CH-331H-RX
HDMI over IP Receiver

HDMI®
HIGH-DEFINITION MULTIMEDIA INTERFACE

Operation Manual

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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
VS1	2019/01/28	Final technical review
VS2	2019/01/31	Updated Section 1, 5

CONTENTS

1. INTRODUCTION

This unit is an HDMI over IP Receiver that allows you to receive extended HDMI signals using the TCP/IP protocol over regular Cat.5e network cable. This extender supports the reception of High-Definition signals (up to 1080p@60Hz) with audio up to 100m over a single cable. The distance can be further extended (up to 100m per segment) by using Gigabit Ethernet network switches, allowing the user to cascade the system without signal loss or introducing delay. This Receiver also features bi-directional IR and RS-232 pass-through.

It is also possible to for this Receiver to operate in multicast mode, allowing large groups of Receivers within the same local network to receive the same AV signal with no additional bandwidth cost. Additionally, that same multicast signal can be used to create large multi-display video walls with amazing simplicity.

This Video over IP system is perfect for both residential and commercial installation environments. Configuration information is provided via the On-Screen Display (OSD) when the unit is unlinked and control is via front panel buttons, WebGUI, Telnet, or the AV over IP Master Controller.

2. APPLICATIONS

- HDMI, IR, and RS-232 extension
- Hotel or convention center display multi-monitor broadcast
- Long distance data and video transmission via cascading
- Distributed video matrix system
- Distributed video wall system

3. PACKAGE CONTENTS

- 1×HDMI over IP Receiver
- 1×5V/2.6A DC Power Adapter
- 1×3.5mm to IR Extender Cable
- 1×3.5mm to IR Blaster Cable
- 1×3.5mm to DE-9 Female Adapter Cable
- 1×Shockproof Feet (Set of 4)

- 1×Operation Manual

4. SYSTEM REQUIREMENTS

- HDMI receiving equipment such as an HDTV, monitor or audio amplifier.
- A compatible HDMI over IP Transmitter is required.
- A Gigabit Ethernet network switch with jumbo frame support is required for multi-endpoint extension. (8K jumbo frames are strongly recommended.)
- A Gigabit Ethernet switch with "IGMP snooping" enabled is required for multicast support.
- A managed Gigabit Ethernet switch with VLAN support is strongly recommended.

Special Notes:

- *Most consumer-grade routers are not able to handle the high traffic rates generated by multicast mode, so using one as your VoIP network switch is discouraged.*
- *Avoid mixing regular network traffic with VoIP traffic. If physically separating the network is not possible, VoIP traffic should reside within its own subnet or VLAN.*

5. FEATURES

- HDMI 1.4 and DVI 1.0 compliant
- HDCP 1.4 compliant
- 1 HDMI output
- Video, audio and control reception 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
- Video output can be scaled to a selected resolution, or left unscaled
- HDMI output supports resolutions up to 1080p@60Hz/WUXGA
- Supports pass-through of audio formats including LPCM 2.0/5.1/7.1, Bitstream and HD Bitstream
- Supports IR and RS-232 bypass

• Unit has an info OSD (when unlinked) and can be controlled via front panel buttons, WebGUI, Telnet, and the AV over IP Master Controller

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel
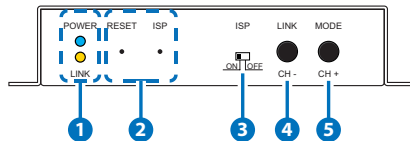
1 POWER LED: This LED will flash while the unit is powering on and will illuminate solidly once it has finished booting and is ready for use.

LINK LED: If the unit has no network connection this LED will not illuminate. While the unit is attempting to establish a connection with a Transmitter this LED will flash. When the unit has established a stable connection with a Transmitter this LED will illuminate solidly.

2 RESET Pinhole: Press this recessed button with a paperclip tip to reboot the unit.

Note: Settings will not be reset.

ISP Pinhole: For factory use only.

3 ISP Switch: For factory use only. For normal operation, this switch should be set to "OFF".

4 LINK/CH− Button: This button controls multiple functions:

A Channel −: Press this button momentarily to decrease the streaming channel to the previous available channel on the local network.

Note: If no other channels are detected, the channel number will not change.

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.

**5 MODE/CH+ Button:** This button controls multiple functions:

A **Channel +:** Press this button momentarily to increase the streaming channel to the next available channel on the local network.

Note: If no other channels are detected, the channel number will not change.

B **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.

Note: Pressing and holding the MODE button while the unit is powering on will perform a full factory reset on the unit. Once the reset is complete, both LEDs will flash rapidly and the unit must then be manually power cycled.

6.2 Rear Panel
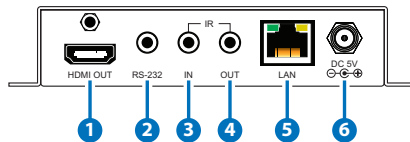
1 **HDMI OUT Port:** Connect to an HDMI TV, monitor, or amplifier for digital video and audio output.

2 **RS-232 Port:** Connect to a PC, laptop, or serial controllable device for the extension of RS-232 signals. The baud rate is configurable, but the default baud rate is 115200.

Note: When a Transmitter is in multicast mode, every connected Receiver unit can send RS-232 commands to that Transmitter and commands sent from the Transmitter side will be sent to all associated Receivers.

3 **IR IN Port:** Connect to an IR Extender to receive IR control signals and extend them to devices connected to the Transmitter on the same broadcast channel. Ensure that the remote being used is within direct line-of-sight of the IR Extender.

4 **IR OUT Port:** Connect to the provided IR Blaster to transmit IR signals from the Transmitter on the same broadcast channel to devices within direct line-of-sight of the IR Blaster.

Note: When the Transmitter is in multicast mode the IR signal is sent to all associated Receivers.
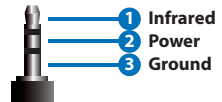
5 **LAN Port:** Connect to a Gigabit Ethernet switch for signal extension from a compatible Transmitter, and to allow WebGUI/Telnet control.

6 **DC 5V Port:** Plug the 5V DC power adapter into this port and connect it to an AC wall outlet for power.

6.3 IR Cable Pinouts

IR Blaster Cable

IR Extender Cable

1 Power
2 Infrared
3 Not Used

1 Infrared
2 Power
3 Ground
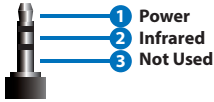
6.4 Serial Port Pinout and Defaults

1 TxD
2 RxD
3 GND

3.5mm to DE-9 Adapter Cable
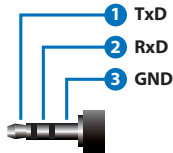
Serial Port Default Settings	
Baud Rate	115200
Data Bits	8
Parity Bits	None
Stop Bits	1
Flow Control	None

6.5 WebGUI Control

• Accessing the WebGUI

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 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 disabling the streaming link on the 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 a Receiver 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).

```
FW: 15-Nov-10 4298
Local IP: 169.254.9.180
Remote IP: 169.254.11.173
ID: FFFFFFFFFFFF
```

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.

| System | Video Wall | Network | Functions |

Note: Video over IP streaming uses a large amount of bandwidth and a Gigabit Ethernet network switch with jumbo frame support and IGMP snooping is required. A managed switch with VLAN support is strongly recommended.

6.5.1 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, basic EDID management, Telnet command entry, and a variety of statistics and information about the operational state of the unit.
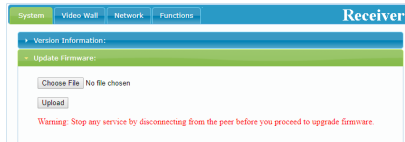
- **Version Information**

This window displays detailed information about the unit's current firmware version.
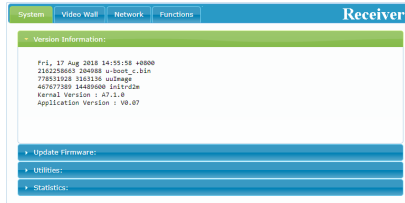
- **Update Firmware**

Provides a way to update the unit's firmware.


1) **Choose File/Upload:** 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.

   Note: The update process takes several minutes to complete and the unit will automatically reboot as a part of the process. While updating, video output may become unstable.

- **Utilities**

The Utilities window allows users to reset/reboot the unit, configure the EDID behavior, and send Telnet commands to the unit.
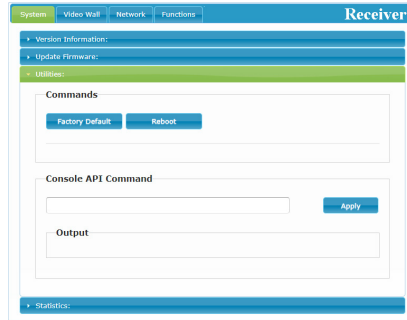
1) **Factory Default:** Click this button to return the unit to its factory defaults.

   Note: Networking configuration details will not be reset.

2) **Reboot:** Click this button to reboot the unit.

3) **Console API Command:** 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, SN, Ethernet information, MAC address, unicast/multicast mode, link status and mode.
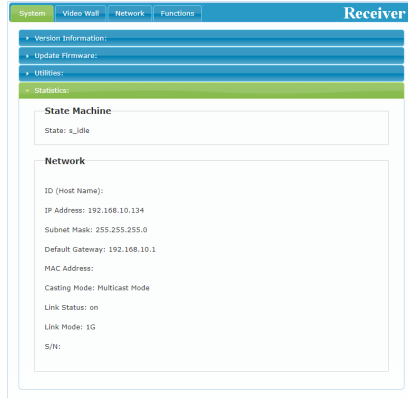
6.5.2 Video Wall Tab

The Video Wall tab allows the 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 connected to, select "This" as the target. Otherwise, select the IP address of the Receiver you want to apply changes to from the "Apply To:" drop down.

Note: While it is possible to create small video walls using unicast mode, doing so wastes bandwidth. In order to more efficiently use the available network bandwidth, it is strongly recommended to only use multicast mode when creating video walls.

1) 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.

Note: Typically all monitors in a video wall are identical and have the same dimensions, but it is also possible to make a 2×2 wall using 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 all 4 corners meeting at the same place.
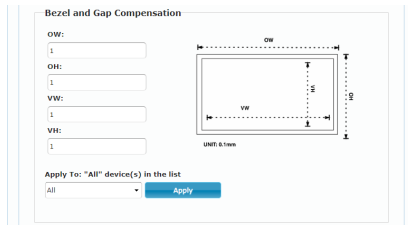
- ■ **OW (Outer Width):** This is the horizontal measurement of the display's outer case (screen plus bezel).
- ■ **OH (Outer Height):** This is the vertical measurement of the display's outer case (screen plus bezel).
- ■ **VW (Video Width):** This is the horizontal measurement of the display's video screen.
- ■ **VH (Video Height):** This is the vertical measurement of the display's video screen.
- ■ **Apply To:** Select which unit(s) to send updated settings to when "Apply" is pressed.
  - – Selecting "All" will send video wall bezel setting changes to all units in the current video wall group.
  - – Selecting "This" will send video wall bezel setting changes to the unit whose WebGUI you are currently connected to.
  - – Selecting an IP address from the "Clients" list will send any bezel setting changes to the Receiver with that IP address.

2) 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 16 displays.
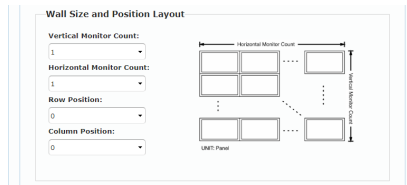
- ■ **Vertical Monitor Count:** Define the number of displays in the video wall, measured vertically. (Maximum is 16 displays)
- ■ **Horizontal Monitor Count:** Define the number of displays in the video wall, measured horizontally. (Maximum is 16 displays)
- ■ **Row Position:** Set the vertical location of the currently controlled display. (Counts top to bottom, from 0 to 15)
- ■ **Column Position:** Set the horizontal location of the currently controlled display. (Counts left to right, from 0 to 15)

3) 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.

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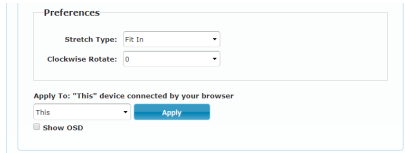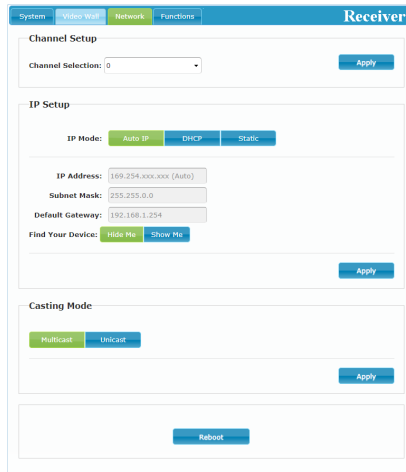
- ■ **Stretch Type:** Set the video stretch method.
  - – Selecting "Fit In" will expand the video to exactly fit the dimensions of the video wall regardless of the source's original aspect ratio.
  - – Selecting "Stretch Out" will zoom the video until the video wall is filled in all 4 dimensions while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

6.5.3 Network Tab

The Network tab provides controls over the Receiver's broadcast reception 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.

1) Channel Setup: Use the dropdown to select the broadcast reception channel for the Receiver. The Receiver will display the video stream from the Transmitter using the selected broadcast channel. The available channel range is from 0 to 255.

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.
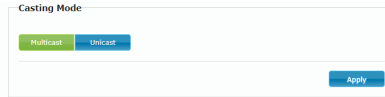
- **IP Mode & Settings:** The IP mode may be switched between "Auto IP", "DHCP" or "Static IP". When the unit is set to Auto IP mode it will automatically assign itself an APIPA address from the 169.254.xxx.xxx range. When the unit is set to DHCP mode it will attempt to automatically obtain an IP address 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 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 Receiver. 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.

- ■ **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 Multicast mode when multiple Receivers are being used, however it does not require a network switch that supports IGMP snooping.

6.5.4 Functions Tab
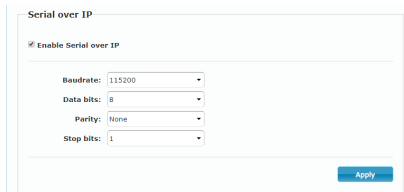
The Functions tab provides control over the Receiver's output resolution, video loss settings, as well as a wide variety of optional features and functions, including EDID management and serial control extension. Changes made to these settings typically require a reboot of the unit. After clicking on "Apply" please follow the reboot instructions in the WebGUI, if necessary.

1) **Video over IP:** This section allows control over many critical functions of the Receiver including: enabling/disabling the VoIP stream, controlling the scaler/output resolution, and controlling the behavior upon signal loss.

- ■ **Enable Video over IP:** Unchecking this checkbox will disable the VoIP stream completely. This option should always remain checked unless troubleshooting is being performed.

- **Copy EDID:** When multiple Receivers are in multicast mode, checking this check box on one indicates which of the Receivers will provide its EDID to the multicast Transmitters.

  Note: This option is only valid in multicast mode. Only one Receiver within the multicast group should have this option enabled at a time.

- **Video Loss Options:** Use the drop down to set the length of time to wait for a lost source to return before showing the Link Lost screen. Available options are: 3, 5, 10, 20, 30, 60 seconds, or Never Timeout. If the "Turn off screen" checkbox is checked, the HDMI output will be completely disabled, including sync, after the timeout time has passed.

- **Scaler Output Mode:** Use the drop down list to select the preferred output resolution for the scaler. Selecting one of the specific resolutions will output all video at that resolution. Selecting "Pass- Through" will output the source video at its original resolution. Selecting "Native" will attempt to scale to the detected native resolution of the display connected to the HDMI output.

2) **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 disable the serial port on this unit.

- **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.

6.6 Telnet Control

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

To Access the Command Line Interface (CLI)	
Windows 7	Click **Start**, type "cmd" in the search field, and press **Enter**.
Windows XP	Click **Start** > **Run**, type "cmd", and press **Enter**.
Mac OS X	Click **Go** > **Applications** > **Utilities** > **Terminal**.

Once in the Command Line Interface (CLI) type "**telnet**" followed by the IP address of the unit (and the port number if it is non-standard) and then hit "Enter". This will connect us to the unit we wish to control.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users\Adminstrator\telnet 192.168.1.50 23
```

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

6.7 Telnet Commands

6.7.1 System Commands

COMMAND
Description and Parameters
help↵
Show the full command list.
help N1↵
Show help details about command **N1**. **N1** = {Any command name}
get_hardware_version↵
Show the current hardware version.
get_firmware_version↵
Show the current firmware version.
set_device_name N1↵
Set the device name **N1** **N1** = {Name}   [29 characters max]
get_device_name↵
Show the current device name.
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.

6.7.2 Network Commands

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.

COMMAND
Description and Parameters
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.
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.

6.7.3 Discovery Service Commands

COMMAND
Description and Parameters
set_showme N1↵
Enable/Disable the discovery "Show Me" feature .
Available values for **N1**:
0   [Disabled]
1   [Enabled]
get_showme↵
Show the current state of the "Show Me" feature.

6.7.4 Receiver Specific Commands

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.
set_rx_channel N1 {N2}↵
Select a VoIP transmission channel to route to this Receiver and, optionally, which content from the channel to route.
N1 = 0 ~ 255   [VoIP channel]
Available values for **N2** (Optional):
V   [Video]
A   [Audio]
S   [Serial]
I   [IR]
Note: Omitting N2 will route all content from the specified channel.
get_rx_channel {N1}↵
Show the currently selected VoIP transmission channel(s).
Available values for **N1** (Optional):
V   [Video]
A   [Audio]
S   [Serial]
I   [IR]
Note: Omitting N1 will show the channel source of all content types.

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]

COMMAND	
Description and Parameters	
41	[1080p@30Hz]
43	[1080p@25Hz]
44	[1080p@24Hz]
Note: Downscaling is limited to ½ of the horizontal/vertical pixels of the source.	
set_vw_osd N1↵	
Enable/disable the 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 current total horizontal and vertical display count.	
set_vw_pos N1 N2↵	
Set this Receiver's 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]
get_vw_pos↵	
Show this Receiver's display's current position within the video wall.	

COMMAND
Description and Parameters
set_vw_bc N1 N2 N3 N4↵
Set the video wall bezel compensation values for this Receiver's display.
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 current video wall bezel compensation values for this Receiver's display.
set_vw_hscale N1↵
Set the video wall horizontal zoom amount for this Receiver's display.
N1 = 0 ~ 99999   [Zoom amount in 1 pixel units]
get_vw_hscale↵
Show the current video wall horizontal zoom amount for this Receiver's display.
set_vw_vscale N1↵
Set the video wall vertical zoom amount for this Receiver's display.
N1 = 0 ~ 99999   [Zoom amount in 1 pixel units]
get_vw_vscale↵
Show the current video wall vertical zoom amount for this Receiver's display.

COMMAND
Description and Parameters
set_vw_shift N1 N2↵
Set the video wall output shift for this Receiver's display. 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 current video wall output shift for this Receiver's display.

6.7.5 Serial Commands

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.
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.

COMMAND
Description and Parameters
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 stop bit]
1   [2 stop bits]
get_serial_stop↵
Show the current serial stop bits.

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

7. CONNECTION DIAGRAM

Media Player

Serial Control Device

HDMI Input

1.5m
60°

3m 7m 3m
60°

IR Input & Output

RS-232

Power Supply

TX

Network Switch

Power Supply

RX

RS-232

Serial Controlled Device

HDMI Output

60°
3m 7m 3m

IR Input & Output

60°
1.5m

HDTV
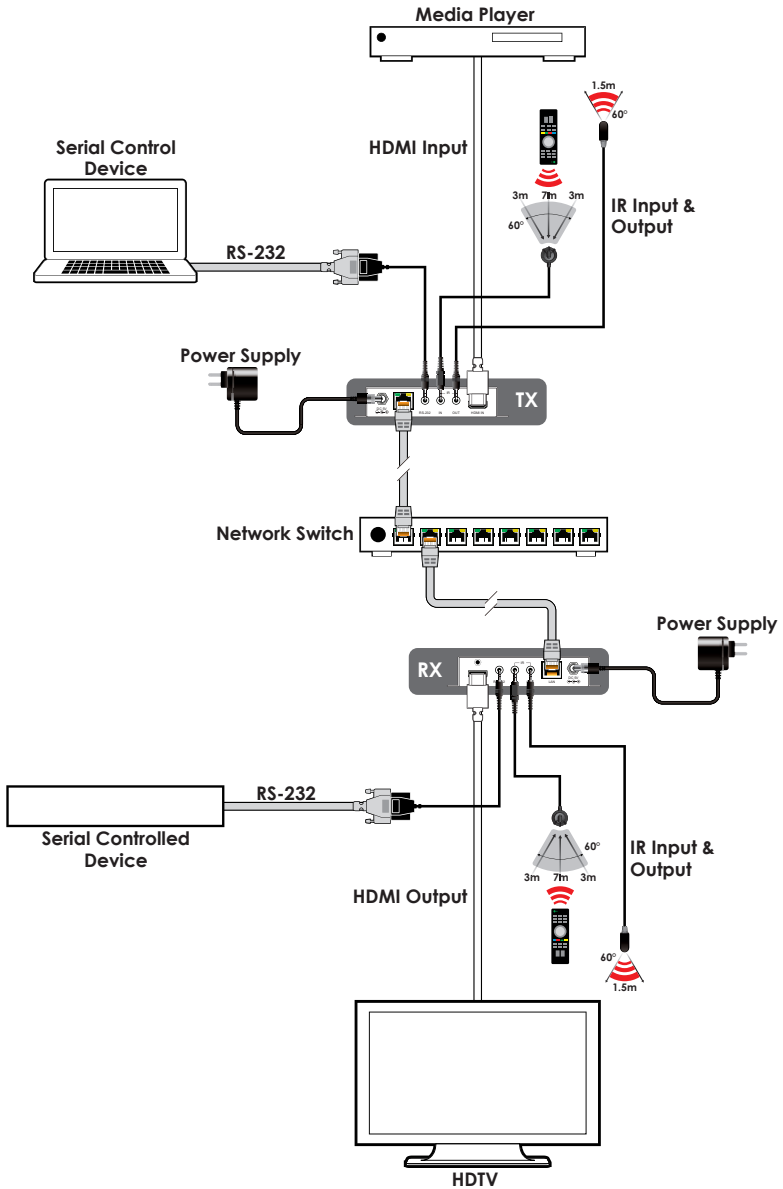
8. SPECIFICATIONS

8.1 Basic Specifications

HDMI Bandwidth	225MHz/6.75Gbps
Input Port	1×LAN (RJ-45)
Output Port	1×HDMI
Pass-through Ports	1×IR Extender (3.5mm)
	1×IR Blaster (3.5mm)
	1×RS-232 (3.5mm)
IR Frequency	30 – 50kHz
	(30 – 60kHz under ideal conditions)
Baud Rate	Up to 115200
Power Supply	5V/2.6A DC
	(US/EU standards, CE/FCC/UL certified)
ESD Protection (HBM)	±8kV (Air Discharge),
	±4kV (Contact Discharge)
Dimensions (W×H×D)	128mm×25mm×108mm [Case Only]
	128mm×25mm×116mm [All Inclusive]
Weight	362g
Chassis Material	Metal (Steel)
Chassis 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	4.2W

8.2 Video Specifications

Supported Resolutions (Hz)	Input Streaming	Output HDMI
720×400p@70/85	✓	✓
640×480p@60/72/75/85	✓	✓
720×480i@60	✓	✓
720×480p@60	✓	✓
720×576i@50	✓	✓
720×576p@50	✓	✓
800×600p@56/60/72/75/85	✓	✓
848×480p@60	✓	✓
1024×768p@60/70/75/85	✓	✓
1152×864p@75	✓	✓
1280×720p@50/60	✓	✓
1280×768p@60/75/85	✓	✓
1280×800p@60/75/85	✓	✓
1280×960p@60/85	✓	✓
1280×1024p@60/75/85	✓	✓
1360×768p@60	✓	✓
1366×768p@60	✓	✓
1400×1050p@60	✓	✓
1440×900p@60/75	✓	✓
1600×900p@60RB	✓	✓
1600×1200p@60	✓	✓
1680×1050p@60	✓	✓
1920×1080i@50/60	✓	✓
1920×1080p@24/25/30	✓	✓
1920×1080p@50/60	✓	✓

Supported Resolutions (Hz)	Input	Output
	Streaming	HDMI
1920×1200p@60RB	✓	✓
2560×1440p@60RB	✗	✗
2560×1600p@60RB	✗	✗
2048×1080p@24/25/30	✗	✗
2048×1080p@50/60	✗	✗
3840×2160p@24/25/30	✗	✗
3840×2160p@50/60 (4:2:0)	✗	✗
3840×2160p@24, HDR10	✗	✗
3840×2160p@50/60 (4:2:0), HDR10	✗	✗
3840×2160p@50/60	✗	✗
4096×2160p@24/25/30	✗	✗
4096×2160p@50/60 (4:2:0)	✗	✗
4096×2160p@24/25/30, HDR10	✗	✗
4096×2160p@50/60 (4:2:0), HDR10	✗	✗
4096×2160p@50/60	✗	✗

8.3 Audio Specifications

Streaming Input/HDMI Output	
LPCM	
Max Channels	8 Channels
Sampling Rate (kHz)	32, 44.1, 48, 88.2, 96, 176.4, 192
Bitstream	
Supported Formats	Standard

8.4 Cable Specifications

Cable Length	1080p		4K30	4K60
	8-bit	12-bit	(4:4:4) 8-bit	(4:4:4) 8-bit
High Speed HDMI Cable				
HDMI Input	15m	10m	✕	✕
Ethernet Cable				
Cat.5e/6	100m		✕	
Cat.6a/7	100m		✕	

- **1080p (FHD Video)**
  - Up to 1080p@60Hz, 12-bit color
  - Data rates lower than 5.3Gbps or below 225MHz TMDS clock
- **4K30 (UHD Video)**
  - 4K@24/25/30Hz & 4K@50/60Hz (4:2:0), 8-bit color
  - Data rates higher than 5.3Gbps or above 225MHz TMDS clock but below 10.2Gbps
- **4K60 (UHD+ Video)**
  - 4K@50/60Hz (4:4:4, 8-bit)
  - 4K@50/60Hz (4:2:0, 10-bit HDR)
  - Data rates higher than 10.2Gbps

9. ACRONYMS

ACRONYM	COMPLETE TERM
ASCII	American Standard Code for Information
AV	Audio/Video
AVR	Audio/Video Receiver or Recorder
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
DHCP	Dynamic Host Configuration Protocol
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
GbE	Gigabit Ethernet
GUI	Graphical User Interface
HD	High-Definition
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDTV	High-Definition Television
IGMP	Internet Group Management Protocol
IP	Internet Protocol
IR	Infrared
KVM	Keyboard/Video/Mouse
LAN	Local Area Network
LED	Light-Emitting Diode
LPCM	Linear Pulse-Code Modulation
MAC	Media Access Control
MJPEG	Motion JPEG
NTSC	National Television System Committee

ACRONYM	COMPLETE TERM
PAL	Phase Alternating Line
PC	Personal Computer
SDTV	Standard-Definition Television
TCP	Transmission Control Protocol
VGA	Video Graphics Array
VLAN	Virtual LAN
VoIP	Video over IP
WUXGA (RB)	Widescreen Ultra Extended Graphics Array (Reduced Blanking)
XGA	Extended Graphics Array