OmniStream™ R-Type
Single-Channel Networked AV Decoder
## Version Information

<table>
<thead>
<tr>
<th>Version</th>
<th>Release Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mar 2018</td>
<td>Initial release</td>
</tr>
<tr>
<td>2</td>
<td>Jul 2018</td>
<td>Includes updates to 1.2.1 firmware; AMS updates</td>
</tr>
<tr>
<td>3</td>
<td>Nov 2018</td>
<td>1.2.2 firmware; Dolby Vision decoding/licensing, fast switching</td>
</tr>
<tr>
<td>4</td>
<td>Aug 2019</td>
<td>Documentation updated to support AMS 2.4.0</td>
</tr>
<tr>
<td>5</td>
<td>Sep 2019</td>
<td>Documentation updated to support OmniStream 1.2.5; various bug fixes and added Portrait Mode (page 44) for Video Walls.</td>
</tr>
<tr>
<td>6</td>
<td>Oct 2019</td>
<td>Updated documentation to include support for Velocity 1.6.2 - Portrait orientation, rotation for Creating Presets (page 59) and Creating and Using Drop Zones (page 64).</td>
</tr>
<tr>
<td>7</td>
<td>Jan 2020</td>
<td>Velocity video wall screen shots updated to match Velocity 2.0.0.2.</td>
</tr>
<tr>
<td>8</td>
<td>Feb 2020</td>
<td>Added web server documentation reflecting changes to 1.2.6 firmware. Refer to the release notes for a complete listing features and bug fixes. - LLDP menu item added. Refer to the LLDP page (page 115).</td>
</tr>
<tr>
<td>9</td>
<td>Jan 2021</td>
<td><strong>Firmware 1.2.7</strong> - FPGA information now available under the System Information page. Refer to System information page (page 98) for more information. - NTP server set to pool.ntp.org, by default; change under the System Information page. Refer to System information page (page 98) for more information. - Custom SAP multicast address can now be configured under SAP page. Refer to SAP page (page 100) for more information. - Telnet session can now be disabled under the Network page. Refer to Network page (page 112) for more information. - Fast-switching timeout interval can now be set. Refer to Fast Switching (page 32) for more information. - Fast-switching now supports resolutions up to 1920x1200. - Output frame rate can now be adjusted. Refer to HDMI Output page (page 104) for more information.</td>
</tr>
</tbody>
</table>
Sales, Marketing, and Customer Support

Main Office
Atlona Incorporated
70 Daggett Drive
San Jose, CA 95134
United States

Office: +1.877.536.3976 (US Toll-free)
Office: +1.408.962.0515 (US/International)

Sales and Customer Service Hours
Monday - Friday: 6:00 a.m. - 4:30 p.m. (PST)

http://www.atlona.com/

International Headquarters
Atlona International AG
Tödistrasse 18
8002 Zürich
Switzerland

Office: +41 43 508 4321

Sales and Customer Service Hours
Monday - Friday: 09:00 - 17:00 (UTC +1)

http://www.atlona.com/

Operating Notes

- The Atlona Management System (AMS) is a free downloadable application from Atlona that provides network configuration assistance for this product. This application is available only for the Windows® Operating System and can be downloaded from the Atlona web site.


NOTE: Scaling and deinterlacing is not supported at 1080i.
Atlona, Inc. (“Atlona”) Limited Product Warranty

Coverage
Atlona warrants its products will substantially perform to their published specifications and will be free from defects in materials and workmanship under normal use, conditions and service.

Under its Limited Product Warranty, Atlona, at its sole discretion, will either:

• repair or facilitate the repair of defective products within a reasonable period of time, restore products to their proper operating condition and return defective products free of any charge for necessary parts, labor and shipping.

  OR

• replace and return, free of charge, any defective products with direct replacement or with similar products deemed by Atlona to perform substantially the same function as the original products.

  OR

• refund the pro-rated value based on the remaining term of the warranty period, not to exceed MSRP, in cases where products are beyond repair and/or no direct or substantially similar replacement products exist.

Repair, replacement or refund of Atlona products is the purchaser’s exclusive remedy and Atlona liability does not extend to any other damages, incidental, consequential or otherwise.

This Limited Product Warranty extends to the original end-user purchaser of Atlona products and is non-transferrable to any subsequent purchaser(s) or owner(s) of these products.

Coverage Periods
Atlona Limited Product Warranty Period begins on the date of purchase by the end-purchaser. The date contained on the end-purchaser’s sales or delivery receipt is the proof purchase date.

Limited Product Warranty Terms – New Products

• 10 years from proof of purchase date for hardware/electronics products purchased on or after June 1, 2013.
• 3 years from proof of purchase date for hardware/electronics products purchased before June 1, 2013.
• Lifetime Limited Product Warranty for all cable products.

Limited Product Warranty Terms – Refurbished (B-Stock) Products and Discontinued Products

• 3 years from proof of purchase date for all Refurbished (B-Stock) and Discontinued hardware and electronic products purchased on or after June 1, 2013.

Remedy
Atlona recommends that end-purchasers contact their authorized Atlona dealer or reseller from whom they purchased their products. Atlona can also be contacted directly. Visit atlona.com for Atlona’s contact information and hours of operation. Atlona requires that a dated sales or delivery receipt from an authorized dealer, reseller or end-purchaser is provided before Atlona extends its warranty services. Additionally, a return merchandise authorization (RMA) and/or case number, is required to be obtained from Atlona in advance of returns.

Atlona requires that products returned are properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization or case number will be refused. Atlona, at its sole discretion, reserves the right to reject any products received without advanced authorization. Authorizations can be requested by calling 1-877-536-3976 (US toll free) or 1-408-962-0515 (US/international) or via Atlona’s website at atlona.com.

Exclusions
This Limited Product Warranty excludes:

• Damage, deterioration or malfunction caused by any alteration, modification, improper use, neglect, improper packaging or shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature.
• Damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Atlona to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product.

• Equipment enclosures, cables, power supplies, batteries, LCD displays, and any accessories used in conjunction with the product(s).

• Products purchased from unauthorized distributors, dealers, resellers, auction websites and similar unauthorized channels of distribution.

Disclaimers
This Limited Product Warranty does not imply that the electronic components contained within Atlona’s products will not become obsolete nor does it imply Atlona products or their electronic components will remain compatible with any other current product, technology or any future products or technologies in which Atlona’s products may be used in conjunction with. Atlona, at its sole discretion, reserves the right not to extend its warranty offering in instances arising outside its normal course of business including, but not limited to, damage inflicted to its products from acts of god.

Limitation on Liability
The maximum liability of Atlona under this limited product warranty shall not exceed the original Atlona MSRP for its products. To the maximum extent permitted by law, Atlona is not responsible for the direct, special, incidental or consequential damages resulting from any breach of warranty or condition, or under any other legal theory. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

Exclusive Remedy
To the maximum extent permitted by law, this limited product warranty and the remedies set forth above are exclusive and in lieu of all other warranties, remedies and conditions, whether oral or written, express or implied. To the maximum extent permitted by law, Atlona specifically disclaims all implied warranties, including, without limitation, warranties of merchantability and fitness for a particular purpose. If Atlona cannot lawfully disclaim or exclude implied warranties under applicable law, then all implied warranties covering its products including warranties of merchantability and fitness for a particular purpose, shall provide to its products under applicable law. If any product to which this limited warranty applies is a “Consumer Product” under the Magnuson-Moss Warranty Act (15 U.S.C.A. §2301, ET SEQ.) or other applicable law, the foregoing disclaimer of implied warranties shall not apply, and all implied warranties on its products, including warranties of merchantability and fitness for the particular purpose, shall apply as provided under applicable law.

Other Conditions
Atlona’s Limited Product Warranty offering gives legal rights, and other rights may apply and vary from country to country or state to state. This limited warranty is void if (i) the label bearing the serial number of products have been removed or defaced, (ii) products are not purchased from an authorized Atlona dealer or reseller. A comprehensive list of Atlona’s authorized distributors, dealers and resellers can be found at www.atlona.com.
Important Safety Information

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.

CAUTION: TO REDUCE 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.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

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

© 2021 Atlona Inc. All rights reserved. “Atlona” and the Atlona logo are registered trademarks of Atlona Inc. Pricing, specifications and availability subject to change without notice. Actual products, product images, and online product images may vary from images shown here.

The terms HDMI, HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI licensing Administrator, Inc.

Dolby, Dolby Atmos, and the double-D symbol are registered trademarks of Dolby Laboratories Licensing Corporation.

For DTS patents, see http://patents.dts.com. Manufactured under license from DTS, Inc. DTS, the Symbol, DTS and the Symbol together, and Digital Surround are registered trademarks and/or trademarks of DTS, Inc. in the United States and/or other countries. © DTS, Inc. All Rights Reserved.

All other trademark(s), copyright(s), and registered technologies mentioned in this document are the properties of their respective owner(s).
# Table of Contents

- **Introduction** 9
- **Features** 9
- **Package Contents** 9
- **Panel Description** 10
- **Installation** 11
  - RS-232 Connections 11
  - IR Connections 12
  - Connection Instructions 14
  - Connection Diagram 15
- **Configuration** 16
  - Accessing Decoders in AMS 16
  - Configuring a Static IP Address 19
- **Basic Operation** 20
  - LED Indicators 20
  - Rebooting OmniStream 20
  - ID Button 21
    - Broadcast Messaging 21
    - Reset to Factory-Default Settings 21
  - Unicast Mode 22
  - Multicast Mode 24
  - Slate / Logo Insertion 27
  - Text Insertion 30
  - Fast Switching 32
- **Advanced Operation** 34
  - AES67 Audio 34
  - IR Control 35
    - Downstream IR Control 35
    - Upstream IR Control 36
  - Scrambling 37
    - Standard Method 37
    - Using the Virtual Matrix 38
  - Creating Video Walls 39
    - Landscape Mode 39
    - Portrait Mode 44
    - Bezel Compensation 50
  - Video Walls using Velocity 52
    - Creating Presets 59
    - Creating and Using Drop Zones 64
    - Custom Drop Zones 72
- **The AMS Interface** 75
  - Device Info page 75
  - IP Input page 78
  - HDMI Output page 80
  - Serial page 84
  - Network page 86
  - Other page 88
    - Logo 88
    - Text 89
    - PTP 90
    - SAP 91
  - The Virtual Matrix 92
    - Layout and Operation 93
# Table of Contents

## Web Server 95
- Accessing the Web Server 95
- Getting the IP Address 95
- Logging In 96
- System information page 98
- SAP page 100
- IP Input page 101
- Serial page 102
- HDMI Output page 104
- Logo page 108
- Text page 110
- Network page 112
- PTP page 114
- LLDP page 115
- Configuration page 116
- Users page 117
- License page 118
- Upgrade page 119

## Appendix 120
- Updating the Firmware using Velocity™/AMS 120
- Updating the Firmware using the Web Server 123
- Mounting Instructions 124
- Rack Tray for OmniStream 125
- Specifications 126
The Atlona OmniStream™ 521 (AT-OMNI-521) is a networked AV decoder for an OmniStream-encoded video stream up to UHD @ 60 Hz and HDR, plus embedded audio and RS-232 or IR control pass-through. It is part of the OmniStream R-Type Series, designed for high performance, flexible distribution of AV over Gigabit Ethernet in residential and commercial applications. The OmniStream 521 is HDCP 2.2 compliant and ideal for the latest as well as emerging UHD and HDR displays. It features visually lossless compression, optimized for motion video, pristine-quality imaging, and extremely low, sub-frame latency from encode to decode – critical for demanding applications such as gaming. This decoder includes an HDMI output, high performance upscaling and downscaling, aspect ratio control, and video wall processing, plus presentation enhancement features such as logo insertion and scrolling on-screen text.

Features

- AV decoder for HDMI® up to 4K/UHD, plus embedded audio and RS-232 or IR control pass-through
- Supports UHD @ 60 Hz plus HDR formats
- High performance, visually lossless video compression
- Pristine-quality downscaling and upscaling
- Simplify integration with plug-and-play network switch compatibility
- Remotely powered via PoE (Power over Ethernet)
- Video wall processing
- Enhance AV presentations with visual enhancements

Package Contents

1 x AT-OMNI-521
1 x Push spring connector, 6-pin
1 x Wall/table mounting brackets
4 x Rubber feet
1 x Installation Guide
Panel Description

1 **PWR**
This LED indicator is green when the unit is powered and booted.

2 **LINK**
This LED indicator is green when the link integrity between the decoder and the network switch is good.

3 **ID**
Press this button to send a broadcast message to any network devices that are listening. This button is also used to set the decoder to factory-default settings. Refer to **ID Button (page 21)** for more information.

**NOTE:** Some older hardware revisions do not have an **ID** button.

4 **Reboot button**
Press this button, using a small, pointed object to reboot the unit.

5 **HDMI OUT**
Connect an HDMI cable from this port to a UHD/HD display.

6 **ETHERNET**
Connect an Ethernet cable from this port to the Local Area Network (LAN).

7 **RS-232 / IR**
Connect the included 6-pin push spring block to connect an automation system and an IR emitter or extender. **RS-232 Connections (page 11)** for more information.
Installation

RS-232 Connections

The AT-OMNI-521 provides RS-232 over IP which allows communication between an automation system and an RS-232 device. This step is optional. Either the top three or bottom three set of terminals can be used for RS-232.

1. Use wire strippers to remove a portion of the cable jacket.
2. Remove at least 3/16” (5 mm) from the insulation of the RX, TX, and GND wires.
3. Insert the TX, RX, and GND wires into correct terminal on the included push-spring block. If using non-tinned stranded wire, press the orange tab, above the terminal, while inserting the exposed wire. Repeat this step for the TX, RX, and GND connections.

**NOTE:** Typical DB9 connectors use pin 2 for TX, pin 3 for RX, and pin 5 for ground. On some devices, pins 2 and 3 are reversed.
**IR Connections**

The same port that provides RS-232 connections also supports bidirectional IR pass-through, allowing a device to be controlled from either the headend or the decoder endpoint. This step is optional. Either the top three or bottom three set of terminals can be used for IR. Only the RS-232 2 port (bottom set of connectors) supports both RS-232 and IR. Therefore, this port must be used for IR connections.

The following components are required. Note that other components may also be used. However, Atlona has tested and verified the following components for this application:

- Xantech CB12 1 Zone Connecting Block
- Xantech 12 V PSU
- Atlona AT-IR-CS-RX
- Atlona AT-OMNI-IR-TX

**Decoder**

1. Connect the SIGNAL, GROUND, and POWER leads from the Xantech CB12 to the AT-IR-SC-RX.
2. On the Xantech CB12, connect the SIGNAL and GROUND leads to the RX and GND pins, respectively, of the RS-232 2 port.
3. Connect the Xantech 12 V power supply (or other compatible 12 V DC power supply) to the Xantech CB12.

**Encoder**

4. Connect the SIGNAL and GROUND pins, from the AT-OMNI-IR-TX, to the TX and GND pins, respectively, of the RS-232 2 port.
5. Refer to the illustration on the next page to verify that the correct connections have been made.
For downstream IR control, either multicast or unicast mode can be used. However, when controlling a source from the decoder (viewing location), unicast mode should be used. Refer to **Unicast Mode (page 22)** and **Multicast Mode (page 24)** for more information. Refer to **IR Control (page 35)** for information on IR configuration within AMS.

**IMPORTANT:** The IR emitter must be placed no more than 1” from the IR sensor on the device, in order to function properly.
Installation

Connection Instructions

1. Connect an Ethernet cable from the **ETHERNET** port on the decoder to a PoE-capable switch on the Local Area Network (LAN).

   **IMPORTANT:** If a PoE-capable switch is not available, a PoE injector (purchased separately) must be used.

2. Connect an HDMI cable from the **HDMI OUT** port to a UHD/HD display.

3. RS-232 (optional)
   - Connect the RS-232 controller/automation system to the **RS-232** port on the decoder.
   - Connect the RS-232 device to the **RS-232** port on the decoder.

4. IR (optional)

   **NOTE:** The IR emitter or IR receiver must always be connected to the **RS-232 2** port. Refer to IR Control (page 35) for more information.

   - **IR emitter**
     Connect the IR emitter to the **TX** and **GND** pins of the **RS-232 2** port. The IR emitter must be placed no more than one inch from the IR sensor on the device, in order to function properly.

   - **IR extender**
     Connect the IR extender from the **RX** and **GND** pins of the **RS-232 2** port to the associated pins on the control system.

5. Once the unit is powered, the **PWR** indicator, on the front panel, will turn red, then amber, then green.
Configuration

Accessing Decoders in AMS

It is recommended that the Atlona Management System (AMS) be used to configure and control OmniStream devices. AMS uses multicast Domain Name Server (mDNS) to automatically discover each encoder on the network. AMS is free and can be downloaded from https://www.atlona.com/ams.

By default, the AT-OMNI-521 is set to DHCP mode, allowing a DHCP server (if present) to assign the encoder an IP address. Once an IP address has been assigned, the Atlona Management System (AMS) can be used to manage the product on the network. Note that AMS will only be able to discover encoders if they are on the same VLAN.

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

1. Launch a web browser and enter the IP address of AMS, in the address bar.
2. Enter the required login credentials. The default login is:
   Username: admin
   Password: Atlona
3. Click the Login button.
4. The AMS Dashboard will be displayed.
5. Click the icon, in the upper-left corner of the AMS Dashboard.
6. Click **Devices** from the fly-out menu.

7. Click the **Unassigned** option.

8. Click the left and right arrows, at the bottom of the **Unassigned** list, to scroll through all available devices.
Configuration

All available decoders will be displayed under the **Unassigned** category. When a decoder is unassigned, it means that it has not been assigned to a site, building, and/or room. Refer to the AMS 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 mode and assigned an IP address within the range of 169.254.xxx.xxx. If this occurs, configure the network interface of the computer that is running AMS, located on the same subnet (169.254.xxx.xxx, subnet mask 255.255.0.0). Refer to Configuring a Static IP Address (page 19) for more information on configuring the AT-OMNI-521 in Auto IP mode.

If no AT-OMNI-512 is found, then verify the following:

- The computer that is running AMS 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 restrictions applied to the network.

9. Click the desired decoder within the **Unassigned** list.

10. Once the unit is selected, the control interface for the encoder will be displayed. The illustration below shows the **DEVICE INFO** screen for the AT-OMNI-521.
Configuring a Static IP Address

The following section is only required to set the AT-OMNI-521 decoder, currently in Auto IP mode, to a static IP address. If a DHCP server is not found within 60 seconds, decoders are automatically placed in Auto IP mode and will be assigned an IP address within the range 169.254.xxx.xxx. If this occurs, a static IP address can be assigned to the decoder in order for AMS to locate it on the network.

1. Make sure that the AT-OMNI-521 is powered. Power is supplied by connecting an Ethernet cable from the ETHERNET port on the decoder to a PoE-capable switch. If a PoE switch is not being used, then a PoE injector (not included) will need to be used.

2. Connect an Ethernet cable from the PC directly to one of the Ethernet ports on the switch. Make sure that the computer being used has AMS installed.

3. Configure the PC to a static IP address that is on the same subnet as the decoder.

**IMPORTANT:** Before continuing, write down the current IP settings in order to restore them, later. If Obtain an IP address automatically and Obtain DNS server automatically are selected, then this step is not required.

4. Login to AMS. Refer to Accessing Decoders in AMS (page 16) for information on the login process.

5. Locate the AT-OMNI-521 decoder under the Unassigned section within AMS.

6. Click on the device.

7. Under AMS, click NETWORK in the menu bar.

8. Click the DHCP Mode drop-down list and select Static.

9. Enter the required network information for the decoder in the IP Address, Subnet, and Gateway fields.

10. Click the Save button in the bottom-right corner, to apply the changes.

11. Disconnect the decoder from the PC and connect it to the network.

12. The decoder is now ready for use.
Basic Operation

LED Indicators

The following table provides a listing of front-panel LED indicators and their status:

<table>
<thead>
<tr>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR</td>
<td>Unit is powered off.</td>
</tr>
<tr>
<td></td>
<td>• If using a PoE switch, make sure that the port on the switch that is</td>
</tr>
<tr>
<td></td>
<td>connected to the decoder, has PoE enabled. When the decoder is</td>
</tr>
<tr>
<td></td>
<td>powered using PoE, the <strong>PWR</strong> indicator will be green.</td>
</tr>
<tr>
<td></td>
<td>• Check the Ethernet cable for possible damage or loose connections.</td>
</tr>
<tr>
<td></td>
<td>• If a PoE switch is not being used, then a PoE injector (not included)</td>
</tr>
<tr>
<td></td>
<td>will need to be connected to the decoder.</td>
</tr>
<tr>
<td>Red</td>
<td>The decoder is booting.</td>
</tr>
<tr>
<td>Green</td>
<td>The decoder is ready.</td>
</tr>
<tr>
<td>LINK</td>
<td>• The decoder is powered, but no Ethernet cables are connected between the</td>
</tr>
<tr>
<td></td>
<td>switch and the <strong>ETHERNET</strong> port.</td>
</tr>
<tr>
<td></td>
<td>• Check the Ethernet cable for possible damage or loose connections.</td>
</tr>
<tr>
<td>Green</td>
<td>Link integrity is good between the decoder and the network.</td>
</tr>
</tbody>
</table>

Rebooting OmniStream

To reboot the OmniStream decoder, press and release the recessed button, on the far-right side of the unit, using a small, pointed object. Rebooting the decoder does not reset the decoder to factory-default settings.
ID Button

The ID button serves two functions:

1. Sends a broadcast message over the network to any devices that may be listening.
2. Resets the encoder to factory-default settings.

**NOTE:** Some older hardware revisions do not have an ID button.

Broadcast Messaging

Press and release the ID button to send a broadcast notification over the network to any devices that may be listening.

Reset to Factory-Default Settings

**WARNING:** Performing a factory-default reset will erase all user-programmed settings from the encoder. IP settings are not preserved.

**Using the ID button**

1. Press and hold the ID button for approximately 30 seconds.
2. The LED indicators on the front panel will flash, then turn “off.”
3. The encoder is now reset and will need to be reconfigured.

**Using the Mclear command**

1. Connect a PC to serial port 1 using a USB to serial cable.
2. Set the PC console port to the following settings: 9600 baud, 8 data bits, 1 stop bit, no parity.
3. Once connected to the CLI, execute the `Mclear` command.

**Using the Web Server**

1. Log in to the encoder using the built-in web server. Refer to Logging In (page 96) for more information. Note that OmniStream devices communicate using both LLDP and CDP protocols. Consult the switch documentation for information on returning neighbor details from the CLI. Neighbor details will include the IP address of the decoder.
2. Click the Reset Defaults checkbox and click the FACTORY RESET button.
3. The decoder is now reset and will need to be reconfigured.
Basic Operation

Unicast Mode

The term *unicast* is used to describe a configuration where information is sent from an encoder to a single decoder. Although it is common to have multiple encoder and decoder units within a system, it may also be desirable to restrict a single encoder to communicate with one decoder. In *unicast* mode, OmniStream encoders and decoders function similar to an n x 1 switcher. Changing the destination IP address at the encoder, will direct the stream to be received by a different decoder.

The illustration below shows three encoders and three decoders on a network, operating in *unicast* mode. The red lines indicate the data paths from each encoder to a separate (single) decoder.

**NOTE:** By default, both encoders and decoders are shipped in multicast mode.

1. Login to AMS. Refer to *Accessing Decoders in AMS (page 16)* if necessary.
3. Click **SESSION** in the menu bar and locate the **Video** section.
4. Enter the IP address of the decoder in the **Destination Multicast/Unicast Address** field. If using dual-channel encoders, repeat this process for each stream.

5. Scroll down to the bottom of the page and click the **SAVE** button to commit all changes.
6. Go to the decoder AMS interface.
7. Click **IP INPUT** from the menu.
8. Remove the IP address from the **Multicast Address** field.
9. Click the **SAVE** button to commit changes.

10. Unicast setup is complete. The decoder unit will now receive streams exclusively from the encoder containing the IP address of this decoder.
Multicast Mode

The term *multicast* is used to describe a configuration where information is sent from one or more points to a set of other points. For example, a single encoder can transmit data to multiple decoders. In addition, if multiple encoders are used, each encoder can stream data to any decoder that is not already receiving data from an encoder. In *multicast* mode, the OmniStream encoders and decoders function similar to a matrix switcher.

The illustration below shows three encoders and three decoders on a network, operating in *multicast* mode, where multiple decoders are subscribed to a single encoder. The red lines indicate the data paths from an encoder (192.168.11.117) to multiple decoders.

**NOTE:** By default, both encoders and decoders are shipped in multicast mode.

1. Login to AMS. Refer to *Accessing Decoders in AMS* (page 16), if necessary.
2. The AMS Dashboard will be displayed.
3. Click the **icon, in the upper-left corner of the AMS Dashboard.
4. Click *Virtual Matrix* from the fly-out menu. Refer to *The Virtual Matrix* (page 92), if necessary.
5. Locate the desired encoder in the Virtual Matrix, as shown on the next page.
6. Create a cross-connection to the desired decoder. When a cross-connection is created, AMS will automatically assign a multicast IP address to both the encoder and decoder. By default, AMS automatically assigns a multicast IP address to each OmniStream encoder and decoder.

Refer to the illustration on the following page, if necessary.
5. Enter the desired scrambling key using one of the following methods:
   • Manual enter a user-defined key in the Key field.
   • Click the icon to generate a random key using AMS. Each time this icon is clicked, a new scrambling key will be generated.

6. Repeat the above process for each session.

7. Click the Save button to commit the changes.
Basic Operation

Slate / Logo Insertion

IMPORTANT: Slate / logo insertion is not supported when fast switching is enabled. Refer to Fast Switching (page 32) for more information on enabling and disabling fast switching.

Slate / logo insertion is managed from within AMS. 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 will be from the encoder IP address(es) to which each decoder is subscribed. When configured on the decoder, the presence of the image is specified on the (individual) HDMI output. Refer to the OmniStream Single-Channel / Dual Channel A/V Encoder User Manual, for information on managing slate / logo insertion on encoder units.

1. Login to AMS. Refer to Accessing Decoders in AMS (page 16) if necessary.
2. Click OTHER in the menu bar.
3. Verify that Logo is selected, near the upper-left corner of the screen. Logo is the default selection and applies to both logo and slate images.
4. Enter the name of the image in the Name field. If a name is not specified, then the UPLOAD button will be disabled.
5. Under the New logo window group, click the Choose File button and select the image to be used. Only .png files are valid selections.
6. Click the UPLOAD button to upload the file.

IMPORTANT: When using 4K images, the image width must not exceed 30% of the horizontal resolution.
Basic Operation

7. A new window group will be created with the name of the logo that was provided in Step 4.

8. Perform one of the following:
   - If the selected image will be used as a logo, then proceed with Steps 9 through 13.
   - If the image will be used as a slate, skip to Step 14.

9. Under the **HDMI Output 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.
Basic Operation

10. 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 fill the screen.

11. Enter the location of the on-screen image, in pixel values, by entering the desired values in the Horizontal and Vertical fields.

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 HDMI OUTPUT in the menu bar, then click the SHOW ADVANCED button.

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

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Disables the image from being displayed.</td>
</tr>
<tr>
<td>Manual</td>
<td>The image will always be displayed, superimposed on the source signal, and will remain even if the source signal is lost.</td>
</tr>
<tr>
<td>Auto</td>
<td>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.</td>
</tr>
</tbody>
</table>

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

17. Click the SAVE button to apply all changes.
Text Insertion

Text can be inserted and scrolled across the screen, making it useful for messages and notifications. Several options are available when using text: Scroll speed adjustment (forward, reverse, or static), number of iterations, text color, vertical / horizontal position, as well as transparency.

1. Login to AMS. Refer to Accessing Decoders in AMS (page 16) if necessary.
2. Click OTHER in the menu bar.
3. Click Text in the side menu bar, in the upper-left corner of the AMS screen.
4. Click the Enabled toggle switch, to allow the text to be displayed. When enabled, the toggle switch will be green.

5. In the Text field, enter the desired text.
6. 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.
7. Enter the number of iterations in the Iteration field. Set this field to 0 (zero) to set the number of iterations to infinity.
8. 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.
9. Specify the location of the text in the Horizontal (%) and Vertical (%) fields. Each of these values is based on the horizontal and vertical resolution of the screen.
9. Specify the size of the text in the **Width (%)** and **Height (%)** fields. Each of these values is based on the horizontal and vertical resolution of the screen.

10. Click the **SAVE** button to apply all changes.
Basic Operation

**Fast Switching**

**IMPORTANT:** If Fast Switching is enabled, latency increases from 0.5 frames to 1.5 frames. When using Fast Switching mode, the output resolution will be 1920x1080p, regardless of the source resolution. Also note that 1080i is not supported in Fast Switching mode. Also note that Slate / Logo Insertion and Text Insertion will be automatically disabled when Fast Switching is enabled.

This feature is a software implementation which vastly improves the HDMI authentication process, resulting in ultra-fast switching between video streams.

1. Login to AMS. Refer to Accessing Decoders in AMS (page 16) if necessary.
2. Click **HDMI OUTPUT** in the menu bar.
3. Click the **Fast Switching Enable** toggle switch. By default, this feature is disabled and the toggle switch will be gray. Click the toggle switch to enable fast switching. When enabled, the toggle switch will be green.

4. Enter the timeout interval in the **Fast Switching Timeout (s)** field. When fast switching is enabled, and if 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, 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. The timeout interval is in seconds.

5. Set the output resolution and frame rate in the **Resolution** and **Framerate** fields. The following table provides maximum timing, color space, and bit-depth specifications when fast switching is enabled.

<table>
<thead>
<tr>
<th>Number of Channels</th>
<th>Resolution</th>
<th>Framerate</th>
<th>Color Space</th>
<th>Bit Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1920 x 1200</td>
<td>60 Hz</td>
<td>4:4:4</td>
<td>12-bit</td>
</tr>
</tbody>
</table>
NOTE: When fast-switching is enabled, the output resolution at the decoder endpoint is dependent on both the number of channels on the decoder and the input resolution received from the encoder. Refer to the table below for details.

<table>
<thead>
<tr>
<th>Input Resolution (from Encoder)</th>
<th>Output Resolution (AT-OMNI-521)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1280 x 720p</td>
<td>1280 x 720p</td>
</tr>
<tr>
<td>1920 x 1080p @ 60 Hz</td>
<td>1920 x 1080p @ 60 Hz</td>
</tr>
<tr>
<td>&gt; 1920 x 1080p (up to UHD)</td>
<td>1920 x 1080p @ 60 Hz</td>
</tr>
</tbody>
</table>
Advanced Operation

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. Login to AMS. Refer to Accessing Decoders in AMS (page 16), if necessary.
2. Click Devices > All and select the desired encoder from the Device List.
3. Click SESSION in the menu bar.
4. Locate the Audio section, under the desired Stream, and click the Enable AES67 toggle switch to enable this feature. When enabled, the toggle switch will be green.

5. Select the type of downmixing from the Downmixing drop-down list, if desired. Available options are: None, Mono, or Stereo.
6. Click the SAVE button within the Stream window group.
7. Go to the decoder interface and click OTHER in the menu bar.
8. Click SAP in the upper-left corner of the screen.
9. 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.
10. Click the SAVE button on the SAP page.
IR Control

OmniStream provides IR control from either the headend / source location to the displays (downstream) or from the viewing location to the headend (upstream). For downstream IR control, either multicast or unicast mode can be used. However, when controlling a source from the viewing location, unicast mode should be used. Refer to Unicast Mode (page 22) and Multicast Mode (page 24) for more information.

**NOTE:** IR control is only supported on the RS-232 / IR 2 (bottom) port. The IR emitter or IR receiver must be connected to this port. Refer to IR Connections (page 12) for wiring information.

**Downstream IR Control**

Follow the instructions below to configure AMS to allow IR data to be sent from the encoder to the decoder endpoint.

1. Login to AMS. Refer to Accessing Decoders in AMS (page 16), if necessary.
2. The AMS Dashboard will be displayed.
3. Click the icon, in the upper-left corner of the AMS Dashboard.
4. Click Devices > All and locate the desired encoder from the AMS Device List.
5. Click SERIAL in the menu bar.
6. Under the Serial Port 2 section, make sure that the Mode drop-down list is set infrared. This will be the only option for the AT-OMNI-521 under Serial Port 2.

7. Scroll down and locate the Serial Configuration 2 section and select Serial Port 2 from the Port drop-down list.
8. Click the Mode drop-down list and select Output.
9. Click the Input drop-down list and select the IP input. The selected input must not be currently in use by another session. If the input is already in use, then an error message will be displayed. If this occurs, then select another input.
10. Click the SAVE button to commit changes. If IR signals need to be sent upstream, to the encoder, then follow the instructions under Upstream IR Control (page 36).
Advanced Operation

Upstream IR Control

In order to send IR data upstream, from the decoder to the encoder, a few additional simple steps are required.

1. Follow steps 1 through 9, under Downstream IR Control (page 35).

2. Click IP Input in the top menu bar.

3. Locate the IP Input 5 (Control) window group and enter the IP address of the encoder, in the Multicast Address field.

4. Enter the port number in the Port field.

5. Click the Enabled toggle switch to enable bidirectional control. When enabled, the toggle switch will be green, and will allow IR signals to be sent to the encoder.

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

OmniStream supports 128-bit Advanced Encryption Standard (AES) scrambling and is required for HDCP-encrypted streams. Scrambling can be enabled or disabled through AMS, and can be applied to individual sessions. In order for scrambling to function properly, it must be enabled on both the encoder session and all decoders subscribed to a stream that is a part of a scrambled session. The scrambling key on both encoder and subscribed decoder(s) must be identical. When enabled, the default scrambling key is “key”.

**Standard Method**

1. Login to AMS. Refer to Accessing Decoders in AMS (page 16), if necessary.
2. Click **Devices > All** and select the desired encoder from the **Device List**.
3. Click **HDMI OUTPUT** in the menu bar.
4. Under the desired HDMI output, click the **Enabled** toggle switch, under **Descrambling**, to enable it. When enabled, the toggle switch will be green and the **Key** field will be displayed.
5. Enter the scrambling key in the **Key** field.

**IMPORTANT:** In order for scrambling to function correctly, the same key that was specified on the encoder (scrambling) must be entered in the **Key** field. Also note that if a user-defined key is specified, then it must be a minimum of eight alphanumeric characters. Special characters and spaces are not permitted.

6. Click the **Save** button at the bottom of the page to commit the changes.
3. Enter the desired scrambling key in the **Key** field.

**NOTE:** If a user-defined key is specified, then it must be a minimum of eight alphanumeric characters. Special characters and spaces are not permitted.

4. Click the **Save** button at the bottom of the page to commit the changes.

### Using the Virtual Matrix

1. Access the Virtual Matrix. Refer to *The Virtual Matrix (page 92)* for more information.

2. Locate the desired encoder or decoder. Scrambling is handled on the encoder; descrambling is handled on the decoder.

3. Click the yellow key icon. The Scrambling dialog box will be displayed. If the key icon for a decoder is clicked, then the Descrambling dialog box will be displayed.

4. Click the **Enable** toggle switch to enable scrambling for the desired session.
Creating Video Walls

**NOTE:** OmniStream video walls do not support 1080i sources.

The following table lists the maximum video wall size, based on the resolution of the source.

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Maximum Video Wall Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>4Kp60</td>
<td>2 x 2</td>
</tr>
<tr>
<td>4Kp30</td>
<td>16 x 16</td>
</tr>
<tr>
<td>1080p60</td>
<td>n x n (no limit)</td>
</tr>
</tbody>
</table>

**Landscape Mode**

The following diagram will be used to illustrate how to configure a 2 x 2 video wall. The details of this diagram are listed below:

- Four decoders are subscribed to a single encoder. Each decoder is connected to a display.
- The encoder is transmitting a 3840 x 2160 video signal.
- The top two displays have been accidentally mounted upside down.

This diagram presents some challenges that need to be met:

a. Since there are four displays, the image from each decoder will need to be scaled to one-fourth of the total resolution. The crop-and-scale feature will be used to provide the correct output.

b. The top two displays have been mounted upside-down. To meet this challenge, the rotate feature will be applied to these two displays.
Advanced Operation

Note that the order in which each image is cropped, scaled, and/or rotated is arbitrary. In this example, the configuration process will begin with Display 1, in the top left.

1. Login to AMS. Refer to Accessing Decoders in AMS (page 16) if necessary.
2. Click HDMI OUTPUT in the menu bar.
3. Click the SHOW ADVANCED button.
4. Locate the Resolution option, in the Video section, and select 1920x1080. This will scale the output resolution from each decoder to 1920x1080.

5. Click the Stretch/Crop Mode drop-down list and select Full Screen. This guarantees that the image will fill the screen.
6. Click the **Enable** toggle to activate the **Video wall** option. Once enabled, the **Video wall** section will be expanded and display all available options.

![Video Wall]

7. Click the **Unit** drop-down list to select the unit of measure. In this example, **Pixels** (the default value) will be used.

![Unit]

**IMPORTANT:** When using Millimeters or Inches, two additional fields will be available: **Video Wall Width** and **Video Wall Height**. When entering these values, the following requirement must be observed: **Video Wall Width** must be greater than or equal to the display width. **Video Wall Height** must be greater than or equal to the display height.

8. Enter the horizontal and vertical resolution of the display in the **Width** and **Height** fields. This is the size of the source to be used for this window of the video wall. The table below, lists width and height examples for a 2x2 video wall, with the specified source resolution.

<table>
<thead>
<tr>
<th>Source resolution</th>
<th>Width (pixels)</th>
<th>Height (pixels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3840 x 2160 (UHD)</td>
<td>1920</td>
<td>1080</td>
</tr>
<tr>
<td>1920 x 1080 (1080p)</td>
<td>960</td>
<td>540</td>
</tr>
</tbody>
</table>

9. Enter the number of video wall rows in the **Horizontal** field and the number of columns in the **Vertical** field. These values are the pixel start position (upper left most pixel). The table below, lists left and right coordinates for a 2x2 video wall, with the specified source resolution.

<table>
<thead>
<tr>
<th>Source resolution</th>
<th>Upper Left</th>
<th>Upper Right</th>
<th>Lower Left</th>
<th>Lower Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>3840 x 2160 (UHD)</td>
<td>0, 0</td>
<td>1920, 0</td>
<td>0, 1080</td>
<td>1920, 1080</td>
</tr>
<tr>
<td>1920 x 1080 (1080p)</td>
<td>0, 0</td>
<td>960, 0</td>
<td>0, 540</td>
<td>960, 540</td>
</tr>
</tbody>
</table>
10. Click the **Rotation** drop-down list to select the rotation angle of the image. In this example, select **180** from the drop-down list. The image will be flipped, vertically. This step is only applied when configuring the two top displays.

![Rotation drop-down list example](image)

The image on Display 1, as illustrated below, has been cropped and rotated and is now displayed correctly. One-fourth of the video wall has been configured.

11. Click the **SAVE** button at the bottom of the screen to commit changes.

12. Repeat steps 4 through 10 for decoders 2, 3, and 4. Note that in the example below, decoders 3 and 4 will not require any rotation. Therefore, make sure the **Rotation** option is set to 0 for decoders 3 and 4.
Once all four decoders have been properly configured, the video wall should appear similar to the following:

13. Check the image, on each display, and make sure they are aligned correctly with the other images on the video wall. Use the Edge Compensation drop-down list to select the desired bevel compensation. See the next page for more information.
Portrait Mode

Images can be rotated 90° or 270° to create portrait-oriented video walls. The steps to configure portrait-oriented video walls is very similar to creating landscape video walls.

A similar scenario to the landscape video wall challenge will be used to illustrate how to configure a 1 x 4 portrait-oriented video wall. The details of this diagram are listed below:

- Four decoders are subscribed to a single encoder. Each decoder is connected to a display.
- The encoder is transmitting a 3840 x 2160 video signal.
- Display 2 and 3 have been mounted upside-down.

*a. Since there are four displays, the image from each decoder will need to be scaled to one-forth of the total resolution. The crop-and-scale feature will be used to provide the correct output.*

*b. Display 2 and 3 have been mounted upside-down. To meet this challenge, the images must be flipped horizontally and rotated 90°, which gives a total rotation angle of 270°. Display 1 and 4 only need to be rotated 90°.*

Note that the order in which each image is cropped, scaled, and/or rotated is arbitrary. In this example, the configuration process will begin with Display 1.
1. Access the built-in web server for the OmniStream decoder and login using the required username and password. The default credentials are listed below:

- Username: admin
- Password: Atlona

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

3. Locate the **Resolution** option, in the **Video** section and select 1920x1080. This will scale the output resolution to 1920x1080.
4. Click the Stretch/Crop Mode drop-down list and select Full Screen. This guarantees that the image will fill the screen.

5. Under the Video Wall section, click the Enable toggle to activate the Video wall option. Once enabled, the Video wall section will be expanded and display all available options.

6. Click the Unit drop-down list to select the unit of measure. In this example, Pixels (the default value) will be used.

**IMPORTANT:** When using Millimeters or Inches, two additional fields will be available: Video Wall Width and Video Wall Height. When entering these values, the following requirement must be observed: Video Wall Width must be greater than or equal to the display width. Video Wall Height must be greater than or equal to the display height.

7. Enter the horizontal and vertical resolution of the display in the Width and Height fields. This is the size of the source to be used for this window of the video wall. The table on the next page, lists width and height examples for a 2x2 video wall, with the specified source resolution.
Advanced Operation

8. Enter the number of video wall rows in the **Horizontal** field and the number of columns in the **Vertical** field. These values are the pixel start position (upper left most pixel). The table below, lists left and right coordinates for a 1x4 video wall, with the specified source resolution.

<table>
<thead>
<tr>
<th>Source resolution</th>
<th>Width (pixels)</th>
<th>Height (pixels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3840 x 2160 (UHD)</td>
<td>1920</td>
<td>1080</td>
</tr>
<tr>
<td>1920 x 1080 (1080p)</td>
<td>960</td>
<td>540</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source resolution</th>
<th>Upper Left</th>
<th>Upper Right</th>
<th>Lower Left</th>
<th>Lower Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>3840 x 2160 (UHD)</td>
<td>0, 0</td>
<td>1920, 0</td>
<td>0, 1080</td>
<td>1920, 1080</td>
</tr>
<tr>
<td>1920 x 1080 (1080p)</td>
<td>0, 0</td>
<td>960, 0</td>
<td>0, 540</td>
<td>960, 540</td>
</tr>
</tbody>
</table>

9. Click the **Rotation** drop-down list to select the rotation angle of the image. In this example, select **90** from the drop-down list to rotate the image as portrait.

The image on Display 1 is cropped and rotated and is now displayed correctly. At this point, one-fourth of the video wall has been configured.
10. Click the SAVE button at the bottom of the screen to commit changes.

11. Repeat steps 3 through 9 for decoders 2, 3, and 4. Since display 2 and 3 were mounted upside-down, they will require a rotation of 180° (to flip horizontally) + 90° (to align them as portrait), giving a total rotation of 270°.

**IMPORTANT:** When using dual-channel decoders, the Rotation feature can only be used when a single HDMI channel is active. Image rotation is not supported on dual-channel decoders when both HDMI channels are active. Single-channel decoders do not have this restriction.

Once all four decoders have been properly configured, the image will be correctly displayed across all four displays. Refer to the illustration on the next page.

12. Check the image, on each display, and make sure they are aligned correctly with the other images on the video wall. Use the Edge Compensation drop-down list to adjust bevel compensation, if necessary. Refer to Bezel Compensation (page 50) for more information.
Figure 2.3: Portrait-mode 1 x 4 video wall displayed correctly.
Bezel Compensation

Displays have a region where video is not displayed, called the bezel. This can cause display issues when creating video walls. Bezel compensation takes this area into account when a single video source is mapped across multiple displays. Bezel compensation can be adjusted at any time.

The illustration on the left shows a simple 2x2 video wall without bezel compensation. Note how the Atlona logo is stretched, horizontally. On the right, bezel compensation is used to correct the “distorted” image.

1. Locate the Bezel Compensation from the Edge Compensation drop-down list.

2. Adjust the Top, Bottom, Left, and Right values, as desired. All entered values are applied to the physical displays in 1 pixel increments. Refer to the examples, below, to properly calculate the amount of bezel compensation.

If one bezel needs compensating in each direction (e.g. on a 2x2 wall, where only bezel is in the way, in each direction), use the following formula:

\[
\text{Bezel width (px)} = \left( \frac{\text{Total width (px)}}{[\text{display area width (in/mm)} + \text{bezel width (in/mm)}]} \right) \times \text{bezel width (in/mm)}
\]
If two bezels need compensating (e.g. on a 3x3 wall, where the middle display has two bezels is in the way, in each direction), use the following formula:

$$\text{Bezel width (px)} = \left( \frac{\text{Total width (px)}}{[\text{display area width (in/mm)} + \text{bezel width #1 (in/mm)} + \text{bezel width #2 (in/mm)}]} \right) x \text{bezel width (in/mm)}$$

3. Click the **SAVE** button at the bottom of the screen to accept changes.
Advanced Operation

Video Walls using Velocity

The following section provides instructions on creating and using video walls with the Atlona Velocity Control Software. Familiarity with the Velocity software is assumed. Refer to the Atlona Velocity User Manual for more information, if necessary.

**NOTE:** As of this writing, the Velocity™ software is limited to a maximum video wall size of 12 x 12, for resolutions of 4Kp30 and 1080p60.

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 Dashboard will be displayed.
5. Click the 📌 icon, in the upper-left corner, to display the fly-out menu.

6. Click **Sites** in the menu bar to expand the list of buildings and rooms.
7. 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.
8. The **Modify Room** screen will be displayed. Click the **Add Technology** icon in the top far-right corner of the screen. This icon is represented by the + sign.

9. The **Technology** fly-out menu will be displayed.

10. In the fly-out menu, click **Miscellaneous > Atlona** to expand the Atlona technology menu.

11. Click the **Quick Add** button for **Velocity Video Wall: VELOCITY-VIDEO-WALL**. The video wall technology will be added to the room.
Advanced Operation

12. Scroll down to the bottom of the page and locate the **Velocity Video Wall** driver.

13. Click the **Edit** icon. This icon is represented by a pencil.

14. 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 default video wall dimensions are set to 3840 x 2160. To modify the video wall size, follow steps 14a through 14e. To continue with the default video wall dimensions, click the **CLOSE** button and go to step 15.

   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.
Advanced Operation

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.

15. The Video Wall Configuration screen will be displayed and will automatically be set to edit displays mode. This mode allows displays in the Pixel Space window to be added, removed, and arranged. In this mode, the Displays icon will be green.

The following identifies each icon in the Pixel Space toolbar.

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 64) 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.
Advanced Operation

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

b. **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.

c. **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.

d. **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.

e. **Undo**
   Click this icon to undo the last operation.

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

16. **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. For this example, four displays will be added, manually.

NOTE: The order in which the displays are placed in the Pixel Space window is not important and both the number of displays and how they are arranged can always be changed at a later time.
17. 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. In this example, a 2x2 video wall will be created.

Once **Auto Arrange** has been applied, the **Pixel Space** window will appear similar to the illustration below. 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 *Atlona Velocity User Manual* for more information on naming devices.
18. 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.

19. 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 the name of the preset in the Preset Edit dialog.
4. Click the CLOSE button to save the preset name and dismiss the dialog.

5. 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 more than one source can be mapped to each display. For example, in the illustration below, the AT-OMNI-512 (225.0.0.19, port 1000) has been mapped to both Left Display 2 (upper-left corner) and Left Display 1 (lower-right corner).
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.

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.
Advanced Operation

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

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
Advanced Operation

Sources can also be re-sized “on the fly” to achieve the desired presentation. Refer to the illustration below. 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 *Atlona Velocity User Manual* for more information on manipulating source windows.

**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.

6. Click **ADD**, under the **Presets** section, on the left side of the screen, to create additional presets.

7. Repeat steps 3 through 5 to create the preset. Once the desired presets have been created, click the preset name under the Presets section 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.
**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](image1)

![Figure 1.2 - Source content properly rotated to span three vertically rotated displays.](image2)

1. Click the **icon in the upper-right corner of the screen.** The **Edit Zone** 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**

**Source 3**

1. Click the icon in the upper-right corner of the source window. The **Edit Zone** 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.
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.

10. Click the Lock Preset button, once the containers have been placed in the desired positions.
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 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.
Advanced Operation

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.
Advanced Operation

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.
The AMS Interface

Device Info page

The Device Info page provides general information about the decoder. The encoder has an identical interface.

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

Model
The model number of the unit.

IP Address
Displays the IP address of the decoder.

MAC Address
Displays the hardware MAC address of the decoder.

Firmware version
The version of firmware that the encoder is running. Always make sure the latest version of firmware is installed.

FIRMWARE UPDATE
Click this button to update the firmware.

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

Location
Provides the option of assigning descriptor for the location of the unit.
The AMS Interface

Uptime
Time elapsed since the last reboot operation.

Hostname
The hostname of this unit. This can be changed if desired. By default, the host name is automatically created using the model of the unit and adding the last five digits of the unit serial number.

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.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None Checked</td>
<td>Resets the decoder with no factory-default settings.</td>
</tr>
<tr>
<td>Reset User</td>
<td>Resets the decoder to factory-default settings and resets custom user information.</td>
</tr>
<tr>
<td>Reset Network</td>
<td>Resets the decoder to factory-default settings and resets network information.</td>
</tr>
<tr>
<td>Reset Defaults</td>
<td>Resets the decoder to factory-default settings. In addition, static multicast addresses are configured. This option can be used to configure a single encoder to transmit to any number of decoders without using the Virtual Matrix within AMS.</td>
</tr>
</tbody>
</table>

**IMPORTANT:** This option will not work for multiple decoders on the same network.

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.

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

Advanced Settings
Click the SHOW ADVANCED button to view the following options.

Timezone
Click this drop-down list to select the time zone, expressed in Universal Coordinated Time (UTC).

System Temperature
The current internal temperature of the unit listed in both degrees Fahrenheit and Celsius.

Die Temperature
The component chip temperature listed in both degrees Fahrenheit and Celsius.

Power Consumption
The current power consumption value.
The AMS Interface

Dolby Vision License Enabled
This indicator will be green if the Dolby Vision license is installed.

Dolby Vision License Key
Enter the license key in this field, then press the SAVE LICENSE button.

SAVE LICENSE
Click this button to activate a valid Dolby License key.

NTP Server
Specify the desired NTP server in this field. This provides timestamps for any logs and alarms.

Buttons
Disabling this feature will lock the ID button on the front panel. This feature is enabled by default.

LEDs
Disabling this feature will turn off all LED indicators on the front panel. This is enabled by default.
The AMS Interface

IP Input page

The IP Input tab provides configuration of each input, the assigned multicast address(es), and ports.

Enabled
Click this checkbox to enable the IP input.

Interface
The physical interface that will be used to carry the multicast traffic. The only available selection is eth1.

Multicast Address
Enter the multicast address of the decoder stream.

Port
Enter the multicast UDP listening port in this field.
Advanced Settings

The following settings are related to IGMPv3 multicast filtering. IGMPv3 provides support for source-specific multicast devices. For example, the receiver of a multicast group can specify a set of addresses to which it can subscribe (include mode) or not subscribe (exclude mode).

Mode (IGMPv3 only)
Click this drop-down list to select the mode. Mode can be set to exclude or include and is specifically used when using Source Specific Multicast (SSM). SSM will only function if the network is properly set up to support it.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>exclude</td>
<td>Multicast content coming from the source mentioned in the <strong>Addresses</strong> section will be excluded (blocked).</td>
</tr>
<tr>
<td>include</td>
<td>Multicast content coming from the source mentioned in the <strong>Addresses</strong> section will be included, and allowed to be passed to the decoder.</td>
</tr>
</tbody>
</table>

Addresses

Enter the IPv4 address of the encoder(s) in this field and is used as the SSM include/exclude list. Use the comma delimiter to separate multiple IP addresses. When using non-SSM networks, this field is ignored.
HDMI Output page

The **HDMI Output** tab provides options to configure the output streams.

**Enabled**
Click this toggle switch to enable or disable scrambling on the decoder. When enabled, the toggle switch will be green.

**Key**
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.

**Encrypted**
Indicates if the content is HDCP-encrypted or not. If true, then HDCP content is being passed in to the decoder and this indicator will be colored green.

**Supported Version**
Click this drop-down list to select the desired HDCP version. If set to none, then the sink is reported as “non-compliant” and will receive non-HDCP content.

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>The decoder will receive non-HDCP content.</td>
</tr>
<tr>
<td>1.4</td>
<td>The decoder will receive HDCP version 1.4 content.</td>
</tr>
<tr>
<td>2.2</td>
<td>The decoder will receive HDCP version 2.2 content.</td>
</tr>
</tbody>
</table>

**Negotiated Version**
The version of HDCP being received.

**EDID**
This is a read-only field and cannot be modified. The data in this field is the EDID of the display to which the decoder is connected. This EDID data in this field can be copied to the encoder, allowing the source to send AV formats which are supported by the sink (display) device. Refer to the AT-OMNI-512 User Manual for more information.
The AMS Interface

**Video**
Click this drop-down list to select the desired primary video input. Select **generator** to use the internal signal generator. Select the **Not Used** option to leave the video input unassigned.

**Status**
Displays the input status. If no input is active or detected, then this field will display "No active video".

**Stretch / Crop Mode**
Click this drop-down list to select the aspect ratio.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keep Aspect Ratio</td>
<td>Aspect ratio is preserved; the output on the decoder will be the same as the input on the encoder.</td>
</tr>
<tr>
<td>Full Screen</td>
<td>Stretches the image to fill the screen. In some cases this can distort (&quot;stretch&quot;) the image.</td>
</tr>
<tr>
<td>16:9</td>
<td>Sets the aspect ratio to 16:9 &quot;widescreen&quot; format, usually associated with HDTV formats.</td>
</tr>
<tr>
<td>16:10</td>
<td>Sets the aspect ratio to 16:10 &quot;widescreen&quot; format, usually associated with computer displays and smart devices.</td>
</tr>
<tr>
<td>4:3</td>
<td>Sets the aspect ratio to 4:3 &quot;pan-and-scan&quot; format, usually associated with SDTV.</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Resolutions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>1440 x 1050</td>
</tr>
<tr>
<td>Auto</td>
<td>1440 x 900</td>
</tr>
<tr>
<td>4096 x 2160</td>
<td>1280 x 1024</td>
</tr>
<tr>
<td>3840 x 2160</td>
<td>1280 x 800</td>
</tr>
<tr>
<td>1920 x 1200</td>
<td>1280 x 768</td>
</tr>
<tr>
<td>1920 x 1080</td>
<td>1280 x 720</td>
</tr>
<tr>
<td>1680 x 1050</td>
<td>1024 x 768</td>
</tr>
<tr>
<td>1600 x 900</td>
<td></td>
</tr>
</tbody>
</table>

**Fast Switching Enable**
Click this toggle switch to enable or disable fast-switching. Refer to **Fast Switching (page 32)** for more information.

**Input**
Click this drop-down list to select the primary audio IP input. Select the **Not Used** option to leave the audio input unassigned.

**Active Input**
Displays the active audio IP Input.
The AMS Interface

Downmixing
Click this drop-down list to select how LPCM audio will be down-mixed. Note that lossless audio formats cannot be down-mixed.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Audio is not down-mixed.</td>
</tr>
<tr>
<td>Stereo</td>
<td>Audio is down-mixed to two-channel stereo.</td>
</tr>
<tr>
<td>Auto</td>
<td>Audio is down-mixed per the EDID of the connected HDMI device.</td>
</tr>
</tbody>
</table>

Status
Displays the audio input status. 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.

Advanced Settings
Click the SHOW ADVANCED button to view the following options.

Slate Mode
Click this drop-down list to select the slate mode. Refer to Slate / Logo Insertion (page 27) for more information.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Disables the image from being displayed.</td>
</tr>
<tr>
<td>Manual</td>
<td>Stretches the image to fill the screen. In some cases this can distort (“stretch”) the image.</td>
</tr>
<tr>
<td>Auto</td>
<td>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.</td>
</tr>
</tbody>
</table>

Enable
Click this toggle switch to enable or disable the video wall feature. When enabled, the toggle switch will be green. Refer to Creating Video Walls (page 39) for more information.

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.

Enable AES67
Click this toggle switch to enable or disable AES67. When enabled, the toggle switch will be green. Refer to AES67 Audio (page 34) for more information.

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.
The AMS Interface

**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.

**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.
Serial page

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

### Supported Modes
Lists the supported protocols.

**Mode**
Click this drop-down list to select the desired serial mode: Infrared or Serial.

**Baud Rate**
Click this drop-down list to select the desired baud rate.

**Data**
Click this drop-down list to select the number of data bits.

**Parity**
Click this drop-down list to select the parity bit.

**Stop**
Click this drop-down list to select the stop bit.

**Flow**
Click this drop-down list to select the type of flow control.
**The AMS Interface**

**Port**
Click this drop-down list to select the port: serial_port1, serial_port2, or Not Used.

**Mode**
Click this drop-down list to select the desired control mode.

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cli</td>
<td>Displays the command-line interface of the decoder.</td>
</tr>
<tr>
<td>output</td>
<td>Serial port will send commands directly to the display device.</td>
</tr>
<tr>
<td>tcpproxy</td>
<td>Commands are sent over IP but triggered over the serial port.</td>
</tr>
</tbody>
</table>

**Advanced Settings**
Click the SHOW ADVANCED button to view the following options.

**Command**
Each of these The Command blocks are used to enter the command string for the desired operation: Display Off, Display On, Volume Down, and Volume Up.

**Mode**
Click this drop-down list to select where the command will be interpreted.

<table>
<thead>
<tr>
<th>Interpret on</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw</td>
<td>Commands are interpreted at the encoder.</td>
</tr>
<tr>
<td>Decoder</td>
<td>Commands are interpreted at the decoder.</td>
</tr>
</tbody>
</table>

**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 decoder requires that only one field be completed.
The AMS Interface

Network page

The **Network** page provides the ability to enable or disable DHCP mode for the physical interface. When DHCP mode is disabled, the IP address, subnet mask, and gateway must be provided. This screen is identical to the **Network** page for the encoder.

**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 network mode. Select DHCP to let the DHCP server (if present) assign the encoder the IP settings; **Subnet** and **Gateway** fields will automatically be populated. When **Static** mode is selected, the information for the **IP Address**, **Subnet**, and **Gateway** fields must be entered.

**IP Address**
Displays the IP address used by the channel. This field can only be changed if **Static** mode is selected.

**Subnet**
Displays the subnet mask for the channel. This field can only be changed if **Static** mode is selected.

**Gateway**
Displays the gateway (router) address for the channel. This field can only be changed if **Static** mode is selected.
Advanced Settings
Click the SHOW ADVANCED button to view the following options.

Link Speed
Displays the port speed in Mbps.

MAC Address
The MAC address of the Ethernet channel.

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: Ation
The AMS Interface

Other page

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

Logo

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 27) for more information on these settings.

Name

Enter a name for the logo in this field.

Choose File

Click this button to select the logo file to be uploaded. Files must be in .png 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.

Enabled

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

Target

The name used by AMS to identify the encoder.

Select 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 on the screen.
**Vertical**
Enter the vertical position of the logo on the screen.

**Height**
Enter the horizontal resolution of the logo, in pixels.

**Width**
Enter the vertical resolution of the logo, in pixels.

⚠️ **IMPORTANT:** Maximum logo resolution (both height and width) is 1/4 of the video resolution.

**Text**
The **Text** page provides the ability to display scrolling or stationary text superimposed on the source image. Refer to #text for more information.

**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. 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.
The AMS Interface

Horizontal (%), Vertical (%)
Specify the location of the text in the Horizontal (%) and Vertical (%) fields. Each of these values is based on the horizontal and vertical resolution of the screen.

Width (%), Height (%)
Specify the size of the text in the Width (%) and Height (%) fields. Each of these values is based on the horizontal and vertical resolution of the screen.

Advanced Settings
Click the SHOW ADVANCED button to view the following options.

Red, Green, Blue, Alpha
Enter the RGBA values for each of the respective fields, to specify a custom color and transparency of the text. Enter the desired value in 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.

PTP
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 interface 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 unit is more likely to get selected as GM.

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.
The AMS Interface

**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 Present**
This indicator displays the existence of a grandmaster clock for the specified PTP domain number. If the indicator is green, then the grandmaster clock exists on this interface.

**GM Identity**
The grandmaster clock identity. If this field is blank, then it means that this interface is the grandmaster clock.

**Master Offset**
Displays the grandmaster clock offset.

**SAP**
The SAP page enables or disables the Session Announcement Protocol protocol. Enabling SAP configures the decoder to look for SAP messages from decoders on the network that are configured to send SAP. Any messages that are discovered will be displayed here.

Enable
Click this toggle switch to enable or disable SAP. If enabled, the toggle switch will be green. Click the **SAVE** button to commit changes.
The Virtual Matrix

1. In AMS, click **Devices** from the fly-out menu.
2. Click the **OmniStream** option.
3. Click **Virtual Matrix**.

4. The **OmniStream Virtual Matrix** page will be displayed.
The illustration below shows multiple OmniStream units (encoders and decoders). The Virtual Matrix is organized into rows and columns.

The blue circle with the checkmark indicates that these two OmniStream units are connected to one another. The third column shows an OmniStream R-Type decoder (AT-OMNI-521). The fourth row shows an OmniStream R-Type encoder (AT-OMNI-512). In this example, the source signal on HDMI 1 IN (encoder) is being sent out, over the network, and will be displayed on HDMI 1 on the decoder. This will create a cross-connection, which connects both the encoder and decoder together.

- **Creating a cross-connection**
  To route an input on an encoder to an output, locate the row and column where an input and output intersect, then click the square with the dots around it.

- **Removing a cross-connection**
  To remove a cross-connection, click on the desired circle icon with the checkmark symbol. The square with the dots around it will be displayed indicating that the cross-connection has been removed.

- To view the individual streams for video, audio, and data, click the icons on the upper-left corner of the screen.
When these icons are clicked, the associated icons will be displayed in the rows and columns of the Virtual Matrix.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>Video only</td>
</tr>
<tr>
<td>A</td>
<td>Audio only</td>
</tr>
<tr>
<td>D</td>
<td>Data only</td>
</tr>
<tr>
<td>✔</td>
<td>Connected; not all signals are active</td>
</tr>
<tr>
<td>✅</td>
<td>Connected; all streams are being used</td>
</tr>
</tbody>
</table>

**IMPORTANT:** R-Type and Pro compatibility: R-Type encoders (AT-OMNI-512) and decoders (AT-OMNI-521) operate in Video Mode, only. Pro encoders can be set to either Video Mode or PC Mode. Video Mode is incompatible with PC Mode. Therefore, in order for both R-Type and Pro encoders/decoders to work within a system, Pro encoders/decoders must be set to Video Mode.

- Click the **Video**, **Audio**, and **Data** icons to return to the normal view.
- Since only HDMI (both audio and video) is being used, the V (video) and A (audio) icons are displayed. The blue circle with the checkmark indicates that the cross-section has been created. However, not all streams are being used. Refer to the chart below.
- This illustration also shows that the data stream (the icon with two arrows and three dots), which is used for control, is also being used and is displayed as a dark-blue circle with the letter “D”.
- The icons in the upper-left corner can also act as a filter. This allows for a clear breakdown of where signals are being routed and is useful when several encoders and decoders are used on a network.
Web Server

Accessing the Web Server

In order to access the web server of the desired encoder/decoder, the IP address of the encoder must be known. This can be accomplished by more than one method. Running IP scanner software or using the Address Resolution Protocol (ARP) are two possibilities. When running an IP scanner or using ARP, both the computer and the OmniStream encoders/decoders must be connected to the same network.

**Tip:** Atlona recommends downloading and using the Network Assignment Planner, when setting up OmniStream products on the network. Recording this information in this document will provide a “snapshot” of the current OmniStream network configuration. The Network Assignment Planner is available for download on the OmniStream product pages, under the Resources tab.

Getting the IP Address

The following method uses the `arp` command, which is available from the command line in Windows. The `arp` command will display the IP-to-physical address translation tables used by the Address Resolution Protocol (ARP). The following procedure can be used for both encoders and decoders.

1. Identify the desired encoder/decoder by locating the MAC address on the bottom of the unit. Figure 1.1 shows a sample label from an AT-OMNI-112 dual-channel encoder.

   The MAC address for the Ethernet 1 physical interface is B8:98:B0:01:F7:EB.

   **Figure 1.1 - Sample label on the bottom of a dual-channel encoder.**

   ![Sample label](image)

2. Connect a PC to the same network where the OmniStream encoders/decoders are connected.

3. Type `cmd` in the search bar, then press [ENTER] to launch the command line interface.
4. At the command prompt, type `arp -a`. Make sure to include a space between `arp` and the `-a` argument, then press [ENTER].

5. Press [ENTER]. Several lines of information will be displayed. Locate the MAC address of the encoder/decoder, under the **Physical Address** column. Directly across from the MAC address, the IP address of the encoder/decoder will be listed under the **Internet Address** column.

```
Interface: 10.1.0.4 --- 0x16
 Internet Address      Physical Address      Type
-----------------------------------------------------
 10.1.0.3              30-cd-a7-37-26-bb     dynamic
 10.1.0.8              b8-98-b0-01-fa-58     dynamic
 10.1.0.11             b8-98-b0-01-f2-56     dynamic
 10.1.0.12             b8-98-b0-01-f7-eb     dynamic
 10.1.1.254            00-38-df-d1-35-8a     dynamic
 10.1.1.255            ff-ff-ff-ff-ff-ff     static
 224.0.0.2             01-00-5e-00-00-02     static
 224.0.0.22            01-00-5e-00-00-16     static
 224.0.0.238           01-00-5e-00-00-e6     static
 224.0.0.252           01-00-5e-00-00-fc     static
 239.255.255.250       01-00-5e-7f-ff-4a     static
 255.255.255.255       ff-ff-ff-ff-ff-ff     static
-----------------------------------------------------
```

Log in

1. Launch the desired web browser and enter the IP address of the encoder in the address bar.

2. Enter the username and password. Note that the password field will always be masked. The default credentials are:

   Username: admin
   Password: Atlona
3. The **System Information** page will be displayed.

4. The login process is complete.
System information page

**Firmware version**
The version of firmware that the encoder is running. Always make sure the latest version of firmware is installed.

**FPGA**
Displays the FPGA model number and the size.

**Model**
The model number of the unit.

**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 enclosure 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, which is constructed as follows: at-omni-[SKU]-[last five digits of MAC address]. If using a custom hostname, it must meet the hostname standards, defined here: [https://tools.ietf.org/html/rfc1123](https://tools.ietf.org/html/rfc1123).

**NTP Server**
Displays the NTP server (if used). Click this field to enter the desired NTP server address.

**Buttons**
Click this toggle switch to enable or disable the button backlight indicators on the front-panel.

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

**SET DATE/TIME**
Click this button to set the current date and time.

**SET TIMEZONE**
Click this button to set the desired time zone.

**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.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None Checked</td>
<td>Resets the encoder with no factory-default settings.</td>
</tr>
<tr>
<td>Reset User</td>
<td>Resets the encoder to factory-default settings and resets custom user information.</td>
</tr>
<tr>
<td>Reset Network</td>
<td>Resets the encoder to factory-default settings and resets network information.</td>
</tr>
<tr>
<td>Reset Defaults</td>
<td>Resets the encoder to factory-default settings. In addition, static multicast addresses are configured. This option can be used to configure a single encoder to transmit to any number of decoders without using the Virtual Matrix within AMS.</td>
</tr>
</tbody>
</table>

**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**
Click this button to perform a soft reboot of the encoder.

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

Enable
Click this toggle to enable or disable SAP. This feature is enabled when the toggle switch is orange. This is the default setting.

Addresses
Encoders currently send SAP announcements on two multicast addresses: 224.2.127.254 and 239.255.255.255. In some rare instances, this can conflict with other network address settings. Custom SAP addresses can be specified in this field.

**NOTE:** If the Addresses field is changed, then the same changes must be applied to all devices, in order for all devices to see the SAP multicast.
IP Input page

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

Name
The name of the input. This field cannot be changed.

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

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

Multicast address
Enter the multicast IP address 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.

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

SAVE
Click this button to commit all changes in the Input window group.
Serial port configuration window groups

The following fields apply to both **Serial port configuration** window groups.

**Name**
The name of the serial port. This field cannot be changed.

**Supported Modes**
Displays the supported protocols for the serial port. This field cannot be changed.

**Mode**
Click this drop-down list to select the desired serial mode. Available values will be reflected in the **Supported Modes** field. Note that serial port 1 only supports serial (RS-232) control and serial port 2 only supports infrared (IR).

**Baudrate**
Click this drop-down list to select the desired baud rate: 115200, 57600, 38400, 19200, or 9600. Only supported on serial port 1.

**Data**
Click this drop-down list to select the number of data bits: 6, 7, or 8. Only supported on serial port 1.

**Parity**
Click this drop-down list to select the parity bit: None, Odd, Even, Mark, or Space. Only supported on serial port 1.

**Stop**
Click this drop-down list to select the stop bit: 1, 1.5, or 2. Only supported on serial port 1.
Flow Control
Click this drop-down list to select the type of flow control: none, xonxoff, or hw.

Port
Click this drop-down list to select the desired serial port: Serial Port 1 or Serial Port 2.

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

Serial configuration window groups
The following fields apply to both Serial configuration window groups.

Name
The name of the port. This field cannot be changed.

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. Select tcpproxy to send IP commands directly to the decoder, which are then output over RS-232 to the display (sink) device. Selecting the cli option will pass through RS-232 data, directly from a control system, to the sink device that is connected to the decoder.

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.

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

DELETE
Click this button to remove the information for this command.

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.

New Command
Click this button to create a new command window group. Provide a name for the command in the displayed dialog box, then click the Create button. Complete each of the fields, as described above.
**HDMI Output page**

**Output window group**

**Name**
The name of the output port. This field cannot be changed.

**Enable**
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.

**Encrypted**
This indicator will be green if the stream content is HDCP-encrypted.

**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.
Web Server

**Input**
Click this drop-down list to select the desired IP input. Available options are ip_input1 - ip_input5, none, and generator.

**Input status**
Displays the input status. If no video stream is detected, then “No active video” will be displayed.

**Status**
Displays the active video input. If no input is active or detected, then this field will display “No active video”.

**HDR**
This indicator will be green if HDR video is present.

**Stretch / Crop Mode**
Click this drop-down list to select the aspect ratio.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keep Aspect Ratio</td>
<td>Aspect ratio is preserved; the output on the decoder will be the same as the input on the encoder.</td>
</tr>
<tr>
<td>Full Screen</td>
<td>Stretches the image to fill the screen. In some cases this can distort (“stretch”) the image.</td>
</tr>
<tr>
<td>16:9</td>
<td>Sets the aspect ratio to 16:9 “widescreen” format, usually associated with HDTV formats.</td>
</tr>
<tr>
<td>16:10</td>
<td>Sets the aspect ratio to 16:10 “widescreen” format, usually associated with computer displays and smart devices.</td>
</tr>
<tr>
<td>4:3</td>
<td>Sets the aspect ratio to 4:3 “pan-and-scan” format, usually associated with SDTV.</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Resolutions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>1440 x 1050</td>
</tr>
<tr>
<td>Auto</td>
<td>1440 x 900</td>
</tr>
<tr>
<td>4096 x 2160</td>
<td>1280 x 1024</td>
</tr>
<tr>
<td>3840 x 2160</td>
<td>1280 x 800</td>
</tr>
<tr>
<td>1920 x 1200</td>
<td>1280 x 768</td>
</tr>
<tr>
<td>1920 x 1080</td>
<td>1280 x 720</td>
</tr>
<tr>
<td>1680 x 1050</td>
<td>1024 x 768</td>
</tr>
<tr>
<td>1600 x 900</td>
<td></td>
</tr>
</tbody>
</table>

**Framerate**
Sets the output frame rate. Available options are auto, 60 Hz, 50 Hz, and 30 Hz.
Slate Mode
Click this drop-down list to select the slate mode. Refer to Slate / Logo Insertion (page 27) for more information.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Disables the image from being displayed.</td>
</tr>
<tr>
<td>Manual</td>
<td>Stretches the image to fill the screen. In some cases this can distort (“stretch”) the image.</td>
</tr>
<tr>
<td>Auto</td>
<td>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.</td>
</tr>
</tbody>
</table>

Video Wall
Click this toggle switch to enable or disable the video wall option. Refer to Creating Video Walls (page 39) for more information on using video walls.

Fast Switching
Click this toggle switch to enable or disable fast-switching. Refer to Fast Switching (page 32) for more information.

Input
Click this drop-down list to select the primary audio IP input. Select the Not Used option to leave the audio input unassigned.

Downmixing
Click this drop-down list to select how LPCM audio will be down-mixed. Note that lossless audio formats cannot be down-mixed.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Audio is not down-mixed.</td>
</tr>
<tr>
<td>Stereo</td>
<td>Audio is down-mixed to two-channel stereo.</td>
</tr>
<tr>
<td>Auto</td>
<td>Display is always on, source audio/video signal switches on/off</td>
</tr>
</tbody>
</table>

Enable AES67
Click this toggle switch to enable or disable AES67. When enabled, the toggle switch will be green. Refer to AES67 Audio (page 34) 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.
Web Server

AUX (CEC)
Click this drop-down list to select the desired IP input for CEC control. Available options are ip_input1 - ip_input5.

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.

Timeout (s)
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.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DispSW AVon</td>
<td>Display switches on/off, source audio/video signal always on.</td>
</tr>
<tr>
<td>DispSW AVSW</td>
<td>Display switches on/off, source audio/video signal switches on/off.</td>
</tr>
<tr>
<td>AV SW</td>
<td>Display is always on, source audio/video signal switches on/off</td>
</tr>
<tr>
<td>Always on</td>
<td>Display is always on, source audio/video signal always on.</td>
</tr>
</tbody>
</table>

SAVE
Click this button to commit all changes within the Output window group.
Logo page

**New logo window group**

**Name**
Enter a name for the logo in this field.

**Choose File**
Click this button to select the logo file to be uploaded. Files must be in .png 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 decoder.

**Logo Insertion window group**

**Target**
Displays the name of the encoder. This field cannot be changed.

**Enable**
Click the toggle switch to enable or disable the logo. If the toggle switch is orange, 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 on the screen. This value is based on the total horizontal resolution of the screen.
Web Server

**Vertical (%)**
Enter the vertical position of the logo on the screen. This value is based on the total vertical resolution of the screen.

**Width (%)**
Enter the width of the logo. This value is based on the total horizontal resolution of the screen.

**Height (%)**
Enter the height of the logo. This value is based on the total vertical resolution of the screen.

**SAVE**
Click this button to commit all changes within the **Logo Insertion** window group.
Text insertion window groups

**Target**
Displays the name of the output where the text will appear. This field cannot be changed.

**Enable**
Click this toggle switch to enable or disable the text. When the toggle switch is orange, the text will be enabled.

**Text**
Enter the desired text in this field.

**Scroll Speed**
Enter the scrolling speed in this 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.

**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. 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. Numbers from 0 to 255 are valid for all fields.
Web Server

**Horizontal**
Enter the horizontal position of the text in this field.

**Vertical**
Enter the vertical position of the text in this field.

**Width**
Enter the width of the text in this field. This value is based on the horizontal resolution of the screen.

**Height**
Enter the height of the text in this field. This value is based on the vertical resolution of the screen.

**SAVE**
Click this button to commit all changes within the Text insertion window group.
Network window groups

Name
Displays the name of the Ethernet interface. This field cannot be changed.

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.

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; Subnet and Gateway fields will automatically be populated. When Static mode is selected, the information for the IP Address, Subnet, and Gateway fields must be entered.

IP Address
Displays the IP address used by the channel. This field can only be changed if Static mode is selected.

Subnetmask
Displays the subnet mask for the channel. This field can only be changed if Static mode is selected.

Gateway
Displays the gateway (router) address for the channel. This field can only be changed if Static mode is selected.
**Web Server**

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

Username:  admin
Password:  Atlona

**Web UI Enable HTTP**
Click this toggle switch to enable or disable HTTP. If disabled, traffic on port 80 is forbidden.

**Web UI Enable HTTPS**
Click this toggle switch to enable or disable HTTPS. If disabled, traffic on port 443 is forbidden.

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

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 interface 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 unit is more likely to get selected as GM.

**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.

---

eth window group

**Interface**
Displays the Ethernet interface associated with the PTP settings.

**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.

**TTL**
Displays the TTL value. PTP uses a default IPv4 TTL value of 1 for multicast. This value may be changed, if necessary, in order for the replies to reach the PTP monitor.

**Is GM**
This indicator displays the existence of a grandmaster clock for the specified PTP domain number. If the indicator is green, then the grandmaster clock exists on this interface.

**GM Identity**
The grandmaster clock identity. If this field is blank, then it means that this interface is the grandmaster clock.

**Master Offset**
Displays the grandmaster clock offset.

**SAVE**
Click this button to commit all changes within the eth window group.
**LLDP page**

The Link Layer Discovery Protocol (LLDP) page returns information about the switch that the encoder is connected to.

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

**Import configuration**

**Choose File**
Click this button to select the desired configuration file to be uploaded.

**IMPORT**
Click this button to upload the selected configuration file to the encoder.

**Export configuration**

**EXPORT**
Click this button to export the current encoder system configuration to a .json file.

**Upload SSL certificate**

**Choose File**
Click these buttons to select the desired certificate or private key.

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

**REVERT**
Click this button to restore the previous configuration.
Users page

User window groups
The following fields apply to all User window groups. Decoders have two usernames, by default: admin and operator.

Username
Enter the desired username in this field.

Role
Click this drop-down list to select the desired role of the user.

New password
Enter the desired password for the username in this field.

Repeat password
Confirm the new password by entering it in this field.

DELETE
Click this button to delete the user in the current window group. Note that the at least one admin role must exist at all times. Therefore, if one admin role and one operator role exist, then the admin user cannot be deleted.

SAVE
Click this button to commit all changes within the current user window group.

New user
Click this button to create a new user. Provide the role and password, as described in the fields above.
License page
This page displays all installed licenses and allows additional licenses to be installed.

License Key
Enter the license key in this field.

INSTALL LICENSE
Click this button to validate and install the license.
Upgrade page
This page is used to update the firmware on the decoder.

Choose File
Click this button to select the firmware file to be uploaded.

UPLOAD
Click this button to upload the selected firmware file.
Appendix

Updating the Firmware using Velocity™/AMS

IMPORTANT:

- If updating from version 1.0.x, OmniStream units must first be updated to version 1.1. Note that this does not apply to OmniStream R-Type units. If running version 1.0.x, contact an Atlona Technical Support Engineer before updating the firmware.

- When updating the firmware, make sure that the unit does not lose power. The firmware update process should take approximately 1 to 2 minutes.

- For full functionality of OMNI 1.2.1 (or later), Velocity must be running at least 1.4.5 and AMS must be on firmware version 2.0.12 and above.

1. Click DEVICE INFO in the menu bar.
2. Click the UPDATE FIRMWARE button to display the Firmware Update dialog.
3. Click and drag the firmware file to the yellow box, to upload the firmware to the device. OmniStream firmware files use the .v2pup file extension. Once the firmware file has been uploaded, it will appear under the Select Firmware section of the dialog box.

4. Click the UPDATE Firmware button to begin the update process.

5. After the UPDATE Firmware button is clicked, the Upgrade Firmware Started message box will be displayed.

6. Click the orange up-arrow icon, in the upper-right corner of the screen, as shown below. If this icon is orange, it indicates that a firmware update is in progress.

The progress bar for the update process will be displayed. The update process should take a few seconds.
7. Click the “X” to close out the progress bar window, then click the **CLOSE** button to dismiss the **Firmware Update** message box.

8. The firmware update process is complete.

9. Clear the web browser cache and refresh the web page. The new firmware version will appear in the **Firmware Version** field, in the **DEVICE INFO** page.
Appendix

Updating the Firmware using the Web Server

Follow the procedure below to update OmniStream units using the built-in web server.

1. Launch the desired web browser and enter the IP address of the encoder/decoder in the address bar.

2. Enter the username and password. Note that the password field will always be masked. The default credentials are:
   
   Username: admin  
   Password: Atlona  

3. The System Information page will be displayed.

4. Click Upgrade in the menu bar to display the Upgrade page.

5. Click the Choose File button.

6. In the Open dialog box, select the correct firmware file. Refer to the table below.

<table>
<thead>
<tr>
<th>Firmware file</th>
<th>OmniStream SKU</th>
</tr>
</thead>
<tbody>
<tr>
<td>at-omni-single-upgrd-os-[version].vpup2</td>
<td>AT-OMNI-111, AT-OMNI-121,</td>
</tr>
<tr>
<td></td>
<td>AT-OMNI-111-WP</td>
</tr>
<tr>
<td>at-omni-dual-upgrd-os-[version].vpup2</td>
<td>AT-OMNI-112, AT-OMNI-122</td>
</tr>
<tr>
<td>at-omni-residential-upgrd-os-[version].vpup2</td>
<td>AT-OMNI-512, AT-OMNI-521</td>
</tr>
</tbody>
</table>

7. Click the UPLOAD button.

8. A progress bar will be displayed, indicating the current upgrade status of the unit. When firmware update process has completed, the Upgrade page will be displayed.

9. The upgrade process is complete.
Mounting Instructions

The AT-OMNI-521 decoder includes two mounting brackets and four mounting screws, which can be used to attach the unit to any flat surface.

1. Using a small Phillips screwdriver, remove the two screws from the left side of the enclosure.

2. Position one of the rack ears, as shown below, aligning the holes on the side of the enclosure with one set of holes on the rack ear.

3. Use the enclosure screws to secure the rack ear to the enclosure.

4. To provide added stability to the rack ear, use two of the included screws and attach them to the two holes, directly below the enclosure screws, as shown above.

5. Repeat steps 1 through 4 to attach the second rack ear to the opposite side of the unit.

6. Mount the unit using the oval-shaped holes, on each rack ear. If using a drywall surface, a #6 drywall screw is recommended.

NOTE: Rack ears can also be inverted to mount the unit under a table or other flat surface.
Appendix

Rack Tray for OmniStream

OmniStream decoders can also be mounted in the OmniStream rack tray (AT-OMNI-1XX-RACK-1RU). The rack tray is sold separately and provides easy mounting and organization of up to two OmniStream encoders/decoders in a convenient 1U rack tray. The OmniStream rack tray can be purchased directly from Atlona.

1. Position the OmniStream products, as shown in the illustration below.

2. Using the included screws, secure each unit to the rack with a Philips screwdriver.

   **NOTE:** OmniStream units can be mounted forward-facing or back-facing, depending upon your requirements.

3. Install the entire assembly into an empty 1U slot in the rack.
## Specifications

### Video
<table>
<thead>
<tr>
<th>HDMI Specification</th>
<th>HDMI 2.0b, HDCP 2.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHD/HD</td>
<td>4096x2160 (DCI) @ 60/30/24 Hz</td>
</tr>
<tr>
<td></td>
<td>3840x2160 (UHD) @ 60/50/24/25/30 Hz</td>
</tr>
<tr>
<td></td>
<td>1080p @ 23.98/24/25/29.97/30/50/59.94/60 Hz</td>
</tr>
<tr>
<td>VESA®</td>
<td>2560x1600</td>
</tr>
<tr>
<td></td>
<td>1920x1200</td>
</tr>
<tr>
<td></td>
<td>1680x1050</td>
</tr>
<tr>
<td></td>
<td>1600x1200</td>
</tr>
<tr>
<td></td>
<td>1600x900</td>
</tr>
<tr>
<td></td>
<td>1440x900</td>
</tr>
<tr>
<td></td>
<td>1400x1050</td>
</tr>
<tr>
<td>Color Space</td>
<td>YUV, RGB</td>
</tr>
</tbody>
</table>

### Decoding
<table>
<thead>
<tr>
<th>Density</th>
<th>One decoding engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decoding Format</td>
<td>VC-2 (SMPTE-2042)</td>
</tr>
<tr>
<td>Video Quality Optimization</td>
<td>Motion Video</td>
</tr>
<tr>
<td>Color Depth</td>
<td>8-bit, 10-bit, 12-bit</td>
</tr>
<tr>
<td>HDR</td>
<td>HDR10, HLG, Dolby® Vision™</td>
</tr>
<tr>
<td>Bit Rate</td>
<td>900 Mbps</td>
</tr>
<tr>
<td>Latency</td>
<td>0.5 frame (e.g. 1080p @ 60 Hz latency is &lt; 8 ms between encoder and decoder)</td>
</tr>
<tr>
<td></td>
<td>1.5 frames in Fast Switching mode (e.g. 1080p @ 60 Hz latency is &lt; 24 ms between encoder and decoder)</td>
</tr>
<tr>
<td>Note: Unusual network configurations may increase overall latency</td>
<td></td>
</tr>
</tbody>
</table>

### Audio
| Pass-through       | LPCM 2.0, LPCM 5.1, LPCM 7.1, Dolby® Digital, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos®, DTS®, DTS-HD Master Audio™ |
| Down-mixing        | Multichannel LPCM to two-channel LPCM |
| Sample Rate        | 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz |
| Bit Depth          | Up to 24-bit |

### Protocols
| Video Streaming    | RTP |
| Audio Streaming    | RTP, up to 7.1 channels |
|                    | AES67, up to LPCM 7.1 channels |
| Addressing         | DHCP, static |
| Encryption         | AES-128 |
| QoS Tagging        | RFC 2475 |
| Discovery          | Multicast DNS, LLDP, SAP |
| Management         | HTTPS, SSH, Telnet, and WebSockets with TLS |
| IP Multicast       | IGMPv2 and IGMPv3 support |
### Graphics Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Insertion</td>
<td>Adjustable height/width, scrolling (speed, direction, or static), iterations (up to infinite), positioning, and adjustable color and alpha (transparency) channels.</td>
</tr>
<tr>
<td>Slate / Logo Insertion</td>
<td>PNG file format, adjustable aspect ratio (keep or stretch), horizontal/vertical size, screen position; slate mode can be set to off, manual (image always displayed, superimposed on the source signal, and will remain if source signal is lost), auto (image will only be displayed when source signal is lost).</td>
</tr>
</tbody>
</table>

### Control

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEC</td>
<td>Supported and triggered from control systems and OmniStream encoders</td>
</tr>
<tr>
<td>RS-232</td>
<td>Device control and configuration; supports baud rates from 2400 to 115200</td>
</tr>
<tr>
<td></td>
<td>Bidirectional pass-through from control system to network</td>
</tr>
<tr>
<td></td>
<td>Bidirectional TCP Proxy (RS-232 commands over IP)</td>
</tr>
<tr>
<td>IR</td>
<td>Pass-through from control system to network</td>
</tr>
<tr>
<td></td>
<td>Pass-through from network to control system</td>
</tr>
</tbody>
</table>

### Connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDMI</td>
<td>1 - Type A, 19-pin, female, locking</td>
</tr>
<tr>
<td>ETHERNET</td>
<td>1 - RJ45, 10/100/1000 Mbps</td>
</tr>
<tr>
<td>RS-232 / IR</td>
<td>1 - Euroblock, 6-pin (2 ports); RS-232 on port 1 and 2, IR on port 2 only</td>
</tr>
</tbody>
</table>

### Indicators and controls

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR</td>
<td>1 - LED, tricolor (red, amber, green)</td>
</tr>
<tr>
<td>LINK</td>
<td>1 - LED, bicolor (red, green)</td>
</tr>
<tr>
<td>ID</td>
<td>1 - Momentary, tact-type, backlit (blue); sends an identification broadcast message over the network to any listening devices.</td>
</tr>
<tr>
<td>Reboot</td>
<td>1 - Momentary, tact-type</td>
</tr>
</tbody>
</table>

### Power

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PoE</td>
<td>IEEE 802.3af</td>
</tr>
<tr>
<td>Consumption</td>
<td>Up to 12 W</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling System</td>
<td>Front-to-rear airflow, temperature-controlled fans</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>+14 to +122 °F</td>
</tr>
<tr>
<td></td>
<td>-10 to +50 °C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-14 to +140 °F</td>
</tr>
<tr>
<td></td>
<td>-10 to +60 °C</td>
</tr>
<tr>
<td>Operating Humidity (RH)</td>
<td>20% to 95%, non-condensing</td>
</tr>
</tbody>
</table>

### Chassis

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1.34 in x 8.19 in x 4.41 in</td>
</tr>
<tr>
<td>Weight</td>
<td>34 mm x 208 mm x 112 mm</td>
</tr>
<tr>
<td></td>
<td>1.5 lbs / 0.7 kg</td>
</tr>
</tbody>
</table>

### Certification

| Device | CE, FCC, CB, RoHS |

---

(1) Scaling and deinterlacing is not supported at 1080i.
(2) All VESA resolutions are 60 Hz.
(3) Slate insertion is limited to 1080p only.
(4) Maximum distance per hop is 330 feet (100 meters), depending upon network configuration.