# IP-A750TX

**Audio over IP Transmitter for IP-7000 series**

## OPERATION MANUAL

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Version 1.1

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## SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply. Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Never spill liquid of any kind on or into this product.
- Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.
- Do not attach the power supply cabling to building surfaces.
- Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.
- Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.
- To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.
- Please completely disconnect the power when the unit is not in use to avoid wasting electricity.

## VERSION HISTORY

| REV. | DATE | SUMMARY OF CHANGE |
|---|---|---|
| **v1.00** | 2020/09/02 | Preliminary release |
| **v1.01** | 2021/08/19 | Typographical correction. |

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# 1. INTRODUCTION

The inherent routing flexibility of Audio over IP (AoIP) provides great advantages over traditional audio cabling solutions while using highly cost effective Cat.5e cable. This greatly reduces the cost of wiring large systems and improves control convenience. This unit takes full advantage of the core benefits provided by AoIP and adds support for a selection of different audio source formats, including both analogue (line in and mic in) and digital (optical S/PDIF). This product allows you to easily extend your audio sources to compatible audio playback devices located anywhere on the local network.

Standard control is provided by front panel controls, WebGUI, and Telnet. Advanced control and system integration is possible using the optional IP Master Controller.

# 2. APPLICATIONS

- Home Theaters
- Classrooms
- Lecture Halls

# 3. PACKAGE CONTENTS

- 1× Audio over IP Transmitter
- 1× 5V/1.2A DC Power Adapter
- 1× 3-pin Terminal Block
- 1× Operation Manual

# 4. SYSTEM REQUIREMENTS

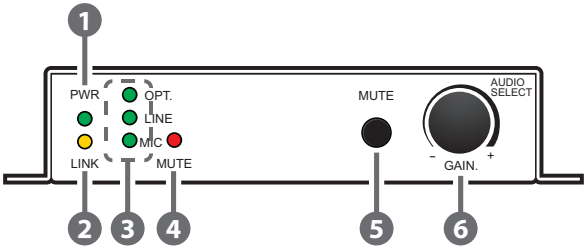
- Audio source equipment such as media players, video game consoles, set-top boxes, or PCs.
- A Gigabit Ethernet switch with "IGMP snooping" enabled is required for multicast support.
- An active network connection from a switch or router that supports PoE (802.3af) to power the unit is highly recommended.

## 5. FEATURES

- Analogue inputs: 1×Mic input, 1×Line input
- Digital input: 1×Optical input
- Audio and RS-232 extension over TCP/IP in unicast (point-to-point) or multicast (single-to-many) modes
- Extension of AoIP signals can be further extended (up to 100m per segment) by using gigabit network switches.
- Gain control for the microphone input
- Compatible with the IP Master Controller to allow integration with existing compatible TCP/IP video matrix networks.
- Field-upgradable firmware
- May be powered directly by Power over Ethernet (PoE) when connected to a Gigabit Ethernet switch that provides PoE (802.3af)
- Standard control is provided by front panel controls, WebGUI, and Telnet. Advanced control and system integration is possible using the optional IP Master Controller.

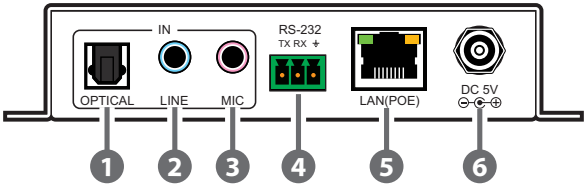
# 6. OPERATION CONTROLS AND FUNCTIONS

## 6.1 Front Panel




1. **PWR LED:** This LED will illuminate to indicate the unit is on and receiving power.
2. **LINK LED:** While the transmitter is attempting to establish a network connection the LINK LED will flash. When the transmitter has established a stable connection the LINK LED will illuminate solidly.
3. **OPT/LINE/MIC LEDs:** The illuminated LED indicates which source is currently selected.
4. **MUTE LED:** This LED will illuminate when audio output is muted.
5. **MUTE Button:** Press to toggle between muting and unmuting the audio output.
6. **GAIN -/+ & AUDIO SELECT Knob:** Turn this knob to increase or decrease the audio gain of the microphone input. Press the knob in to sequentially switch through the available inputs.

## 6.2 Rear Panel

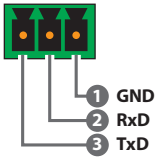



1. **OPTICAL IN Port:** Connect to the optical audio output of a device such as a media player or game console using an appropriate optical cable.
2. **LINE IN Port:** Connect to the analogue stereo output of a device such as an audio player or PC.
3. **MIC IN Port:** Connect to the analogue output of a microphone.
4. **RS-232 3-pin Terminal Block:** Connect to a PC, laptop, or other serial control device with a 3-pin adapter cable for the extension of RS-232 signals to a compatible receiver.
5. **LAN(POE) Port:** Connect via a Gigabit Ethernet switch to compatible receiver(s) to transmit data, and to a PC/laptop to control the unit via WebGUI.

   *Note: This unit can be powered directly by the connected Gigabit Ethernet switch if it provides PoE (802.3af).*
6. **DC 5V Port:** Plug the 5V DC power adapter into the unit and connect it to an AC wall outlet for power. (Optional if powered by PoE)

## 6.3 RS-232 Pinout

**3-pin Terminal Block**



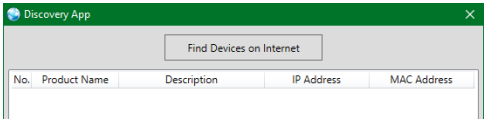
## 6.4 WebGUI Control

**Device Discovery**

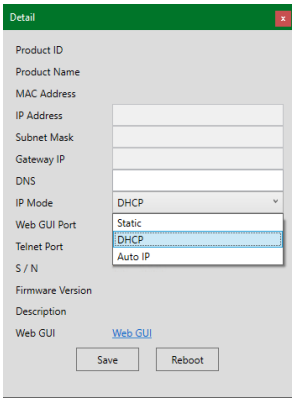
Please obtain the "Device Discovery" software from your authorised dealer and save it in a directory where you can easily find it.

Connect the unit and your PC/Laptop to the same active network and execute the "Device Discovery" software. Click on "Find Devices on Internet" and a list of devices connected to the local network will show up indicating their current IP address.

*Note: This unit defaults to Auto IP mode. The current IP address can be verified using the Device Discovery software.*




By clicking on one of the listed devices you will be presented with the network details of that particular device.




1) **IP Mode:** If you choose, you can alter the static IP network settings for the device, or switch the unit into DHCP mode to automatically obtain proper network settings from a local DHCP server. To switch to DHCP mode, please select DHCP from the IP mode drop-down, then click "Save" followed by "Reboot".

2) **WebGUI Hotkey:** Once you are satisfied with the network settings, you may use them to connect via Telnet or WebGUI. The network information window provides a convenient link to launch the WebGUI directly.

**WebGUI Overview**

All major functions of the unit, including status, streaming method, streaming channel selection, input selection, gain/mute control, Ethernet settings, and reset/firmware functions are controllable via multiple tabs in the WebGUI interface allowing for reasonably intuitive operation.

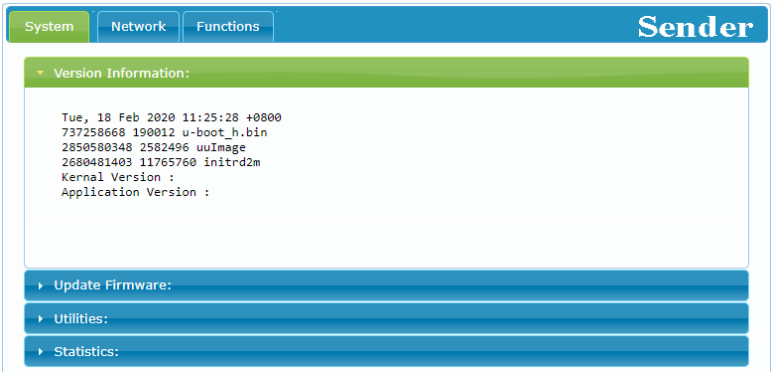
Each transmitter and receiver in the system is controlled by its own WebGUI interface which may be accessed by opening a standard web browser on a PC and typing in the IP address of the unit you wish to connect to. If you do not already know the IP addresses of the units in your system, you can discover the IP addresses by using the Device Discovery software.

Once you have connected to a unit's WebGUI, you will be presented with a screen containing multiple tabs for each functionality area of the unit. To view the contents of a tab, click on the appropriate button at the top of the window. The individual tabs and functions will be introduced in the following sections.

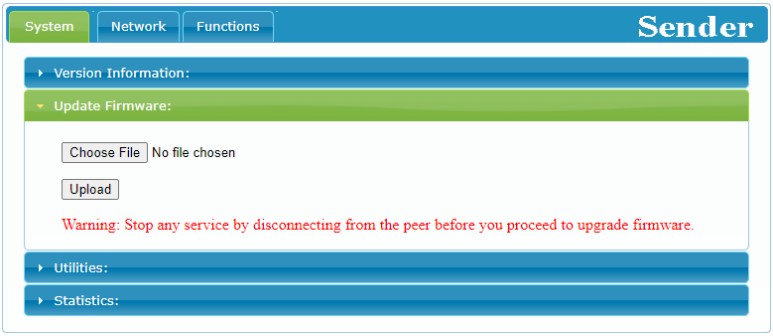
*Note: A Gigabit Ethernet network switch with IGMP snooping is required when using multicast mode. A managed switch with VLAN support is strongly recommended.*

### 6.4.1 System Tab

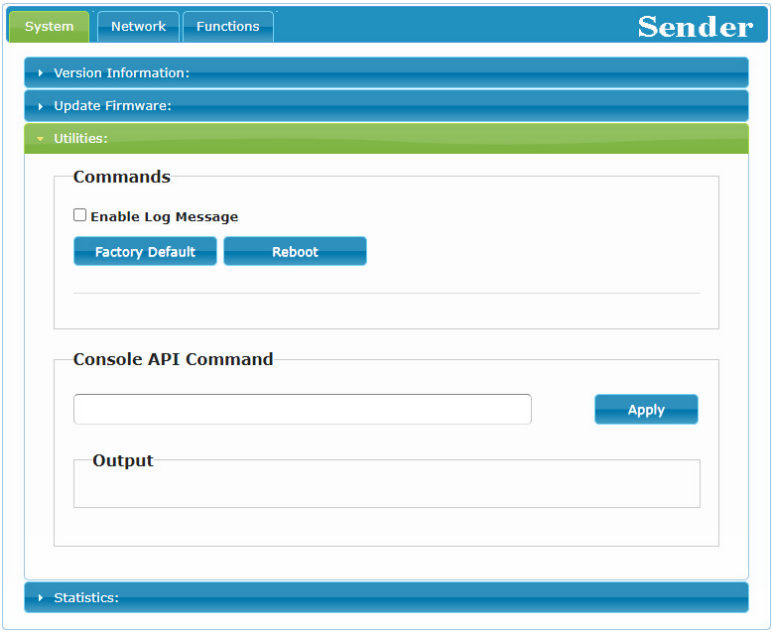
The System tab contains four windows that provide access to firmware version information, a firmware update interface, utilities for rebooting and resetting the unit, Telnet command entry, and a variety of statistics and information about the operational state of the unit.



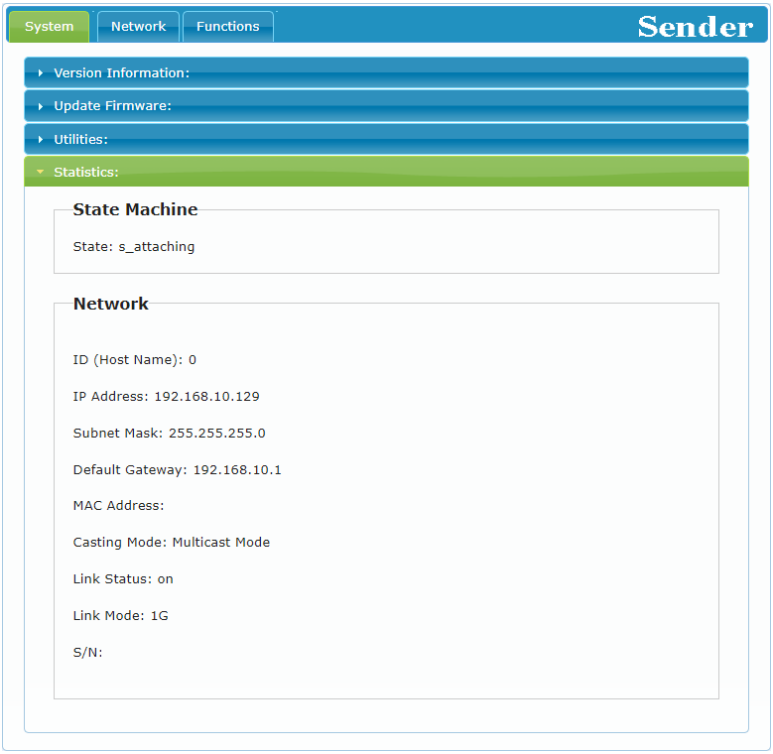

1) **Version Information:** This window displays detailed information about the current firmware version.




2) **Update Firmware:** Provides a way to update the transmitter's firmware. Click "Choose File" to select the firmware update file from the local PC (*.bin format). After selecting an appropriate file, click the "Upload" button to begin the update process.




3) **Utilities:** The Utilities window allows users to reset the unit back to the factory defaults by clicking "Factory Default". The unit may be rebooted (without resetting settings) by pressing the "Reboot" button. Finally, individual Telnet commands may be sent to the unit by using the "Console API Command" text entry field and pressing "Apply". Any responses from the unit will be displayed in the "Output" field.

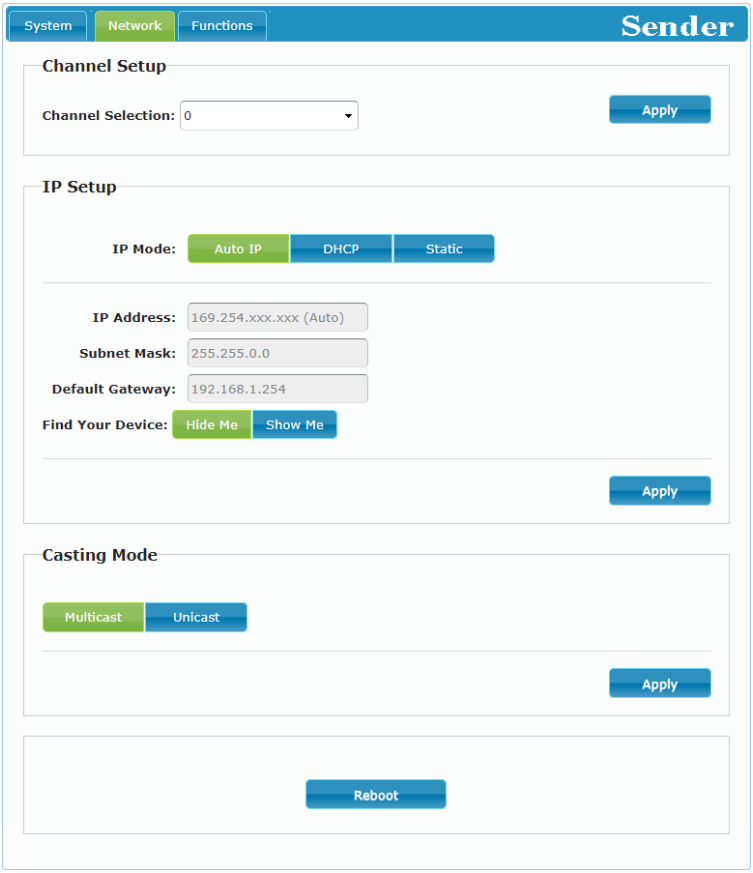



4) **Statistics:** The Statistics window shows all available information about the operational status of the unit, including current Host ID Name, Ethernet information, MAC address, unicast/multicast mode, link status and mode.

### 6.4.2 Network Tab

The Network tab provides controls over the transmitter's broadcast channel, IP configuration, and network broadcast mode. Changes made to the network settings will require a reboot of the unit. After clicking on "Apply" please follow the reboot instructions in the WebGUI.

*Note: If the IP address is changed then the IP address required for WebGUI access will also change accordingly. If the new address is assigned via "Auto IP" or "DHCP" it can be verified using the Device Discovery software.*




1) **Channel Setup:** Use the dropdown to select the broadcast channel for the transmitter. All receivers on the local network that are set to the

same channel will receive audio from this transmitter. The available channel range is from 0 to 255.

*Note: Every transmitter within the same local network must be assigned a different broadcast channel in order to avoid conflicts.*

2) **IP Setup:** This section allows for configuration of the IP acquisition mode and Ethernet settings of the unit. It also provides an easy way to find the physical unit when installed with many other similar units.

   - **IP Mode & Settings:** The IP mode may be switched between "Auto IP", "DHCP" or "Static IP". When the unit is set to Auto IP mode it will automatically assign itself an APIPA address from the 169.254.xxx.xxx range. When the unit is set to DHCP mode it will attempt to automatically obtain an IP address from a DHCP server. When the IP mode is set to static IP, you can manually set the IP address, netmask and gateway address. Click the "Apply" button to save changes made to the IP Mode or Configuration.

     *Note: The default network setting for this unit is "Auto IP".*

   - **Find Your Device:** Selecting "Show Me" will cause the unit to immediately begin flashing the PWR and LINK LEDs on the front of the unit to make it easy to find. Selecting "Hide Me" returns the LEDs to their normal behavior. This setting is useful when troubleshooting an installation with a large number of units in a rack.

3) **Casting Mode:** Allows for the selection of the broadcasting mode used by the transmitter. Click the "Apply" button to save changes made to the broadcasting mode.

   *Note: Receivers must be set to the same mode as the linked transmitter in order to receive audio.*

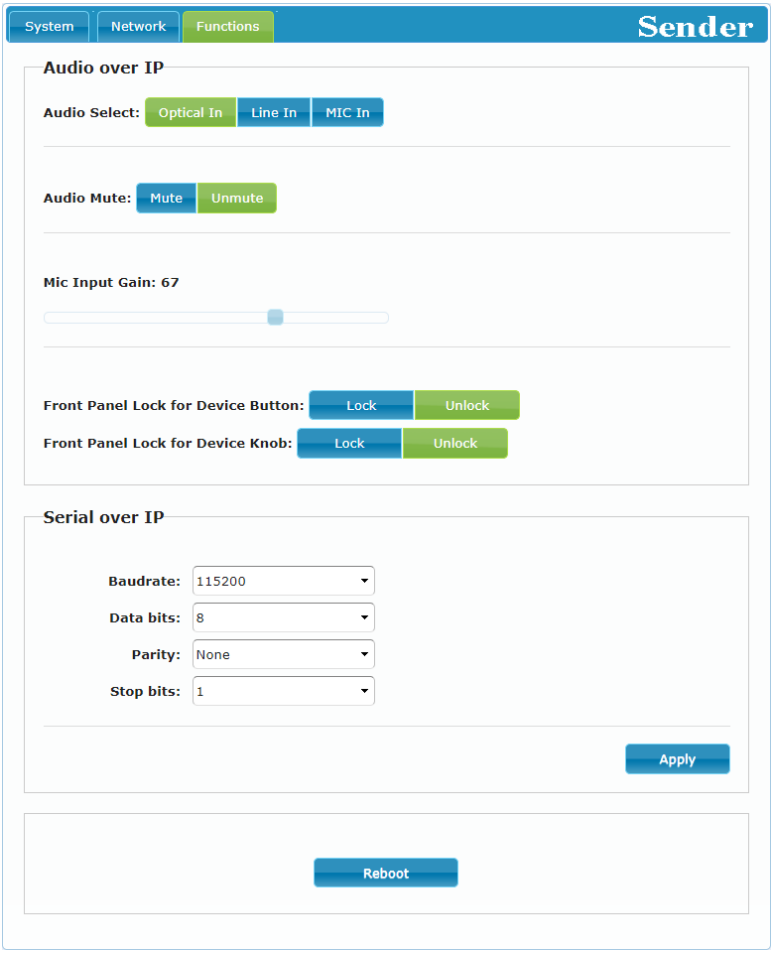
   - **Multicast:** This mode sends a single audio stream that can be played simultaneously by multiple receivers without increasing bandwidth usage. This mode is ideal for matrixing scenarios.

     *Note: Multicast mode requires a network switch with IGMP snooping enabled.*

   - **Unicast:** This mode uses a discrete audio stream for every connected receiver and is ideal for simple, point-to-point, streaming setups. This mode uses considerably more bandwidth than Unicast mode when multiple receivers are being used, however it does not require a network switch that supports IGMP snooping.

### 6.4.3 Functions Tab

The Functions tab provides control over the transmitter's audio source selection, audio mute/unmute, mic gain, front panel locks and serial control extension configuration. Changes made to these settings typically require a reboot of the unit. After clicking on "Apply" please follow the reboot instructions in the WebGUI, if necessary.




1) **Audio over IP:** This section allows control over selection of the input source, enabling/disabling the audio mute, changing the microphone gain, and front panel locks.

- **Audio Select:** Select between the optical, line or mic inputs on the transmitter.
- **Audio Mute:** Enable or disable muting the audio output.
- **Mic Input Gain:** Increase or decrease the audio gain of the microphone input by dragging the slider.

  *Note: This is only controllable when Mic In is the selected source.*
- **Front Panel Lock for Device Button and Knob:** Enable or disable either of these lock types for the front panel. When the locks are enabled, the user can only change settings using the WebGUI or Telnet commands.

2) **Serial over IP:** Set the desired baud rate, data bits, parity, and stop bit for the RS-232 signal to extend.

   *Note: The transmitter and receiver must have the same serial settings.*

### 6.5 Telnet Control

Before attempting to use Telnet control, please ensure that both the unit and the PC are connected to the same active networks.

Start your preferred Telnet/Console client, or use the built in client provided by most modern computer operating systems. After starting the client, connect by using the current IP address of the unit and port 23 (if the communication port number used by the unit has not been changed previously). This will connect us to the unit we wish to control and commands may now be entered directly.

*Note 1: If the IP address of the unit is changed then the IP address required for Telnet access will also change accordingly.*

*Note 2: This unit defaults to Auto IP mode. The current IP address can be verified using the Device Discovery software. The default communication port is 23.*

## 6.6 Telnet Commands

| COMMAND<br>Description and Parameters |
|---|
| **help↵**<br>Show the full command list. |
| **help N1↵**<br>Show details about the specified command.<br>**N1** = {Command} |
| **get fw ver↵**<br>Show the unit's current firmware version. |
| **get hw ver↵**<br>Show the unit's current hardware version |
| **get command ver↵**<br>Show the unit's current command version. |
| **get mac addr↵**<br>Show the unit's MAC address. |
| **get model name↵**<br>Show the unit's model name. |
| **get model type↵**<br>Show the unit's product type.<br>Possible response values:<br>1 [Matrix]<br>2 [Scaler]<br>3 [Splitter]<br>4 [Repeater]<br>5 [Extender]<br>6 [Transceiver]<br>7 [Switch]<br>8 [Controller] |
| **set factory default↵**<br>Reset the unit to the factory defaults. |

| COMMAND | |
|---|---|
| **Description and Parameters** | |
| **set factory ipconfig default**↵ | |
| Reset the unit's network settings to the factory defaults. | |
| **set system reboot**↵ | |
| Reboot the unit. | |
| **set keylock N1**↵ | |
| Enable or disable the front panel button key lock feature. | |
| Available values for **N1**: | |
| ON | [Key lock enabled] |
| OFF | [Key lock disabled] |
| **get keylock**↵ | |
| Show the current front panel button key lock state. | |
| **set audio volume knob lock N1**↵ | |
| Enable or disable the front panel volume knob lock feature. | |
| Available values for **N1**: | |
| ON | [Knob lock enabled] |
| OFF | [Knob lock disabled] |
| **get audio volume knob lock**↵ | |
| Show the current lock state of the front panel volume knob. | |
| **set uart 1 reset**↵ | |
| Reset the unit's RS-232 settings to the factory defaults. | |

| COMMAND | |
|---|---|
| **Description and Parameters** | |
| **set uart 1 baudrate N1↵** | |
| Set the baud rate of the RS-232 port. | |
| Available values for **N1**: | |
| 300 | [300 baud] |
| 600 | [600 baud] |
| 1200 | [1200 baud] |
| 2400 | [2400 baud] |
| 4800 | [4800 baud] |
| 9600 | [9600 baud] |
| 19200 | [19200 baud] |
| 38400 | [38400 baud] |
| 57600 | [57600 baud] |
| 115200 | [115200 baud] |
| **get uart 1 baudrate↵** | |
| Show the current baud rate of the RS-232 port. | |
| **set uart 1 stop bit N1↵** | |
| Set the number of stop bits for the RS-232 port. | |
| Available values for **N2**: | |
| 1 | [1 Stop Bit] |
| 2 | [2 Stop Bits] |
| **get uart 1 stop bit↵** | |
| Show the current number of stop bits of the RS-232 port. | |
| **set uart 1 data bit N2↵** | |
| Set the data bits for the RS-232 port. | |
| Available values for **N1**: | |
| 5 | [5 Data Bits] |
| 6 | [6 Data Bits] |
| 7 | [7 Data Bits] |
| 8 | [8 Data Bits] |
| **get uart 1 data bit↵** | |
| Show the current number of data bits of the RS-232 port. | |

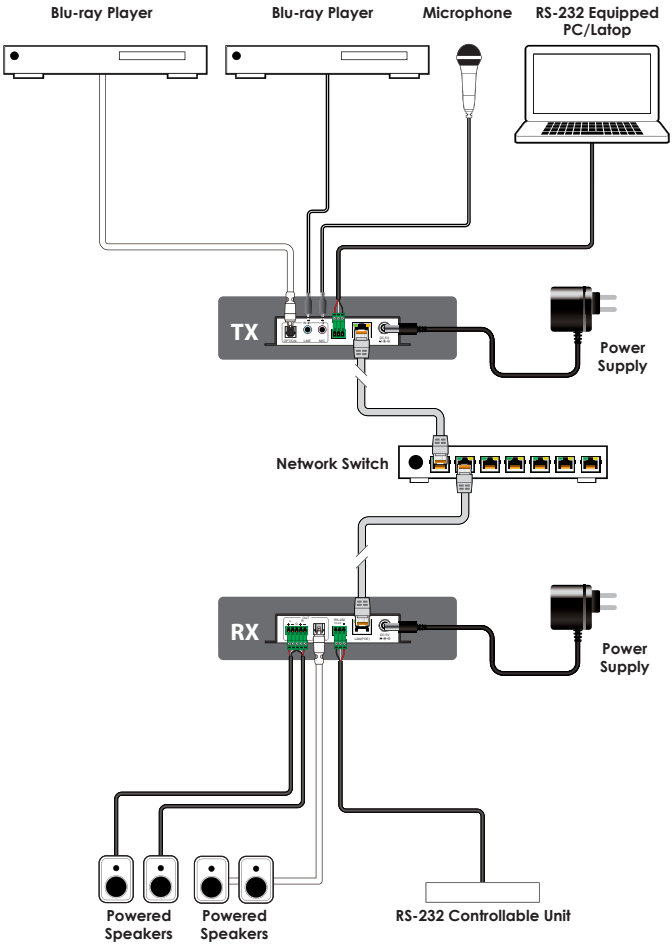
| COMMAND |
| --- |
| **Description and Parameters** |
| **set uart 1 parity N1**↵<br><br>Set the parity of the RS-232 port.<br><br>Available values for **N1**:<br>0 [None]<br>1 [Odd]<br>2 [Even] |
| **get uart 1 parity**↵<br><br>Show the current parity setting of the RS-232 port. |
| **set ip mode N1**↵<br><br>Set the unit's IP address assignment mode.<br><br>Available values for **N1**:<br>STATIC [Static IP mode]<br>DHCP [DHCP mode]<br>FORCE IP [Auto IP mode] |
| **get ip mode**↵<br><br>Show the current IP address assignment mode. |
| **get ipconfig**↵<br><br>Show the unit's current IP configuration information. |
| **get ip addr**↵<br><br>Show the unit's current IP address. |
| **get netmask**↵<br><br>Show the unit's current netmask. |
| **get gateway**↵<br><br>Show the unit's current gateway address. |
| **set static ipaddr N1**↵<br><br>Set the unit's static IP address.<br><br>**N1** = X.X.X.X [X = 0~255, IP address] |
| **get static ipaddr**↵<br><br>Show the unit's current static IP address. |

| COMMAND | |
|---|---|
| **Description and Parameters** | |
| **set static netmask N1↵** | |
| Set the unit's static netmask. | |
| **N1** = X.X.X.X | [X = 0~255, Netmask] |
| **get static netmask↵** | |
| Show the unit's current static netmask. | |
| **set static gateway N1↵** | |
| Set the unit's static gateway address. | |
| **N1** = X.X.X.X | [X = 0~255, Gateway address] |
| **get static gateway** | |
| Show the unit's current static gateway address. | |
| **set audio out A route N1↵** | |
| Route the specified audio input to the streaming output. | |
| Available values for **N1**: | |
| 1 | [Optical input] |
| 2 | [Line input] |
| 3 | [Mic input] |
| **get audio out A route↵** | |
| Show the current audio input routed to the streaming output. | |
| **set audio in 3 pre-gain N1↵** | |
| Set the gain level for the mic input. | |
| **N1** = 0~100 | [Mic gain] |
| **get audio in 3 pre-gain↵** | |
| Show the current gain level for the mic input. | |
| **get audio in type list↵** | |
| List all available audio input sources. | |

| COMMAND | |
|---|---|
| **Description and Parameters** | |
| **s**et **audio in 1 mute N1**↵<br><br>Set the mute state for all audio inputs.<br><br>Available values for **N1**:<br>ON [Muted]<br>OFF [Unmuted] | |
| **get audio in 1 mute**↵<br><br>Show the current mute state for all audio inputs. | |
| **set tx channel N1**↵<br><br>Set the Audio over IP (AoIP) transmission channel.<br><br>**N1** = 0~255 [Channel index value] | |
| **get tx channel**↵<br><br>Show the current AoIP transmission channel. | |
| **set showme N1**↵<br><br>Enable or disable the unit's LEDs blinking to more easily visually identify the unit.<br><br>Available values for **N1**:<br>ON [Enabled]<br>OFF [Disabled] | |
| **get showme**↵<br><br>Show the current state of the showme function. | |
| **set stream cast mode N1**↵<br><br>Set the AoIP transmitter's network broadcast mode.<br><br>Available values for **N1**:<br>UNICAST [Unicast mode]<br>MULTICAST [Multicast mode] | |
| **get stream cast mode**↵<br><br>Show the AoIP transmitter's current network broadcast mode. | |

*Note: Commands will not be executed unless followed by a carriage return. Commands are not case-sensitive.*

# 7. CONNECTION DIAGRAM



# 8. SPECIFICATIONS

## 8.1 Technical Specifications

| | |
|---|---|
| **Input Ports** | 1×Optical In (TOSLINK)<br>1×Line In (3.5mm)<br>1×Mic In (3.5mm) |
| **Output/Control Port** | 1×Ethernet (RJ-45) |
| **Pass-through Port** | 1×RS-232 (3-pin Terminal Block) |
| **Baud Rate** | Up to 115200 |
| **Power Supply** | 5V/1.2A DC<br>(US/EU standards, CE/FCC/UL certified)<br>or<br>PoE (802.3af) |
| **ESD Protection (HBM)** | ±8kV (Air Discharge)<br>±4kV (Contact Discharge) |
| **Dimensions (W×H×D)** | 108mm×25mm×108mm [Case Only]<br>108mm×25mm×116mm [All Inclusive] |
| **Weight** | 370g |
| **Chassis Material** | Metal (Aluminum) |
| **Chassis Colour** | Black |
| **Operating Temperature** | 0˚C – 40˚C/32˚F – 104˚F |
| **Storage Temperature** | -20˚C – 60˚C/-4˚F – 140˚F |
| **Relative Humidity** | 20 – 90% RH (Non-condensing) |
| **Power Consumption** | 2.27W |

## 8.2 Audio Specifications

### 8.2.1 Digital Audio

| S/PDIF Input | |
|---|---|
| **LPCM** | |
| **Max Channels** | 2 Channels |
| **Sampling Rate (kHz)** | 32, 44.1, 48, 88.2, 96, 176.4, 192 |
| **Bitstream** | |
| **Supported Formats** | Standard |

### 8.2.2 Analogue Audio

| Analogue Input (Line In) | |
|---|---|
| **Max Audio Level** | 2Vrms |
| **Impedance** | 19kΩ |
| **Type** | Unbalanced |

| Analogue Input (Mic In) | |
|---|---|
| **Max Audio Level** | 2Vrms |
| **Impedance** | 16kΩ |
| **Type** | Unbalanced |

## 9. ACRONYMS

| ACRONYM | COMPLETE TERM |
|---|---|
| **ADC** | Analogue-to-Digital Converter |
| **AoIP** | Audio over IP |
| **ASCII** | American Standard Code for Information Interchange |
| **AVoIP** | Audio/Video over IP |
| **Cat.5e** | Enhanced Category 5 cable |
| **Cat.6** | Category 6 cable |
| **Cat.6A** | Augmented Category 6 cable |
| **Cat.7** | Category 7 cable |
| **CLI** | Command-Line Interface |
| **DAC** | Digital-to-Analogue Converter |
| **dB** | Decibel |
| **DHCP** | Dynamic Host Configuration Protocol |
| **GbE** | Gigabit Ethernet |
| **Gbps** | Gigabits per second |
| **GUI** | Graphical User Interface |
| **IGMP** | Internet Group Management Protocol |
| **IP** | Internet Protocol |
| **kHz** | Kilohertz |
| **LAN** | Local Area Network |
| **LED** | Light-Emitting Diode |
| **LPCM** | Linear Pulse-Code Modulation |
| **MAC** | Media Access Control |
| **MHz** | Megahertz |
| **OPT** | Optical |

| ACRONYM | COMPLETE TERM |
|---|---|
| **PD** | Powered Device |
| **PoE** | Power over Ethernet |
| **S/PDIF** | Sony/Philips Digital Interface Format |
| **SNR** | Signal-to-Noise Ratio |
| **TCP** | Transmission Control Protocol |
| **THD+N** | Total Harmonic Distortion plus Noise |
| **VLAN** | Virtual LAN |
| **Ω** | Ohm |

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