CH-U330TX & CH-U330RX

4K UHD Multi-Function Extender
with Video over IP and KVM

Operation Manual

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.

REVISION HISTORY

VERSION NO.	DATE (DD/MM/YY)	SUMMARY OF CHANGE
RDV1	23/11/15	Preliminary release
RDV2	26/04/16	1. Add Ethernet requirements 2. Add Web Link Pair Selection and Dip Switch Table 3. Revised HDMI output resolution 4. Update Audio table
RDV3	08/06/16	1. Revised video format 2. Revised Min In to input port 3. Revised power adapter specification 4. Revised baud rate of Transmitter
RDV4	25/08/16	1. Revised introduction 2. Revised system requirement 3. Revised features
VS0	20/02/17	Updated text/diagrams

CONTENTS

1. INTRODUCTION

This 4K UHD Multi-Function Extender with KVM over TCP/IP allows you to transmit HDMI or VGA signals over Cat.5e/6/7 network cable. This extender supports the transmission of Ultra High-Definition signals (up to 4K@30Hz 4:4:4 or 4K@60Hz 4:2:0) along 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 Transmitter operate in multicast mode, allowing you to send a single AV signal to a large number of Receivers within the same local network. 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 and front panel controls.

2. APPLICATIONS

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

3. PACKAGE CONTENTS

- 1×4K UHD Multi-Function Transmitter
- 1×4K UHD Multi-Function Receiver
- 2×IR Blaster Cable
- 2×5V/2.6A 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" is required for proper multicast support.

5. FEATURES

- HDMI 2.0 and DVI 1.0 compatible, HDCP 2.2/1.4 compliant
- 1×HDMI input and output, 1×VGA input and output & 1×VGA bypass output
- Video, audio and control transmission over TCP/IP
- HDMI input resolutions up to 4K@60Hz (YUV 4:2:0) or 4K@30Hz (YUV 4:4:4)
- HDMI output resolutions up to 4K@30Hz (YUV 4:4:4)
- 4K@50/60Hz (YUV 4:2:0) sources are automatically converted to 4K@25/30Hz (YUV 4:4:4) for output
- Supports pass-through of audio formats including LPCM 2.0/5.1/7.1, Bitstream, and HD Bitstream
- Audio line in on Transmitter sends audio to the line out on connected Receivers
- Microphone input on Receiver for transmission to the Transmitter
- Supports USB keyboard and mouse extension
- Supports IR and RS-232 bypass
- Device has an info OSD and can be controlled via WebGUI and front panel controls

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Transmitter's Front Panel
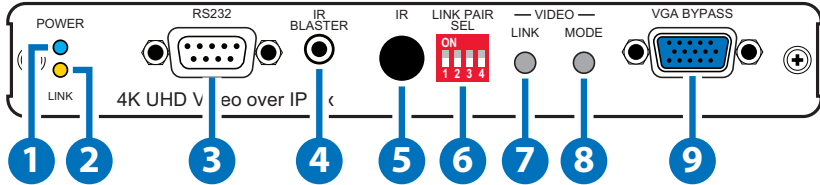
1 **POWER LED:** This LED will flash BLUE while the unit is powering on and will illuminate solid BLUE once it is ready to be used.

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 ORANGE. When the Transmitter has established a stable connection with a Receiver the LINK LED will illuminate in solid ORANGE.

3 **RS232 :** 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. 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 **IR BLASTER:** Connect to the provided IR Blaster to transmit IR signals sent from the Receiver to devices within direct line-of-sight of the IR Blaster.

5 **IR WINDOW:** Accepts IR signals from any standard remote control and sends the signal to the associated Receiver. When the Transmitter is in multicast mode the IR signal is sent to all associated Receivers.

6 **LINK PAIR SEL:** These 4 dip switches determine the unit's LINK PAIR ID (0-15). Please check the chart at the end of this manual for the dipswitch combination values. In unicast mode the LINK PAIR ID of the Transmitter must be set to the same value as the destination Receiver. In multicast mode all destination Receivers must be set to the same ID as the multicast Transmitter. In both cases, all Transmitters and Receivers must be connected to the same local

subnet. Up to 16 Transmitter/Receiver pairs can exist within the same network, depending on available network bandwidth and the resolution of each video stream. The factory default setting for each unit is "0". Please reboot the unit after changing the LINK PAIR ID.

⑦ VIDEO LINK: The video link with the Receiver can be enabled or disabled with this button. When the link is disabled and the Receiver is connected to a monitor it will display the system's current IP and firmware information.

Shortcut Key Function:

Reset to default (auto IP & multicast) Mode: 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 power the unit off and back on and it will be in the default auto IP and multicast modes. The IP address will be assigned automatically within the 169.254.xxx.xxx address range.

Enable/Disable VGA Loopback Function: Press and hold the button for 3 seconds to enable or disable the VGA Loopback function which allows you to locally monitor non-HDCP HDMI sources (1080p or below) for troubleshooting purposes.

⑧ VIDEO MODE: Selects the video mode for streaming data between "Graphic" and "Video" modes. "Graphic" mode is optimized for high-detail static displays and "Video" mode is optimized for full motion video.

Shortcut Key Function:

Anti-Dither Mode (Certain ATI Graphic Cards): 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. This feature is disabled by default.

⑨ VGA BYPASS: Connect to an analog VGA monitor to locally view the connected VGA or HDMI (non-HDCP, 1080p or lower) source.

![CYP logo]

6.2 Transmitter's Rear Panel
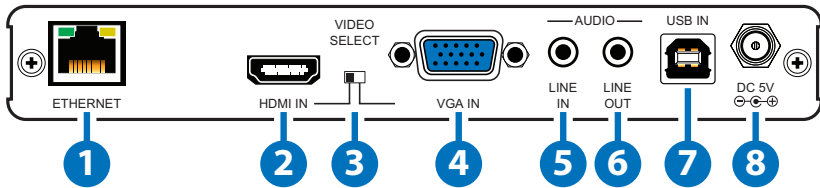
1. **ETHERNET:** Connect via a Gigabit Ethernet switch to compatible Receiver(s) to transmit data, and to a PC/laptop to control the unit via WebGUI.

2. **HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.

3. **VIDEO SELECT:** Selects input source between HDMI and VGA. After changing the input type the unit must be rebooted.

4. **VGA IN:** Connect to VGA source equipment such as a PC or laptop.

5. **LINE AUDIO IN:** Connect to the stereo analog output of a device such as a CD player or PC.

6. **LINE AUDIO OUT:** Connect to powered speakers or an amplifier for stereo analog audio output. This will output the audio from the Mic input on a connected Receiver.

7. **USB IN:** Connect directly to a PC to extend its USB functionality to the ports on the connected Receiver.

8. **DC 5V:** Plug the 5V DC power adapter into the unit and connect it to an AC wall outlet for power.

6.3 Receiver's Front Panel
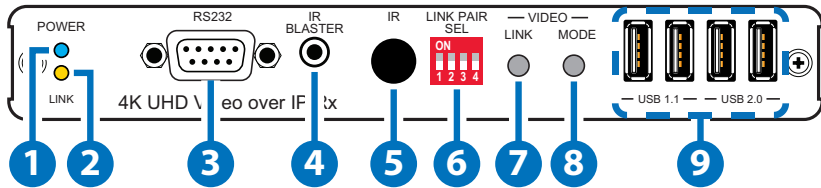
1 POWER LED: This LED will flash BLUE while the unit is powering on and will illuminate solid BLUE once it is ready to be used.

2 LINK LED: If the Receiver has no network connection the LINK LED will not illuminate. While the Receiver is attempting to establish a connection with a Transmitter the LINK LED will flash ORANGE. When the Receiver has established a stable connection with a Transmitter the LINK LED will illuminate in solid ORANGE.

3 RS232: Connect directly to an RS-232 controllable device to receive commands from the device connected to the Transmitter. The baud rate is configurable, but the default baud rate is 115200. 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 connected Receivers.

4 IR BLASTER: Connect to the provided IR Blaster to transmit IR signals from the Transmitter to devices within direct line-of-sight of the IR Blaster.

5 IR WINDOW: Accepts IR signals from any standard remote control and sends the signal to the associated Transmitter.

6 LINK PAIR SEL: These 4 dip switches determine the unit's LINK PAIR ID (0-15). Please check the chart at the end of this manual for the dipswitch combination values. In unicast mode the LINK PAIR ID of the Transmitter must be set to the same value as the destination Receiver. In multicast mode all destination Receivers must be set to the same ID as the multicast Transmitter. In both cases, all Transmitters and Receivers must be connected to the same local subnet. Up to 16 Transmitter/Receiver pairs can exist within the same network, depending on available network bandwidth and the resolution of each video stream. The factory default setting for each unit is "0". Please reboot the unit after changing the LINK

PAIR ID.

7 **VIDEO LINK:** The video link with the Receiver can be enabled or disabled with this button. When the link is disabled and the Receiver is connected to a monitor it will display the system's current IP and firmware information.

Shortcut Key Function:

Reset to default (auto IP & multicast) mode: 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 power the unit off and back on and it will be in the default auto IP and multicast modes. The IP address will be assigned automatically within the 169.254.xxx.xxx address range.

8 **VIDEO MODE:** Selects the video mode for streaming data between "Graphic" and "Video" modes. "Graphic" mode is optimized for high-detail static displays and "Video" mode is optimized for full motion video.

Shortcut Key Function:

Anti-Dither Mode (Certain ATI Graphic Cards): 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. This feature is disabled by default.

9 **USB 1.1/2.0:** The 2 USB 1.1 slots provide connections for slower USB devices such as keyboards, mice, etc. The 2 USB 2.0 slots provide connections for USB devices requiring higher transfer speeds such as thumb drives.

Note: Isochronous (steady streaming) data devices such as USB cameras and external hard drives are not supported.

6.4 Receiver's Rear Panel
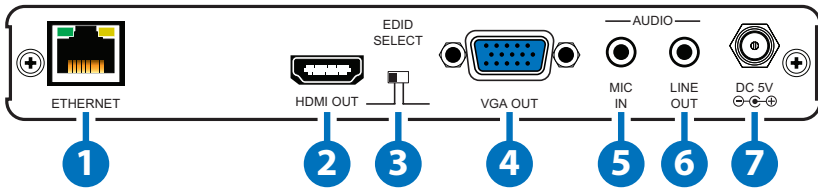
1 ETHERNET: Connect via a Gigabit Ethernet switch to a compatible Transmitter to receive data, and to a PC/laptop to control the unit via WebGUI.

2 HDMI OUT: Connect to HDMI TVs, monitors or amplifiers for digital video and audio output.

3 EDID SELECT: Selects the source for the EDID data that is passed to the Transmitter (from HDMI or VGA). Please reboot the unit after changing this setting.

Note: The EDID source type on the Receiver should match source type selected on the Transmitter for best compatibility.

4 VGA OUT: Connect to a VGA monitor or display for analog video output. (VGA or Non-HDCP HDMI sources only)

5 MIC AUDIO IN: Connect to an analog microphone or to the output of a device such as a CD player or PC. This audio will be sent to the analog audio output on the connected Transmitter.

Note: Under certain connection scenarios audio will not be sent back to the Transmitter. Please check the chart at the end of this manual to verify if audio from this port will be available.

6 LINE AUDIO OUT: Connect to powered speakers or an amplifier for stereo analog audio output.

7 DC 5V: Plug the 5V DC power adapter into the unit and connect it to an AC wall outlet for power.

6.5 IR Cable Pin Assignment

IR Blaster

1. **Power**
2. **IR Signal**
3. **NC**
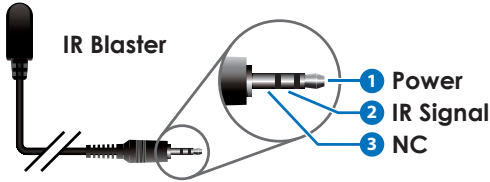
6.6 WebGUI Control

Connect both the Transmitter and Receiver to active gigabit networks through Cat.5e/6 and verify that both units are set to the same LINK PAIR ID and that both LINK LEDs are lit solidly. If the LINK LEDs are blinking, please re-check the network connections and try again.

On the Receiver side, connect a display to the HDMI output port and the screen will display the TCP/IP information for both the Receiver (Local IP) and the Transmitter (Remote IP). The current firmware version will also be displayed. See below for reference.
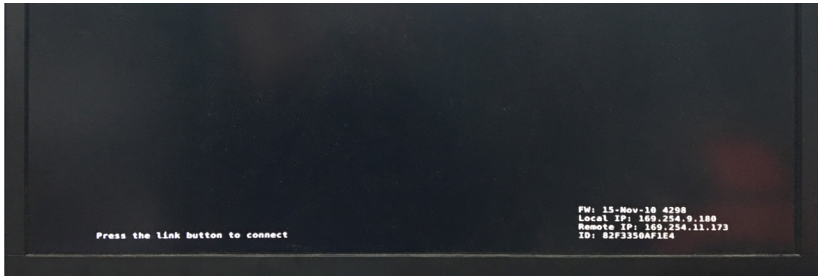
Use these IP addresses to connect to the WebGUI for either the Receiver or Transmitter in a web browser. This will allow for the viewing or control of each unit's configuration and information.

The WebGUI is divided into 3 tabbed sections: System, Network and Functions.
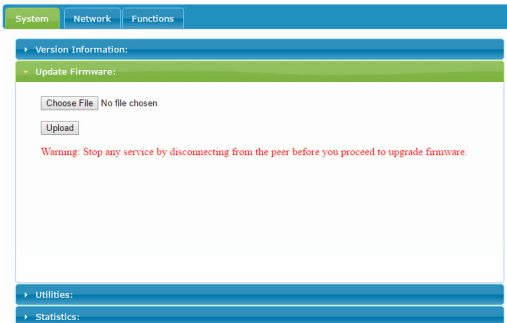
6.6.1 System

Under the "System" tab there are 4 sections: Version Information, Update Firmware, Utilities and Statistics.
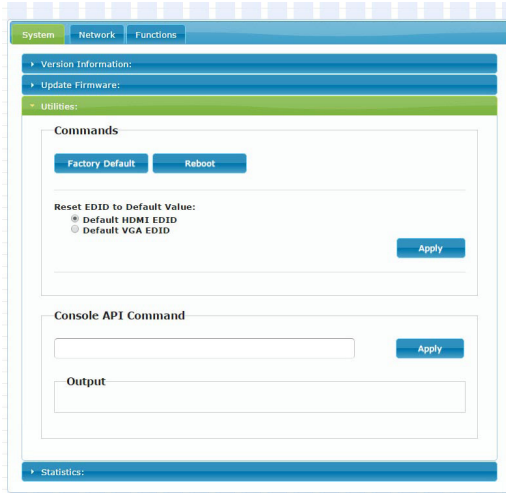
(1) Version Information: Shows the unit's firmware version and WebGUI version.

(2) Update Firmware: Provides a method for uploading and updating firmware in the field.

(3) Utilities: Allows the user to reset the unit back to the factory defaults or reboot the device. When connected to a Transmitter there is also an option to set the EDID to either HDMI or VGA.

Note: The Console API Command section is for factory use only.

(4) Statistics: This window shows all the detailed information about the unit's current network and functionality settings including Casting Mode (Unicast or Multicast), Link Status and Link Mode.
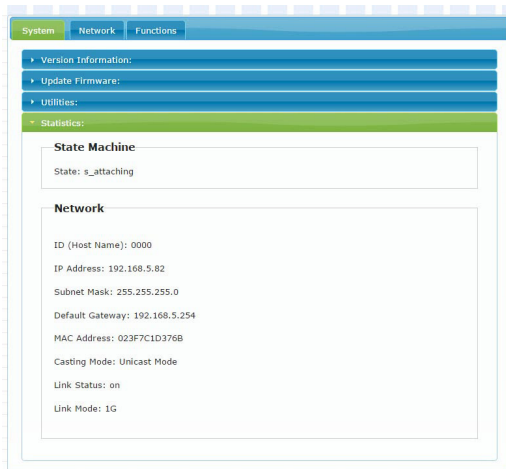
6.6.2 Network

The "Network" tab allows the user to change the unit's Link Pair ID, IP mode, IP address and Casting Mode. After making changes to the IP or Casting mode settings the unit must be rebooted for the changes to take effect.
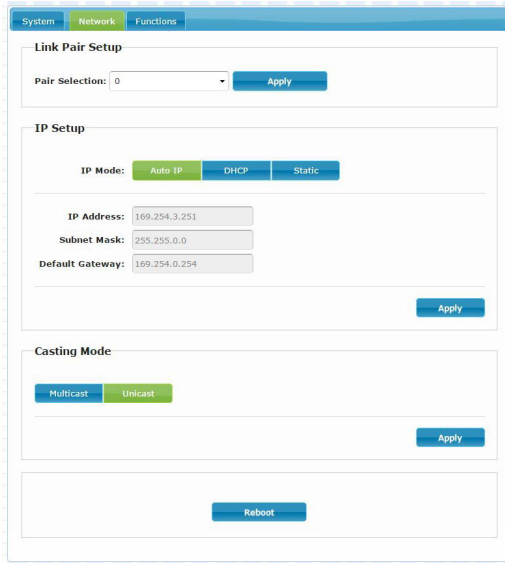
Note: Rebooting the unit will cause any changes made to the Link Pair ID to revert to the ID defined by the physical dip switches on the unit.

(1) **Link Pair Setup:** Adjusting this value allows you to temporarily change the unit's Link Pair ID (as set by the physical dip switches). After clicking on APPLY the unit will attempt to connect to other units on the local network with matching Link Pair IDs. This new ID will revert to the ID specified by the physical dip switches if the unit is rebooted or powered off.

(2) **IP Setup:** Allows for the selection of IP address assignment method. After making changes in this section please press APPLY and then reboot the unit to make the new settings take effect.

"Auto IP" will scan the local network and assign the unit an address from the 169.254.xxx.xxx address range without the need for a DHCP server.

"DHCP" will make the unit search for a DHCP server on the local

network to have an IP address automatically assigned to it.

"Static" allows the user to manually enter in the IP address, subnet mask and default gateway values.

(3) Casting Mode: This section allows for the selection of unicast or multicast data transmission modes for the unit.

"Unicast" will send the signal from a single unicast-configured Transmitter to a single unicast-configured Receiver. Both units must have the same Link Pair ID.

"Multicast" will send the signal from a single multicast-configured Transmitter to all multicast-configured Receivers on the local network with the same Link Pair ID as the Transmitter.

6.6.3 Functions

The "Functions" tab allows the user to choose which features are supported for transmission over TCP/IP. After changing any of these settings, please press APPLY and then reboot the unit for the new settings to take effect.

(1) Video Over IP: This section provides a control to enable or disable the sending of a video/audio stream to linked Receivers. When

video transmission is disabled, all linked Receivers will output their OSD info screen.

Note: If video is disabled on a Transmitter, all Receivers with the same Link Pair ID must also have video disabled in order to form a stable connection.

(2) USB Over IP: This section provides a control to enable or disable the extension of USB between linked units.

(3) Serial Over IP: This section provides a control to enable or disable the extension of USB between linked units. The serial RS-232 port's parameters can also be configured here. All linked units must have the same serial configuration in order for the signals to be passed correctly between them.

7. CONNECTION DIAGRAM
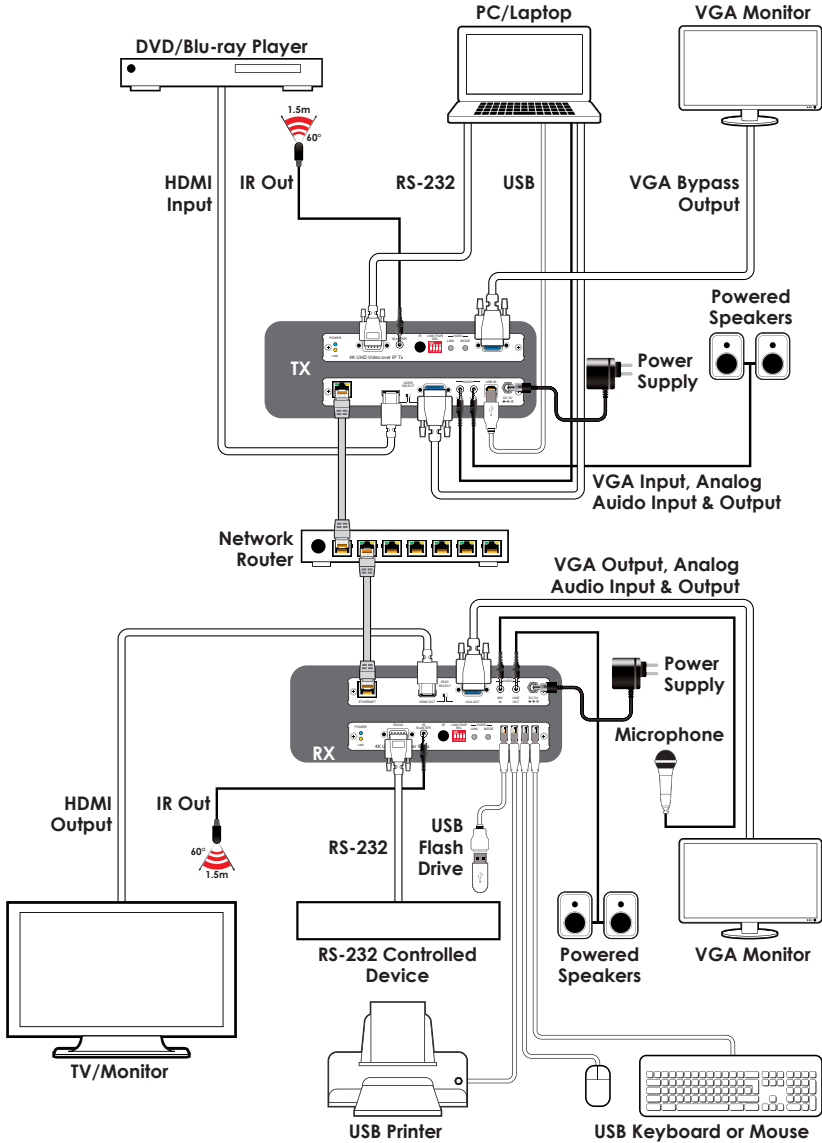
8. SPECIFICATIONS

8.1 Technical Specifications

Transmitter

Video Bandwidth	340MHz/10.2Gbps
Input Ports	1×HDMI, 1×VGA (15-pin D-sub), 1×Line Audio (3.5mm), 1×USB 2.0 (Type B), 1×RS-232 (9-pin D-sub)
Output Ports	1×CAT5e/6, 1×VGA (15-pin D-sub), 1×Line Audio (3.5mm), 1×IR Blaster (3.5mm)
Supported Resolutions	408i@60Hz - 4K@60Hz (4:2:0, 8-bit) VGA@60Hz - WUXGA@60Hz (RB)
HDMI Cable Length	10m (1080p@60Hz, 12-bit) 5m (4K@60Hz, 4:2:0, 8-bit)
Cat.5e/6 Cable Length	100m (4K@60Hz, 4:2:0, 8-bit)
IR Frequency	30 - 50kHz (30 - 60kHz under ideal conditions)
Baud Rate	Up to 115200bps
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	180mm×30mm×100mm (W×H×D) [Case Only] 180mm×30mm×113.5mm (W×H×D) [All Inclusive]
Weight	395g
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 (No-condensing)
Power Consumption	6.82W

Receiver

Video Bandwidth	340MHz/10.2Gbps
Input Ports	1×CAT5e/6, 1×Microphone Audio (3.5mm)
Output Ports	1×HDMI, 1×VGA (15-pin D-sub), 1×Line Audio (3.5mm), 1×IR Blaster (3.5mm), 4×USB 1.1/2.0 (Type A), 1×RS-232 (9-pin D-sub)
Supported Resolutions	480i@60Hz - 4K@24/25/30Hz VGA@60Hz - WUXGA@60Hz (RB)
HDMI Cable Length	10m (1080p@60Hz, 12-bit) 5m (4K@60Hz, 4:2:0, 8-bit)
Cat.5e/6 Cable Length	100m (4K@60Hz, 4:2:0, 8-bit)
IR Frequency	30 - 50kHz (30 - 60kHz under ideal conditions)
Baud Rate	Up to 115200bps
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	180mm×30mm×100mm (W×H×D) [Case Only] 180mm×30mm×113.5mm (W×H×D) [All Inclusive]
Weight	395g
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	7.3W

8.2 Video Specifications

Supported Resolutions (Hz)	Input VGA	Input HDMI	Output VGA	Output HDMI
640×480p@60	✓	✓	✓	✓
800×600p@60	✓	✓	✓	✓
1024×768p@60	✓	✓	✓	✓
1280×720p@50/59.94/60	✓	✓	✓	✓
1280×768p@60		✓		✓
1280×960p@60	✓	✓	✓	✓
1280×1024p@60	✓	✓	✓	✓
720×480p@60		✓		✓
720×576p@50		✓		✓
1366×768p@60	✓	✓	✓	✓
1600×1200p@60 (RB)	✓	✓	✓	✓
1920×1080p@24/25		✓		✓
1920×1080p@50/59.94/60	✓	✓	✓	✓
1920×1200p@60 (RB)	✓	✓	✓	✓
1920×1080i@50/59.94/60		✓		✓
3840×2160p@24/25/30		✓		✓
3840×2160p@50/60 (YUV 4:2:0)		✓		
4096×2160p@24		✓		✓
4096×2160@50/60 (YUV 4:2:0)		✓		

Note:

- *4K@50/60Hz (YUV 4:2:0) sources will be automatically converted to 4K@25/30Hz for HDMI output.*

- *VESA VGA supports up to 1920×1200@60Hz (Pixel clock < 150MHz).*

8.3 Audio Specifications

Unicast Data Transmission Mode:

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:

Audio Inputs			Audio Outputs		
HDMI IN (TX)	LINE IN (TX)	MIC IN (RX)	HDMI OUT (RX)	LINE OUT (TX)	LINE OUT (RX)
●			●		●
	■				■
		▲			
●	■		■		■
●		▲	●		●
	■	▲			■
●	■	▲	■		■

Note:

●=HDMI audio source

■=Line audio source

▲=Microphone audio source.

Supported Audio Formats (kHz)	
LPCM 2.0@44.1/88.2/176.4	Bitstream
LPCM 2.0@32/48/96192	HD Bitstream
LPCM 5.1@44.1/88.2/176.4	
LPCM 5.1@32/48/96192	
LPCM 7.1@44.1/88.2/176.4	
LPCM 7.1@32/48/96192	

8.4 Link Pair Selections

Link Pair ID	Dip Switches			
	1	2	3	4
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

Note: 0=Off, 1=On.

9. ACRONYMS

ACRONYM	COMPLETE TERM
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
IR	Infrared
LPCM	Linear Pulse-Code Modulation
PC	Personal Computer
PCM	Pulse-Code Modulation
UHD	Ultra-High-Definition
USB	Universal Serial Bus
VGA	Video Graphics Array (640×480@60Hz)
WUXGA	Wide Ultra Extended Graphics Array (1920×1200@60Hz)