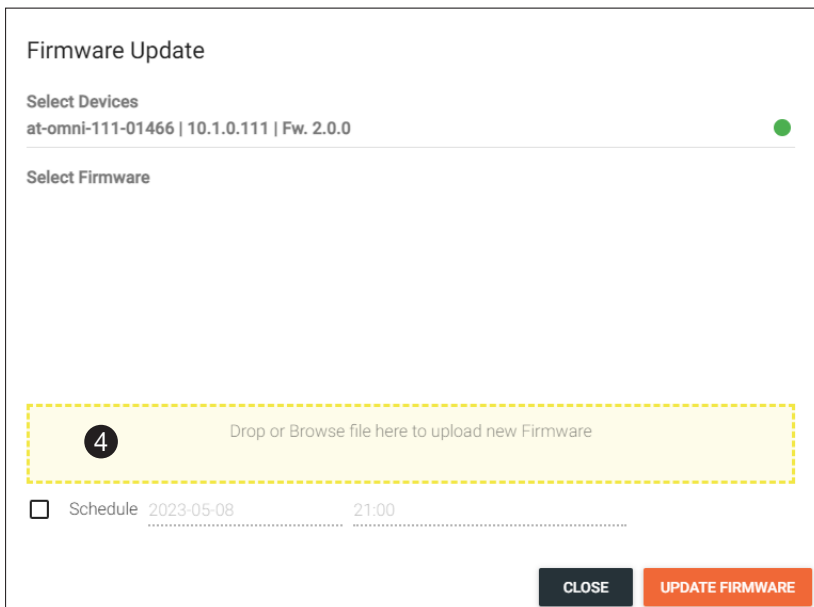
5. A progress bar will be displayed to show the loading process.
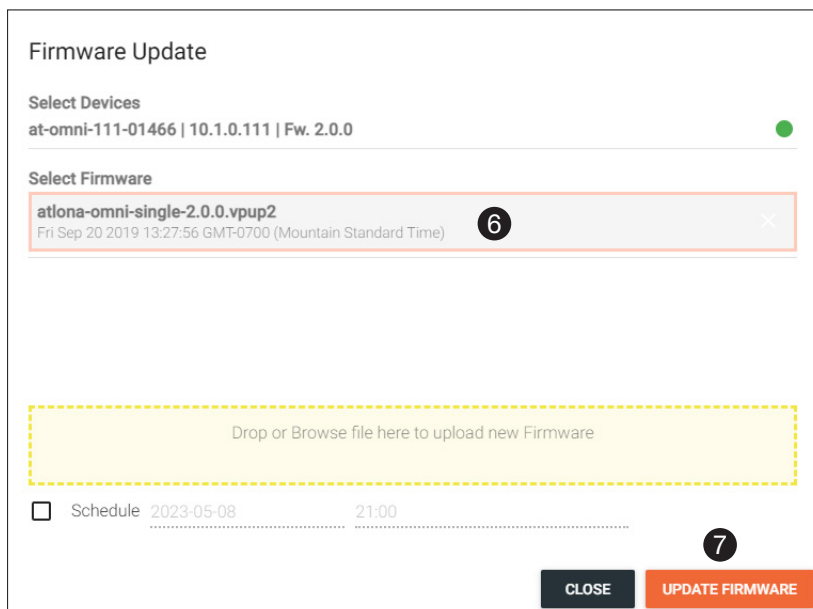
6. Once the firmware file has been uploaded, it will appear under the **Select Firmware** section of the dialog box.
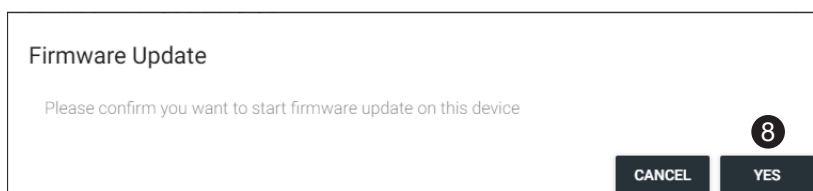
7. Click the **UPDATE FIRMWARE** button to begin the update process.

8. A dialog will be displayed asking to confirm the update process. Click **YES** to continue.

9. The firmware update process will begin and a progress bar will show the status.

Firmware Update

AT-OMNI-111   **RUNNING**
atlona-omni-single-2.0.0.vpup2   9/20/2019, 2:01:50 PM | 4 years
AT-OMNI-111 - 10.1.0.111   Running ... | 9/20/2019, 2:01:50 PM | 4 years

⑨

CLOSE   REMOVE ALL COMPLETED
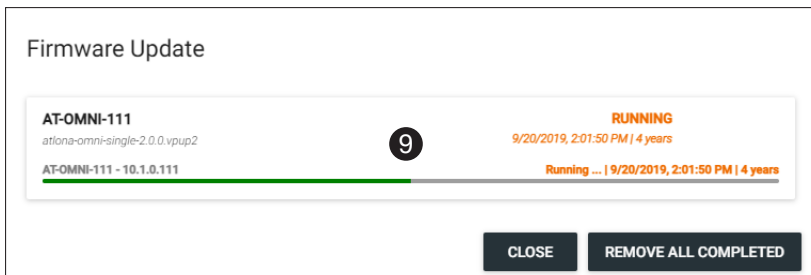
10. Once completed, click the **CLOSE** button.

Firmware Update

AT-OMNI-111   **COMPLETED**
atlona-omni-single-2.0.0.vpup2   9/20/2019, 2:05:03 PM | 3 minutes
AT-OMNI-111 - 10.1.0.111   Completed | 9/20/2019, 2:05:03 PM | 3 minutes

⑩   CLOSE   REMOVE ALL COMPLETED
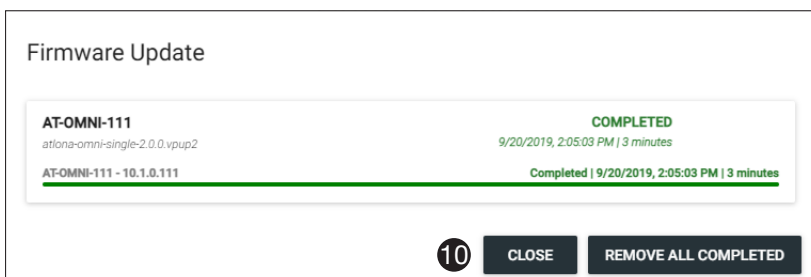
Performing a Link Test

Follow the procedure below to perform a link integrity test between an encoder and decoder(s).

1. Go to the encoder.

2. Verify that all desired decoders are subscribed to the encoder's multicast address and port number. In the decoder example below, the **IP INPUT** > **IP Input 1** > **Multicast Address** field is set to `226.0.0.1`. This is the same IP address that is assigned to the **SESSION** > **Stream 1** > **Destination Multicast/Unicast Address** field on the encoder.
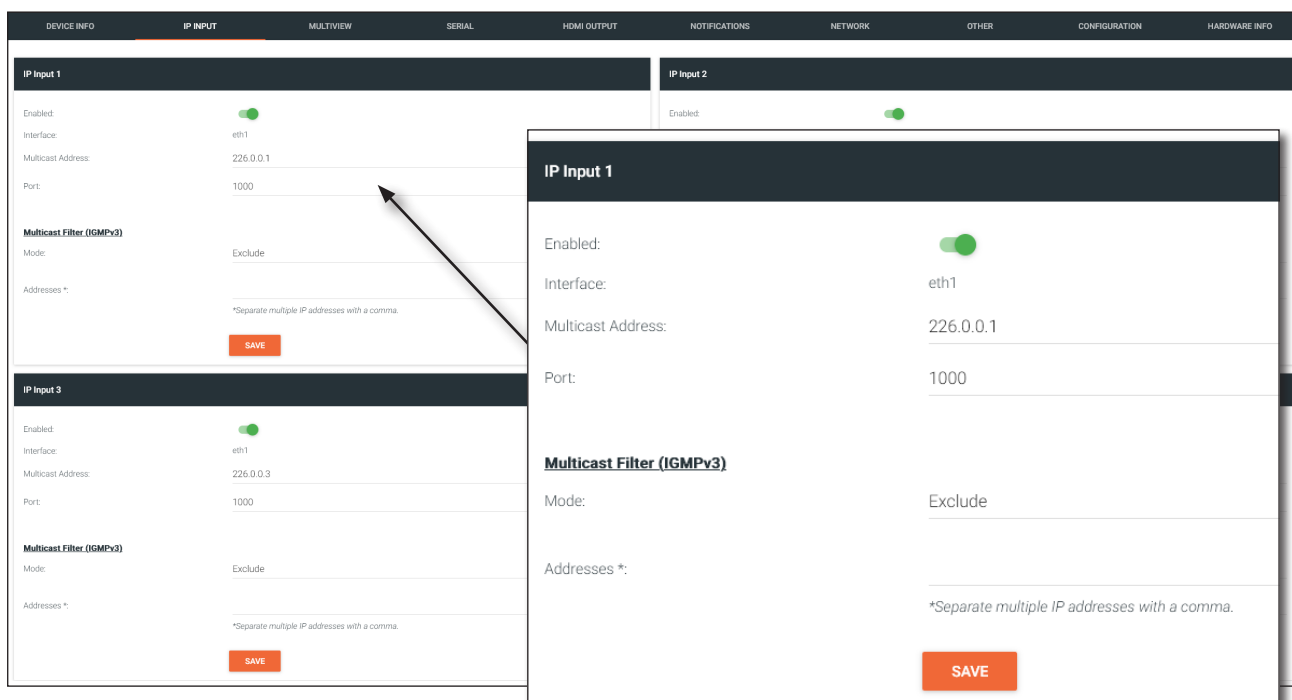
3. On the encoder, click **SESSION** in the menu bar.

4. Under the **Video** section, click the **LINK TEST** button.
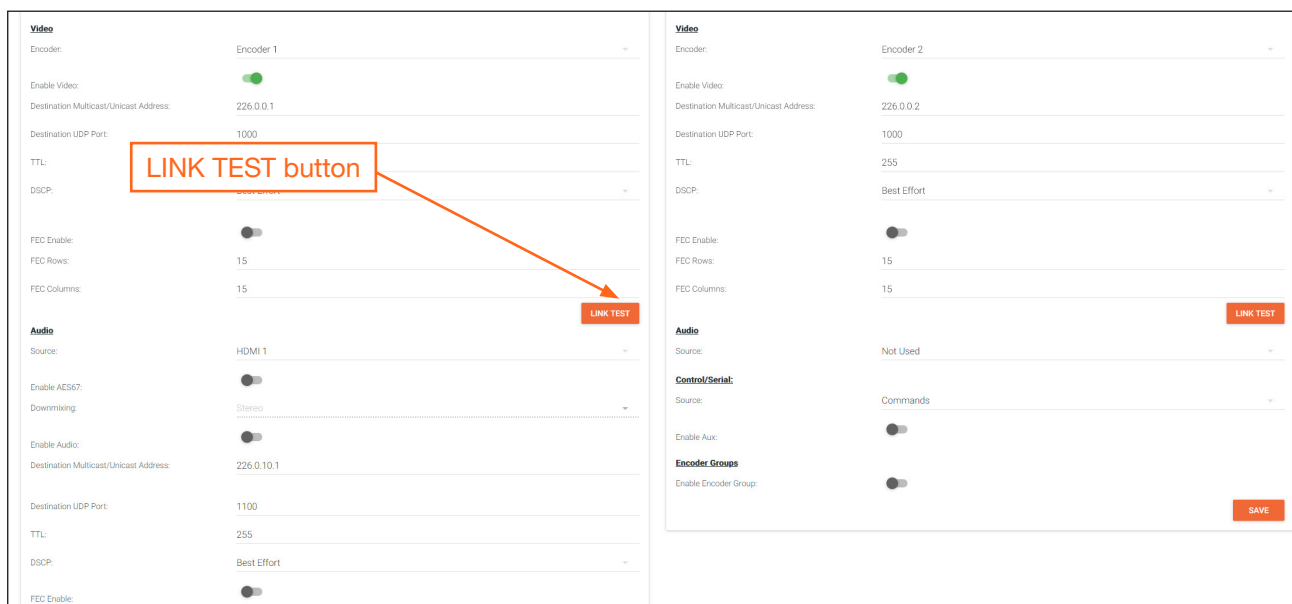
5. The **LINK TEST** button will be hidden and an animated icon will appear, indicating that the link test is in progress.
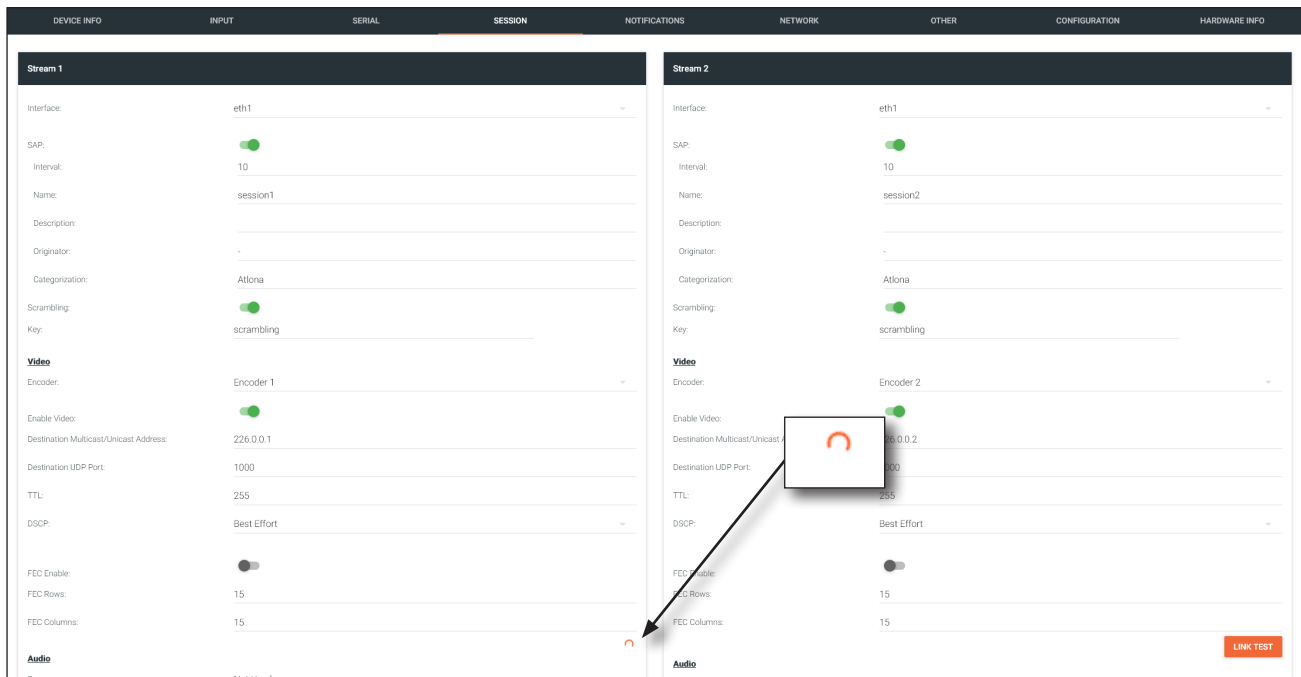
6. After the link test has completed, the **LINK TEST** button will be displayed.

7. Click **NOTIFICATIONS** in the menu bar to review the test results.
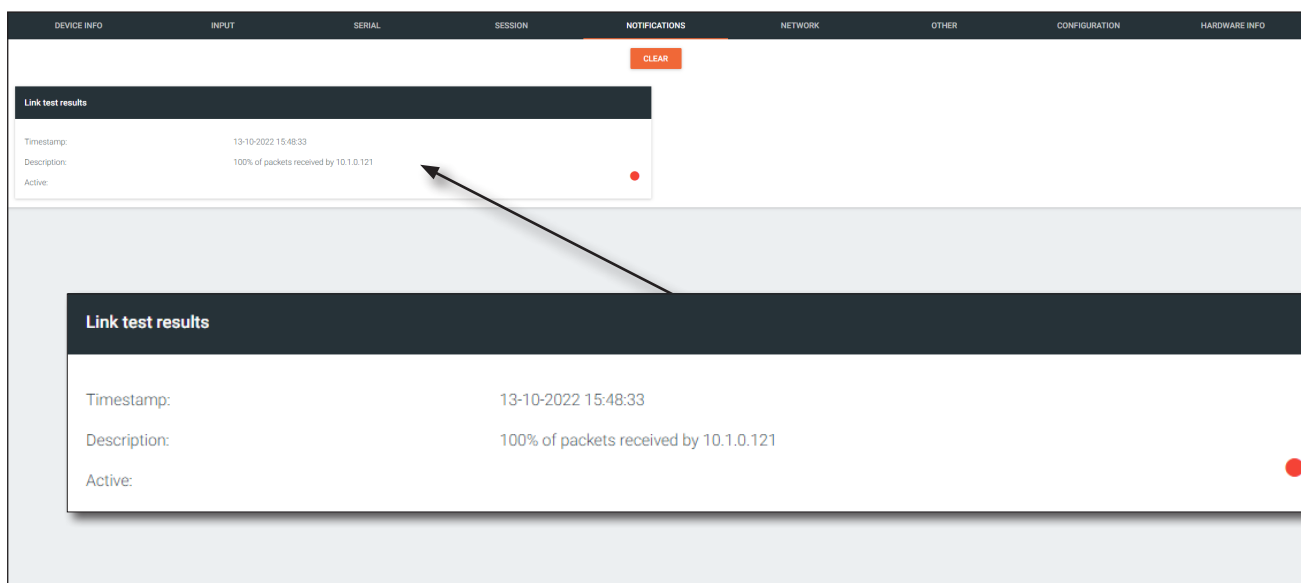
If the test passed, information similar to the following will be displayed: "100% of packets received by ..." indicates no packets were dropped / zero loss.

If the test fails, it could be that less than 100% of packets are received, indicating connectivity, but with some amount of packet loss. If it shows "No one replied!" or if the target decoder is not shown in results, it could indicate that there is a connectivity issue or that the decoder is not subscribed to the correct video multicast address.

8. Click the **CLEAR** button to remove the test results from the **NOTIFICATIONS** page.

<h1 style="text-align:center; color:#E8540A;">Notes on Dual Streaming</h1>

Dual streaming is supported exclusively on the AT-OMNI-111 and allows two unique streams per HDMI input at different bit rates and resolutions. Dual streaming on the AT-OMNI-111 provides two benefits:

• To allow two streams at two different resolutions for use with the Multiview capabilities of the AT-OMNI-121.

• To provide another option for bandwidth management, where users could, for example, choose to only use lower-resolution, lower-bitrate streams in scenarios where the stream needs to traverse multiple switches.

Frequently Asked Questions

Question: What is the maximum video bit rate of each of the two streams?

Answer: The maximum video bit rate for the encoder is 900 Mb/s and can be allocated across the streams. If only one stream is being used, then the maximum bandwidth (900 Mb/s) will be availble. If two streams are being used, then the bandwidth allocation will need to be managed so that the combined bit rate does not exceed 900 Mb/s. The encoder will generate a notification if the maximum bandwidth of 900 Mb/s is attempted from an encoder.

Question: Are there bit rate recommendations for each stream?

Answer: The ideal bit rate for each stream depends on the resolution of the stream. The following guidelines are offered, and the bit rate can always be adjusted as desired.

Resolution	Recommended Bit Rate
4K60 4:4:4	750 Mb/s
4K60 4:2:0	350 Mb/s
4K30 4:4:4	350 Mb/s
1080p60 4:4:4	150 Mb/s

Question: What are the scaling capabilities of each stream?

Answer: The AT-OMNI-111 has two independent scalers – one for each stream. The scaler on Encoder 1 is capable of scaling up and down to resolutions as high as 3840x2160. The scaler on Encoder 2 is capable of scaling up and down to resolutions as high as 1920x1080. For each scaler, there is a list of resolutions that can be selected. Arbitrary scaling resolutions cannot be created and used.

Question: Does each stream have its own session?

Answer: The AT-OMNI-111 has six sessions that can be fully configured. Each session can utilize either of the two encoders, and the most common use case will be to have Stream 1 using Encoder 1 and Stream 2 using Encoder 2, creating two unique streams at two resolutions. However, there is nothing that prevents using Encoder 1 or Encoder 2 on both sessions.

FEC Details

Matrix Size, Overhead, and Latency

- FEC can only work if a single packet from each row/column is missing. Multiple packets missing from each row/column will cause FEC to fail.
- Due to the above, a smaller matrix is more robust, as there is a better chance of errors not occurring in the same row/column.
- FEC has a bitrate overhead that is inversely proportional to the matrix size: the bigger the matrix, the less bitrate overhead is generated.
- FEC has a latency overhead that is directly proportional to the matrix size: the bigger the matrix, the more latency is introduced.
  - » As of v1.0.0, OmniStream does not explicitly synchronize audio and video. Therefore, FEC configuration can have a noticeable impact on lip sync. The tables below should be used to keep the audio/video lip sync as tight as possible.
- FEC latency overhead is also inversely proportional to bitrate: the higher the bitrate, the less FEC latency is introduced.
  - » For applications where lip sync is very critical, using a higher audio sampling rate, and thus a higher audio bitrate, can result in more accurate lip sync.

FEC and Video Bitrate

- The bitrate configured on the video encoder includes FEC overhead and will automatically adjust itself depending on the bitrate needed for FEC.
- FEC overhead can be calculated using the following formulas:

$$Video\ rate = \frac{Configured\ bit\ rate}{1 + \left(\dfrac{Rows + Columns}{Rows \times Columns} \right)}$$

$$FEC\ rate = Configured\ bit\ rate -\ Video\ rate$$

- The following table provides a few examples of how this works.

FEC / matrix usage	Configured bit rate	Used for video	Used for FEC
FEC disabled	900 Mbps	900 Mbps	0 Mbps
FEC enabled, 4x4	900 Mbps	600 Mbps	300 Mbps
FEC enabled, 10x10	900 Mbps	750 Mbps	150 Mbps
FEC enabled, 20x20	900 Mbps	818 Mbps	82 Mbps
FEC enabled, 4x4	450 Mbps	300 Mbps	150 Mbps
FEC enabled, 10x10	450 Mbps	375 Mbps	75 Mbps
FEC enabled, 20x20	450 Mbps	409 Mbps	41 Mbps

FEC, Latency, and Lip Sync

• In order for FEC to work, the matrix must be filled in order to calculate the FEC packets. This introduces some additional latency. Due to high bitrates, this is not noticeable for video, but can be very significant for audio. Therefore, Atlona recommends either leaving FEC disabled for audio or using a very small matrix.

• Latency calculations are complex. The tables below provide some common working benchmarks. In order to minimize lip sync issues, try to match the additional latencies for video and audio as closely as possible.

  » Video - additional video latency for enabling FEC using various matrix sizes.

Configured bit rate	4x4	10x10	20x20
900 Mbps	0.64 ms	3.20 ms	11.74 ms
450 Mbps	1.28 ms	6.40 ms	23.47 ms

  » Audio - additional audio latency for enabling FEC using various matrix sizes.

Format	1x4	2x4	4x4	10x10
2 channel PCM, 44.1 kHz	34.01 ms	68.03 ms	136.10 ms	850.30 ms
2 channel PCM, 48 kHz	31.25 ms	62.50 ms	125.00 ms	781.30 ms
2 channel PCM, 96 kHz	15.63 ms	31.25 ms	62.50 ms	390.60 ms
2 channel PCM, 192 kHz	7.81 ms	15.63 ms	31.25 ms	195.30 ms

• It is recommended to keep lip sync within ±1 frame of video to prevent any noticeable syncing issues.

• Examples of good choices to minimize lip sync issues are:

  » Video configured for 450 Mbps, FEC 10x10; Audio is 2 channel PCM, 192 kHz, FEC 1x4: 6.40 ms – 7.81 ms = -1.41 ms

  » Video configured for 900 Mbps, FEC 10x10; Audio is 2 channel PCM, 48 kHz, FEC disabled: 6.40 ms – 0 ms = 6.40 ms

Differentiated Services Code Point

Differentiated Services Code Point (DSCP) is a method of managing network traffic, in addition to providing *Quality of Service* (QoS) within the Layer-3 (Network Layer) of the OSI network model. DSCP uses the 6-bit Differentiated Services (DS) field in the IP header in order to determine packet classification/priority. Normally, all routers and switches will forward network traffic to the proper destination with the same priority, no matter what type of data it is. This methodology is what is known as *Best Effort*.

The `Best Effort` setting will provide normal priority for data packets, while other settings will raise the priority on data packets. However, it should be noted that a higher priority setting on one type of data type may also result in data packet loss for other data types, depending upon network traffic.

When QoS or differentiated services policy is used, all network devices such as routers, networks switches, and end-devices must be configured properly in accordance with QoS policies on the network. There are two main methodologies for tagging traffic: *Assured Forwarding (AF)* and *Class Selectors (CS)*.

The tables below provide a list of the available selections and their description.

> ⚠ **IMPORTANT:** Consult the IT administrator as to what methods to use and the required settings for each encoder on the network.

Table 1 - Assured Forwarding

Selection	Queue Classification	Drop Probability
AF11	Class 1	Low
AF21	Class 2	Low
AF31	Class 3	Low
AF41	Class 4	Low

Table 2 - Class Selectors

Selection	Class Selector Name
CS0 / Best Effort	Routine
CS1	Priority
CS2	Immediate
CS3	Flash
CS4	Flash Override
CS5	Critical
CS6	Interwork Control
CS7	Network Control
EF	Expedited Forwarding