CH-U331TX

HDMI/VGA over IP Transmitter with USB/KVM Extension

Operation Manual

HIGH-DEFINITION MULTIMEDIA INTERFACE

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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.

VERSION HISTORY

REV.	DATE	SUMMARY OF CHANGE
RDV1	2017/02/23	Preliminary release
RDV2	2017/04/20	Changed text/silkscreen
RDV3	2017/08/29	Added video wall functions
VS1	2017/09/12	Updated text/diagrams
VS2	2017/11/01	Final technical review
VS3	2018/01/11	Minor changes to the commands
VS4	2018/06/05	Updated section 8.3
VS5	2018/07/10	Added ISP SEL switch description
VS6	2020/06/04	Updated format, corrected ISP SEL description
VS7	2020/09/02	Corrected rotation description

CONTENTS

1. Introduction..... 1
2. Applications 1
3. Package Content 2
4. System Requirements..... 2
5. Features..... 3
6. Operation Controls and Functions 4
6.1 Transmitter's Front Panel 4
6.2 Transmitter's Rear Panel 6
6.3 IR Cable Pin Assignments 7
6.4 RS-232 Protocol 7
6.5 Telnet Commands..... 8
6.6 WebGUI Control 20
6.6.1 System Tab..... 21
6.6.2 Video Wall Tab..... 23
6.6.3 Network Tab 27
6.6.4 Functions Tab 29
7. Connection Diagram 33
8. Specifications 34
8.1 Technical Specifications 34
8.2 Video Specifications 35
8.3 Audio Specifications 36
9. Acronyms 38

1. INTRODUCTION

This unit is part of a 4K UHD Multi-Function Extension system that allows you to extend HDMI or VGA signals along with KVM using the TCP/IP protocol over regular Cat.5e/6/7 network cable. This extender supports the transmission of Ultra High-Definition signals (up to 4K@30Hz YUV 4:4:4 or 4K@60Hz YUV 4:2:0) with audio and USB up to 100m on a single cable. The transmission distance can be further extended (up to 100m per segment) by using gigabit network switches, allowing the user to cascade the system without signal loss or introducing delay.

It is also possible to have the extension system's Transmitter operate in multicast mode, allowing you to send a single AV signal to a large number of Receivers within the same local network. Additionally, that same multicast signal can be used to create large multi-display video walls with amazing simplicity. This system is perfect for both residential and commercial installation environments.

This system also features bi-directional IR and RS-232 pass-through, analog line level in/out, and a microphone input (on the Receiver), providing the user with a variety of audio options. The USB functionality allows the system to act like a remote USB hub which, when combined with the VGA input/output feature, provides a flexible remote KVM platform. Configuration information is provided via On Screen Display (OSD) and control is by WebGUI, Telnet, and front panel controls.

2. APPLICATIONS

- HDMI, VGA, USB, Audio, IR, and RS-232 extension
- Broadcasting a system over a single Cat.5e/6 cable
- Multimedia display on a large number of displays via multicast
- Hotel or convention center display multi-monitor broadcast
- Long distance data and video transmission via cascading
- Distributed video matrix system
- Distributed video wall system
- Remote KVM control of a system

3. PACKAGE CONTENT

- 1×HDMI/VGA over IP Transmitter with USB/KVM Extension
- 1×IR Extender Cable
- 1×IR Blaster Cable
- 1×5V/2.6A DC Power Adaptor
- 1×Operation Manual

4. SYSTEM REQUIREMENTS

- HDMI or VGA source equipment such as media players, video game consoles, PCs or set-top boxes.
- HDMI or VGA receiving equipment such as HDTVs, monitors or audio amplifiers.
- Analog audio receiving equipment such as headphones, audio amplifiers or powered speakers.
- A Gigabit Ethernet network switch with jumbo frame support is required. (8K jumbo frames are strongly recommended.)
- A Gigabit Ethernet switch with “IGMP snooping” enabled is required for multicast support.

5. FEATURES

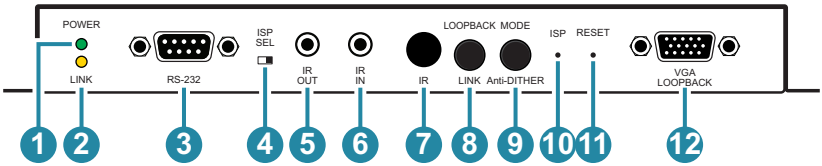
- HDMI 2.0 and DVI 1.0 compliant
- HDCP 1.4 & 2.2 compliant
- 1×HDMI input, 1×VGA input & 1×VGA bypass output
- Video, audio and control transmission over TCP/IP in Unicast (point-to-point) or Multicast (single-to-many) modes
- Multi-monitor video wall support with 180° and 270° rotation options
- HDMI input resolutions up to 4K@60Hz (YUV 4:2:0, 8-bit) or 4K@30Hz (YUV 4:4:4, 8-bit)

  Note: 4K@50/60Hz (YUV 4:2:0) sources are automatically converted to 4K@25/30Hz (RGB) for output
- VGA input and output resolutions up to WUXGA (RB)
- Supports pass-through of audio formats including LPCM 2.0/5.1/7.1, and Bitstream over HDMI

  Note: The optical output on Receivers can only support LPCM 2.0 & Bitstream sources.
- The analog Line In on the Transmitter sends audio directly to the analog Line Out and is inserted into the HDMI output on connected Receivers
- The Mic In on the Receiver sends audio directly to the analog Line Out on the Transmitter
- Both Tx and Rx may powered directly by PoE when connected to a Gigabit Ethernet switch that provides PoE (802.3af)
- Supports USB keyboard, mouse and storage extension
- Supports IR and RS-232 bypass
- Unit can be controlled via WebGUI, Telnet, and front panel controls

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Transmitter's Front Panel



1. **POWER LED:** This LED will flash while the unit is powering on and will illuminate solidly once it is ready to be used.
2. **LINK LED:** If the Transmitter has no network connection the LINK LED will not illuminate. While the Transmitter is attempting to establish a connection with a Receiver the LINK LED will flash. When the Transmitter has established a stable connection with a Receiver the LINK LED will illuminate solidly.
3. **RS-232 IN:** Connect directly to your PC/laptop to send commands to RS-232 devices connected to the Receiver. The baud rate is configurable, but the default baud rate is 115200.

   Note: When the Transmitter is in multicast mode every connected Receiver unit can send RS-232 commands to the Transmitter and commands sent from the Transmitter side will be sent to all associated Receivers.
4. **ISP SEL:** For Factory use only. By default this is set to the left (towards the RS-232 port) and allows normal RS-232 functionality. Setting this switch to the right enables ISP engineering mode.
5. **IR OUT:** Connect to the provided IR Blaster to transmit IR signals sent from the associated Receiver to devices within direct line-of-sight of the IR Blaster.
6. **IR IN:** Connect to the provided IR Extender to extend the IR control range of remotely located devices. Ensure that the remote being used is within direct line-of-sight of the IR Extender.

   Note: When the Transmitter is in multicast mode the IR signal is sent to all associated Receivers.

7 **IR WINDOW:** Accepts IR signals from any standard remote control and sends the signal to the IR Out on the associated Receiver.

Note: When the Transmitter is in multicast mode the IR signal is sent to all associated Receivers.

8 **LOOPBACK/LINK:** This button controls multiple functions:

a **Loopback:** Press this button momentarily to toggle the VGA Loopback function on and off, allowing you to locally monitor non-HDCP HDMI sources (1080p or below) for troubleshooting purposes.

b **Video Link:** Press and hold the button for 3 seconds to enable or disable the Video Link. When the link is disabled and the Receiver is connected to a display it will show the system's current IP and firmware information.

c **Reset to Factory Defaults:** Press and hold this button when powering the unit on until both the POWER and LINK lights are blinking. Once both lights are blinking you can reboot the unit and all settings will be returned to the factory defaults (Including resetting the IP mode to auto, broadcast channel to 0, and the streaming mode to multicast). A new IP address will be assigned automatically within the 169.254.xxx.xxx address range.

9 **MODE/Anti-DITHER:** This button controls multiple functions:

a **Video Mode:** Press this button momentarily to toggle the video data streaming method between "Graphic" and "Video" modes. "Graphic" mode is optimized for high-detail static displays and "Video" mode is optimized for full motion video.

b **Anti-Dither:** Press and hold this button for 3 seconds to enable and switch between the three "Anti-Dither" modes (1-bit, 2-bit and off). Certain graphics cards use dithering to emulate a larger color palette, but dithering causes difficulty for maintaining low-bandwidth during real-time video compression, so these Anti-Dithering modes are designed to remove the dithering prior to compression and transmission of the signal. If the source is not using dithering, please leave this feature disabled as it may cause a blocking effect with non-dithered content.

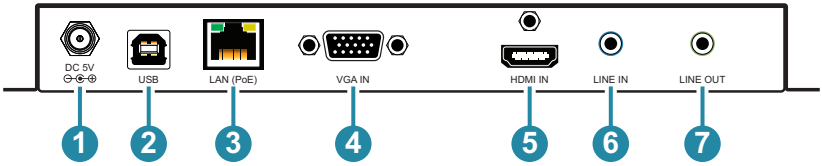
Note: This feature is set to "off" by default.

10 **ISP:** For factory use only.

11 **RESET:** Press this recessed button to reboot the unit (Settings will not be reset).

12 **VGA LOOPBACK OUT:** Connect to an analog VGA monitor to locally view the connected VGA or HDMI (non-HDCP, 1080p or lower) source.

6.2 Transmitter's Rear Panel



1. **DC 5V:** Plug the 5V DC power adapter into the unit and connect it to an AC wall outlet for power. (Optional if powered by PoE)
2. **USB:** Connect directly to a PC to extend its USB functionality to the ports on the connected Receiver.
3. **LAN (PoE):** Connect via a Gigabit Ethernet switch to compatible Receiver(s) to transmit data, and to a PC/laptop to control the unit via WebGUI.

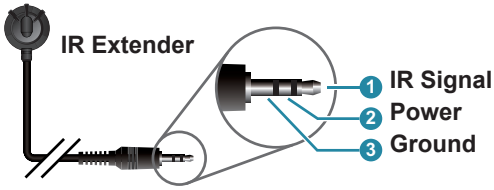
   Note: This unit can be powered directly by the connected Gigabit Ethernet switch if it provides PoE (802.3af).
4. **VGA IN:** Connect to VGA source equipment such as a PC or laptop.

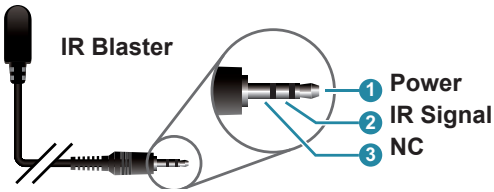
   Note: PC text and content with fine details may display with some visual artifacts when transmitted at 4K@60Hz (YUV 4:2:0).
5. **HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.
6. **LINE IN:** Connect to the stereo analog output of a device such as a CD player or PC.

   Note: When a live audio source is connected to the Line In, it will be automatically embedded into the transmitted signal, and will completely replace any existing HDMI audio.
7. **LINE OUT:** Connect to powered speakers or an amplifier for stereo analog audio output. This will output the audio from the Mic In on the connected Receiver.

   Note: This function is only available in Unicast mode. The Mic In audio channel from the Receiver is only active when an analog source is also connected to the Line In port on the Transmitter.

6.3 IR Cable Pin Assignments





6.4 RS-232 Protocol

TRANSMITTER			RECEIVER	
Pin	Definition		Pin	Definition
1	NC		1	NC
2	Tx		2	Rx
3	Rx	▶	3	Tx
4	NC	◀	4	NC
5	GND		5	GND
6	NC		6	NC
7	NC		7	NC
8	NC		8	NC
9	NC		9	NC

6.5 Telnet Commands

1. Help

COMMAND	DESCRIPTION AND PARAMETERS
HELP	Show the full command list.
HELP N1	Show help details about command N1. N1 = {Any command name}

2. Network

COMMAND	DESCRIPTION AND PARAMETERS
GET_IPCONFIG	Show the current IP configuration.
SET_IP_MODE N1	Set the IP configuration mode. Available values for N1: 0 [Static IP Mode] 1 [DHCP Mode] 2 [Auto IP Mode]
GET_IP_MODE	Show the current IP configuration mode.
SET_IP_ADDRESS N1	Set the static IP address. N1 = X.X.X.X [X = 0~255]
GET_IP_ADDRESS	Show the current IP address.
SET_NETMASK N1	Set the Ethernet netmask. N1 = X.X.X.X [X = 0~255]
GET_NETMASK	Show the current Ethernet netmask.
SET_GATEWAY N1	Set the IP gateway address. N1 = X.X.X.X [X = 0~255]
GET_GATEWAY	Show the current gateway address.
SET_NET_MODE N1	Set the network broadcast mode. Available values for N1: 0 [Unicast Mode] 1 [Multicast Mode]
GET_NET_MODE	Show the current network broadcast mode.

2. Network

COMMAND	DESCRIPTION AND PARAMETERS
SET_JUMBO_MTU N1	Enable/disable the jumbo frame MTU. Available values for N1: 0 [Disabled] 1 [Enabled]
GET_JUMBO_MTU	Show the jumbo frame MTU state.

3. System

COMMAND	DESCRIPTION AND PARAMETERS
GET_HARDWARE_VERSION	Show the current hardware version.
FACTORY_RESET N1	Perform a factory reset on the unit and select the IP mode after the reset completes. Available values for N1: 0 [Reset into Static IP mode] 1 [Reset into Auto IP mode]
REBOOT	Reboot the unit.

4. Transmitter Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_TX_CHANNEL N1	Set the VoIP transmission channel. N1 = 0~255
GET_TX_CHANNEL	Show the current VoIP transmission channel.
SET_PQ_MODE N1	Set the Tx video optimization mode. Available values for N1: 0 [Graphic optimized mode] 1 [Video optimized mode]
GET_PQ_MODE	Show the current Tx video optimization mode.

4. Transmitter Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_HDCP_ALLOW N1	Enable/disable HDCP encrypted source support. Available values for N1: 0 [Disabled] 1 [Enabled]
GET_HDCP	Show the current HDCP support state.
SET_USB_MOUSE N1	Set the USB mouse performance mode. Available values for N1: 0 [High resolution mode] 1 [Compatibility mode]
GET_USB_MOUSE	Show the current USB mouse performance mode.
SET_BANDWIDTH N1	Set the broadcast stream bandwidth maximum. Available values for N1: 0 [50 Mbps] 1 [100 Mbps] 2 [200 Mbps] 3 [400 Mbps] 4 [Best Effort]
SET_FRAME_RATE N1	Set the percentage of frames from the source video to encode. N1 = 2~100 [Frame Percent]
SET_VW_OSD N1 {N2}	Enable/disable video wall OSD to display the Target Receiver number on the designated display. Available values for N1: 0 [Disable] 1 [Enable] N2 = 0~255 [Target Rx {Optional}]
	Note: Target Receiver number can be obtained by turning on the Video Wall OSD. Omitting N2 makes the setting global to all Receivers.

4. Transmitter Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_VW_LAYOUT N1 N2 {N3}	Set the video wall's total horizontal and vertical display count. N1 = 1~16 [Horizontal display count] N2 = 1~16 [Vertical display count] N3 = 0~255 [Target Rx {Optional}] *Note: Target Receiver number can be obtained by turning on the Video Wall OSD. Omitting N3 makes the settings global to all Receivers.*
SET_VW_POS N1 N2 {N3}	Set the display's position within the video wall. (Cannot exceed the video wall's horizontal and vertical display count.) N1 = 0~15 [Row] N2 = 0~15 [Column] N3 = 0~255 [Target Rx {Optional}] *Note: Target Receiver number can be obtained by turning on the Video Wall OSD. Omitting N3 makes the settings global to all Receivers.*
SET_VW_BC N1 N2 N3 N4 {N5}	Set the video wall display's bezel compensation values. N1 = 0~99999 [Video width] N2 = 0~99999 [Total display width] N3 = 0~99999 [Video height] N4 = 0~99999 [Total display height] N5 = 0~255 [Target Rx {Optional}] *Note: Target Receiver number can be obtained by turning on the Video Wall OSD. Omitting N5 makes the settings global to all Receivers.*

4. Transmitter Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_VW_HSCALE N1 {N2}	Set the video wall display's horizontal zoom amount. N1 = 0~99999 [Zoom amount in 1 pixel units] N2 = 0~255 [Target Rx {Optional}] *Note: Target Receiver number can be obtained by turning on the Video Wall OSD. Omitting N2 makes the setting global to all Receivers.*
SET_VW_VSCALE N1 {N2}	Set the video wall display's vertical zoom amount. N1 = 0~99999 [Zoom amount in 1 pixel units] N2 = 0~255 [Target Rx {Optional}] *Note: Target Receiver number can be obtained by turning on the Video Wall OSD. Omitting N2 makes the setting global to all Receivers.*
SET_VW_SHIFT N1 N2 {N3}	Set the video wall display's output shift. Available values for N1: U [Shift up] D [Shift down] L [Shift left] R [Shift right] N2 = 0~80000 [Pixel shift amount. Must be in increments of 8.] N3 = 0~255 [Target Rx {Optional}] *Note: Target Receiver number can be obtained by turning on the Video Wall OSD. Omitting N3 makes the setting global to all Receivers.*

4. Transmitter Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_VW_DELAY N1 {N2}	Set the video wall display delay. N1 = 0~99999 [Delay in microseconds] N2 = 0~255 [Target Rx {Optional}] *Note: Target Receiver number can be obtained by turning on the Video Wall OSD. Omitting N2 makes the setting global to all Receivers.*

5. Receiver Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_EDID_COPY N1	Copy and use the EDID of the connected display. Available values of N1: 0 [Disabled] 1 [Enabled]
GET_EDID_COPY	Show the state of the EDID copy function.
R N1	Select the VoIP transmission channel to display. N1 = 0~255
GET_RX_CHANNEL	Show the currently selected VoIP transmission channel.

5. Receiver Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_OUTPUT_RES N1	Set the output resolution. Available values for N1: 0 [640×480@60Hz] 2 [800×600@60Hz] 4 [1024×768@60Hz] 6 [1280×768@60Hz] 7 [1280×800@60Hz] 8 [1280×1024@60Hz] 10 [1360×768@60Hz] 11 [1366×768@60Hz] 12 [1440×900@60Hz] 14 [1400×1050@60Hz] 15 [1600×900@60Hz] 16 [1600×1200@60Hz] 17 [1680×1050@60Hz) 20 [1920×1200@60Hz) 22 [Bypass] 23 [Auto-Detect] 24 [480i@60Hz] 25 [576i@50Hz] 26 [480p@60Hz] 28 [576p@50Hz] 29 [720p@60Hz] 31 [720p@50Hz] 32 [720p@30Hz] 34 [720p@25Hz] 35 [1080i@60Hz] 37 [1080i@50Hz] 38 [1080p@60Hz] 40 [1080p@50Hz] 41 [1080p@30Hz]

5. Receiver Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_OUTPUT_RES N1	43 [1080p@25Hz] 44 [1080p@24Hz] *Note: Downscaling is limited to 1/2 of the horizontal/vertical pixels of the source. For example: 3840×2160 (4K) to 1920×1080 (1080p) is OK, but 3840×2160 (4K) to 1280×720 (720p) or 640×480 is not. When outputting to a video wall, the resolution of the entire video wall together (rather than each individual display) should be used for this calculation.*
SET_VW N1	Enable/disable video wall functionality. Available values for N1: 0 [Disable] 1 [Enable]
GET_VW	Show video wall functionality status.
SET_VW_OSD N1	Enable/disable video wall OSD to display the Target Receiver number on the connected display. Available values for N1: 0 [Disable] 1 [Enable]
GET_VW_OSD	Show the current video wall OSD state.
SET_VW_LAYOUT N1 N2	Set the video wall's total horizontal and vertical display count. N1 = 1~16 [Horizontal display count] N2 = 1~16 [Vertical display count]
GET_VW_LAYOUT	Show the video wall's total horizontal and vertical display count.

5. Receiver Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_VW_POS N1 N2	Set the position within the video wall of the display connected to this Receiver. (Cannot exceed the video wall's horizontal and vertical display count.) N1 = 0~15 [Row] N2 = 0~15 [Column]
GET_VW_POS	Show the position within the video wall of the display connected to this Receiver.
SET_VW_BC N1 N2 N3 N4	Set the video wall bezel compensation values for the display connected to this Receiver. N1 = 0~99999 [Video width] N2 = 0~99999 [Total display width] N3 = 0~99999 [Video height] N4 = 0~99999 [Total display height]
GET_VW_BC	Show the video wall bezel compensation values for the display connected to this Receiver.
SET_VW_HSCALE N1	Set the horizontal zoom amount of the display connected to this receiver. N1 = 0~99999 [Zoom amount in 1 pixel units]
GET_VW_HSCALE	Show the horizontal zoom amount of the display connected to this receiver.
SET_VW_VSCALE N1	Set the vertical zoom amount of the display connected to this receiver. N1 = 0~99999 [Zoom amount in 1 pixel units]
GET_VW_VSCALE	Show the vertical zoom amount of the display connected to this receiver.

5. Receiver Specific

COMMAND	DESCRIPTION AND PARAMETERS
SET_VW_SHIFT N1 N2	Set the video output shift of the display connected to this receiver. Available values for N1: U [Shift up] D [Shift down] L [Shift left] R [Shift right] N2 = 0~80000 [Pixel shift amount. Must be in increments of 8]
GET_VW_SHIFT	Show the video output shift of the display connected to this receiver.
SET_VW_DELAY N1	Set the video delay of the display connected to this receiver. N1 = 0~99999 [Delay in microseconds]
GET_VW_DELAY	Show the video delay of the display connected to this receiver.

6. Serial

COMMAND	DESCRIPTION AND PARAMETERS
SET_SERIAL_ALLOW N1	Enable/disable Serial bypass support. Available values for N1: 0 [Disabled] 1 [Enabled]
GET_SERIAL_ALLOW	Show the current Serial bypass support state.

6. Serial

COMMAND	DESCRIPTION AND PARAMETERS
SET_SERIAL_BAUD N1	Set the Serial baud rate. Available values for N1: 0 [300] 1 [600] 2 [1200] 3 [2400] 4 [4800] 5 [9600] 6 [19200] 7 [38400] 8 [57600] 9 [115200]
GET_SERIAL_BAUD	Show the current Serial baud rate.
SET_SERIAL_BITS N1	Set the number of Serial data bits. Available values for N1: 0 [5 bits] 1 [6 bits] 2 [7 bits] 3 [8 bits]
GET_SERIAL_BITS	Show the current number of Serial data bits.
SET_SERIAL_PARITY N1	Set the Serial parity bit. Available values for N1: 0 [None] 1 [Odd] 2 [Even]
GET_SERIAL_PARITY	Show the current Serial parity bit.
SET_SERIAL_STOP N1	Set the Serial stop bits. Available values for N1: 0 [1] 1 [2]
GET_SERIAL_STOP	Show the current Serial stop bits.

7. USB

COMMAND	DESCRIPTION AND PARAMETERS
SET_USB_ALLOW N1	Enable/disable USB support. Available values for N1: 0 [Disabled] 1 [Enabled]
GET_USB_ALLOW	Show current USB support state.

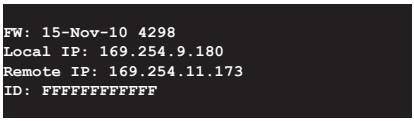
8. Video

COMMAND	DESCRIPTION AND PARAMETERS
VIDEO_SOURCE_HDMI	Select HDMI as the video input source.
VIDEO_SOURCE_VGA	Select VGA as the video input source.

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

6.6 WebGUI Control

- **Important Notes**
  - All major functions of the unit, including status, streaming method, streaming channel selection, output resolution, video wall configuration, EDID management, Ethernet settings, and reset/firmware functions are controllable via multiple tabs in the WebGUI interface allowing for reasonably intuitive operation.
  - Each Transmitter and Receiver 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 disabling the streaming link on either the Transmitter or Receiver units in a connected system and connecting an HDMI display to each Receiver. This is done by pressing and holding the “LINK” button on the front of the unit for 3 seconds (The LINK light will blink rapidly, then turn off).
  - Once the link is broken, each connected Receiver will output a 640×480 black screen with OSD text at the bottom identifying its own IP address (Local IP), as well as the IP address of the Transmitter (Remote IP) that shares the same broadcasting channel with it (channel 0 by default). After obtaining the IP address information, press and hold the “LINK” button again for 3 seconds to return the unit to normal operation (The LINK light will light up solid yellow).



  - 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.
  - Video over IP streaming uses a large amount of bandwidth (especially at higher resolutions) and a Gigabit Ethernet network switch with jumbo frame support and IGMP snooping is required. A professional managed switch with VLAN support is strongly recommended. Please note that most consumer-grade routers are not able to handle the high traffic rates

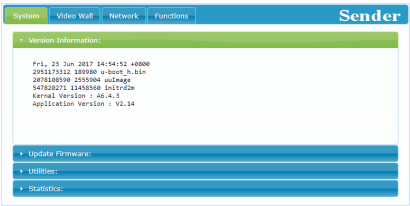
generated by multicast mode, so using a router directly as your network switch is discouraged. It is strongly suggested to avoid mixing your regular network traffic with VoIP streaming traffic and the VoIP traffic should exist within a separate subnet, at the minimum.

6.6.1 System Tab

The System tab contains 4 windows that provide access to firmware version information, a firmware update interface, utilities for rebooting and resetting the unit, basic EDID management, Telnet command entry, and a variety of statistics and information about the operational state of the unit.

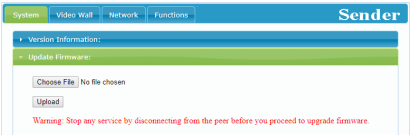
- **Version Information**

This window displays detailed information about the current firmware version.



- **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.



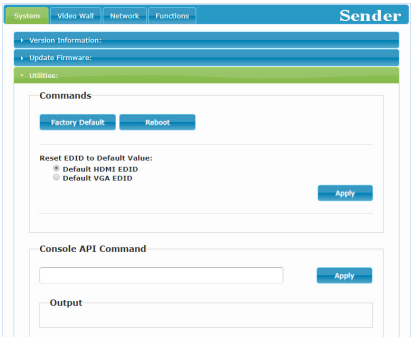
- **Utilities**

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.

If the EDID received from the primary Receiver unit (selected via a checkbox on the preferred Receiver in Multicast mode) has compatibility issues with the connected HDMI source, the internal HDMI EDID (up to 4K30 w/audio) or VGA EDID (up to WUXGA wo/audio) can be selected. Please press “Apply” after making the selection.

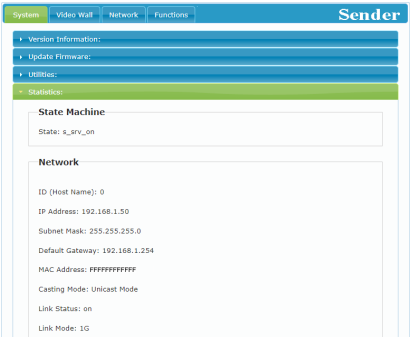
Note: This EDID setting will be reset if the unit is rebooted.

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.



- **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.



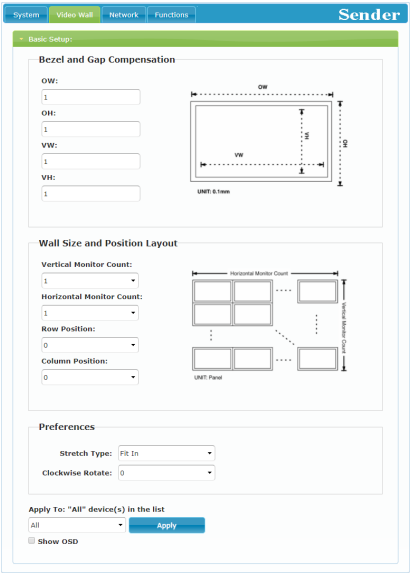
6.6.2 Video Wall Tab

The Video Wall tab allows user to design, edit and manipulate a video wall system created using multiple Receiver units connected to identical displays. The bezel and video size of the displays being used, as well as the horizontal and vertical monitor count, is defined here. Video stretch and rotation can also be controlled on this tab. Receivers in the video wall group (all Receivers sharing the same channel) can be controlled by any other unit within the same group. The Video Wall tab is accessible on both Transmitters and Receivers, however video wall settings may only be applied to Receiver units.

When saving changes on the Video Wall tab, remember to select the appropriate “Apply To:” target unit before pressing the “Apply” button. To make changes to the unit you are currently connected to, select “This” as the target. Otherwise, select the IP address of the Receiver (Client) you want to apply changes to from the “Apply To:” drop down.

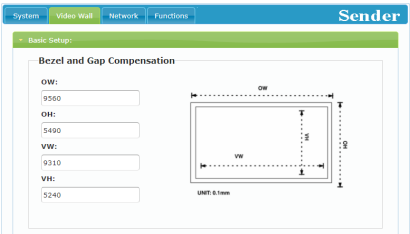
Notes:

- *While it is possible to create small video walls using unicast mode, in order to more efficiently use the available network bandwidth, it is **strongly** recommended to only use multicast mode when creating video walls.*
- *The Video Wall tab is optional, and will not show up in the WebGUI tab list unless the “Enable Video Wall” checkbox on the Functions tab is checked. It is not required to activate the Video Wall tab on Transmitters used within video wall systems.*



- **Bezel and Gap Compensation**

This section of the Video Wall tab is used to define the physical dimensions of each display being used in the video wall. Accurate measurements are needed of the monitor's outer frame (OW, OH) and the video screen (VW, VH). The measurements may be made using any unit of measurement (inches, mm, cm, etc.) as long as **ALL** measurements in the same wall are made using the exact same units and the numbers are integers.



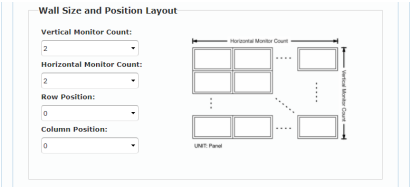
- **OW (Outer Width):** This is the horizontal measurement of the display's outer case.
- **OH (Outer Height):** This is the vertical measurement of the display's outer case.
- **VW (Video Width):** This is the horizontal measurement of the display's video screen.

- **VH (Video Height):** This is the vertical measurement of the display's video screen.

Note: Typically all monitors in a video wall are identical and have the same dimensions, but it is possible to use differently sized displays as long as the same measurement units are used to measure each display and the displays are still arranged in a normal rectangular layout with corners meeting at the same place.

- **Wall Size and Position Layout**

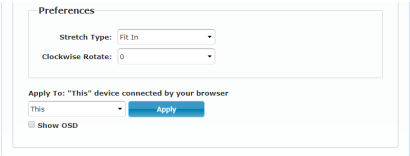
This section of the Video Wall tab is used to define the number of displays used in the video wall as well as the location of the specific display within the video wall. A typical video wall consists of an equal number of horizontal and vertical monitors (for example: 2×2 or 3×3), however it is possible to create video walls using this system with a wider variety of dimensions as long as the end result is still a rectangle (for example: 5×1 or 2×3). Both horizontal and vertical dimensions are limited to a maximum of 8 displays.



- **Vertical Monitor Count:** Define the number of displays in the video wall, measured vertically. (Maximum is 8 displays)
- **Horizontal Monitor Count:** Define the number of displays in the video wall, measured horizontally. (Maximum is 8 displays)
- **Row Position:** Set the vertical location of the currently controlled display. (Counts top to bottom, from 0 to 7)
- **Column Position:** Set the horizontal location of the currently controlled display. (Counts left to right, from 0 to 7)

- **Preferences**

This section of the Video Wall tab provides additional controls over how the source video is displayed on the video wall as well as providing a drop down to determine which Receiver to apply changed settings to.



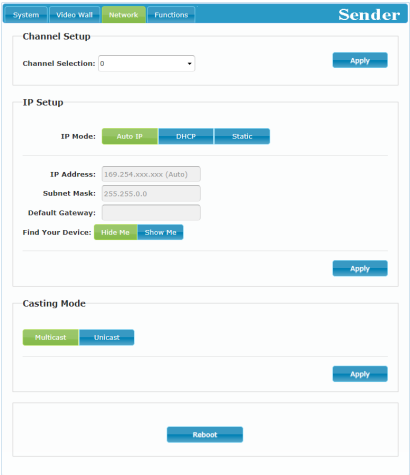
- **Stretch Type:** Set the video stretch method.
  - Selecting “Fit In” will expand the video to exactly fit the dimensions of the video wall regardless of the source’s original aspect ratio.
  - Selecting “Stretch Out” will zoom the video until the video wall is filled in all 4 dimensions while maintaining the aspect ratio of the original source.
- **Clockwise Rotate:** Set the rotation of the video output to 0, 180 or 270 degrees.
- **Apply To:** Select which unit(s) to send updated settings to when “Apply” is pressed.
  - Selecting “All” will direct updates to the video wall settings of all units in the current video wall group (Transmitter and Receivers).
  - Selecting “This” will direct updates to the video wall settings of the unit whose WebGUI you are currently connected to.
  - Selecting an IP address from the “Hosts” list will direct updates to the video wall settings of the Transmitter with that IP address.
  - Selecting an IP address from the “Clients” list will direct updates to the video wall settings of the Receiver with that IP address.
- **Show OSD**: Enables or disables the OSD display of the current channel selection.

Note: When setting up a new video wall, or changing the configuration of an existing one, remember to update the configuration of each Receiver in the system.

6.6.3 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 might be necessary to temporarily disable the Video Link between the Receiver and Transmitter in order to display the units' new IP addresses on the Receiver's HDMI output. Press and hold the LINK button for 3 seconds to enable or disable the Video Link.



- **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 video 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.

- **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 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.

- **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 Transmitter in order to receive video.

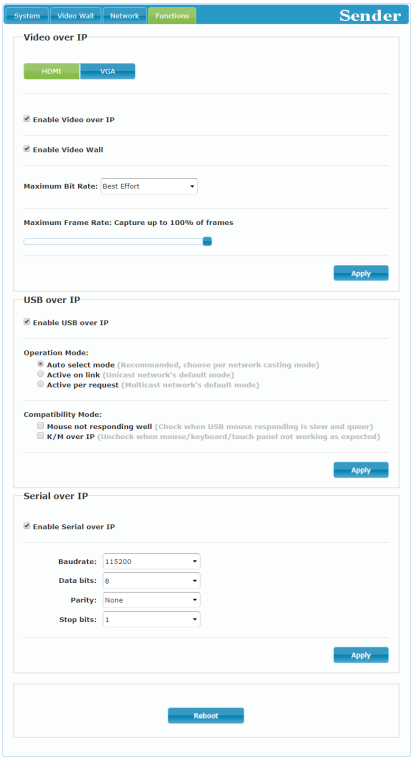
- **Multicast:** This mode sends a single video stream that can be viewed simultaneously by multiple receivers without increasing bandwidth usage. This mode is ideal for video wall or matrixing scenarios. Multicast mode requires a network switch with IGMP snooping enabled.

  Note: The 3 port network switch built into the Receiver units supports IGMP snooping and may be used to distribute a multicast stream.

- **Unicast:** This mode uses a discrete video 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.

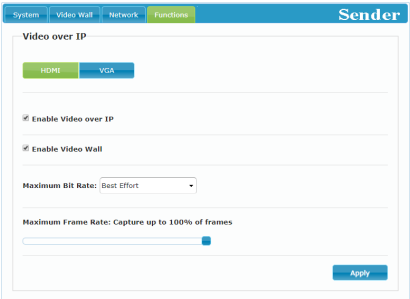
6.6.4 Functions Tab

The Functions tab provides control over the Transmitter's video source selection, streaming bandwidth/quality settings, as well as a wide variety of optional features and functions, including USB and Serial control extension. 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.



- **Video over IP**

This section allows control over many critical functions of the Transmitter including: selection of the input source, enabling/disabling the VoIP stream, enabling access to the Video Wall tab, and controlling the streaming bit rate and quality.



- **HDMI/VGA:** Switch between the HDMI or VGA input on the Transmitter.
- **Enable Video over IP:** Unchecking this checkbox will disable the VoIP stream completely. This option should always remain checked unless troubleshooting is being performed.
- **Enable Video Wall:** Checking this box will enable the Video Wall tab in the WebGUI.

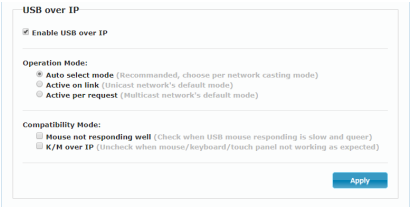
  Note: It is not required to enable this on the Transmitter to set up a video wall. Only Receiver units require this to be enabled.
- **Maximum Bit Rate:** Set the maximum bit rate that can be used by a single video stream. Available options are: Best Effort, 400 Mbps, 200 Mbps, 100 Mbps, 50 Mbps. Selecting “Best Effort” will use up to the maximum available bandwidth in order to maintain a full framerate video stream.

  Note: While it is generally suggested to select “Best Effort” when streaming 4K video sources, the amount of bandwidth required can be very large and will limit the number of concurrent video streams.
- **Maximum Framerate:** Adjusting this slider will set the percentage of frames from the source video to encode (2–100%). This is ideal for reducing the bandwidth requirements of high-resolution, but limited motion, sources such as power point presentations or information screens.

  Note: If the framerate is lowered too far with motion video sources, the video will become noticeably choppy.

- **USB over IP**

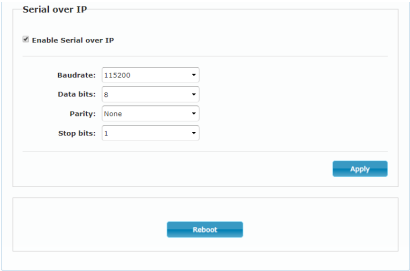
This section provides controls for the USB over IP extension functionality, including enabling/disabling USB support, changing the USB operational mode, and enabling special compatibility modes.



- **Enable USB over IP:** Unchecking this checkbox will completely disable support for USB over this stream. This option should generally remain checked, but, if USB support is not required, disabling this feature can save some bandwidth.
- **Operation Mode:** Sets the USB extension mode. Available options are Auto, Active on link (Unicast optimized), and Active per request (Multicast optimized). Auto mode is set by default and will automatically select the correct mode depending on the broadcast mode of the unit.
- **Compatibility Mode:** These troubleshooting options enable specialized optimizations to solve issues when a mouse or touch panel is not responding properly. They should normally be left unchecked.

- **Serial over IP**

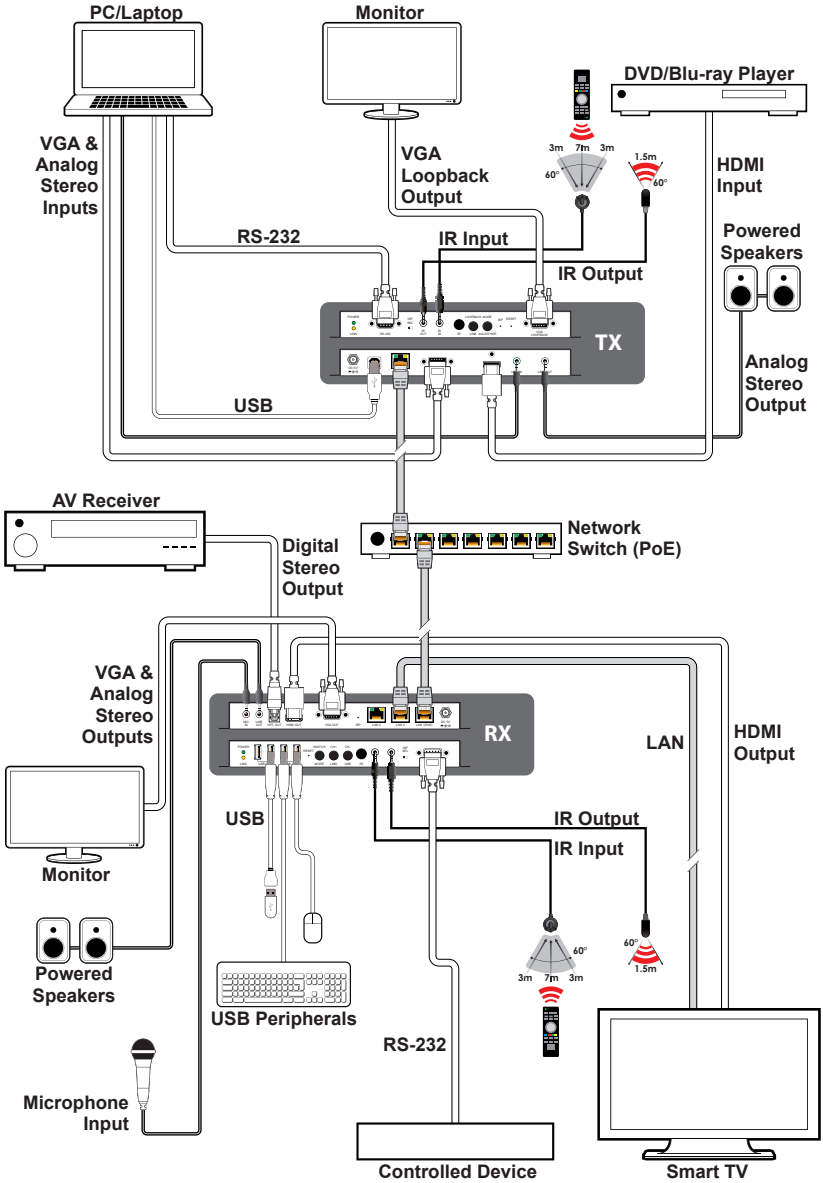
This section provides controls for the Serial over IP extension functionality, including enabling/disabling Serial support and setting the RS-232 data configuration.



- **Enable Serial over IP:** Unchecking this checkbox will completely disable support for sending RS-232 commands over this stream. This option should generally remain checked, but, if serial support is not required, disabling this feature can save a very small amount of bandwidth.
- **Serial Settings:** 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.

7. CONNECTION DIAGRAM



8. SPECIFICATIONS

8.1 Technical Specifications

HDMI Bandwidth	340MHz/10.2Gbps
Input Ports	1×HDMI 1×VGA 1×3.5mm (Stereo Audio) 1×IR Extender [3.5mm] 1×RS-232 [9-pin D-sub] 1×USB Type-B
Output Ports	1×Cat.5e/6/7 (LAN) 1×3.5mm (Stereo Audio) 1×IR Blaster [3.5mm]
Supported Resolutions	480i@60Hz - 4K@30Hz (4:4:4, 8-bit) VGA@60Hz - WUXGA@60Hz (RB)
IR Frequency	30 - 50kHz (30 - 60kHz under ideal conditions)
Power Supply	5V/2.6A DC (US/EU standards, CE/FCC/UL certified)
ESD Protection	Human Body Model: ±12kV (Air Discharge) ±8kV (Contact Discharge)
Dimensions	231.5mm×25mm×108mm (W×H×D) [Case Only] 231.5mm×25mm×120mm (W×H×D) [All Inclusive]
Weight	660g
Chassis Material	Metal
Silkscreen Color	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	7.15W

8.2 Video Specifications

Supported Resolutions (Hz)	Input		Output	
	HDMI	VGA	HDMI	VGA
640×480p@60	✓	✓	✓	✓
720×480p@59/60	✓		✓	
720×576p@50	✓	✓	✓	✓
800×600p@60	✓	✓	✓	✓
1024×768p@60	✓	✓	✓	✓
1280×720p@50/59/60	✓	✓	✓	✓
1280×768p@60	✓		✓	
1280×960p@60	✓	✓	✓	✓
1280×1024p@60	✓	✓	✓	✓
1440×480p@60	✓		✓	
1440×576p@50	✓		✓	
1366×768p@60	✓	✓	✓	✓
1600×1200p@60 (RB)	✓	✓	✓	✓
1920×1080p@24/25	✓		✓	
1920×1080p@50/59/60	✓	✓	✓	✓
1920×1200p@60 (RB)	✓	✓	✓	✓
1920×1080i@50/59/60	✓		✓	
3840×2160p@24/25/30	✓		✓	
3840×2160p@50/60 (YUV 4:2:0)	✓		✓	
4096×2160p@24/25/30	✓		✓	

Notes:

- *HDMI Input: Up to 4096×2160p@60Hz (YUV 4:2:0).*
- *HDMI Output: HDMI input at 4K@60Hz (YUV 4:2:0) will automatically be converted to 4K@30Hz (RGB) for output.*
- *VESA VGA up to 1920×1200@60Hz (Pixel clock<150MHz).*

8.3 Audio Specifications

Supported Audio Formats:

Supported Formats (kHz)	HDMI Input	HDMI Output
LPCM 2.0@44.1/88.2/176.4	✓	✓
LPCM 2.0@32/48/96/192	✓	✓
LPCM 5.1@44.1/88.2/176.4	✓	✓
LPCM 5.1@32/48/96/192	✓	✓
LPCM 7.1@44.1/88.2/176.4	✓	✓
LPCM 7.1@32/48/96/192	✓	✓
Standard Bitstream	✓	✓

Unicast Data Transmission Mode:

Connected I/O	Audio Inputs			Audio Outputs		
	HDMI IN (TX)	LINE IN (TX)	MIC IN (RX)	HDMI OUT (RX)	LINE OUT (TX)	LINE OUT (RX)
	●			●		●
		■		■		■
	●	■		■		■
			▲			
		■	▲	■	▲	■
	●	■	▲	■	▲	■

Multicast Data Transmission Mode:

Connected I/O	Audio Inputs			Audio Outputs		
	HDMI IN (TX)	LINE IN (TX)	MIC IN (RX)	HDMI OUT (RX)	LINE OUT (TX)	LINE OUT (RX)
	●			●		●
		■		■		■
	●	■		■		■
			▲			
		■	▲	■		■
	●	■	▲	■		■

Notes:

● = *HDMI audio source.*

■ = *Line audio source.*

▲ = *Microphone audio source.*

9. ACRONYMS

ACRONYM	COMPLETE TERM
Cat.5e	Category 5 (enhanced) Cable
Cat.6	Category 6 Cable
Cat.7	Category 7 Cable
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
GUI	Graphical User Interface
HD	High-Definition
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
IP	Internet Protocol
IR	Infrared
LAN	Local Area Network
LPCM	Linear Pulse-Code Modulation
OSD	On-Screen Display
PC	Personal Computer
PoE	Power over Ethernet
S/PDIF	Sony/Philips Digital Interface Format
TCP	Transmission Control Protocol
UHD	Ultra-High-Definition
USB	Universal Serial Bus
VGA	Video Graphics Array (640×480@60Hz)
WUXGA	Wide Ultra Extended Graphics Array (1920×1200@60Hz)

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