AVoIP HDMI/VGA
ENCODER, DECODER & CONTROLLER

LBN-MST
LBN-MSR
LBN-MSC-P
USER MANUAL

TABLE OF CONTENTS

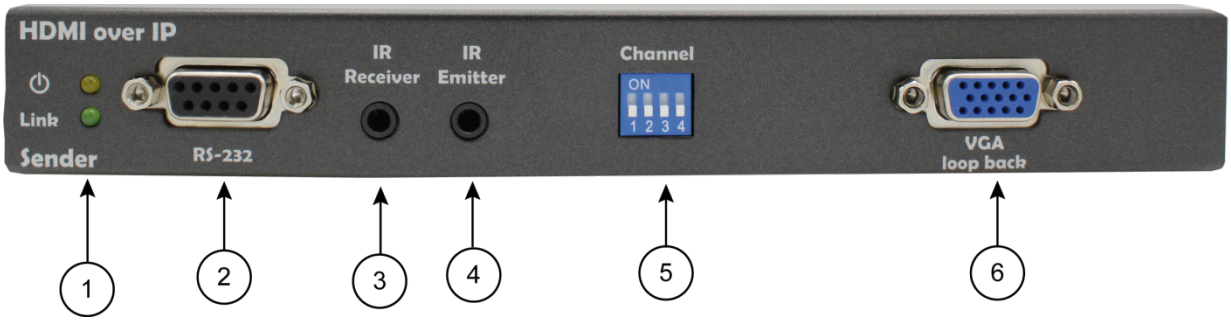
PRODUCT DESCRIPTION

The AVoIP HDMI/VGA Encoder(Tx) & Decoder (Rx) with PoE (over Fiber or CAT 5e) provides stunning 4K video distribution at a very cost effective price point. Engineered for simplicity in mind, the AVoIP System is designed to operate exactly like a conventional Matrix Switcher and is configured to work out of box with no IP knowledge required. The AVoIP Matrix Switching Controller automatically detects devices connected to the Encoder/Decoder and the BCI App provides drop down menu simplicity for configuring all connected devices. Featuring advanced EDID along with HDCP management and extremely low latency video. This is an ideal solution for digital signage with advanced video wall processing and video distribution for training rooms, classrooms and conference rooms.

FEATURES

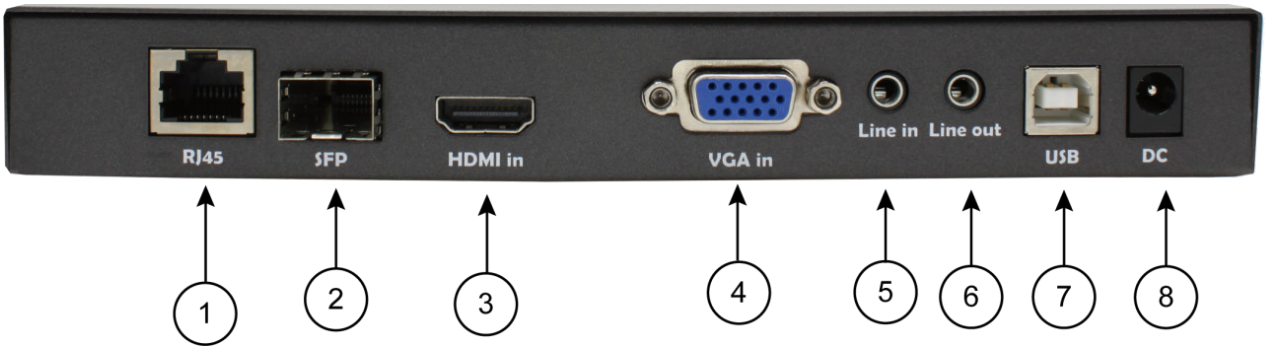
- Leveraging advanced network IP video technology for conventional 18G 4K HDMI video matrix switching
- Operates exactly like a conventional HDMI video matrix switcher, via API commands or virtual key buttons
- Perfect for users with minimum IP network knowledge/experience
- Accommodate up to HDMI 1.4 (4K@30Hz, 4:4:4) signals, with external audio, RS-232, IR, and USB
- Extend and switch HDMI 1.4 video over CAT-5e/6 cable up to 100m, with negligible latency
- >100x100 input/output routing, based on Cisco SG300/500 Gigabit Ethernet switcher
- Remote powering via POE
- Support RS-232, Telnet, and Web GUI control
- Virtual front-panel buttons for quick, manual operation

LBN-MST Front Panel



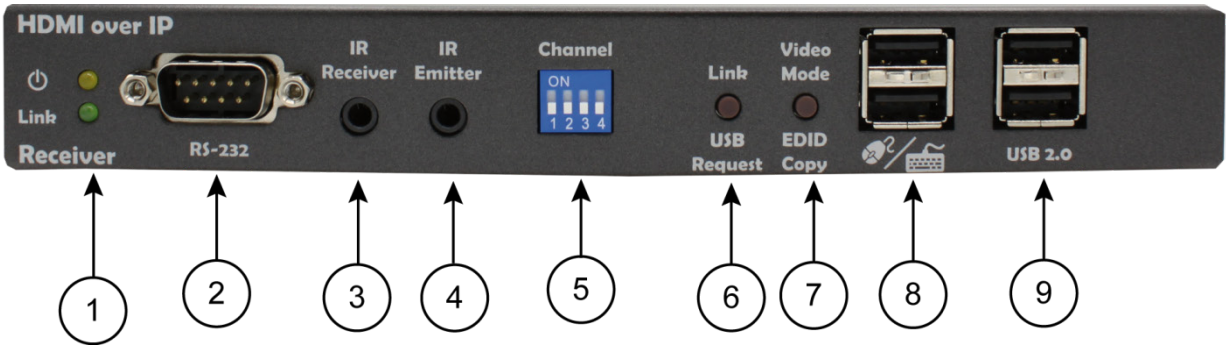
1. Power LED (top) – This LED illuminates amber when unit is powered ON
   Link – This LED illuminates solid green when a source is connected. This LED flashes when there is no source connected.
2. RS-232 port – Connect to RS-232 port of external device.
3. IR Decoder – Connect to an IR Decoder cable.
4. IR Emitter – Connect to an IR Emitter cable.
5. Channel DIP Switch – Not used. Reserved
6. VGA loopback – connect to a display to view non-HDCP HDMI content

LBN-MST Rear Panel



1. RJ45 – Gigibit Ethernet port (supports PoE). Connect to a Gigabit Ethernet switch.
2. SFP – SFP cage for SFP fiber module.
3. HDMI In – Connect to an HDMI source.
4. VGA In – Connect to a VGA source.
5. Line in – Stereo analog audio input. Connect to an analog audio source using a 3.5mm stereo cable.
6. Line out – Stereo analog audio output. Connect to amplifier input using a 3.5mm stereo cable.
7. USB host port – Connect to PC USB port.
8. DC power jack – Connect to 12VDC power supply. 12VDC power supply is not needed if using a PoE Ethernet switch.

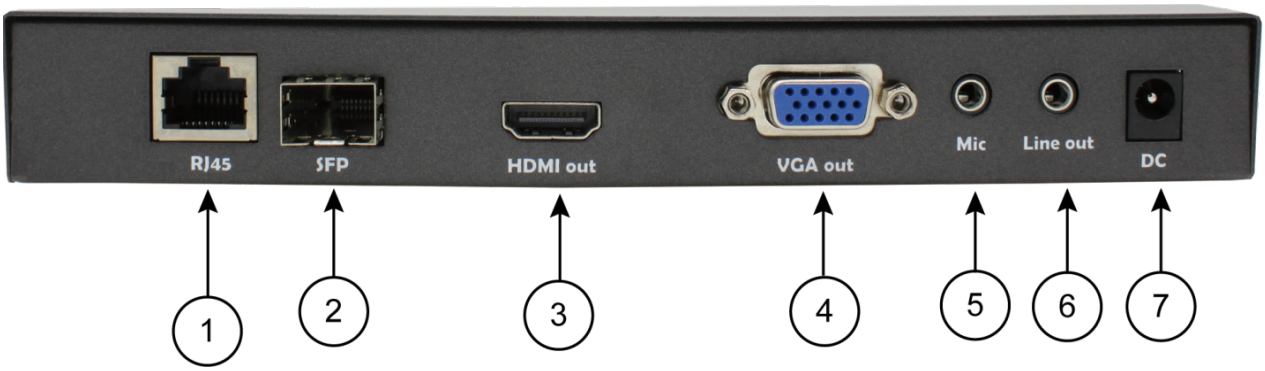
LBN-MSR Front Panel



1. Power LED (top) – This LED illuminates amber when unit is powered ON.
   Link – This LED illuminates solid green when connected to an encoder. This LED flashes when it is establishing a connection. It is off when not connected to any encoder.

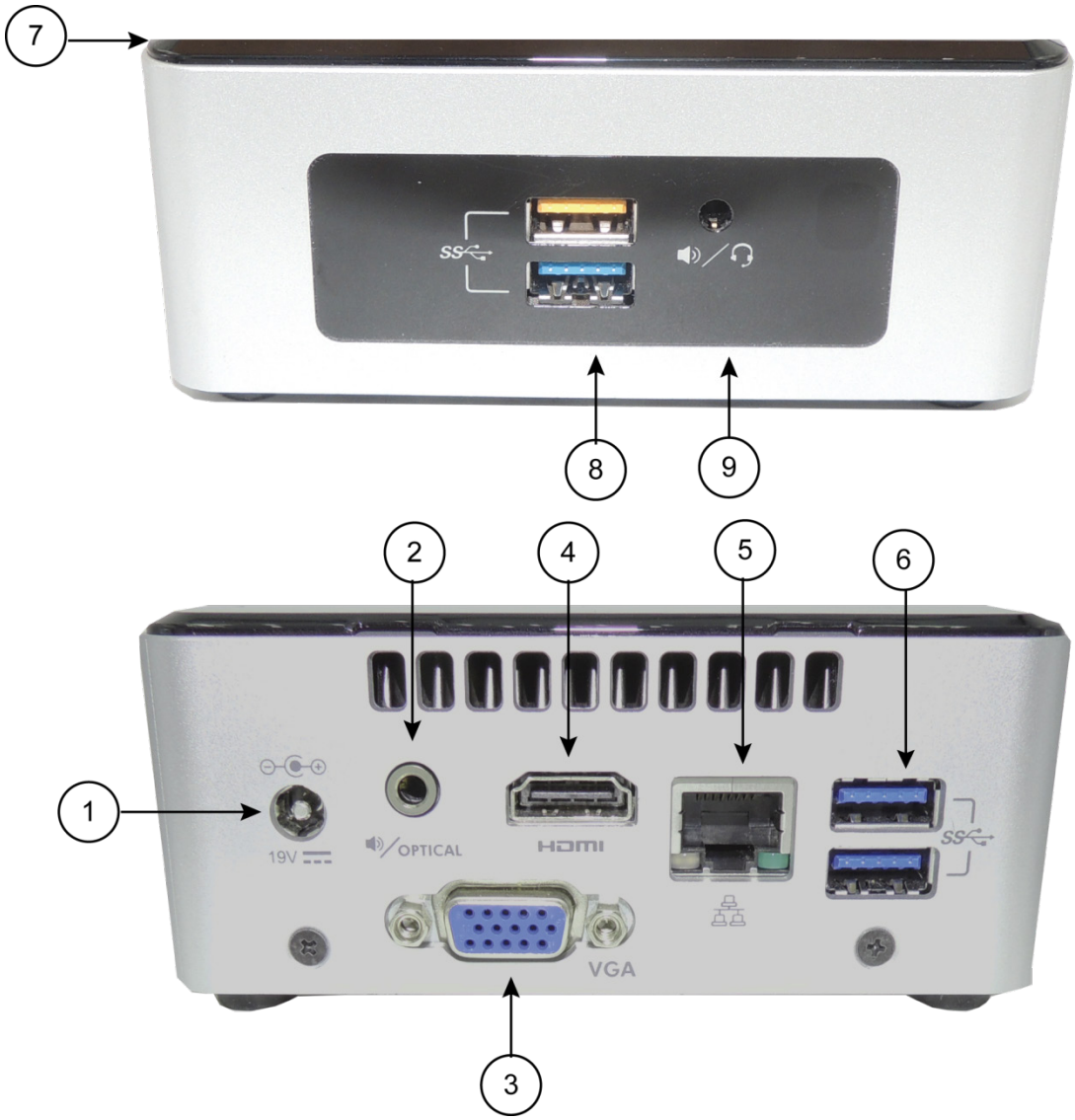
2. RS-232 port – Connect to RS-232 port of external device.
3. IR Decoder – Connect to an IR Decoder cable.
4. IR Emitter – Connect to an IR emitter cable.
5. Channel DIP Switch – Not used. Reserved
6. Link Button – Reserved.
7. Video Mode button – Reserved.
8. USB port – Connect to keyboard or mouse.
9. USB 2.0 port – Connect to USB device.

OPERATION CONTROL AND FUNCTIONS



LBN-MSR Rear Panel

1. RJ45 – Gigibit Ethernet port (supports PoE). Connect to a Gigabit Ethernet switch.
2. SFP – SFP cage for SFP fiber module.
3. HDMI Out – Connect to HDMI input on the display.
4. VGA Out – Connect to VGA input on the display.
5. Mic – Microphone input. Connect to a microphone using a 3.5mm stereo cable. Only works in unicast mode.
6. Line Out – Stereo analog audio output. Connect to amplifier input using a 3.5mm stereo cable.
7. DC power jack – Connect to a 12VDC power supply. 12VDC power supply is not needed if using a PoE Ethernet switch.



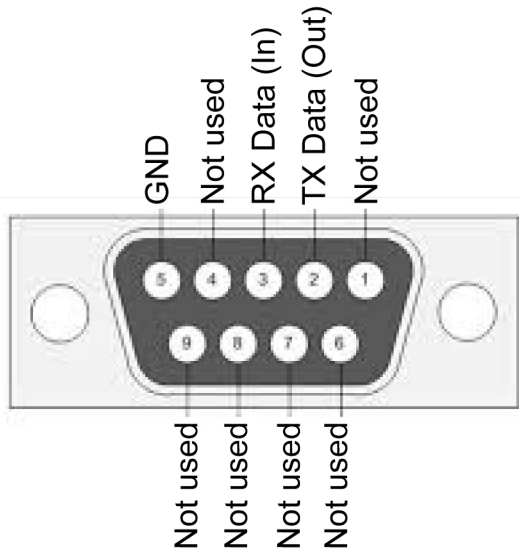
LBN-MSC-P Front and Rear Panel

1. DC power jack – Connect to the included 19VDC power supply.
2. Audio output – reserved.
3. VGA output – reserved.
4. HDMI output – reserved.
5. Ethernet port – connect to Gigibit Ethernet switch using CAT5e cable.
6. SS USB ports – connect to optional USB-to-RS-232 adapter or USB-to-Ethernet adapter.
7. Power button – Not used. Unit will power on once 19VDC power supply is plugged in.
8. SS USB ports - connect to optional USB-to-RS-232 adapter or USB-to-Ethernet adapter.
9. Audio/headphone output – reserved.

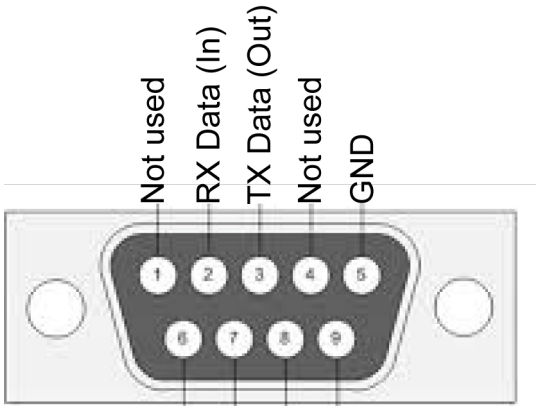
CONNECTOR PINOUT ASSIGNMENT

3.1 RS-232 Pinout

Decoder



Encoder



SYSTEM SETUP

The following section describes the system setup for a simple 2x2 switcher.

System Checklist

LBN-MST Encoder (2)

LBN-MSR Decoder (2)

LBN-MSC-P Controller (1)

1G Ethernet Switch (1)

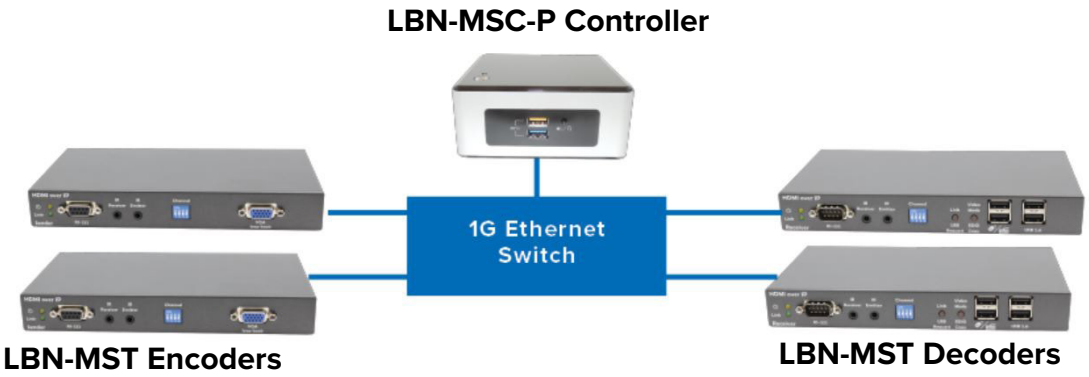
PC/Laptop (1)

HDMI Source (2)

Display (2)

HDMI cables (4)

CAT5E patch cables (5)



System Setup

1. Configure Ethernet switch: the Gigabit Ethernet switch must support 8k jumbo frame packets and IGMP snooping. Please refer to the **Quick Install Guide for Certified Ethernet Switches**.
2. Connect the encoder, decoder and controller to the Ethernet switch per setup diagram
3. Connect the encoder and decoder to the Ethernet switch using the CAT5E patch cables
4. Connect power supplies to the encoders and decoders if the Ethernet switch does not support PoE.
5. Connect the controller to the Ethernet switch using the CAT5E patch cable.
6. Connect power to the controller. It is not necessary to press the power button.
7. Connect the HDMI sources to the encoders
8. Connect the displays to the decoders.

Accessing Controller Web Server

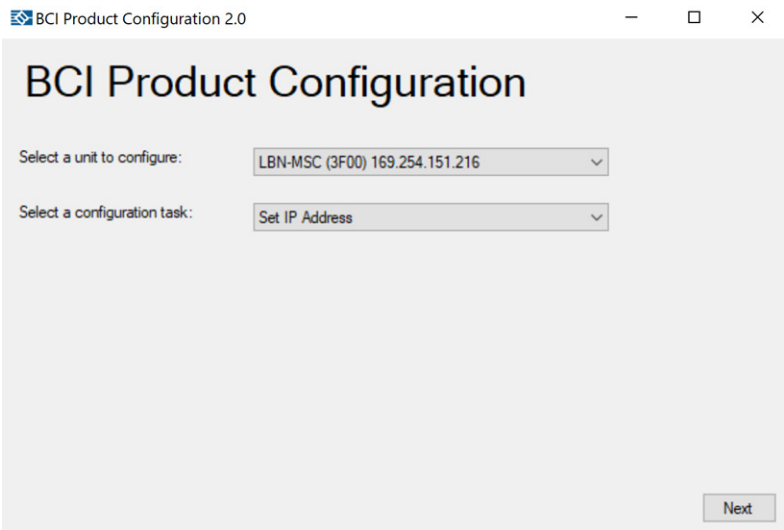
There are 2 ways to access the controller:

Method #1: Using its Wi-Fi Hotspot:

- Connect power supply to the controller. Once power is plugged in, the controller will boot up
- By default, the controller will power up in hotspot mode. Use the PC/Laptop to connect to the hotspot. The controller hotspot will appear as lbn1g-xxxx-hotspot under the PC/Laptop's Wi-Fi settings. The default password is Br0@data.
- Open a web browser and type 10.42.0.1 in the address bar. You may also use the special URL http://lbn1g-msx/

Method #2: Using the BCI Product Configuration Tool:

- Connect power supply to the controller. Once power is plugged in, the controller will boot up
- Connect the controller and a PC to an Ethernet switch
- Install and open the BCI Product Configuration Tool
- The controller's IP address will appear



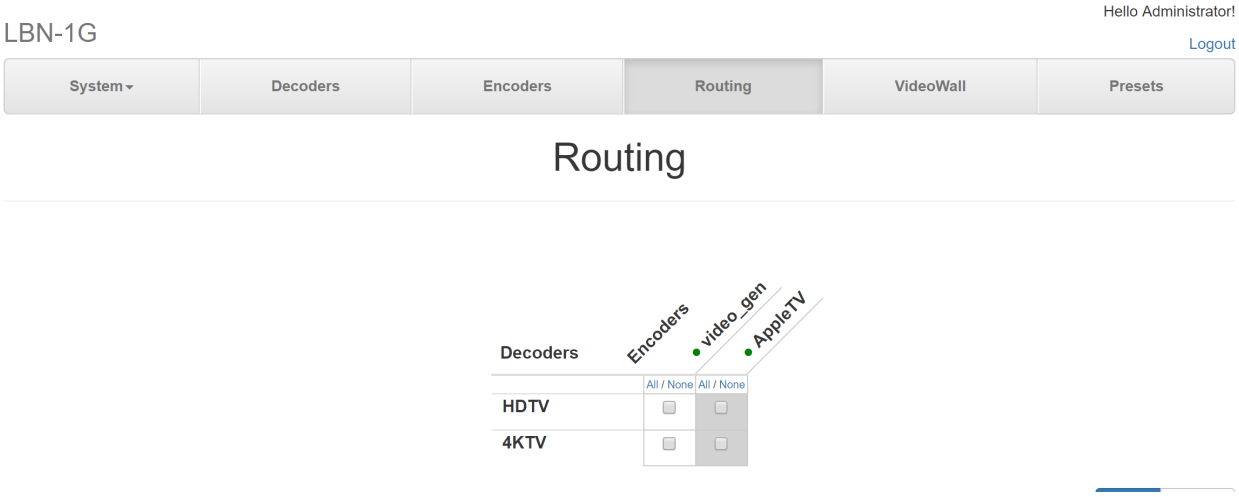
- Open a web browser and type the controller's IP address to access the web UI.

Web UI Default Login Credentials

Default User Name: admin

Default Password: Br0@data

Video Routing



The Routing page provides a matrix view of encoders and decoders in the system. Decoders are shown on the left and encoders are shown on the top of the matrix. To set up a route, click on the box for the corresponding connection and a check mark will appear. Click on the Apply button to complete the route. An encoder can be routed to all decoders by clicking on All for the corresponding Encoder and then Apply. Un-route All can be done by clicking None and then Apply.

EDID Management

After a box is checked to establish a connection, there is an option to copy the EDID from a connected decoder to the encoder by clicking the **EDID** button in the lower right corner. The **EDID** button turns green to indicate that the encoder is using the EDID from the selected decoder. If none of the EDID buttons are selected, the encoder uses the default internal EDID.

Presets

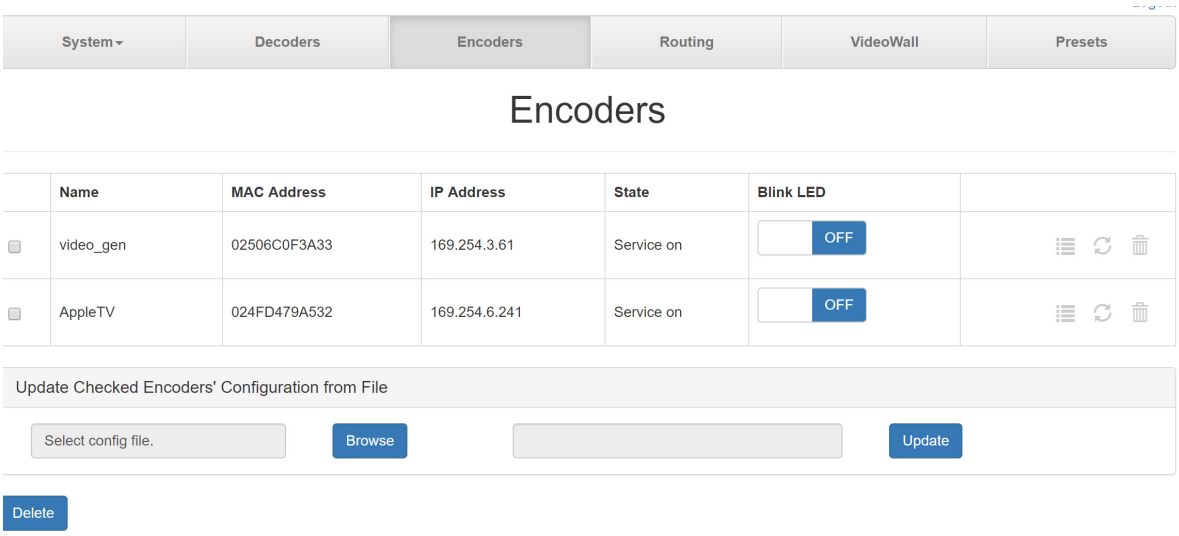
The current routes and EDID settings can be saved to a user defined preset. Click on the Save Preset button and the Save Preset window will pop up.

Type in the preset name and preset description and then click Save Preset. All saved presets are managed in the Presets page.

Encoders

The controller's web interface allows the user to easily manage and configure any encoder in the system.

Click the Encoders tab on the top menu bar to bring up the Encoders page.



This page shows a table of all the encoders in the system. The name of each encoders is show on the left side of the table. Each encoder will have a default name which can be changed. Each encoder also has a unique physical identifier called the MAC Address. The MAC Address is also printed on a label attached to the outside of the device case. The operational status of each encoder is shown in the State column. The encoder states are defined as follows:

Attaching: Encoder is ready

Service On: Active source is plugged in

Unavailable: Encoder is disconnected

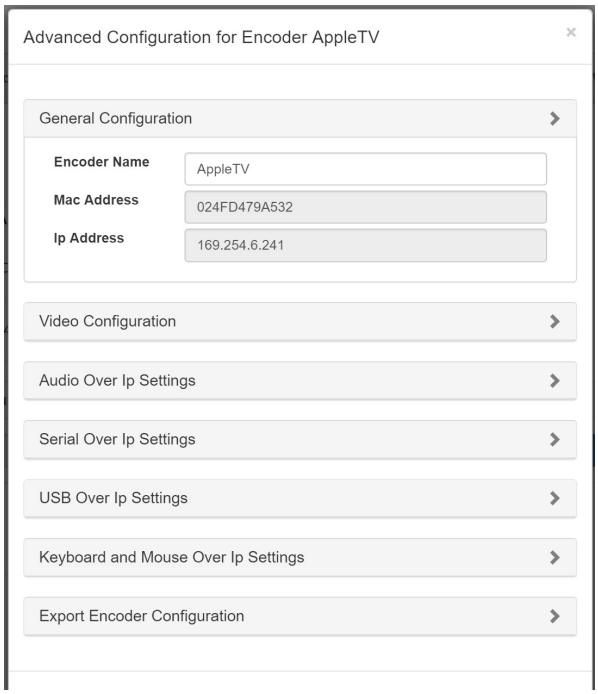
The configuration for one or more Encoders can be updated from a file. First select the Encoder to be updated by checking the box to the left of the Encoder name. Then click on the Browse button and browse to the update file (CSV format). Click on the Update button to start the update process. See **Export Encoder Configuration** in **Advanced Encoder Configuration** section for instructions on how to export a file.

Power LED

As an aid for setting up a system with a large number of Encoder units, the power LED on a Encoder can be set to blink so that a particular device can be easily identified amongst many other units. To blink the LED, set the Blink LED switch to the ON position. The LED will continue to blink until the switch is set to OFF.

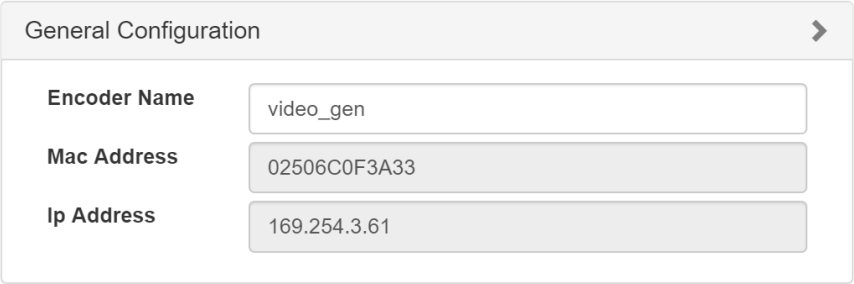
Encoder Configuration

In the right hand column, click on the “List” icon to bring up the Encoder Settings pop up window.



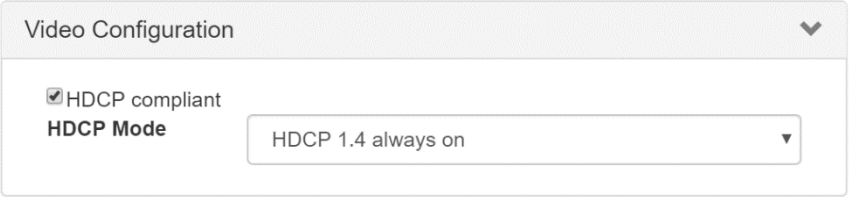
Renaming an Encoder

In the General Configuration panel, type in a new name in the Encoder Name box. This panel also shows the encoder's MAC address and IP address.



HDCP

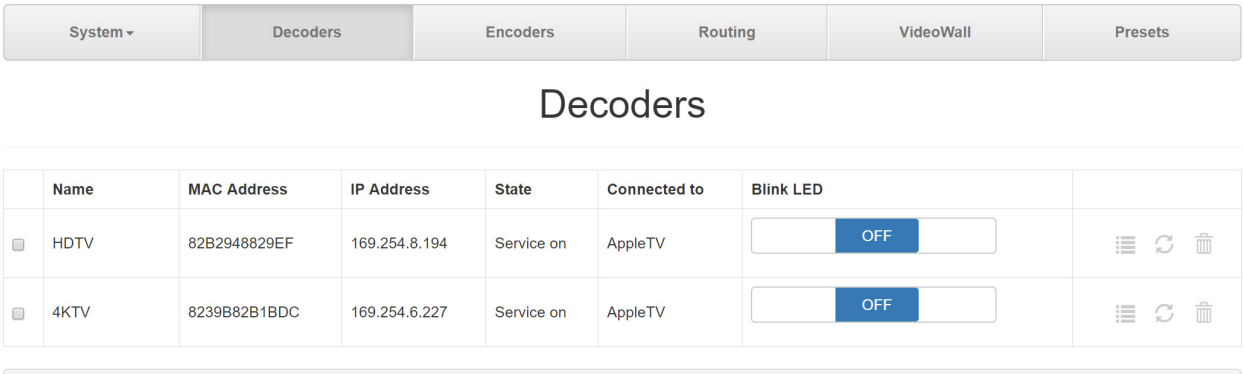
The Encoder's HDMI input supports HDCP 1.4 and HDCP 2.2. If you do not want the HDMI input to be HDCP compliant, uncheck the HDCP Compliant box.



Decoder

The controller's web interface allows the user to easily manage and configure the decoder in the system.

Click the Decoder tab on the top menu bar to bring up the Decoder page.



This page shows a table of all the decoders in the system. The name of each decoder is shown on the left side of the table. Each decoder will have a default name which can be changed. Each decoder also has a unique physical identifier called the MAC Address. The MAC Address is also printed on a label attached to the outside of the device case. The operational status of each decoder is shown in the State column. The decoder states are defined as follows:

Idle: Decoder is ready

Service On: Decoder is streaming video

Unavailable: Decoder is disconnected

The **Connected to** column shows the encoder that the decoder is connected to.

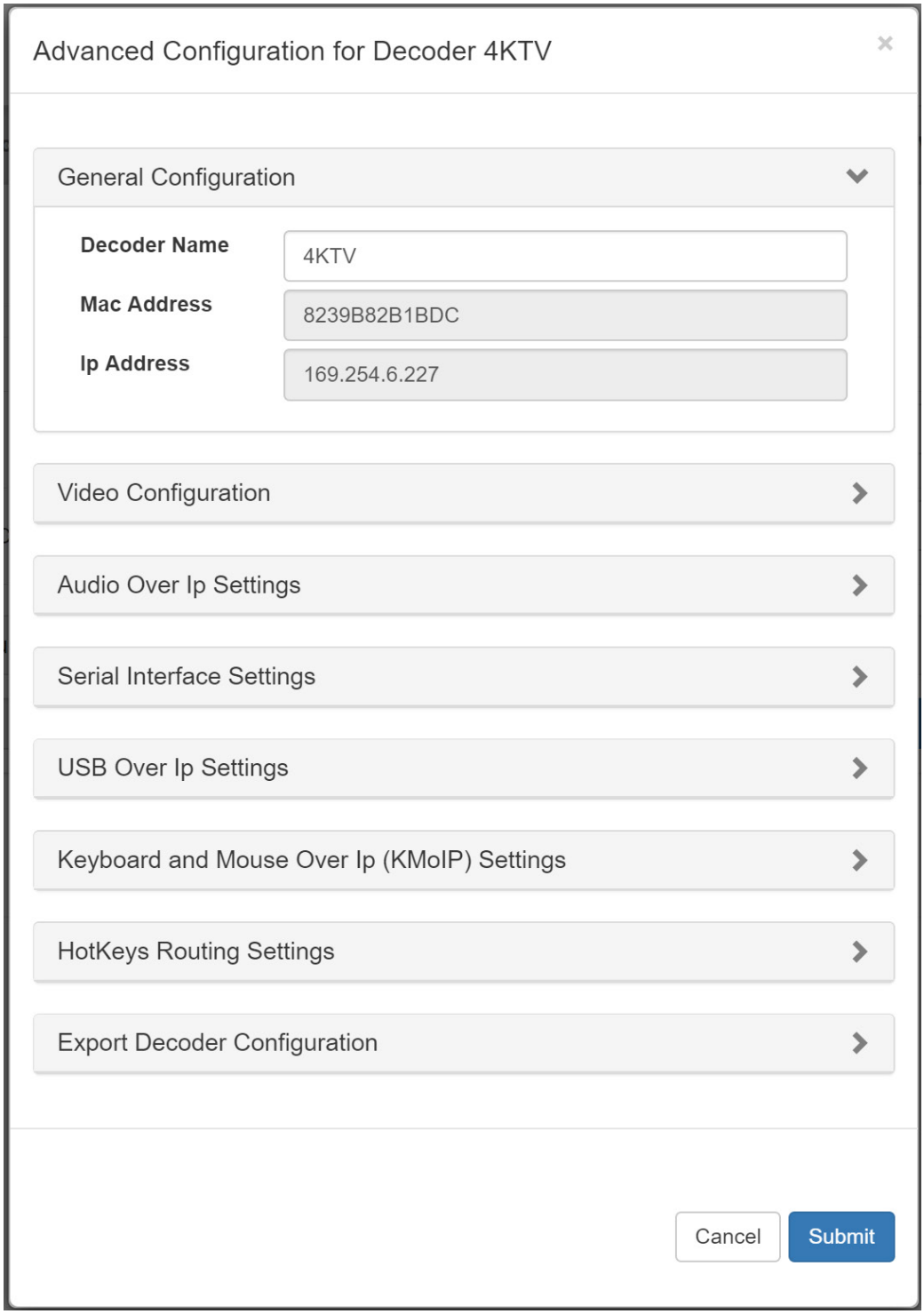
The configuration for one or more Decoders can be updated from a file. First select the Decoder to be updated by checking the box to the left of the Decoder name. Then click on the Browse button and browse to the update file (CSV format). Click on the Update button to start the update process. See Export Decoder Configuration in Advanced Decoder Configuration section for instructions on how to export a file.

Power LED

As an aid for setting up a system with a large number of units, the power LED on a decoder can be set to blink so that the device can be easily identified amongst many other units. To blink the LED, set the Blink LED switch to the ON position. The LED will continue to blink until the switch is set to OFF.

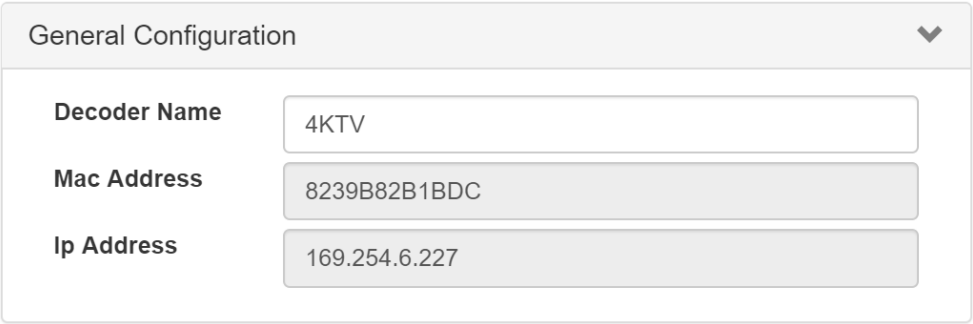
Decoder Configuration

On the right hand column, click on the “List” icon to bring up the Decoder Settings pop up window.



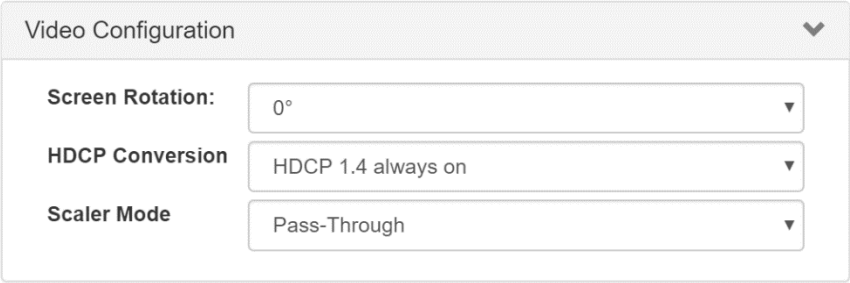
Renaming a Decoder

In the **General Configuration** panel, type in a new name in the **Decoder Name** box. This panel also shows the decoder's MAC address and IP address.



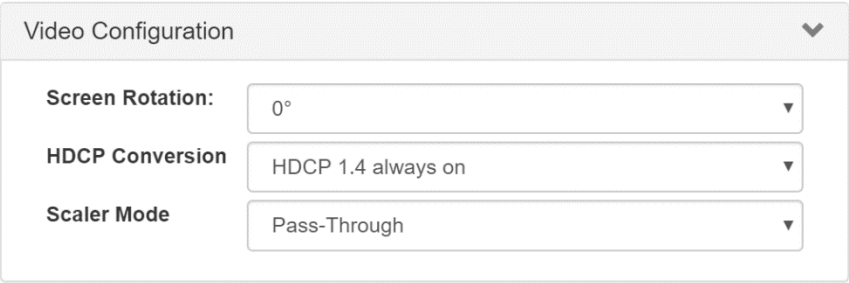
HDCP

In order to accommodate older displays that only support HDCP 1.4, the decoder supports the conversion of HDCP 2.2 to HDCP 1.4. In the Video Configuration panel, select the **HDCP Conversion** drop down list and select **HDCP 1.4 Always On** to enable this feature.



Scaler

The decoder is equipped with a flexible scaler that allows the HDMI output to be scaled to various commonly used resolutions. In the Video Configuration panel, select the Scaler Mode drop down list to select the desired output resolution. The supported resolutions include: Full HD 1080p60, Full HD 1080p50, Ultra HD 2160p30, Ultra HD 2160p25, WXGA (1366x768), WXGA+ (1440x900), WUXGA (1920x1200), SXGA+ (1400x1050). Select Pass-through to bypass the scaler and Auto to output the native resolution of the display.



Advanced Encoder Configuration

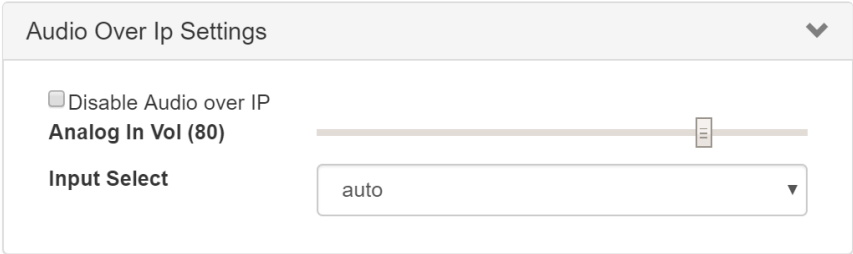
Audio

The analog audio input supports several options that can be selected in the **Audio Over IP Settings.**

Auto: If an analog audio input is plugged in, the HDMI embedded audio will be replaced by the analog audio. If no analog audio input is plugged in, the HDMI embedded audio will remain unmodified.

HDMI: The HDMI embedded audio will not be modified. The analog input audio is not used.

Analog: The analog input audio will replace the embedded HDMI audio.



Analog Input Volume: The slider adjusts the analog audio input volume level from 0 to 80.

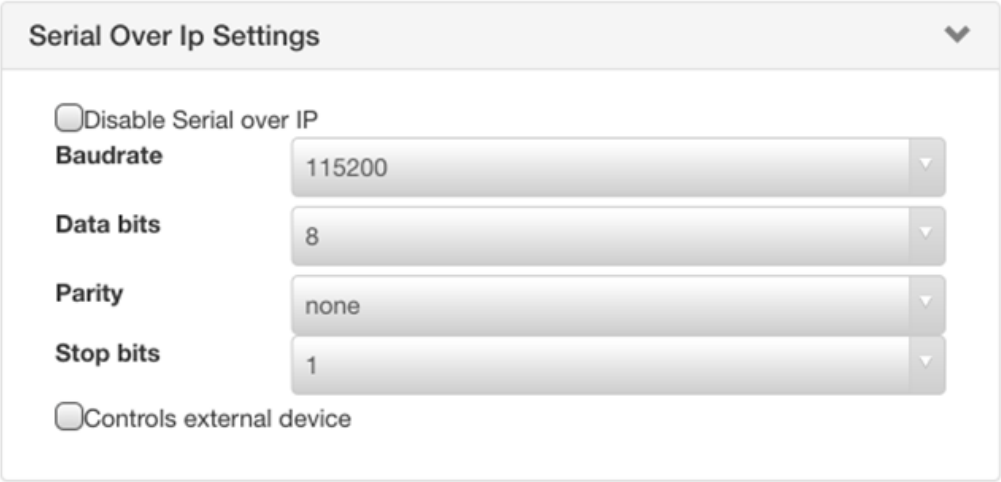
RS-232 Port

The RS-232 port supports 2 modes of operation:

1) Pass-through
2) Control External Device

When the encoder is connected to a single decoder in **Pass-through mode**, the serial data from the external device connected to the encoder is directed to the RS-232 port of the associated decoder. When the encoder is connected to multiple decoders in **Pass-through mode**, the device connected to the decoders initiates the connection to the encoder based on a “first come first served” protocol. For example, the first decoder that transmits data to the encoder will have control of the serial connection. After 2 seconds of inactivity, the connection will be released and the next decoder can take control of the connection.

In both modes of operation, the RS-232 serial settings must be set to match the serial port settings of the connected device. The RS-232 port settings are configured in Serial Over IP Settings.



Disable Serial over IP: Select this box to disable the serial over IP function. This box should be unselected for normal serial operation.

Baud rate: This menu selects the baud rate. The baud rate options are 300, 600, 1200, 2400, 4800, 9600, 19200, 3800, 57600, 115200.

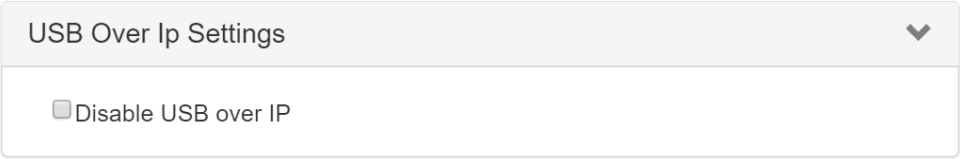
Data bits: This menu selects the number of data bits. The number of data bits supported are 5, 6, 7 and 8.

Parity: This menu selects the parity. The parity options are None, odd and even.

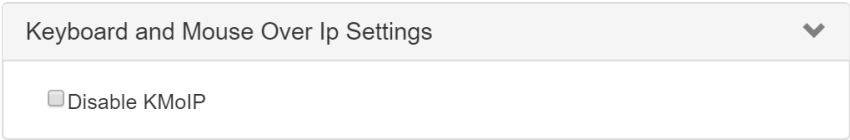
Stop bits: This menu selects the number of stop bits. The stop bit options are 1 or 2.

Controls external device: When this box is selected, the server can be used to send command strings to the RS-232 port (see UARTSTR command in API).

USB



Disable USB over IP: Select this check box to disable the USB over IP function (KMoIP will still be operational if it is not disabled). This box should be unselected for normal USB operation.



Disable KMoIP: Select this box to disable the Keyboard and Mouse over IP feature. KMoIP enables keyboard and mouse emulation, which allows for fast keyboard/mouse switching. This box should be unselected for normal USB operation.

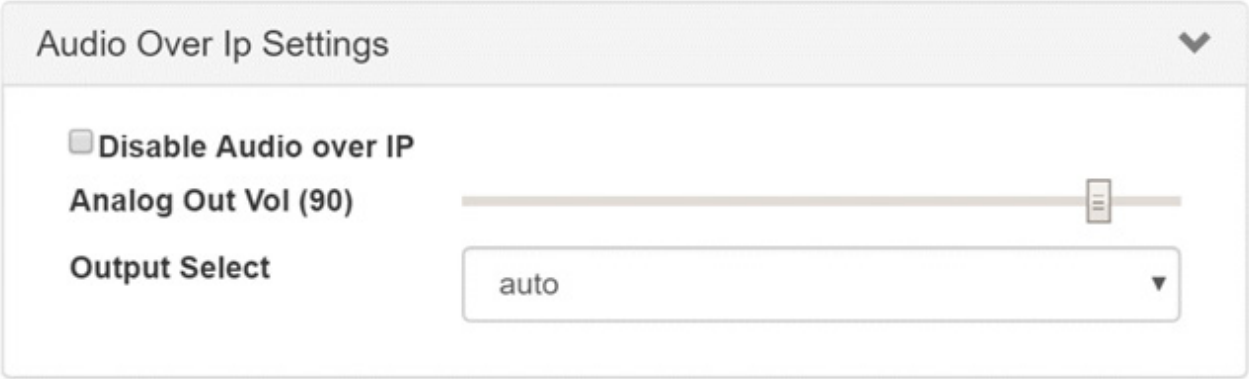
Export Encoder Configuration

The configuration of an Encoder can be exported to a file, which can be used to update one or more Encoders with the same configuration. Click on **Export Encoder Configuration** and then click **Export**. A file named **encoders_config.csv** will be saved to the local Downloads directory.

Advanced Decoder Configuration

Audio

The decoder analog audio output supports several options that can be selected in **Audio Over IP Settings,** Output Select drop down list.



Auto: The analog audio output follows the HDMI audio.
HDMI: The analog audio output follows the HDMI audio.
Analog: The analog output audio is determined by the Analog audio input setting on the Encoder.

The Analog Output Volume slider adjusts the analog audio output volume level from 0 to 80.

RS-232 Port

The RS-232 port supports 3 modes of operation:

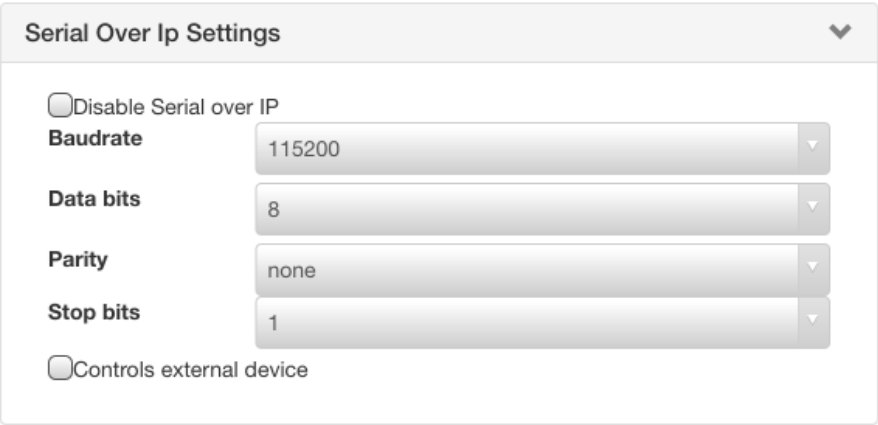
1) Pass-through
2) Control External Device
3) Control External Device (auto)

When the decoder is connected to a single encoder in **Pass-through** mode, the serial data from the external device connected to the decoder is directed to the RS-232 port of the associated encoder. When the encoder is connected to multiple decoders in **Pass-through** mode, the device connected to the decoder initiates the connection to the encoder based on a “first come first served” protocol. For example, the first encoder that transmits data to the encoder will have control of the serial connection. After 2 seconds of inactivity, the connection will be released and the next decoder can take control of the connection.

In **Control External Device** mode, an external control system can send serial strings directly to the RS-232 port of a encoder or decoder using the UARTSTR command. Alternatively, the external controller can establish a direct connection to the RS-232 port of a decoder or encoder using the OPENPORT command.

In **Control External Device (auto)** mode, the decoder can be configured to send serial strings out to the RS-232 port automatically when video is detected. Typically this mode is used to “turn on” a display when video is available at the decoder output. Up to 3 serial strings can be sent upon video detect. When video is no longer detected, a different serial string can be sent to “turn off” the display.

In all 3 modes of operation, the RS-232 port serial settings must be set to match the serial port settings of the connected device. The RS-232 port settings are configured in **Serial Over IP Settings**.



Disable Serial over IP: Select this box to disable the serial over IP function. This box should be unselected for normal serial operation.

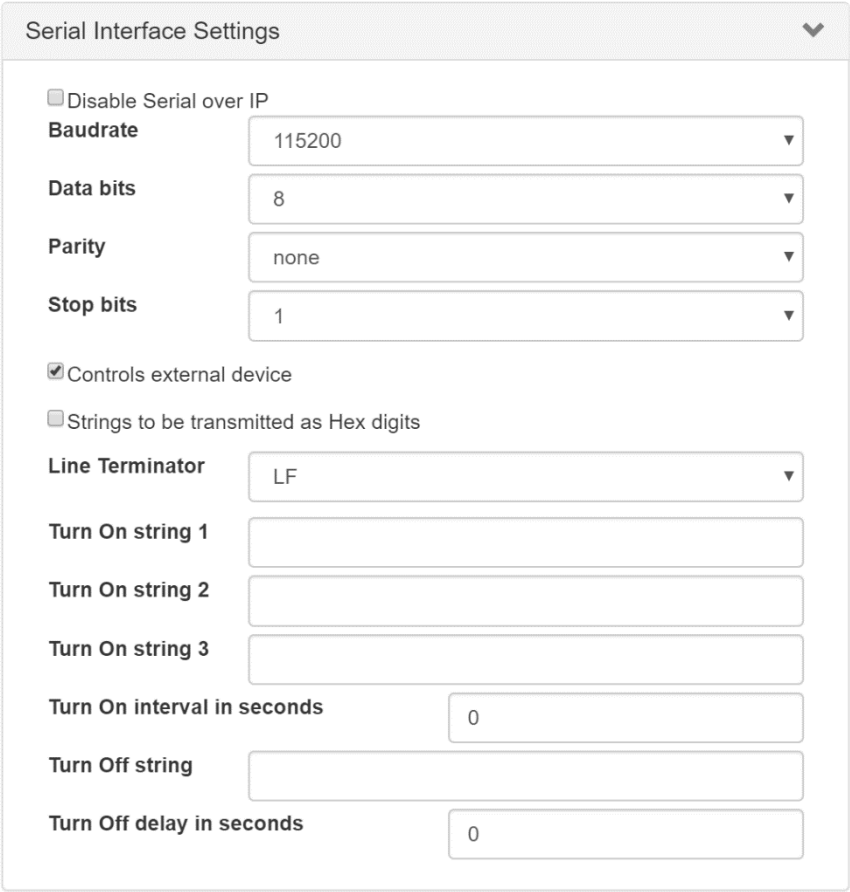
Baud rate: This menu selects the baud rate. The baud rate options are 300, 600, 1200, 2400, 4800, 9600, 19200, 3800, 57600, 115200.

Data bits: This menu selects the number of data bits. The number of data bits supported are 5, 6, 7 and 8.

Parity: This menu selects the parity. The parity options are None, odd and even.

Stop bits: This menu selects the number of stop bits. The stop bit options are 1 or 2.

Controls external device: When this box is selected, the server can be used to send command strings to the RS-232 port (see UARTSTR command in API).



USB

Virtual hub

When a encoder (USB host) is connected to multiple decoders (USB devices), the host can be controlled from multiple decoder units at one time. Each decoder unit can use a USB device without interfering with other decoders.

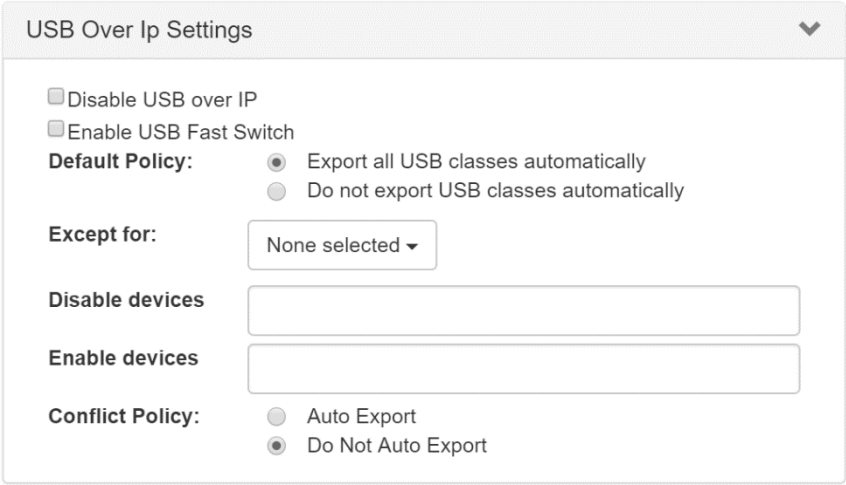
Device Class Filtering

By setting up a default policy, one or more device classes can be blocked on a particular Decoder.

Under Default Policy, if **Export all USB classes automatically** is selected, then all USB device classes will be enabled unless a particular device class is disabled in the **Except for:** drop down list.

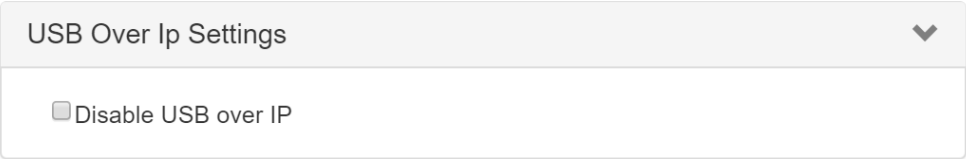
If **Do not export USB classes automatically** is selected, then all USB device classes will be disabled unless a particular device class is enabled in the **Except for:** drop down list.

In conjunction with the default policy, a specific vendor/id entered in the **Disable Devices** box will be disabled and a specific vendor/id entered in the **Enable Devices** box will be enabled.



Keyboard and Mouse

KMoIP enables keyboard and mouse emulation, which allows for fast keyboard/mouse switching. The **Disable KMoIP** box should be unselected for normal USB operation. KMoIP is enabled on USB port 1 and 2 by default. KMoIP can also be enabled on USB port 3 and 4 by selecting the check box next to the port.



Hotkeys Routing

A hotkey can be used to trigger a route to a particular encoder. Each hotkey is mapped as follows:

Hotkey 1 = <left ctrl>+1

Hotkey 2 = <left ctrl>+2

Hotkey 3 = <left ctrl>+3

Hotkey 4 = <left ctrl>+4

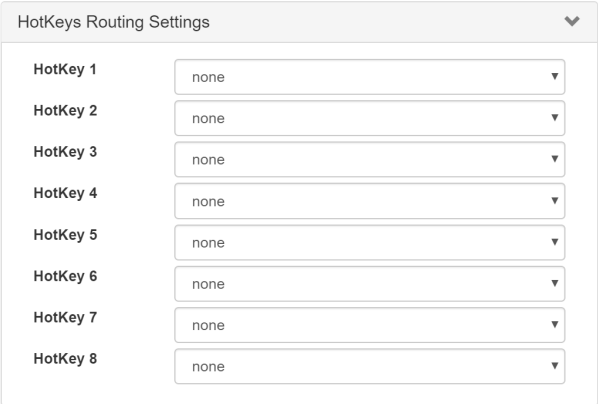
Hotkey 5 = <left ctrl>+5

Hotkey 6 = <left ctrl>+6

Hotkey 7 = <left ctrl>+7

Hotkey 8 = <left ctrl>+8

In the **Hotkeys Routing Settings** select the hotkey to be configured. From the drop down list, select a encoder to associate with the hotkey. When a hotkey is pressed 3 times in 750 ms, it will



Export Decoder Configuration

The configuration of a Decoder can be exported to a file, which can be used to update one or more Decoders with the same configuration. Click on **Export Decoder Configuration** and then click **Export**. A file named **decoders_config.csv** will be saved to the local Downloads directory.

RS-232 Command Line Interface

The controller provides an RS-232 command line interface. An optional USB-to-RS232 adapter must be plugged into one of the available USB ports and connected to your PC/laptop's RS-232 port as shown below:

USB to RS-232 Adapter

Using a terminal console program or 3rd party control processor, make a connection using the following default settings:

Baudrate: **19200**

Data Bits: **8**

Parity: **None**

Stop Bits: **1**

Flow Control: **None**

Termination: **Carriage Return CR (0x0D)**

See Section 9.0 Appendix for serial API command list.

Network Control Interface

To obtain the controller's IP address, type **ipconfig** in the command line interface.

If the controller is connected to a network via WiFi, make sure that your Laptop/PC is connected to the same network.

Accessing the Telnet port: Use a telnet client to connect to the IP address using port 23.

Default Username: **broadata**

Default Password: **Br0@data**

See Section 9.0 Appendix for serial API command list.

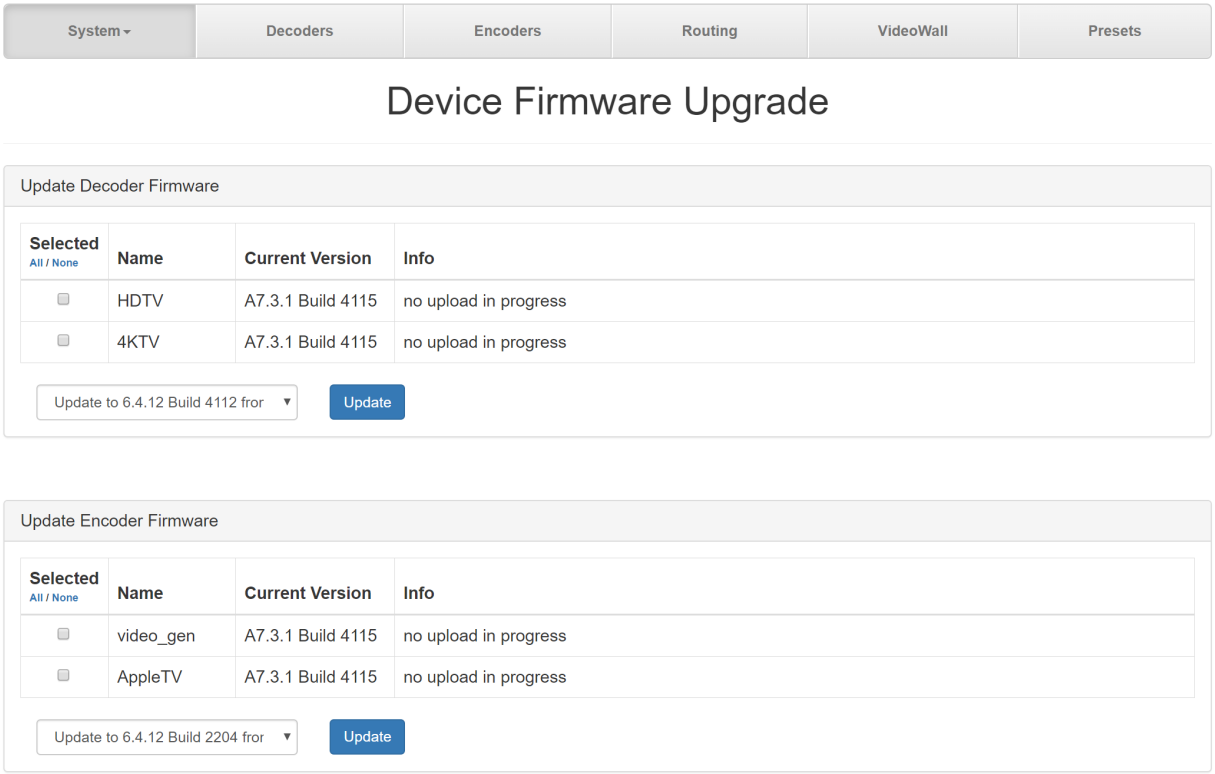
You can also connect the controller directly to the network by using a USB-to-Ethernet Adapter as shown below.

USB to Ethernet Adapter

Connect to network with an Ethernet cable

Updating Encoder/Decoder Device Firmware

Click the **System** tab on the top menu bar and select **Device Update** from the drop down list.



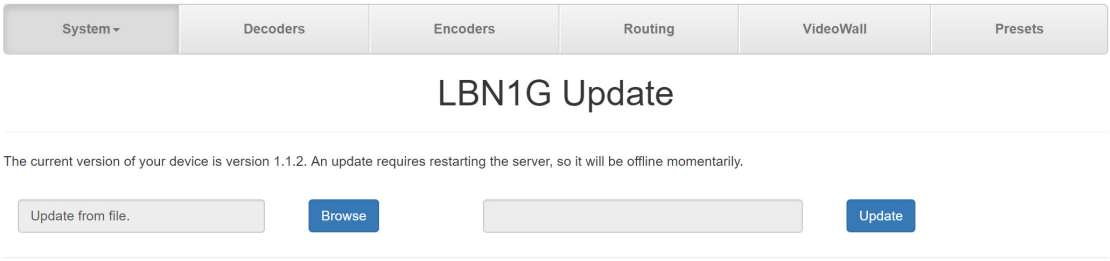
Select the box to the left of a particular Decoder to be updated or select **All** to select all decoders. The decoder can be updated from the cloud or from a file. Cloud update will always update to the latest firmware stored on the Broadata cloud server. From the update menu, select Update to <version> from cloud and then click on **Update**.

If Internet access is not available, a decoder can be updated from a file stored locally on the PC/laptop. From the update menu, select Update from file. Browse to the update file and then click on **Update**.

Follow the same procedure to update the encoder.

Updating Controller Firmware

Click the **System** tab on the top menu bar and select **Server Update** from the drop down list.



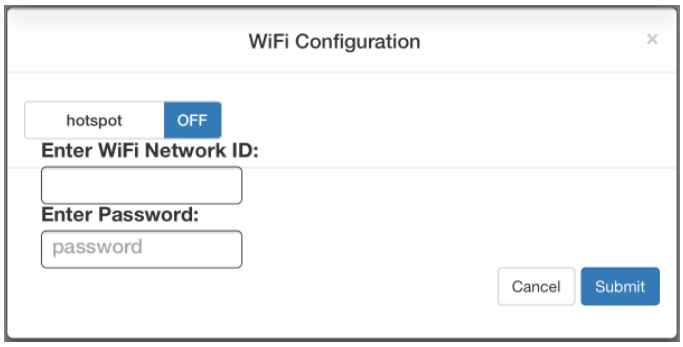
The server can be updated from the cloud or from a file just like the decoders and encoders

Cloud update will always update the server to the latest firmware stored on the Broadata cloud server. From the update menu, select **Update to <version> from cloud** and then click on **Update**.

If Internet access is not available, the server can be updated from a file stored locally on the PC/laptop. From the update menu, select **Update from file**. Browse to the update file and then click on **Update**.

Connecting to Wifi

From the System drop down menu, select **Wifi** to bring up the Wifi Configuration pop up window.



Note: The MSX controller's factory Wifi configuration turns on the server's hotspot.

To turn Hotspot Off and connect to a local Wifi network, set the Hotspot switch to **OFF**. Enter the WiFi network ID and password and then click **Submit**. The server will reboot and connect to the selected Wifi network.

To turn Hotspot On, set the Hotspot switch to **ON** and click **Submit**. On your mobile device, go to Wifi settings and select the MSX hotspot, **lbn1g-xxxxx-hotspot**. In hotspot mode, the server IP address defaults to **10.42.0.1**.

LBN-MSx Web Interface

Routing

Click on the Routing tab on the top menu bar to bring up the Routing page.

The Routing page provides a matrix view of Encoders and Decoders in the system. Decoders are shown on the left and Encoders are shown on the top of the matrix. To set up a route, click on the box for the corresponding connection and a check mark will appear. Click on the Apply button to complete the route. A Encoder can be routed to all Decoders by clicking on All for the corresponding Encoder and then Apply. Unroute All can be done by clicking None and then Apply.

EDID Management

After a box is checked to establish a connection, there is an option to copy the EDID from a connected Decoder to the Encoder by clicking the EDID button in the lower right corner. The EDID button turns green to indicate that the Encoder is using the EDID from the selected Decoder. If none of the EDID buttons are selected, the Encoder uses the default internal EDID.

Presets

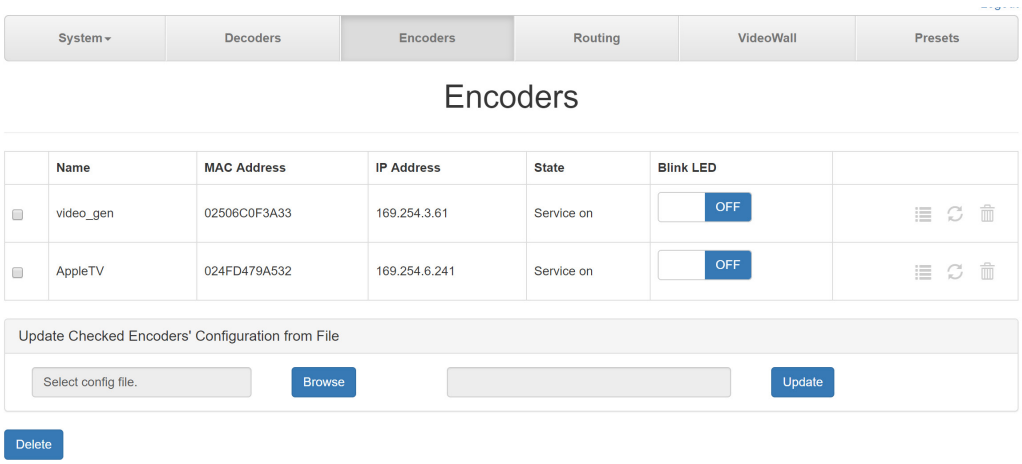
The current routes and EDID settings can be saved to a user defined preset. Click on the Save Preset button and the Save Preset window will pop up.

Type in the preset name and preset description and then click Save Preset. All saved presets are listed in the Presets page.

Encoders

Encoder Status

Click the Encoders tab on the top menu bar to bring up the Encoder page.



All available encoders will be listed in the table. The State column indicates the current state of a particular encoder. The encoder states are defined as follows:

Attaching: Encoder is ready

Service On: Active source is plugged in

Unavailable: encoder is disconnected

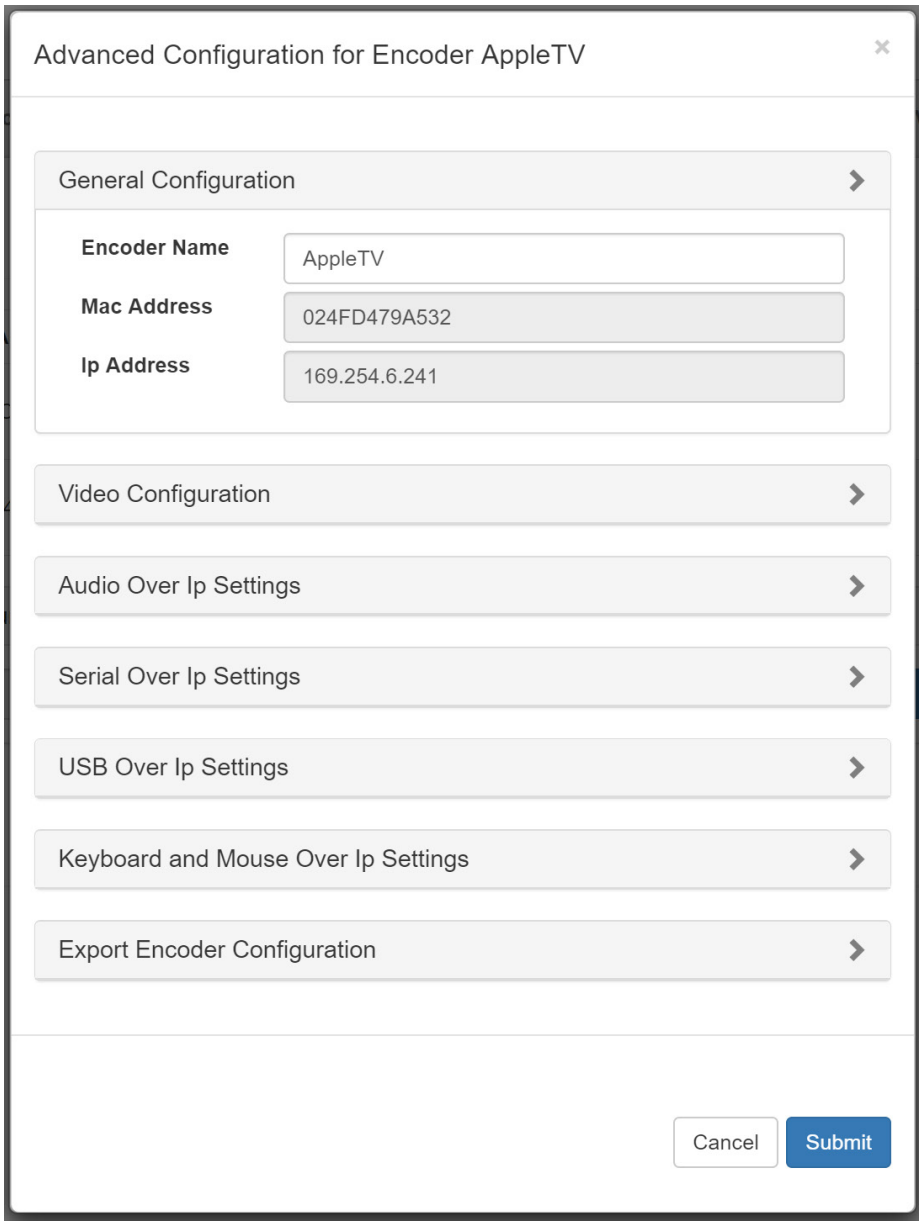
The configuration for one or more Encoders can be updated from a file. First select the Encoder to be updated by checking the box to the left of the Encoder name. Then click on the Browse button and browse to the update file (CSV format). Click on the Update button to start the update process. See Export Encoder Configuration in Advanced Encoder Configuration section for instructions on how to export a file.

Blink LED

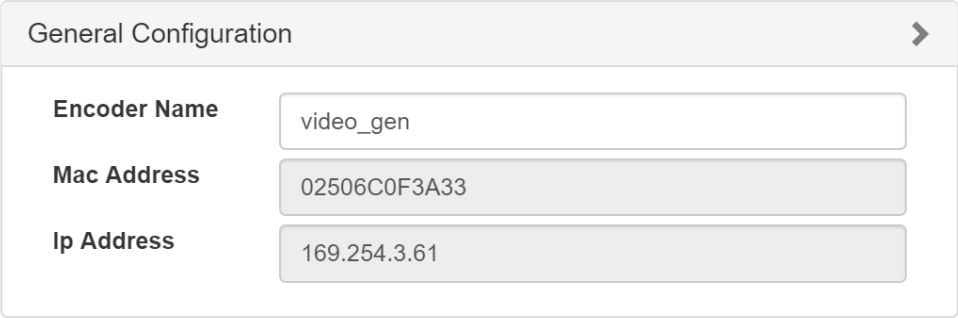
As an aid for setting up a system with a large number of units, the power LED on an encoder can be set to blink so that a particular device can be easily identified amongst many other units. To blink the LED, set the Blink LED switch to the ON position. The LED will continue to blink until the switch is set to OFF.

Encoder Settings

In the right hand column, click on the List icon to bring up the Encoder Settings pop up window.



General Configuration

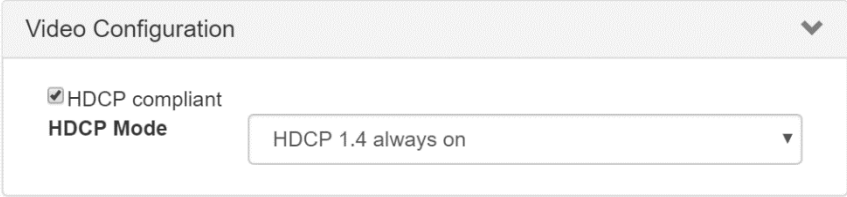


Encoder Name: This box shows the encoder's name that can be user defined.

MAC address: This box shows the Encoder's MAC address.

IP address: This box shows the encoder's IP address.

Video Configuration



HDCP Compliant: Select this box to be compliant with HDCP sources.

HDCP Mode: This menu configures the HDCP encryption of the video content.

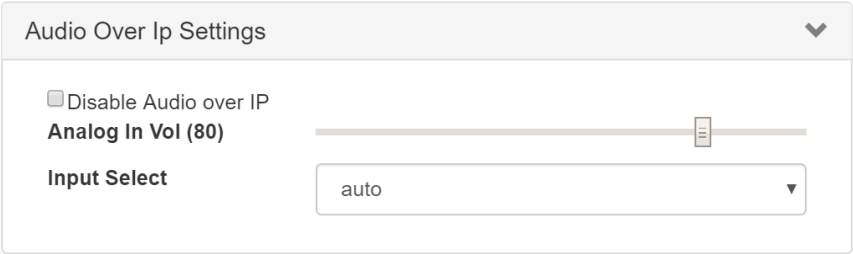
Note: Switching speed is optimized when switching between encoders with a common HDCP encryption.

HDCP 1.4 always on: the content will be encrypted with HDCP 1.4

HDCP 2.2 always on: the content will be encrypted with HDCP 2.2

None: the content's HDCP encryption will not be altered.

Audio Over IP Settings



Disable Audio over IP: Select this box to disable the audio over IP function. This box should be unselected for normal audio operation.

Analog Input Volume: This slider adjusts the analog audio input volume level from 0 to 80.

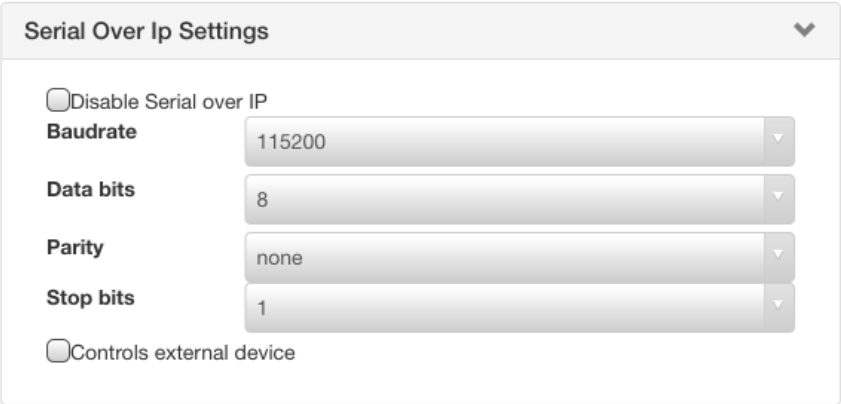
Input Select: This menu sets the operating mode of the analog audio input.

Auto: If an analog audio input is plugged in, the HDMI embedded audio will be replaced by the analog audio. If no analog audio input is plugged in, the HDMI embedded audio will remain unmodified.

HDMI: The HDMI embedded audio will not be modified. The analog input audio is not used.

Analog: The analog input audio will replace the embedded HDMI audio.

Serial Over IP Settings



This panel is used to configure the RS-232 serial port settings.

Disable Serial over IP: Select this box to disable the serial over IP function. This box should be unselected for normal serial operation.

Baud rate: This menu selects the baud rate. The baud rate options are 300, 600, 1200, 2400, 4800, 9600, 19200, 3800, 57600, 115200.

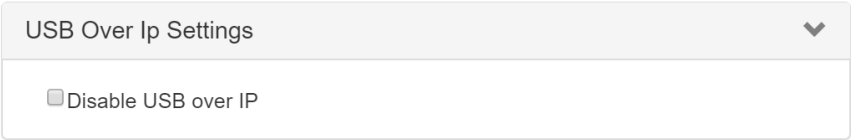
Data bits: This menu selects the number of data bits. The number of data bits supported are 5, 6, 7 and 8.

Parity: This menu selects the parity. The parity options are None, odd and even.

Stop bits: This menu selects the number of stop bits. The stop bit options are 1 or 2.

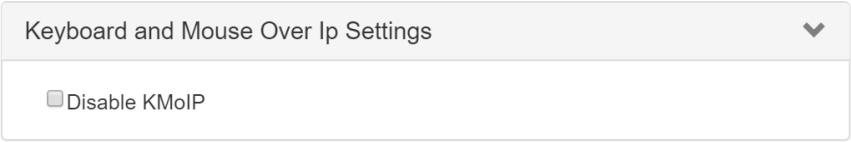
Controls external device: When this box is selected, the server can be used to send command strings to the RS-232 port (see UARTSTR command in API).

USB Over IP Settings



Disable USB over IP: Select this check box to disable the USB over IP function (KMoIP will still be operational if it is not disabled). This box should be unselected for normal USB operation.

Keyboard and Mouse Over IP Settings



Disable KMoIP: Select this box to disable the Keyboard and Mouse over IP feature. KMoIP enables keyboard and mouse emulation, which allows for fast keyboard/mouse switching. This box should be unselected for normal USB operation.

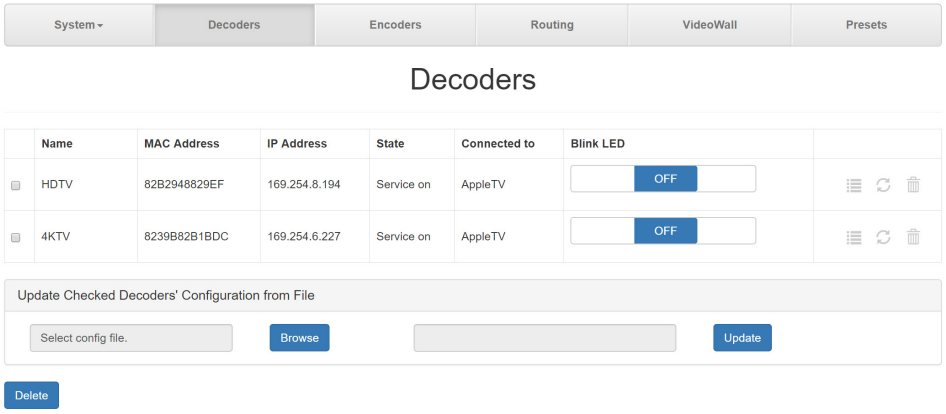
Export Encoder Configuration

The configuration of an Encoder can be exported to a file, which can be used to update one or more Encoders with the same configuration. Click on **Export Encoder Configuration** and then click **Export**. A file named **encoders_config.csv** will be saved to the local Downloads directory.

Decoders

Decoder Status

Click the Decoders tab on the top menu bar to bring up the Decoders page.



All available decoders will be listed in the table. The **State** column indicates the current state of a particular decoder. The decoder states are defined as follows:

Idle: Decoder is ready

Service On: Decoder is streaming video

Unavailable: Decoder is disconnected

The **Connected to** column shows the encoder the decoder is connected to.

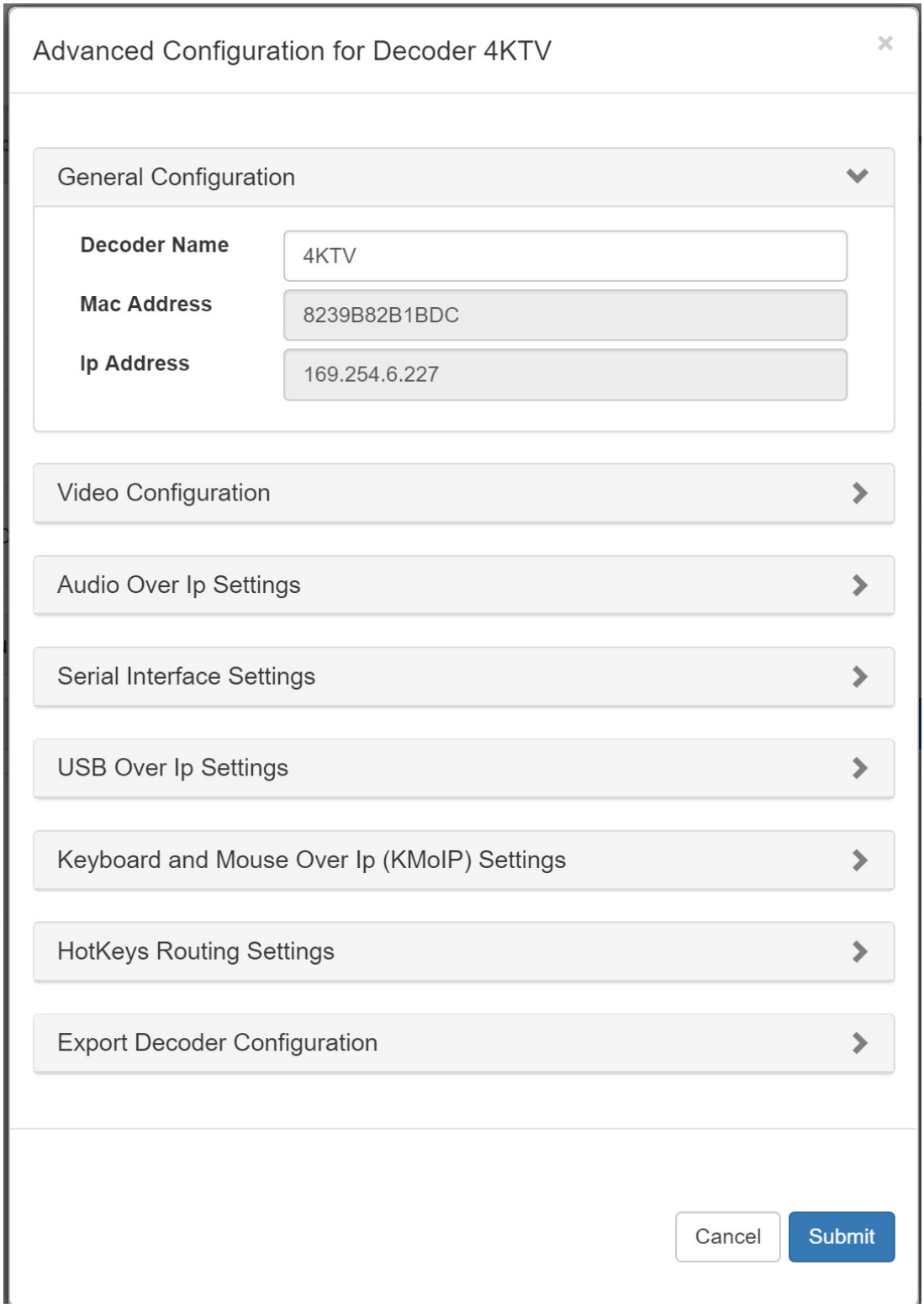
The configuration for one or more Decoders can be updated from a file. First select the Decoder to be updated by checking the box to the left of the Decoder name. Then click on the Browse button and browse to the update file (CSV format). Click on the Update button to start the update process. See **Export Decoder Configuration** in **Advanced Decoder Configuration** section for instructions on how to export a file.

Blink LED

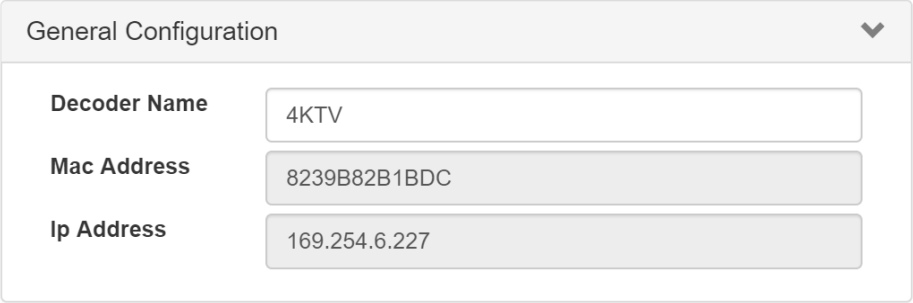
As an aid for setting up a system with a large number of units, the power LED on a Decoder can be set to blink so that the device can be easily identified amongst many other units. To blink the LED, set the Blink LED switch to the ON position. The LED will continue to blink until the switch is set to OFF.

Decoder Settings

In the right hand column, click on the List icon to bring up the Decoders Settings pop up window.



General Configuration



Decoder Name: This box shows the decoder name that can be user defined.

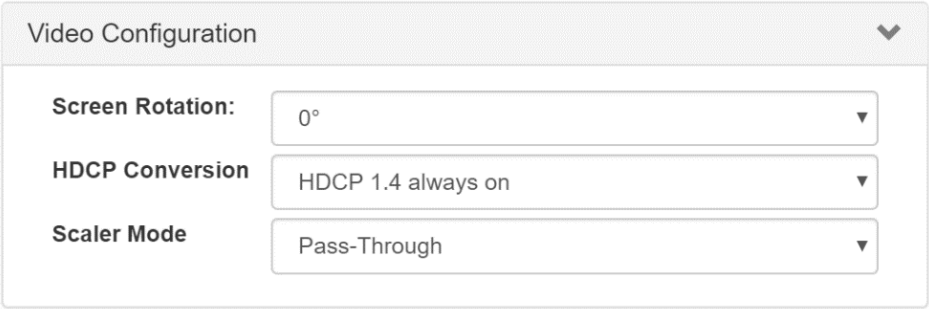
MAC Address: This box shows the decoder's MAC address.

IP Address. This box shows the decoder's IP address.

MAC Address: This box shows the decoder's MAC address.

IP Address. This box shows the decoder's IP address.

Video Configuration



Screen Rotation: This menu allows the display orientation to be rotated 90, 180 or 270 degrees.

HDCP Conversion: This menu configures the HDCP encryption of the output video content.

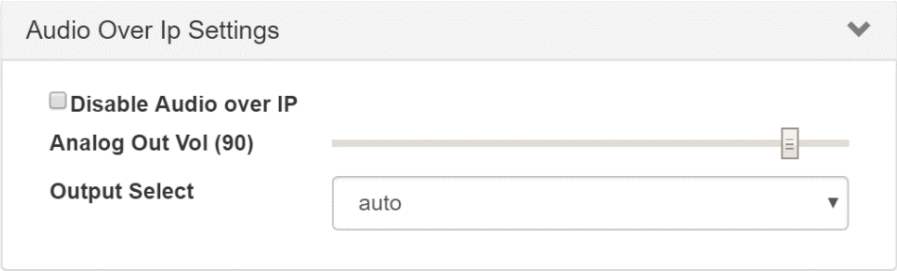
HDCP 1.4 always on: the content will be encrypted with HDCP 1.4

HDCP 2.2 always on: the content will be encrypted with HDCP 2.2

None: the content's HDCP encryption will not be altered.

Scaler Mode: This menu selects whether the scaler is enabled or bypassed. The scaler output resolutions are: Full HD 1080p60, Full HD 1080p50, Ultra HD 2160p30, Ultra HD 2160p25, WXGA (1366x768), WXGA+ (1440x900), WUXGA (1920x1200), SXGA+ (1400x1050).

Audio Over IP Settings



Disable Audio over IP: Select this box to disable the audio over IP function. This box should be unselected for normal audio operation.

Analog Output Volume: The volume slider adjusts the analog audio output volume level from 0 to 80.

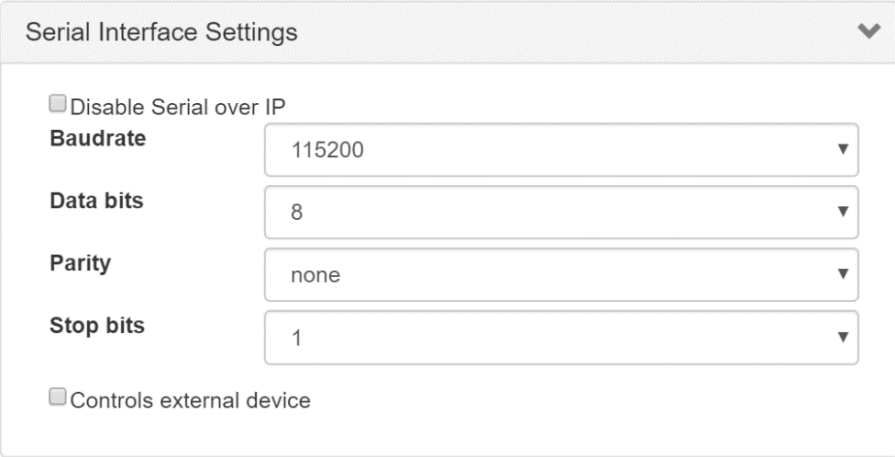
Output Select: This menu sets the operating mode of the analog audio output.

Auto: The analog audio output follows the HDMI audio.

HDMI: The analog audio output follows the HDMI audio.

Analog: The analog output audio is determined by the Analog audio input setting on the Encoder

Serial Over IP Settings



This panel is used to configure the RS-232 serial port settings.

Disable Serial over IP: Select this box to disable the serial over IP function. This box should be unselected for normal serial operation.

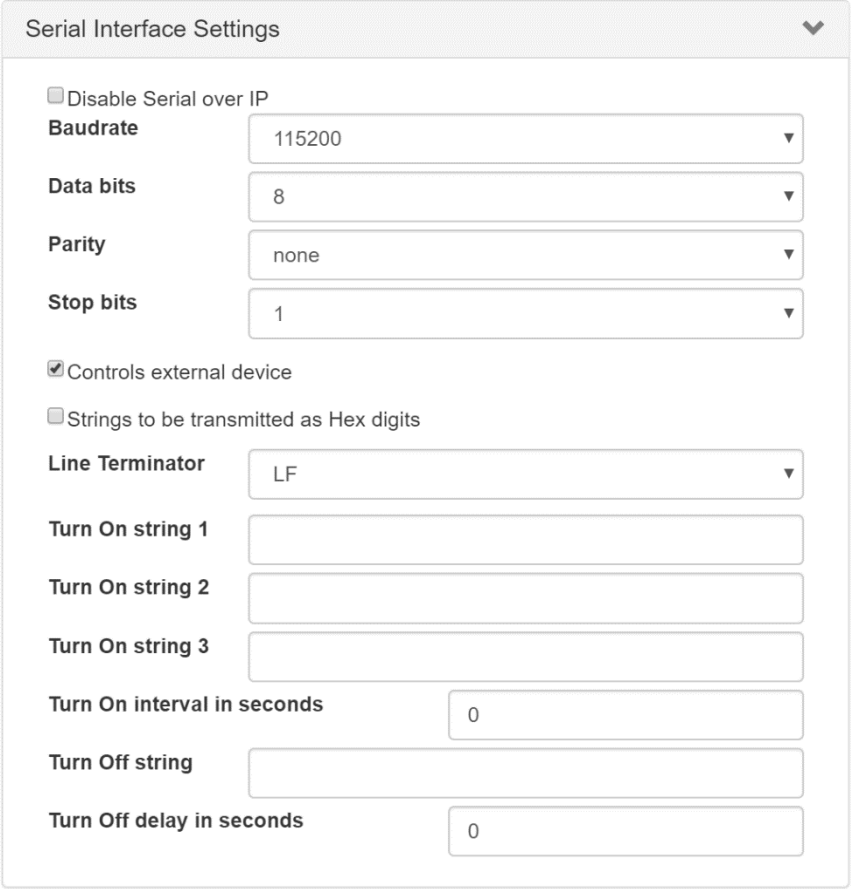
Baud rate: This menu selects the baud rate. The baud rate options are 300, 600, 1200,2400, 4800,9600, 19200, 3800, 57600, 115200.

Data bits: This menu selects the number of data bits. The number of data bits supported are 5, 6, 7 and 8.

Parity: This menu selects the parity. The parity options are None, odd and even.

Stop bits: This menu selects the number of stop bits. The stop bit options are 1 or 2.

Controls External Device: Select this check box to enable the automatic transmission of serial strings to an external device when video is active.



Strings to be transmitted as Hex digits: Select this box to transmit hex strings.

Line Terminator: Select line terminator CR, LF or CR+LF.

Turn On String 1: First string to be transmitted upon video active.

Turn On String 2: Second string to be transmitted upon video active.

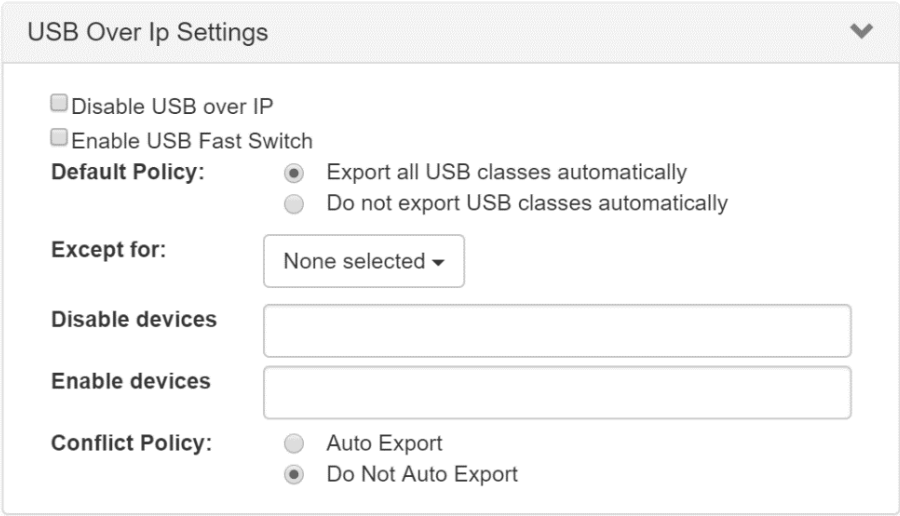
Turn On String 3: Third string to be transmitted upon video active.

Turn On Interval: Delay in seconds between transmission of strings.

Turn Off String: String to be transmitted once output video is no longer active.

Turn Off Delay: Delay in seconds before string is transmitted after output video is no longer active.

USB Over IP Settings



Disable USB over IP: Select this check box to disable the USB over IP function (KMoIP will still be operational if it is not disabled). This box should be unselected for normal USB operation.

Default Policy:

Export all USB device classes automatically: this option enables all USB device classes.
Do not export USB classes automatically: this option will disable all USB devices classes.

Except for: If Export all USB device classes automatically is selected, this menu is used to disable one or more specific device classes. If Do not export USB classes automatically is selected, this menu is used to enable one or more specific device classes.

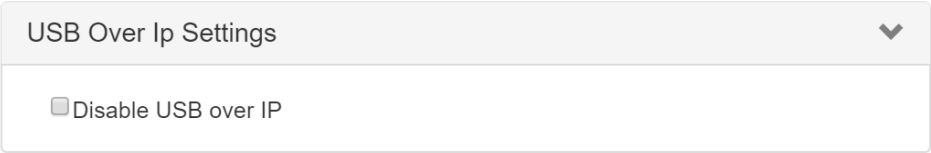
Disable devices: In conjunction with the default policy, a specific vendor/id entered in this box will be disabled.

Enable devices: In conjunction with the default policy, a specific vendor/id entered in this box will be enabled.

Conflict Policy:

Auto export: In the event of a conflict in the export policy, all device classes will be exported.
Do not auto export: In the event of a conflict in the export policy, all devices will not be exported.

Keyboard and Mouse Over IP Settings



Disable KMoIP: Select this box to disable the Keyboard and Mouse over IP feature. KMoIP enables keyboard and mouse emulation, which allows for fast keyboard/mouse switching. This box should be unselected for normal USB operation. KMoIP is enabled on USB port 1 and 2 by default. KMoIP can also be enabled on USB port 3 and 4 by selecting the check box next to the port.

Hotkeys Routing

A hotkey can be used to trigger a route to a particular Encoder. Each hotkey is mapped as follows:

Hotkey 1 = <left ctrl>+1

Hotkey 2 = <left ctrl>+2

Hotkey 3 = <left ctrl>+3

Hotkey 4 = <left ctrl>+4

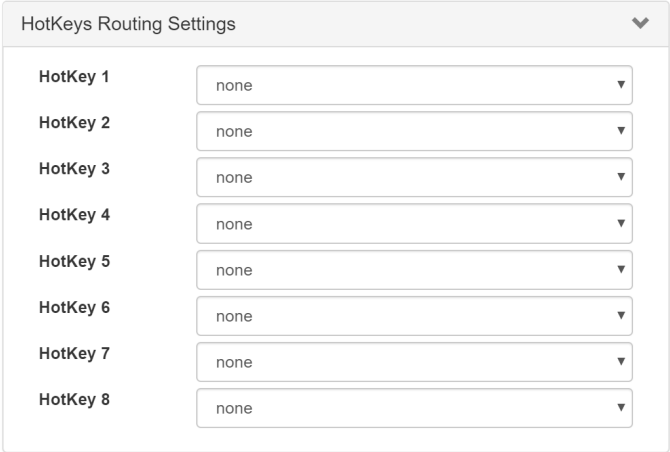
Hotkey 5 = <left ctrl>+5

Hotkey 6 = <left ctrl>+6

Hotkey 7 = <left ctrl>+7

Hotkey 8 = <left ctrl>+8

In the Hotkeys Routing Settings select the hotkey to be configured. From the menu, select a Encoder to associate with the hotkey. When a hotkey is pressed 3 times in 750 ms, it will trigger a route to that particular Encoder.

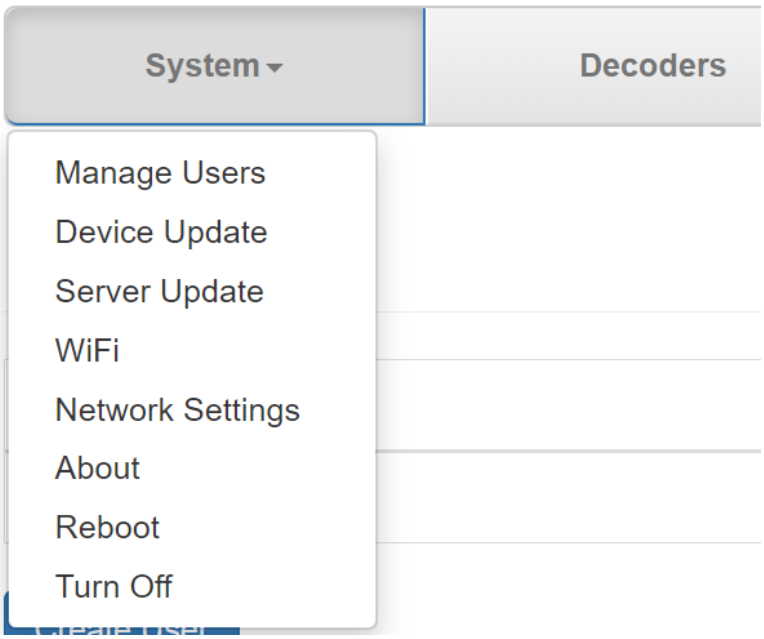


Export Decoder Configuration

The configuration of a Decoder can be exported to a file, which can be used to update one or more Decoders with the same configuration. Click on **Export Decoder Configuration** and then click **Export**. A file named **decoders_config.csv** will be saved to the local Downloads directory.

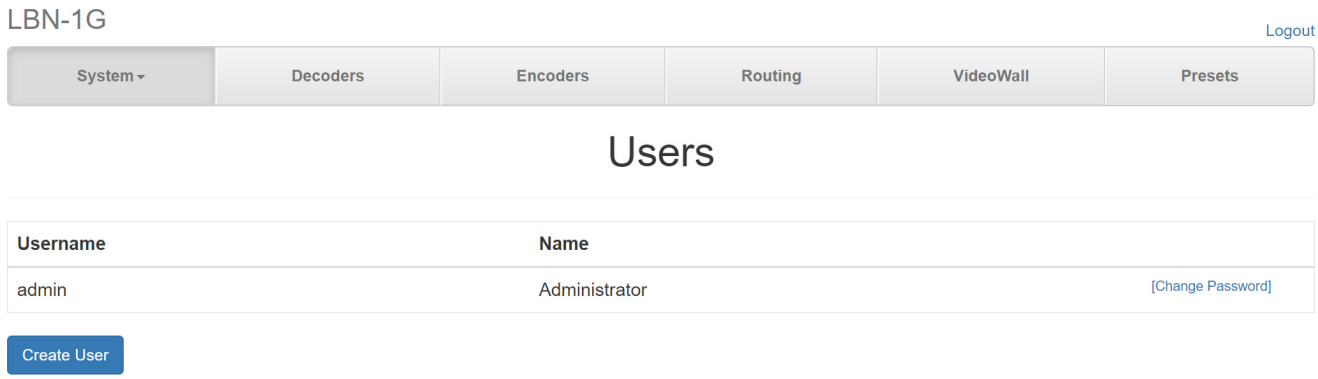
System

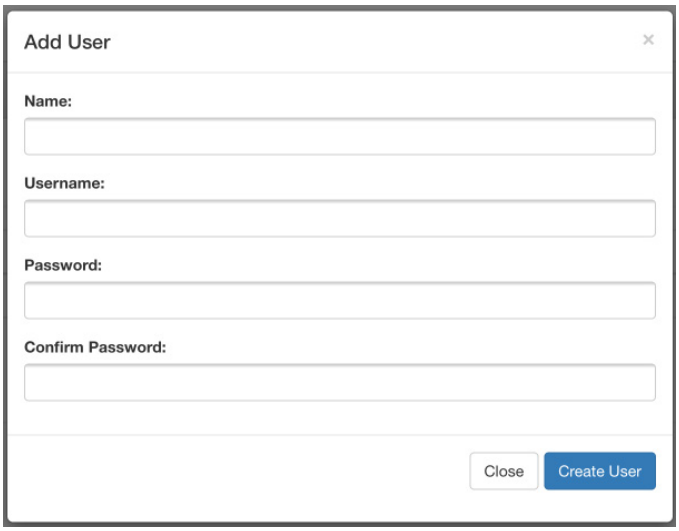
Click on the **System** tab on the top menu bar for the **System** pull down menu.



Manage Users

From the System pull down menu, select **Manage Users** to bring up the Users admin page. The Users page allows an administrator to add authorized users to the system. Click on the **Create User** button to add a new user.

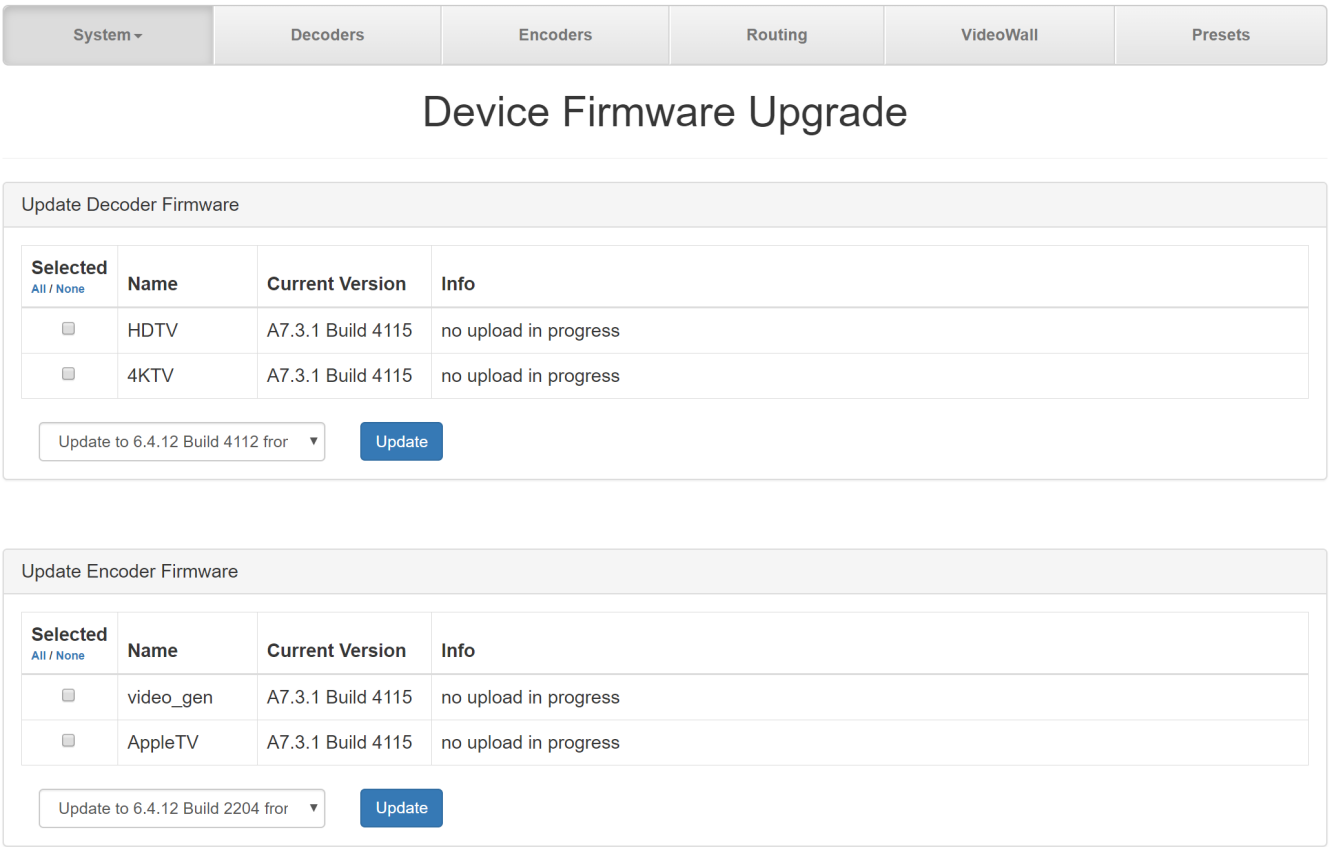




Enter Name, Username and Password for each new user and then click on the **Create User** button.

Encoder/Decoder Update

From the System pull down menu, select **Device Update** to bring up the Device Firmware Upgrade page.



Update Decoder/Encoder Firmware

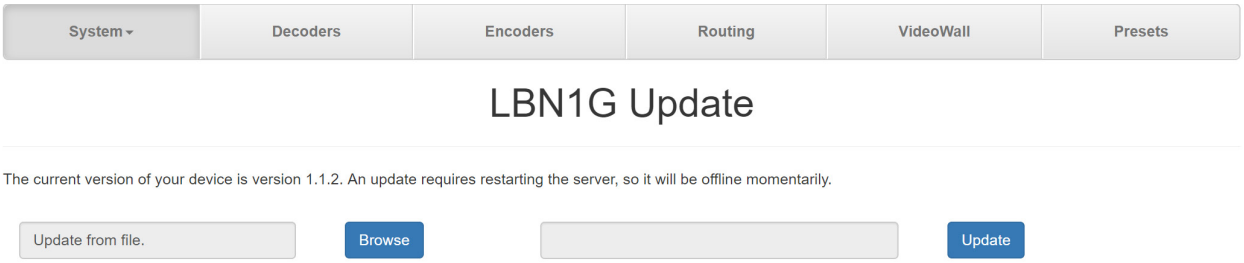
Select the box to the left of a particular Decoder to be updated or select **All** to select all decoders. The decoders can be updated from the cloud or from a file. Cloud update will always update to the latest firmware stored on the Broadata cloud server. From the update menu, select Update to <version> from cloud and then click on **Update**.

If Internet access is not available, a decoder can be updated from a file stored on a USB flash drive. From the update menu, select Update from file. Insert USB flash drive that contains the update file. Browse to the update file and then click on **Update**.

Follow the same procedure to update the encoder.

Server Update

From the System pull down menu, select **Server Update** to bring up the Server Update page.



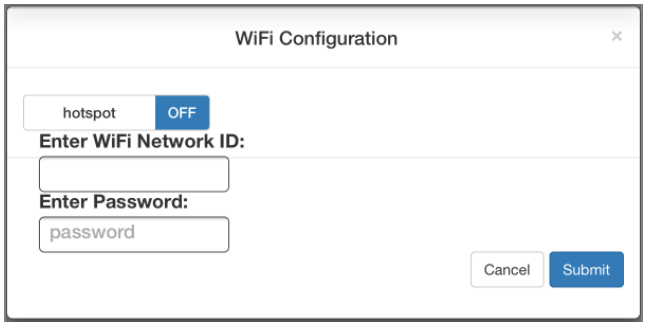
Similar to the encoders and decoders, the server can be updated from the cloud or from a file.

Cloud update will always update the server to the latest firmware stored on the Broadata cloud server. From the update menu, select Update to <version> from cloud and then click on **Update**.

If Internet access is not available, the server can be updated from a file stored on a USB flash drive. From the update menu, select Update from file. Insert USB flash drive that contains the update file. Browse to the update file and then click on **Update**.

Wifi

From the System pull down menu, select **Wifi** to bring up the Wifi Configuration pop up window.



Note: The MSX server's factory Wifi configuration turns on the server's hotspot.

To turn Hotspot Off and connect to a local Wifi network, set the Hotspot switch to OFF. Enter the WiFi network ID and password and then click Submit. The server will reboot and connect to the selected Wifi network.

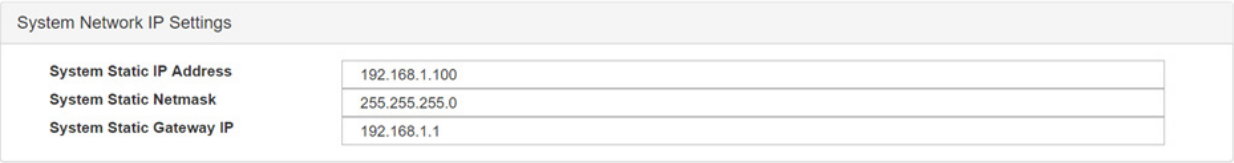
To turn Hotspot On, set the Hotspot switch to ON and click Submit. On your mobile device, go to Wifi settings and select the MSX hotspot, "lbn1g-xxxxx-hotspot". In hotspot mode, the server IP address defaults to 10.42.0.1.

Network Settings

From the System pull down menu, select Network Settings to bring up the Network Settings page.
The network interface (AVoIP) operates in Auto IP mode by default. IP addresses in the range 169.254.x.x are automatically assigned to Encoders, Decoders and the local controller interface. The network can also operate in Static IP mode. In Static IP mode, static IP addresses can be manually assigned to Encoders, Decoders and the local controller interface.

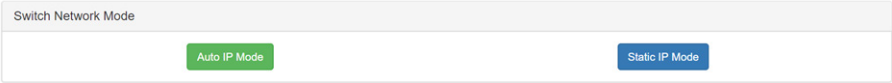
Static IP Mode

Assign static IP address, Netmask and Gateway IP address to the controller in System Network IP Settings, then click the Save button.



Assign static IP addresses to the Encoders and Decoders in the Static IP Address box. The static IP addresses must be in the same range as the controller. Click the Save button.

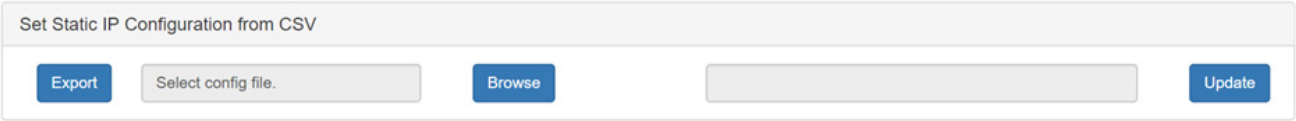
At the top of the page, click on the Static IP Mode button to switch to static IP mode.



Caution: While operating in Static IP Mode, any new Encoder or Decoder that is plugged into the switch will not be discovered by the server because Encoders and Decoders operate in Auto IP mode by default.

Export devices IP Configuration file

The network settings for all devices can be exported to a .csv file. To export the IP configuration, click on the **Export** button.



A file named **network_config.csv** will be saved to the local Downloads directory. The .csv file can be manually edited using Excel. Only the device names and Static IP Addresses can be modified. After editing in Excel, the file must be saved as type CSV (Comma delimited).

Set static IP addresses from file

The static IP addresses for all devices can be updated from a file. After the **network_config.csv** file from above is edited, it can be used to update the static IP addresses of the devices. To update the IP configuration, click on the Browse button and browse to the .csv file. Then click on **Update**. The static IP addresses for the devices should update according to the file. If any names were changed in the file, the device name will also be updated. Lastly, click on the **Static IP Mode** button to switch to static IP mode.

About

From the System pull down menu, select **About** to bring up the About pop up window that shows the current software versions.

Turn Off

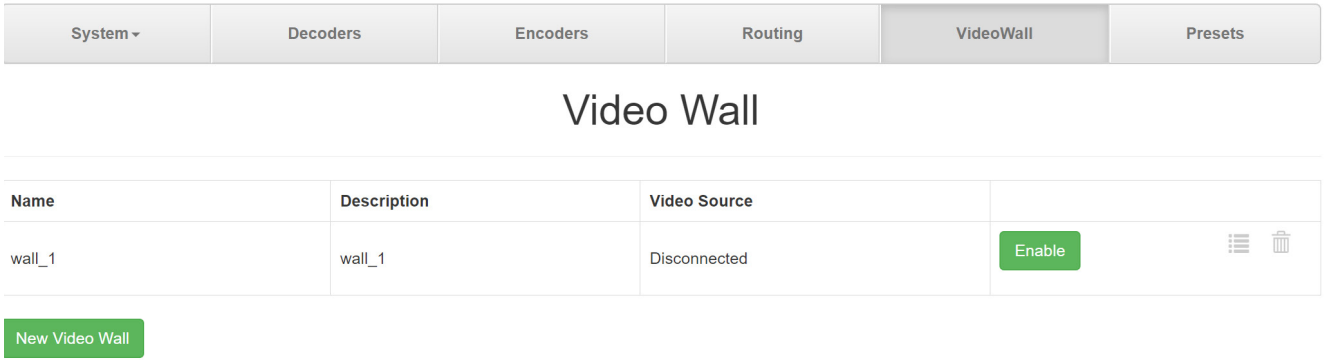
From the System pull down menu, select **Turn Off** to safely shutdown the server.

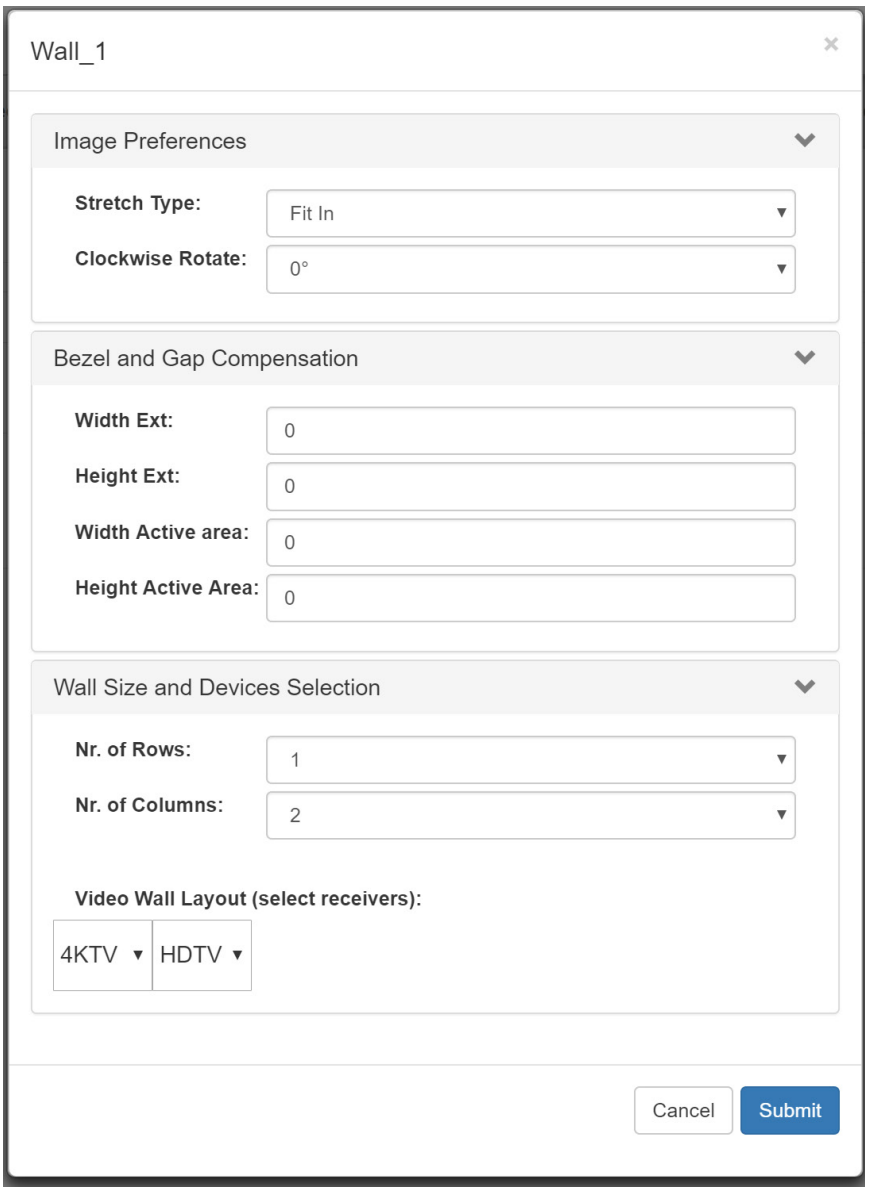
Video Wall

A video wall can be easily setup using the Video Wall setup page.

Video Wall Setup

Click on the **Video Wall** tab on the top menu bar to bring up the Video Wall setup page. To create a new video wall, click on **New Video Wall**. In the Save Video Wall pop up window, enter the video wall name and description and then click **Save**. The new Video Wall name will now appear on the Video Wall setup page. To configure the video wall, click the List icon on the right and the setup window will pop up.





Select the Image Preferences and enter the bezel and gap compensation values. Values are in units of 1 mm and must be integers. Next define the size of the video wall by selecting the number of rows and columns. The video wall layout will reflect the row and column selection. The last step is to assign a Decoder to each position in the layout. Click on one of the positions and a list of Decoders will show up. Select the Decoder you want to assign to that position. Repeat for all positions and then click **Submit**. On the Video Wall page click on **Enable** to activate the video wall on the routing page. **Note**: A Decoder that has been assigned to an active video wall will no longer be available and will not appear in the routing page. A video wall must be disabled before its associated Decoders can be used.

Image Preferences:

Stretch Type: Select Fit In or Stretch

Clockwise Rotate: Select the image rotation of 90, 180 or 270 degrees.

Bezel and Gap Compensation

Width Ext: Enter the external width of the display in millimeters.

Height Ext: Enter the external height of the display in millimeters.

Width Active Area: Enter the width of the active area (width inside the bezel) in millimeters.

Height Active Area: Enter the height of the active area (height inside the bezel) in millimeters.

Wall Size and Devices Selection

Rows: Select the number of rows for the video wall.

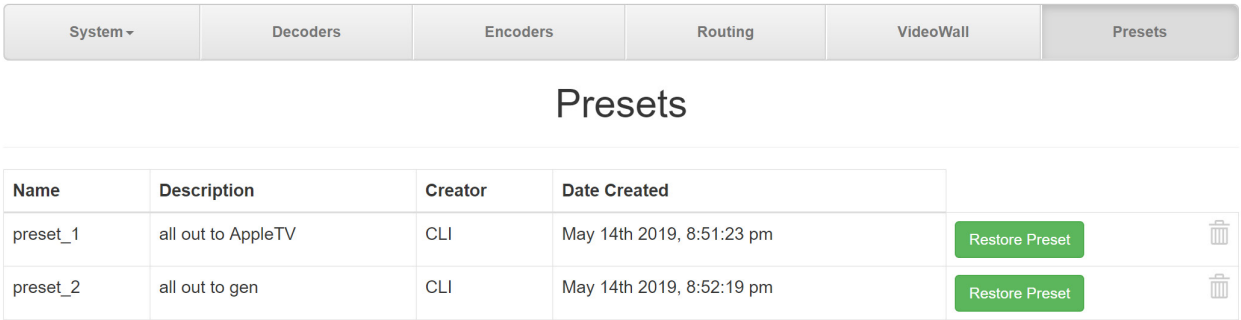
Columns: Select the number of columns for the video wall.

Video Wall Layout

Assign a Decoder to the selected position in the video wall.

Presets

Click on the **Presets** tab on the top menu bar to bring up the Presets page.



All the presets that were saved on the Routing page are listed on this page. To restore one of the presets, click on the associated **Restore Preset** button. The Restore Preset confirmation window will pop up. Click on **Restore Preset** to complete the restore process. Unused presets can be deleted by clicking on the trash icon.

SPECIFICATIONS

VIDEO/AUDIO SPECIFICATIONS

HDMI	HDMI 1.4, up to 4K@30Hz 4:4:4 or 4K@60Hz 4:2:0 Embedded Audio: Stereo or 7.1 Surround Sound HDMI Female connector
VGA	Up to 1920x1200 (WUXGA) @ 60Hz HD-15 connector
Port Count	TX: 1-HDMI Input, 1-VGA Input, 1-VGA-Loopback RX: 1-HDMI Output and 1-VGA Output

AUDIO

External Audio	3.5mm mini-stereo jack
Port Control	TX: 1-Line Input and 1-Line Output RX: 1-Mic Input and 1-Line Output

SERIAL DATA

Serial Rate	RS-232
Data Rate	Up to 115.2 KBaud
Connector	DB-9
Port Count	One RS-232 in TX and in RX

IR CONTROL

Data Rate	30-50 KHz
Connector	3.5mm Mini Jack
Port Count	One IR Input/Output in TX and in RX

USB

Mode	USB 2.0
Port Count	One USB-Host in TX and Four USB-Device in RX

RJ-45

Cable Type	CAT-5e/6
Distance	Depending Cable Spec (up to 100m)
Connector	RJ-45

PHYSICAL

Dimensions Standalone	7.75"(W) x 4.25"(D) x 1.1"(H)
Power Consumption	12 VDC @ 1 Amp (Max.)
Operating Temperature	0 to 40°C
Humidity	0 to 90% RH, Non-Condensing

CERTIFICATIONS

CE, FCC

GREEN COMPLIANCE

RoHS

Replacement Policy

Standard products found defective on arrival (DOA) will be replaced, based on availability, within 24 to 48 hours anywhere in the U.S. Please call Customer Service at 800-214-0222 for information.

Return/Repair Service

The LBN-MSx System contains no user serviceable components. If you have a problem with your unit, please contact the Customer Service Department. To facilitate our return/repair processing please contact Broadata Communications, Inc. to obtain a Return Material Authorization (RMA). Please include the following information:

- Product Model Number
- Serial Number
- Complete Description of Problem
- Hardware Installation Description

LIMITED WARRANTY

Broadata Communications, Inc. (BCI) warrants, for a period of one year from date of shipment, each product sold shall be free from defects in material and workmanship. BCI will correct, either by repair, or at BCI's election, by replacement, any said products that in our sole discretion prove to be defective and are returned to the manufacturing location within 30 days after such defect is ascertained. All warranties are limited to defects arising under normal use and do not include malfunctions or failure resulting from misuse, abuse, neglect, alterations, electrical power problems, usage not in accordance with product instructions, improper installation, or damage determined by BCI to have been caused by the Buyer or repair made by a third party. Limited warranties granted on products are to the initial customer end-user and are not transferable. OUR LIABILITY UNDER THIS WARRANTY SHALL IN ANY CASE BE LIMITED TO THE INVOICE VALUE OF THE PRODUCT SOLD AND BCI SHALL NOT BE LIABLE TOANYONE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM THE USE OF ITS PRODUCTS OR THE SALE THEREOF. We make NO WARRANTY AS TO THE MERCHANTABILITY OF ANY GOODS, OR THAT THEY ARE FIT FOR ANY PARTICULAR PURPOSE OR END APPLICATION NOR DO WE MAKE ANY WARRANTY, EXPRESSED OR IMPLIED OTHER THAN AS STATED ABOVE.

No	Command	Description
1	**help**	List commands
2	**ipconfig**	Get server IP address
3	**route**	Route receiver to transmitter
4	**uart**	Set transmitter/receiver uart parameters
5	**video_scaler**	Set video scaler mode
6	**default**	Set device to default settings
7	**reboot_device**	Reboot device
8	**default_server**	Set server to factory defaults
9	**rename_device**	Rename an old device name to a new name
10	**get_version**	Get device version
11	**get_route**	Get input or output route status
12	**get_uart**	Get uart parameters
13	**get_outputs**	List all receivers in the network
14	**get_inputs**	List all transmitters in the network
15	**get_video_active**	Get transmitter or receiver video active status
16	**get_video_scaler**	Get video scaler mode
17	**scanwifi**	List all available Wifi networks
18	**setupwifi**	Set Wifi credentials
19	**setuphotspot**	Set to hotspot mode
20	**uart_mode**	Set device UART to pass-through or control mode
21	**get_uart_mode**	Get uart mode
22	**uartstr**	Injects strings into an endpoint's RS232 interface

No	Command	Description
23	**openport**	Forwards commands to device's serial port until 'closeport' is received. Creates a "virtual" bi-directional port
24	**audio_level**	Set audio volume level
25	**audio_step**	Step audio volume up or down
26	**audio_mute**	Mute audio
27	**get_audio_level**	Get audio volume level
28	**get_audio_mute**	Get audio mute state
29	**restore_preset**	Restore a preset
30	**get_presets**	Get list of saved presets
31	**save_preset**	Save current routing configuration to a preset
32	**delete_preset**	Delete a preset

Command	Description
help	List Commands

Syntax	Description
help	Lists Commands

Command Example	Command Response
help	(Lists commands)

ipconfig

Syntax	Description
ipconfig	Display the IP addresses of the MSC controller

Command Example	Command Response
ipconfig	192.168.1.117 (IP address of WiFi interface) 172.16.2.44 (IP address of USB secondary Ethernet interface)

route

Syntax	Description
route <output> <input>	Route receiver to transmitter

Parameter	Description	Range
<output>	output = receiver name *names are case sensitive	User defined
<input>	input = transmitter name *names are case sensitive	User defined

Command Example	Command Response
route OUT1 IN1	Routing OUT1 to IN1

uart

Syntax	Description
uart <device_name> <baud rate> <data bits> <parity> <stop bits> <line termination> <format>	Set transmitter/receiver UART parameters

Parameter	Description	Range
<device name>	Receiver or transmitter name	User defined
<baud rate>	Baud rate	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200, 128000, 256000
<data bits>	Data bits	6, 7 or 8
<parity>	Parity	none, odd, or even
<stop bits>	Stop bits	1 or 2
<line termination>	End-of-line termination	CR, LF, or CR+LF
<format>	Character format	hex or ascii

Command Example	Command Response
uart OUT1 9600 8 none 1	Successfully changed OUT1 configuration (9600-8n1)

Note: Default settings is
baud rate: 115200
data bits: 8
parity: none
stop bits: 1
line terminator: none
format: ascii

video_scaler

Syntax	Description
video_scaler <output> <mode>	Set video scaler mode

Parameter	Description	Range
<output>	Receiver name	User defined
<mode>	Scaler resolution	0=bypass, 1=auto, 2=1080p50, 3=1080p60, 4=2160p25, 5=2160p30, 6=1366x768, 7=1440x900, 8=1920x1200, 9=1400x1050

Command Example	Command Response
video_scaler OUT1 3	Successfully changed RX configuration

Note: Default setting is Bypass (Scaler is OFF)

default

Syntax	Description
default <device_name>	Set device to default settings

Parameter	Description	Range
<device_name>	transmitter or receiver name	User defined

Command Example	Command Response
default OUT1	Command accepted

Command Example	Command Response

reboot_device

Syntax	Description
reboot_device <device_name>	Reboot device

Parameter	Description	Range
<device_name>	transmitter or receiver name	User defined

Command Example	Command Response
reboot OUT1	Rebooting decoder

default_server

Syntax	Description
default_server	Set server to factory default settings

Command Example	Command Response
default_server	LBN_MSC Console version 1.1.x

rename_device

Syntax	Description
rename_device <old_name> <new_name>	Rename an old device name to a new name

Parameter	Description	Range
<old_name>	Old device name	User defined
<new_name>	New device name	User defined

Command Example	Command Response
rename_device OUT1 OUT1-new	Successfully changed device name from OUT1 to OUT1-new

get_version

Syntax	Description
get_version <device_name>	Get device version

Parameter	Description	Range
<device_name>	transmitter or receiver	User defined

Command Example	Command Response
get_version OUT1	A6.4.12 Build 2204

get_route

Syntax	Description
get_route <device_name>	Get input or output route status

Parameter	Description	Range
<device_name>	transmitter or receiver	User defined

Command Example	Command Response
get_route OUT1	IN1

get_uart

Syntax	Description
get_uart <device_name>	Get UART parameters

Parameter	Description	Range
<device_name>	transmitter or receiver	User defined

Command Example	Command Response
get_uart OUT1	OUT1: baud rate: 115200 data bits: 8 parity: none stop bits: 1 Line terminator: CR format: hex

get_outputs

Syntax	Description
get_outputs	List all receivers in the network

Command Example	Command Response
get_outputs	OUT1, OUT2

get_inputs

Syntax	Description
get_inputs	List all transmitters in the network

Command Example	Command Response
get_inputs	IN1, IN2

get_video_active

Syntax	Description
get_video_active <device_name>	Get transmitter or receiver video active status

Parameter	Description	Range
<device_name>	transmitter or receiver	User defined

Command Example	Command Response
get_video_active OUT1	OUT1 <state> <state>: Idle or Active

get_video_scaler

Syntax	Description
get_video_scaler <output>	Get video scaler mode status

Parameter	Description	Range
<output>	Receiver name	User defined

Command Example	Command Response
get_video_scaler OUT1	<scaler state> <scaler state>: bypass, auto, 1080p50, 1080p60, 2160p25, 2160p30, 1366x768, 1440x900, 1920x1200, 1400x1050

scanwifi

Syntax	Description
scanwifi	List all available WiFi networks *Only works when hotspot mode is OFF

Command Example	Command Response
scanwifi	response: SSID: network name-1 SSID: network name-2 SSID: network name-3

setupwifi

Syntax	Description
setupwifi <SSID> <password>	Set WiFi credentials to connect the NUC to a WiFi access point

Parameter	Description	Range
<SSID>	Network name	User defined
<password>	Wifi password	User defined

Command Example	Command Response
setupwifi network-1 1234	None

uart_mode

Syntax	Description
uart_mode <device_name> <mode>	Set device UART to pass-through or control mode

Parameter	Description	Range
<device_name>	transmitter or receiver	User defined
<mode>	Uart mode	0= pass-through, 1= control external device or use uartstr

Command Example	Command Response
uart_mode OUT1 0	uart mode set to pass-thru

Note: Default setting is Pass-through

get_uart_mode

Syntax	Description
get_uart_mode <device_name>	

Parameter	Description	Range
<device_name>	transmitter or receiver	User defined

Command Example	Command Response
get_uart_mode OUT1	<device_name> <uart state> <uart state>: “uart mode is pass-thru” or “uart mode set to control external device or use uartstr”

uartstr

Syntax	Description
uartstr <device_name> <string>	Injects strings into an endpoint's RS232 interface *uart_mode must be set to 1 for the device

Parameter	Description	Range
<device_name>	Transmitter or receiver name	User defined
<string>	ASCII string HEX pairs of HEX digits separated by a space. Strings with spaces must be included within quotes "<string_with_spaces_>" ex) "1a 2b 0f"	User defined

Command Example	Command Response
ASCII Example: **uartstr RX1 turnontv**	None
HEX Example: **uarstr RX1 "05 f2 a8 e2"**	None

openport

Syntax	Description
openport <device_name>	Forwards commands to device's serial port until 'closeport' is received. Creates a "virtual" bi-directional port *uart_mode must be set to 1 for the device

Parameter	Description	Range
<device_name>	Transmitter or receiver name	User defined

audio_level

Syntax	Description
audio_level <device_name> <level>	

Parameter	Description	Range
<device_name>	Transmitter or receiver name	User defined
<level>	Audio level	0~80

Command Example	Command Response
audio_level OUT1 70	OUT1 volume set to 70

audio_step

Syntax	Description
audio_step <device_name> <direction>	

Parameter	Description	Range
<device_name>	Transmitter or receiver name	User defined
<direction>	Step audio volume up or down	up or down (step size = 4)

Command Example	Command Response
audio_step OUT1 down	OUT1 volume set to <audio_level>

audio_mute

Syntax	Description
audio_mute <device_name> <state>	Mute audio

Parameter	Description	Range
<device_name>	Transmitter or receiver name	User defined
<state>	Audio status	1=mute, 0=unmute

Command Example	Command Response
audio_mute OUT1 1	OUT1 muted

Defaut settings is unmute

get_audio_level

Syntax	Description
get_audio_level <device_name>	

Parameter	Description	Range
<device_name>	Transmitter or receiver name	User defined

Command Example	Command Response
get_audio_level OUT1	OUT1 audio level is <level>

get_audio_mute

Syntax	Description
get_audio_mute <device_name>	Get audio volume level

Parameter	Description	Range
<device_name>	Transmitter or receiver name	User defined

Command Example	Command Response
get_audio_mute OUT1	OUT1 is <state> <state>: muted, umuted

restore_preset

Syntax	Description
restore_preset <preset_name>	Restore a preset

Parameter	Description	Range
<preset_name>	Preset name (no spaces)	User defined

Command Example	Command Response
restore_preset preset_1	Routing <tx1_name> to <rx1_name> Routing <tx2_name> to <rx2_name> Routing <tx3_name> to <rx3_name> *Lists all routes applied by the preset

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