

4K HDMI USB Matrix Extender over IP

Model No. KH-3000

User Manual

Version 2.1

1. Introduction

Thanks for purchasing 4K HDMI USB Matrix Extender over IP, (Model No. KH3000), extends HDMI, USB, Audio, RS232, and IR over IP via CAT.x or Optic Fiber alternatively, further repeating and distributing through over Gigabit Ethernet Switch.

Multicasting support multiple Transmitters (TX) and Receivers (RX) which are also capable of engaging in cross-points matrix architecture connection. To be allowed 7.1 CH audio and complied 3D video, USB 2.0/1.1 with transmission. The web-UI built in makes configuration and operation to control software easily and conveniently for proceeding functionalities. Please read this manual and retain it for future reference.

1.1 Features

- Only using one UTP/STP CAT5e/6 or Fiber Optic cable alternatively required
- Adopt visually lossless compression algorithm
- HDMI Digital Audio/Video extension distance up to 100 meters (330 feet) between Transmitter and Receiver (point-to-point); up to 10 kilometers between Transmitter and Receiver over Fiber Optic cabling which is compatible for standard **SFP (Small Form Plug) module**, no matter to Single/Multi Modes, the effective distance extended based on the quality of Fiber Optic and Transceiver modules accordingly.
- Support Ultra HD video 4K/2K, and 1920 x 1200 (WUXGA) 32bps@60Hz (reduced blanking)
- Support all 3D image format
- Support repeating/distributing/matrix extension through Gigabit Ethernet Switch being transceiver suited for both of Transmitter and Receiver units
- Compatible with USB 2.0 data transmitted rates up to 480 Mbps and backward with USB 1.1 (Transmitter : 1 port USB-B type Host Interface / Receiver : 4 ports USB-A type Device Interface)
- Mapping different Transmitter sources, even grouping loop for each Receiver by corresponding to video channel
- Wall-mount housing design with rack mountable bracket for easy and robust installation
- Audio supports 7.1CH LPCM, DTS, Dolby, analog LINE-IN/LINE-OUT
- Support both of Interlaced and Progressive Display Modes
- Support DDC/DDC2B, Hot-Plug Detection (HPD) and HDCP compliant
- Support Default EDID and EDID copy function for optimal PC-to-Screen performance
- Bidirectional Infrared Remote (IR) signal and RS232 control communication (Transmitter & Receiver)
- Support a 4K HDMI local loopback output in Transmitter unit
- 7-segment LED display for video channel indication
- IR remote control for video channel setting
- Support PD of POE (optional)

Advanced features:

- i. Web-UI shows the linking connections status included all of Transmitter (TX) and Receiver (RX)
- ii. TX-RX connection switching control by operation of web-UI, push buttons, IR remote control or keyboard Hot-Key.
- iii. Firmware upgraded by web-UI control.
- iv. Visualize video wall configuration.
- v. The Transmitter (TX) unit supports HDMI-in and monitoring HDMI-out synchronized.
- vi. Redundant Flash ROM for FW recovery from the failed update.
- vii. Two-digit LED display indicates current transmitting and receiving channel.
- viii. Total 99 selectable channels to transmit or receive.

1.2 Package Contents

- 1. HDMI Extender Transmitter (TX) x 1
- 2. HDMI Extender Receiver (RX) x 1
- 3. Power Supply DC 5V / 3A (TX & RX pair units) x 2
- 4. IR cables (IR blaster cable x 1; IR receiver cable x 1)
- 5. USB 2.0 cable x 1
- 6. Audio/Mic cable x 1
- 7. IR remote control x 1
- 8. User Manual x 1

2. Specifications

		Transmitter (TX)	Receiver (RX)
Console Connection	Video Output	HDMI Type A 19-pin, female x 1	HDMI Type A 19-pin, female x 1
	Serial Control Port (RS-232)	D-SUB 9pin, female x 1, Baud Rate 115,200bps	D-SUB 9pin, male x 1, Baud Rate 115,200bps
Host Connection	Video Input	HDMI Type A 19-pin, female x 1	N/A
Extension Port	RJ-45	HDMI 2.0 Ultra HD Video 4K/2K Audio + IR + RS-232 + USB extension over IP	
Optic Fiber Link		1	


USB Interface	Host	USB Type B, female x 1	N/A
	Device	N/A	USB Type A, female x 4 ■ Keyboard x 1 ■ Mouse x 1 ■ Device x 2
Audio	2-way analog audio ■ Line IN x1 ■ Line Out x1		2-way analog audio ■ MIC IN x1 ■ Line Out x1
	Supports High Definition Audio (HD) 5.1/6.1/7.1 Surround Sound ■ Dolby® TrueHD ■ DTS-HD™ Master Audio LPCM audio up to 7.1 channels 192kHz.		
Hardware Switch	Set / Reset	Push Button	
	Function Selection	Push Button	
	Video Channel	Push Button (CH+/CH-)	
Infrared Remote (IR)	Bi-directional, thru. 20~60KHz, Two way Pass-Thru.		
LED Indicators	Status Monitoring	■ Power : Blue LED ■ Link : Green LED	
	Function Selection	■ EDID Copy : Green LED (use Local port)	■ EDID Update : Green LED
		■ SFP Status : Green LED ■ Video Profile Selection (Video or graphic mode): Green LED	
		N/A	■ USB Link (Up-Stream) : Green LED
DDC Supported	DDC, DDC2, DDC2B		
Extension Cable Type & Length	CAT.5e/CAT.6 Extending Distance : 330 ft (100m) Fiber Optic (SFP module) single-mode up to 30 Km		
Max. Video Resolution	4K/2K		
OS Compatibility	OS Independent		
Power Supply	External DC 5V / 3A Power Supply		
Dimension (L x W x H)	7.34"(180mm) x 3.75"(92mm) x 1.1" (27mm)		
Weight	440 g	440 g	
Housing material	Chassis Metal		
Operating Temperature	32 ~ 122 °F (0 ~ 50 °C)		
Storage Temperature	-4 ~ 140 °F (-20 ~ 60 °C)		
Humidity	0% - 80% RH		



3. Panel Layout diagram

■ Transmitter (TX):

Front Panel



1. **Serial over IP** : RS232 extension port
 - connect to Source Device's RS-232 port
2. (a)  : LED indicator for Power-On status
 - Constantly lights when power-on sequence is done
- (b) **Link** : LED indicator for LAN link status
 - Goes out when LAN link between Transmitter and Receiver/Gigabit Ethernet Switch is off
 - Blinks when LAN link between Transmitter and Receiver/Gigabit Ethernet Switch is on and there is no image data stream on LAN link
 - Constantly lights when LAN link between Transmitter and Receiver/Gigabit Ethernet Switch is on and there is image data stream on LAN link
- (c) **SFP** : LED indicator for fiber link status
 - Constantly lights when Transmitter is powered on
 - Blinks when there is image data stream on fiber link between Transmitter and Receiver
3. (a) **Set/Reset** : The button for Function Setting / System Reset / Reset to Default
 - Short press for setting the following functions
 - **EDID** : Updates EDID stored in Transmitter with EDID of display connected to Transmitter
 - **Video Profile** : Configures video profile with video or graphic mode
 - **Video Channel** : Selects video channel
 - Long press (3 sec) for System Reset when no above functions selected to be set
 - Longer press (6 sec) for Reset to Default when no above functions selected to be set
- (b) **Select** : The button for selecting the functions of EDID / Video Profile / Video Channel to be set

- Each press for cyclically selecting EDID / Video Profile / Video Channel / Quit “Select” in sequence
 - Slow blink in the related LED indicators when selecting EDID or Video Profile
 - Slow blink in 7-segment LED display when selecting Video Channel
 - Constant lighting in EDID LED indicator, Video Profile LED indicator and 7-segment LED display when quitting “Select”
4. (a) **EDID** : LED indicator for EDID update status
- Blinks when EDID update is ready to be set
 - Press SET/RESET button to set/clear EDID update
 - Constantly lighting indicates EDID stored in Transmitter is updated with EDID of display connected to Transmitter
 - Going out indicates EDID is not being updated
- (b) **V. Profile** : LED indicator for Video Profile (video/graphic mode)
- Blinks when Video Profile is ready to be set
 - Press SET/RESET button to set Video Profile to video/graphic mode
 - The short OSD pops up on Receiver’s display to show the setting result of video/graphic mode
 - Constantly lights when Video Profile is set to video mode
 - Goes out when Video Profile is set to graphic mode
5. **Video Channel** : 7-segment LED display for Video Channel indication
- Blinks when Video Channel is ready to be set
 - Press CH+ or CH- button to change video channel
 - Press SET/RESET button to set the video channel change
6. **CH+ / CH-** : Push buttons for changing video channel
7. **IR Emitter** : Phone Jack for emitting signal of IR extension over IP
8. **IR Receiver** : Phone Jack for receiving signal of IR extension over IP
9.  : Phone Jack for analog audio output of Audio extension over IP
10.  : Phone Jack for analog audio input of Audio extension over IP
11. **USB** : USB type B connector for Host link of USB extension over IP
- Connects to Source Device’s USB port

Back Panel:



1. **SFP** : SFP cage for Fiber Optic (SFP module) of fiber link between Transmitter and Receiver
2. **LAN** : RJ45 connector for LAN link between Transmitter and Receiver/Gigabit Ethernet Switch
3. **HDMI In** : HDMI connector for the source signal of HDMI extension over IP
4. **HDMI Out** : HDMI connector for looping back the source signal to Transmitter's connected display
5. **DC 5V-2A** : DC Jack for 5V DC power supply

Receiver (RX):

Front Panel



1. **Serial over IP** : RS232 extension port
 - connect to Sink Device's RS-232 port
2. (a) **Power** : LED indicator for Power-On status
 - Constantly lights when power-on sequence is done(b) **Link** : LED indicator for LAN link status
 - Goes out when LAN link between Transmitter and Receiver/Gigabit Ethernet Switch is off
 - Blinks when LAN link between Transmitter and Receiver/Gigabit Ethernet Switch is on and there is no image data stream on LAN link
 - Constantly Lights when LAN link between Transmitter and Receiver/Gigabit Ethernet Switch is on and there is image data stream on LAN link

(c) **SFP** : LED indicator for fiber link status

- Constantly lights when Transmitter is powered on
- Blinks when there is image data stream on fiber link between Transmitter and Receiver

3. (a) **Set/Reset** : The button for Function Setting / System Reset / Reset to Default

- Short press for setting the following functions
 - EDID : Updates EDID stored in Transmitter with EDID of display connected to Receiver
 - USB : Links or unlinks USB extension
 - Video Profile : Configures video profile with video or graphic mode
 - Video Channel : Selects video channel
- Long press (3 sec) for System Reset when no above functions selected to be set
- Longer press (6 sec) for Reset to Default when no above functions selected to set

(b) **Select** : The button for selecting the functions of EDID / USB / Video Profile / Video Channel to be set

- Each press for cyclically selecting EDID / USB / Video Profile / Video Channel / Quit "Select" in sequence
- Slow blink in the related LED indicators when selecting EDID, USB or Video Profile
- Slow blink in 7-segment LED display when selecting Video Channel
- Constant lighting in EDID, USB, Video Profile LED indicators and 7-segment LED display when quitting "Select"

4. (a) **EDID** : LED indicator for EDID update status





- Blinks when EDID update is ready to be set
- Press SET/RESET button to set EDID update
- Constantly lighting indicates EDID stored in Transmitter is updated with EDID of display connected to Receiver
- Going out indicates EDID is not being updated

(b) **USB** : LED indicator for USB link status

- Blinks when USB link is ready to be set
- Press SET/RESET button to set USB link/unlink
- The short OSD pops up on Receiver's display to show the setting result of USB link/unlink
- Constantly lights when USB link is set
- Goes out when USB unlink is set


(c) **V. Profile** : LED indicator for Video Profile (video/graphic mode)

- Blinks when Video Profile is ready to be set
- Press SET/RESET button to set Video Profile to video/graphic mode

- The short OSD pops up on Receiver's display to show the setting result of video/graphic mode
 - Constantly lights when Video Profile is set to video mode
 - Goes out when Video Profile is set to graphic mode
5. **Video Channel** : 7-segment LED display for Video Channel indication
 - Blinks when Video Channel is ready to be set
 - Press CH+ or CH- button to change video channel
 - Press SET/RESET button to set the video channel change
 6. **CH+ / CH-** : Push buttons for changing video channel
 7. **IR Emitter** : Phone Jack for emitting signal of IR extension over IP
 8. **IR Receiver** : Phone Jack for receiving signal of IR extension over IP
 9.  : Phone Jack for analog audio input of Audio extension over IP
 10.  : Phone Jack for analog audio output of Audio extension over IP
 11. **USB** : USB type A connectors for Device link of USB extension over IP
 - Connects to USB Device equipment
 12.   : USB type A connectors for USB link of Keyboard/Mouse extension over IP
 - Connects to USB Keyboard/Mouse

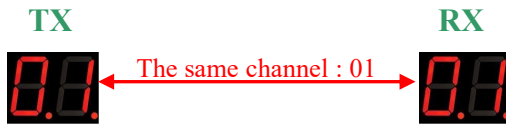
Back Panel:



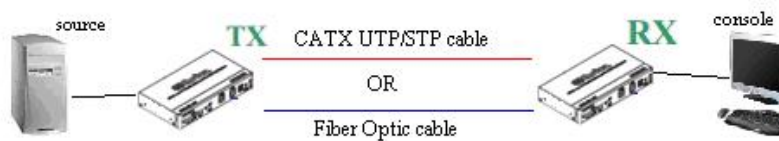
1. **SFP** : SFP cage for Fiber Optic (SFP module) of fiber link between Transmitter and Receiver
2. **LAN** : RJ45 connector for LAN link between Transmitter and Receiver/Gigabit Ethernet Switch
3. **HDMI Out** : HDMI connector for the sink signal of HDMI extension over IP
4. **DC 5V**  : DC Jack for 5V DC power supply

4. Connections Diagrams (Important Notices)

- **One to one mapping extension**



For single pairing of Audio/Video source linking, video channel default set by 01 per each unit, extends linking directly between TX and RX, or adjusting each RX's video channel corresponds to same as TX's, and then press " **SET/RESET** " button of RX to go on working extension linking.

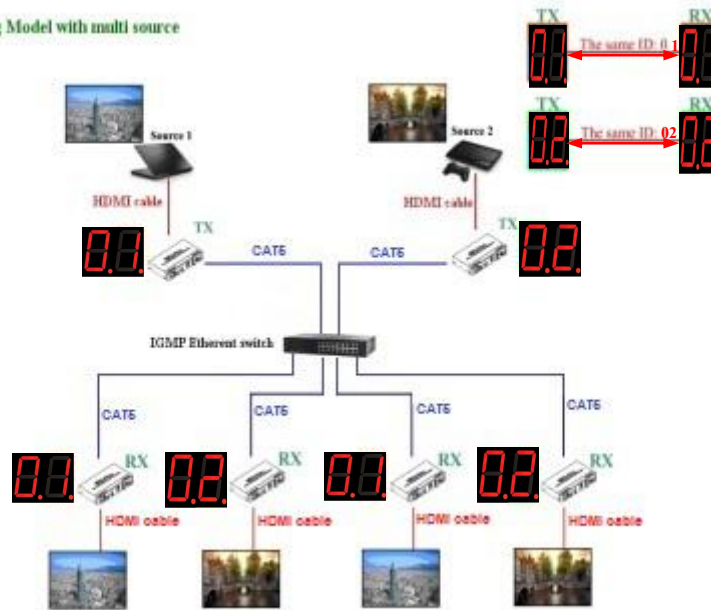


- **Multicasting matrix installation the units of TX or RX, using as extender matrix system over IP network – (Requires Gigabit/1000Mbps network switch)**

For multicast-matrix installation, Gigabit Managed Switch or Gigabit Smart Switch supporting IGMP V2 querier function and Jumbo Frame (at least 8K) is a must and connect all TX and RX to it.

Each Transmitter (TX) must be set differently unique video channel ranging from 01~99 to avoid channel conflict, and adjusting each Receiver's (RX) video channel corresponds to the Transmitter's (TX) video channel, whose video content would be displayed on RX's display, and then press " **SET/RESET** " button of RX to go on implementing extension linking.

Multicasting Model with multi source

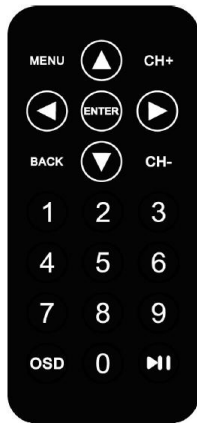


Operate by Push Button or IR Remote Control

Installation

1. Power on Gigabit Switch and enabled Jumbo Frame (8k) and IGMP v2.
2. Select video channel by using Push Buttons (CH+/CH-) on every TX/RX based on the link mapping, and set it up by pressing **"Set/Reset"** button. The 7-segment LED display (**Video Channel**) would stop blinking, which means "setting done".
3. Connect all of TXs and RXs to Gigabit Switch by Cat5e/6 cables.
4. Connect all of TXs with video sources, and all of RXs with Display/TV by HDMI cables.
5. Connect IR emitter cable to TX's or RX's IR Emitter Jack, and point IR emitter to TX's or RX's connected device's IR receiver window, which you like to control.
6. Connect IR Receiver cable to TX's or RX's IR Receiver Jack, and point IR receiver to TX's or RX's connected device's IR remote.
7. Connect straight RS232 cable to TX and RX where RS232 controller or Display/TV/device can take RS232 command.
 - If TX/RX's RS232 port and device's RS232 port are different gender, use gender changer.
 - If TX/RX's RS232 port and device's RS232 port are different gender, use gender changer.
8. Plug-in DC power adapter to all TX and RX. Units power on.
9. Power on all Video Sources and start playing video.
10. Power on all Display/TV and select HDMI input.

Now shall be all display/TVs showing video depended on video channel selection Operation.
11. To assign different video channels (sources), using IR Receiver cable and 99-channel IR remote controller on Receiver side to switch source channel, or change Receiver's Video Channel by using push button on Receiver.
12. The 99-channel IR remote controller's instruction as follows.

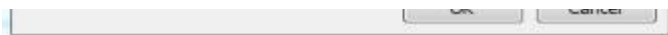


- A. Press “CH+” or “CH-” to the next or previous available video channel
- B. Press the number key “1” ~ “0” and “ENTER” to directly change to the specific video channel
- C. Press “OSD” to show the status information of TX & RX in the same link on the top left corner of display connected to RX. The status information includes :
 - ①. TX’s IP
 - ②. RX’s IP & MAC address
 - ③. Firmware version of this receiver
 - ④. Device mode setting of this receiver (Extender or Matrix)
 - ⑤. Current receiving video channel
 - ⑥. Current video resolution

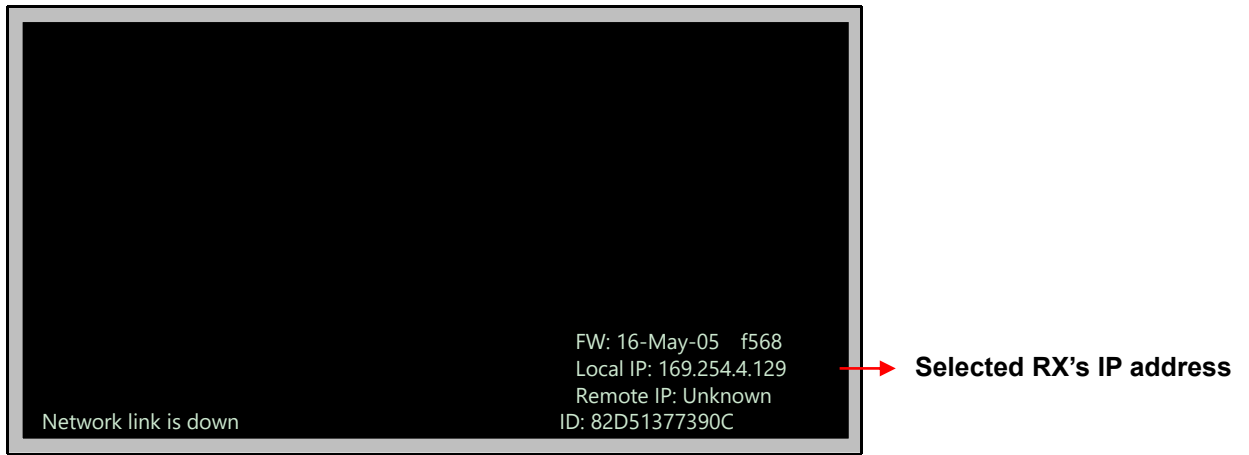
Operate of Web UI

Installation

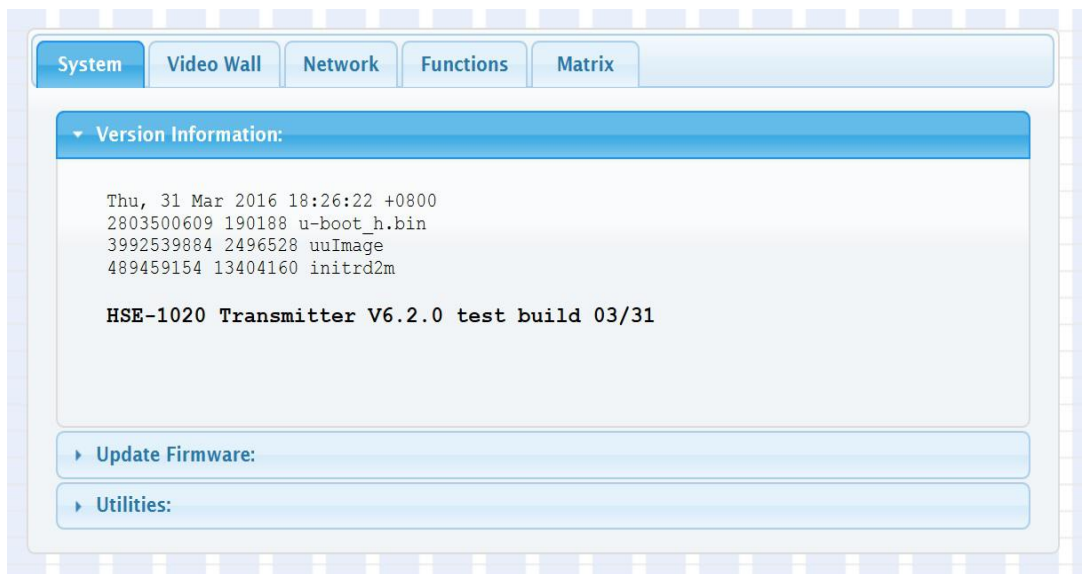
1. Power on Gigabit Switch and enabled Jumbo Frame and IGMP.
2. Connect all Transmitter (TX) and Receiver (RX) to Gigabit Switch by CAT.x or Fiber Optic cable in order to set up the matrix extension network.
3. Connect all Transmitters (TXs) with video sources, and all Receivers (RXs) with Display/TV/Monitor by HDMI cables.
4. Get a PC for executing Web browser, and connect this control PC to Gigabit Switch by CAT.x cable.
5. Connect IR emitter cable to TX's or RX's IR Emitter Jack, and point IR emitter to TX's or RX's connected device's IR receiver window, which you like to control.
6. Connect IR Receiver cable to TX's or RX's IR Receiver Jack, and point IR receiver to TX's or RX's connected device's IR remote.
7. Connect RS232 straight cable to TX and RX where RS232 controller or Display/TV/device can take RS232 command.
 - If TX/RX's RS232 port and device's RS232 port are different gender, use gender changer.
 - If TX/RX's RS232 port and device's RS232 port are different gender, gender changer
8. Plug-in DC power adapter to all Transmitter (TX) and Receiver (RX). Units power on.
9. Power on all Video Sources and start playing video.
10. Control PC's IP setting
 - Select Internet Protocol Version 4 (TCP/IPv4)
 - IP address: **169.254.2.1** or the other IP address within **169.254.XXX.XXX**
 - Netmask: **255.255.0.0**



11. Access the Web Interface Control Software
 - A. Randomly select a RX in the matrix extension network and unlink it by disconnect its CAT.x or Fiber Optic cable.
 - B. The OSD will immediately appear on the display connected to the selected RX as follows. The select RX's IP & MAC address are shown in the OSD



- C. Re-link the selected RX to matrix extension network by re-connecting the CAT.x or fiber Optic cable.
- D. Access the Web browser via the control PC by using the selected RX's IP address shown in the OSD (<http://169.254.XXX.XXX/>).
- E. When the access is done, the home page of Web Interface Control Software will appear as follows.




Advanced Configuration of Web UI

Configuring IP Mode

With default, the Extender system is set to **DHCP Mode**, automatically showing the default IP and subnet mask. If DHCP server is not available, device will automatically use IP addresses at 169.254.xxx.xxx range with subnet mask 255.255.0.0.

User does not need to change it unless you surely know what IP address you can assign to this device. To assign static IP, all TX and RX need to be at same IP range and corresponding subnet mask.

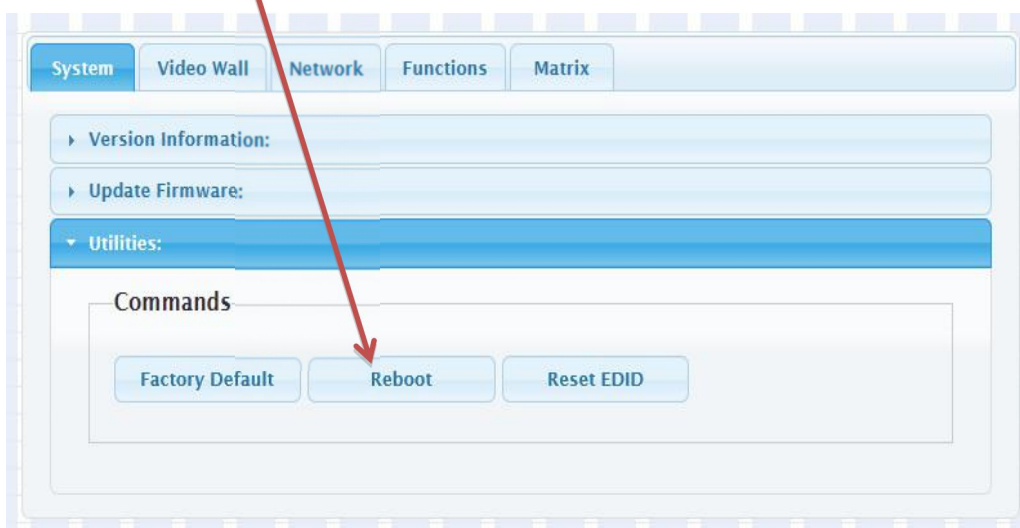


The screenshot shows the 'Network' configuration page in the Web UI. At the top, there are tabs for 'System', 'Video Wall', 'Network', 'Functions', and 'Matrix'. The 'Network' tab is selected. Below the tabs, there are two main sections: 'IP Setup' and 'Device Mode'. In the 'IP Setup' section, 'IP Mode' is set to 'DHCP' (with 'Static' as an alternative). Below this, there are input fields for 'IP Address' (169.254.7.197), 'Subnet Mask' (255.255.0.0), and 'Default Gateway' (0.0.0.0). An 'Apply' button is located at the bottom right of this section. The 'Device Mode' section below it has 'Matrix' and 'Extender' buttons, with 'Extender' selected. An 'Apply' button is also present at the bottom right of this section.

When you apply new settings, please reboot the unit to take effect.

To reboot the TX unit or RX unit, using either way

- 1) Long presses "SET/RESET" button on the unit for 3 sec
- 2) Or Click the **Reboot** button on the Web interface.



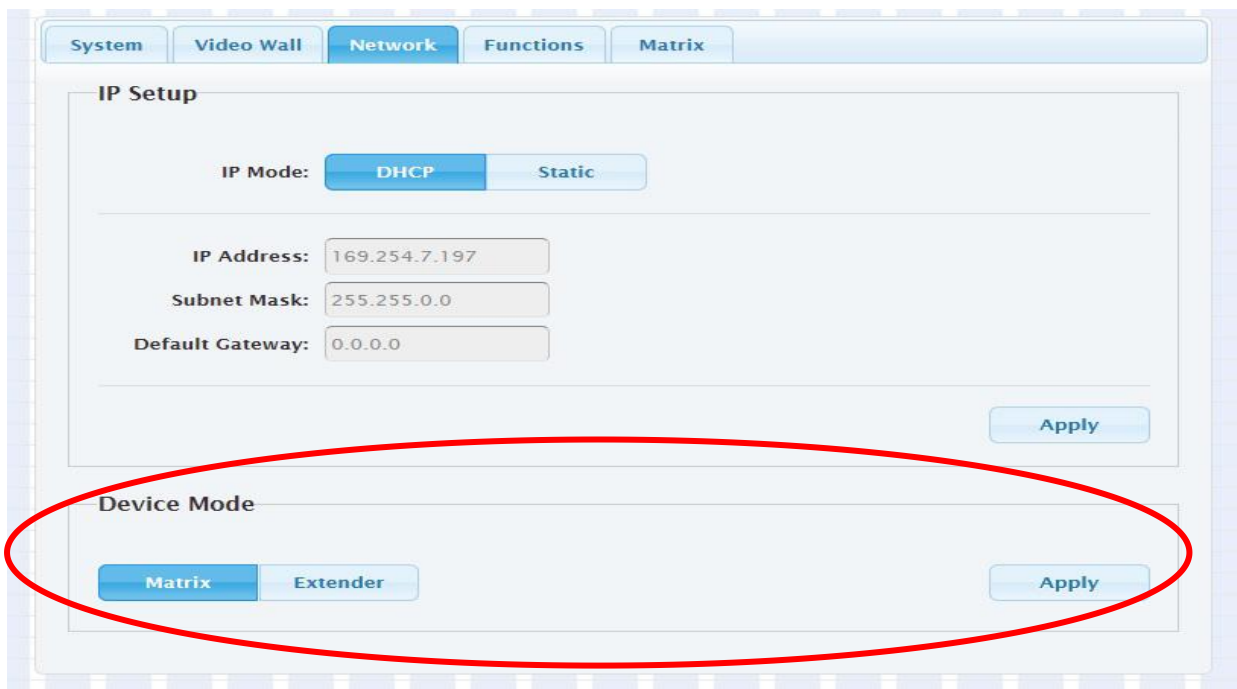
The screenshot shows the 'Utilities' section of the Web UI. At the top, there are tabs for 'System', 'Video Wall', 'Network', 'Functions', and 'Matrix'. The 'Network' tab is selected. Below the tabs, there are three expandable sections: 'Version Information', 'Update Firmware', and 'Utilities'. The 'Utilities' section is expanded, showing a 'Commands' area with three buttons: 'Factory Default', 'Reboot', and 'Reset EDID'. A red arrow points from the 'Reboot' button in this screenshot to the 'Reboot' button in the previous screenshot.

Device Mode of Extension Application

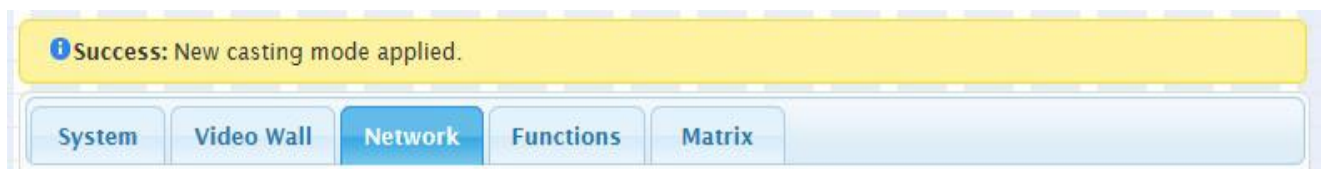
The Extension application has two device modes: Matrix and Extender. In Matrix mode, multiple Receiver (RX) units can receive signals from multiple (or a single) Transmitter (TX) units on the same network. In Extender mode, only a single Receiver (RX) unit can receive signals from Transmitter (TX) unit with the same channel. **By default, the Extension Application is configured to Matrix Mode.**

How to change to Extender Mode

1. By default, access the Web interface for each TX and RX unit that will be using Matrix Mode.
2. Click the **Network** tab and click **Extender** button. When selected, the **Extender** button will be highlighted in blue, and then click the **Apply** button.



3. A message will be displayed, indicating that the casting mode has been applied to the TX unit.



4. After a few seconds, another message will be displayed stating that the TX unit must be rebooted in order for fitting the new setting changing to take effect.



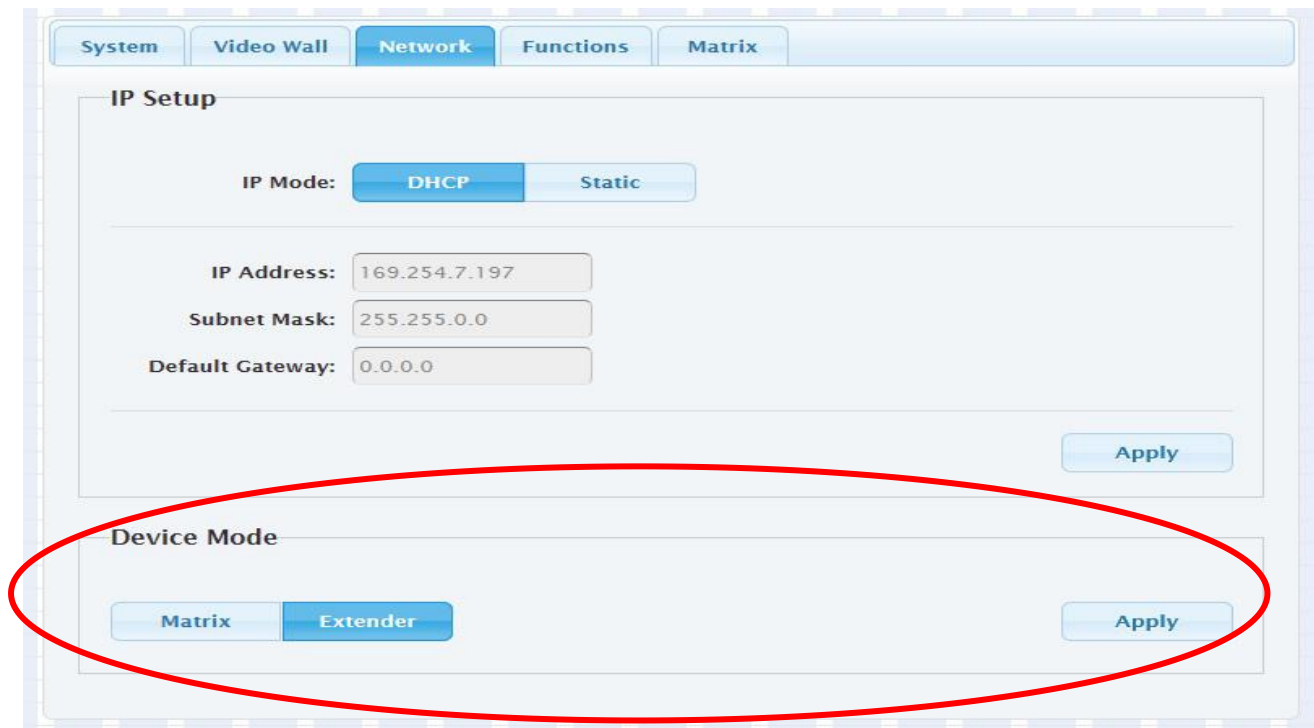
5. Reboot the TX unit by one of these methods alternatively.
 - (1). Press the “**Set/Reset**” on the TX unit for 3 sec.
 - (2). Click the **Reboot** button on the Web interface.



6. Repeat steps 1 through 5 in sequence for each TX and RX on the network.

How to change to Matrix Mode

Click the **Network** tab and click **Matrix** button. When selected, the **Matrix** button will be highlighted in blue, and then click the **Apply** button



The IP Mode required to be assigned either **DHCP** or **Static** mode.

**** Precaution****

With any changes in device modes or change channel setting REQUIRED “ Reboot “ of each Transmitter (TX) and Receiver (RX) unit, no matter what you use the alternative method, which are changed accordingly in order for the new setting to take effect.

How to Update EDID of connected display (Support Multi-channel audio and 3D)

KH3000 features EDID Management. Before the source can send video (and/or audio) data, the source device (connected to each Transmitter/TX unit) reads the EDID from the display which is connected to each Receiver/RX unit. The EDID contains information about what type of audio/video data can be accepted from the source.

By default, the internal HDMI EDID (stored in the TX unit) is used. However EDID from Receiver (RX's) HDMI output connected device like display, amplifier,...etc, can be gotten and stored in Transmitter/TX. **It can support Multi-channel audio and 3D function from the device which connected to the Receiver/RX unit.**

If installed and operated by HSE-1020-4K Web Interface, then EDID copy will be done every time the video channel switched automatically.

If installer operates by IR remote control, please follow procedure below.

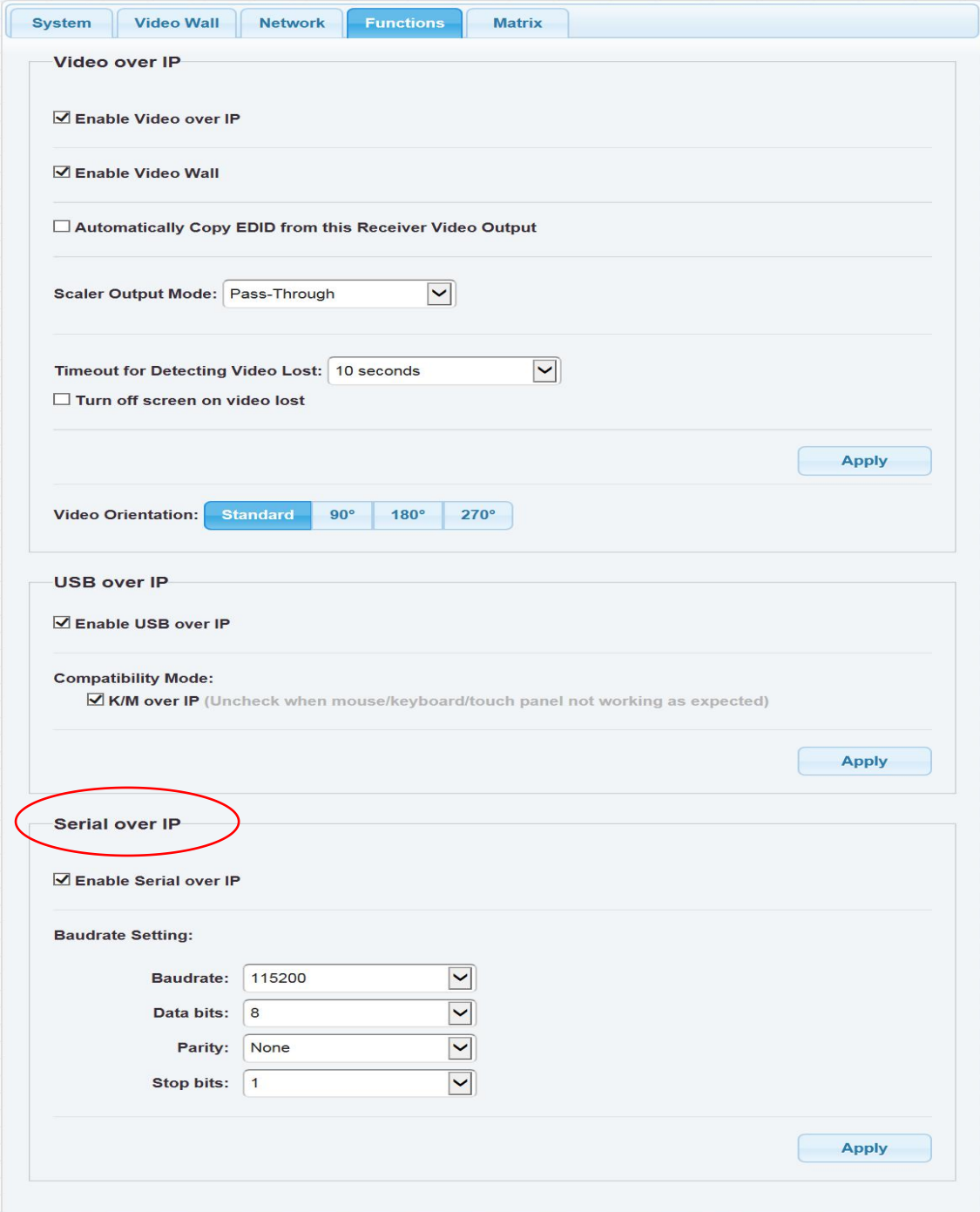
EDID Copy by Button

1. Press “Select” button to make “EDID” LED blink in order to select EDID Copy function
2. Press “SET/RESET” button to set EDID Copy function
3. “EDID” LED constantly lighting means EDID will instantly copy to transmitter (TX), and will done each time when video channel switched.
4. In Extender mode, EDID copy will automatically perform when video connection established or Receiver (RX) connected display changed.

Using RS-232

KH3000 supports RS-232 pass-through, allowing the control of remote RS-232 devices (near the Receiver/RX unit) from the source (Transmitter/TX unit) location. The RS-232 host (controller) and the device (client) **must be set to the same baud rate**. In addition, the **correct baud rate** must be set on the Transmitter/TX and Receiver/RX units which are being used to control the RS-232 client.

1. Access the Web Interface Control Software using RX's IP address <http://169.254.XXX.XXX/>.
2. Click the **Functions** tab and locate the **Serial over IP** section.
3. Make sure that the Enabled Serial over IP box is checked.



The screenshot displays the 'Functions' tab of the Web Interface Control Software. The 'Serial over IP' section is highlighted with a red circle. The configuration options are as follows:

- Video over IP**
 - Enable Video over IP
 - Enable Video Wall
 - Automatically Copy EDID from this Receiver Video Output
 - Scaler Output Mode: Pass-Through
 - Timeout for Detecting Video Lost: 10 seconds
 - Turn off screen on video lost
 - Apply
 - Video Orientation: Standard, 90°, 180°, 270°
- USB over IP**
 - Enable USB over IP
 - Compatibility Mode:
 - K/M over IP (Uncheck when mouse/keyboard/touch panel not working as expected)
 - Apply
- Serial over IP**
 - Enable Serial over IP
 - Baudrate Setting:
 - Baudrate: 115200
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Apply

4. After select the needed value, click the **Apply** button.
5. **Reboot** to go on the new setting effect.

USB Extension

When connecting USB devices to KH3000, the functionality is similar to video and RS-232.

1. Extender Mode

In Extender mode, only a single Receiver (RX) will be able to communicate with a Transmitter (TX). The USB control is communication directly between Transmitter (TX) and Receiver (RX).

2. Matrix Mode

In Matrix mode, the USB host device can be controlled from one of multiple Receiver (RX) units at a time. The **USB** link controlling on reach Receiver/RX in order to enable USB on each RX. In matrix mode, HSE-1020-4K behaves like a USB hub.

Audio Input and Output

1. Our computer has a **Mic-In** jack, as part of the sound card. However, we want to be able to access this jack from the Receiver/RX unit. Thus, connect the microphone to the **Mic-in** jack on the Receiver/RX unit.
2. In order to get the audio from the microphone into the computer, connect a 3.5mm-to-3.5mm stereo cable from **Line out** jack on the Transmitter/TX unit to the **Line in** jack on the computer.



WARNING:

DO NOT connect the cable from the **Line out** jack on the TX unit to the **Mic In** jack **on the computer**. Doing it will result in audio “clipping” and may cause damage to the sound card.



Note: HDMI audio will always be passed through to the **HDMI out** connector on the Receiver unit. However, if a 3.5mm stereo cable is connected to the **Line in** jack on the Sender unit, the embedded HDMI audio is switched off. This allows the audio signal from **Line in** jack (TX unit) to be received on the **Line out** jack (Receiver/RX unit)

When using a microphone, the audio behavior will differ between unicast and multicast mode:

- **Matrix Mode**

The **Mic- in jack is disabled** in matrix mode. However, if an audio source is connected the Line in jack on a Transmitter/TX unit, the audio signal will be distributed to all Receiver/RX units which are set to the same video channel. Each Receiver/RX unit would have a separate pair of power speakers connected to the Line out jack.

- **Extender Mode**

In extender mode, separate microphone can be connected to each Receiver (RX) unit. The audio signal coming from the microphone will be sent to the Transmitter (TX) unit on the same channel with the Receiver (RX) unit.

➤ **Video Profile**

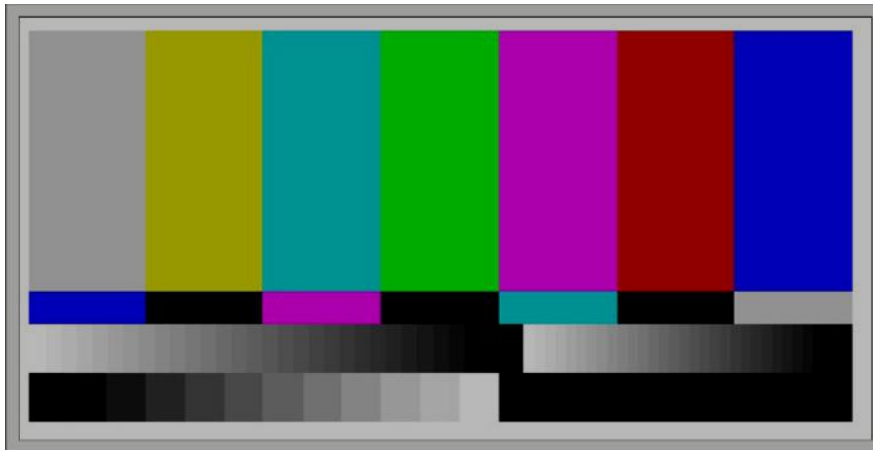
The KH3000 provides two video profiles : **Video** mode and **Graphic** mode

1. In TX or RX, press “Select” button to make “V. Profile” LED blink in order to select Video Profile function
2. Press “SET/RESET” button to set Video Profile to Video/Graphic mode
3. “V. Profile” LED constantly lighting means Video Profile is set to Video mode
4. “V. Profile” LED going out means Video Profile is set to Graphic mode

By default, the units set are in “**Video Mode**”. If the High-Definition signal is a video source, it will be displayed in optimal quality.

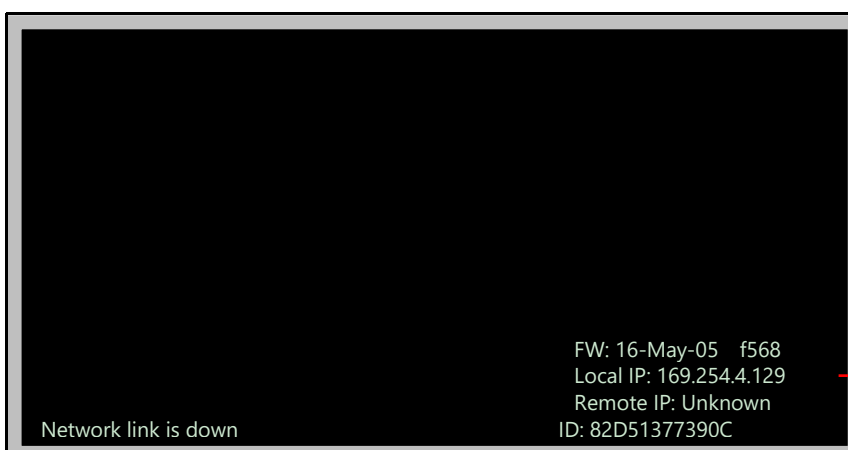


If the High-Definition signal is a Graphic Source (e.g. images, pattern generator, etc.), press the Video Mode on the rear panel of Receiver (RX) until “**Graphic Mode**” is displayed in the foreground on the graphic image. Set HSE-1020-4K to Graphic Mode to maintain the sharpest image possibly.



Matrix Connection Management w/ displaying TX’s source content

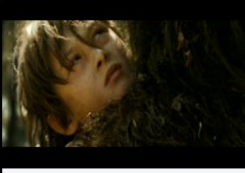

1. Set up a matrix extension network by connecting all TXs and RXs to Gigabit Switch Hub (supporting IGMP, 8K jumbo frame) with Cat. 5 cable
2. Also connect a PC to the same Gigabit Switch Hub with Cat. 5 cable. Set this PC’s IP domain and subnet mask to be 169.254.XXX.XXX and 255.255.0.0 under Internet Protocol Version 4 (TCP/IPv4).
3. Unlink a RX from the network and get this RX’s IP & MAC address shown on the display connected to this RX as follows. Use this RX’s IP address <http://169.254.XXX.XXX/> to access the Web UI (Web Interface Control Software).
4. Re-link the RX to the network.



Selected RX's IP address

5. Make sure and set all TXs and RXs to be in Matrix mode (default setting is Matrix mode)
6. Click “Matrix” Tab in Web UI, and then the matrix connection grid table comes out.
7. In the grid table, click the blank space mapped to the coordinate of TX (horizontal row, named with Channel##) and RX (vertical column, named with Receiver: #) which you would connect.
8. The blank space clicked for a connection will turn to green like the below illustration.
9. Click “Apply” button to set the connection
10. Click “Refresh” button to display the updated status of all TXs and RXs in the matrix extension network
11. Check “Show OSD” function to show the index number of display connected to RX
12. Uncheck “Show OSD” function to remove the index number of display connected to RX
13. In the grid table, there is a hyperlink to each TX’s or RX’s Web UI, which is embedded in “Channel##” (standing for TX in the matrix extension network) or “Receiver: #” (standing for RX in the matrix extension network). Point the mouse cursor to any “Channel##” or “Receiver: #” as well as click the right button of mouse to access the Web UI accordingly.

System
Video Wall
Network
Functions
Matrix

				
	Channel07	Channel51	Channel81	Channel99
Receiver:1				
Receiver:2				
Receiver:3				
Receiver:4				

Refresh
Apply

Show OSD

Hot-Key Video Channel Switch on RX side

Besides push button, IR remote and Web UI, HSE-1020-4K can support using keyboard connected to RX to switch video channel in matrix mode by following the below steps.

1. Press "Scroll Lock" twice, and then key in the channel number to which you would like to switch. The channel of RX is switched accordingly. For instance, press "Scroll Lock" twice, and then key in "99". The channel of RX is switched to channel 99.
2. Please note that the keyboard MUST connect to RX's USB port with keyboard/mouse symbol.
3. Please note K/M over IP function of RX must enable.

Video wall

1. Set up a matrix extension network by connecting all TXs and RXs to Gigabit Switch Hub (supporting IGMP, 8K jumbo frame) with Cat. 5 cable
2. Also connect a PC to the same Gigabit Switch Hub with Cat. 5 cable. Set this PC's IP domain and subnet mask to be 169.254.XXX.XXX and 255.255.0.0.
3. Make sure and set all TXs and RXs to be in Matrix mode (default setting is Matrix mode)
4. Click "Video Wall" Tab in Web UI, and then the video wall control panel comes out.

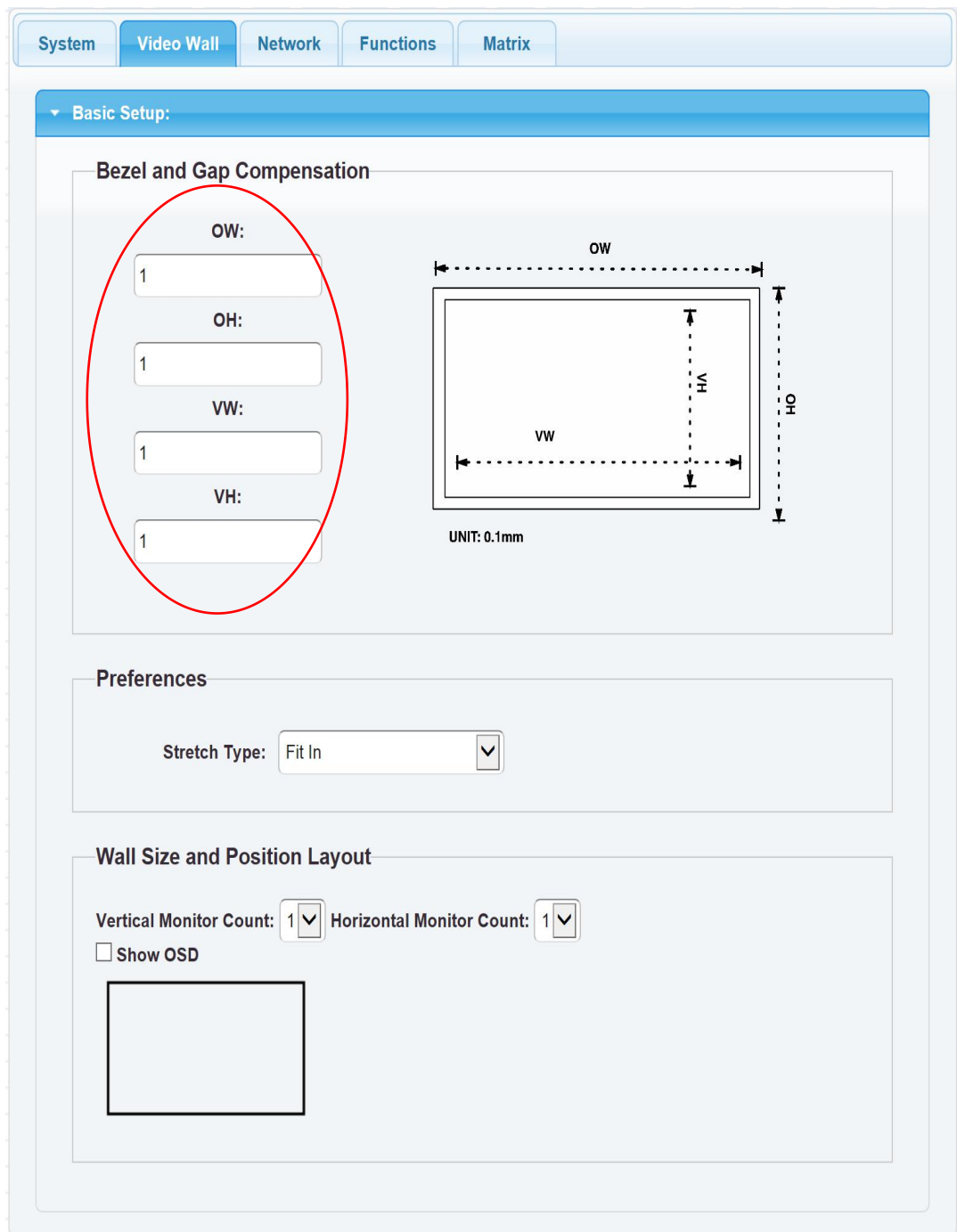
The screenshot shows the 'Video Wall' configuration page in a web browser. The page has a navigation bar with tabs for 'System', 'Video Wall', 'Network', 'Functions', and 'Matrix'. The 'Video Wall' tab is selected. Below the navigation bar is a 'Basic Setup' section with a sub-section 'Bezel and Gap Compensation'. This section contains four input fields for OW, OH, VW, and VH, all with the value '1'. To the right of these fields is a diagram of a monitor with dimensions OW, OH, VW, and VH indicated by dashed lines. Below the diagram is the text 'UNIT: 0.1mm'. Below the 'Bezel and Gap Compensation' section is a 'Preferences' section with a 'Stretch Type' dropdown menu set to 'Fit In'. Below the 'Preferences' section is a 'Wall Size and Position Layout' section with 'Vertical Monitor Count' and 'Horizontal Monitor Count' dropdown menus both set to '1', and a 'Show OSD' checkbox. Below the 'Show OSD' checkbox is a small rectangular diagram representing the video wall layout.

5. The following is the setting procedure.

1. Step 1: Set common values of all devices:

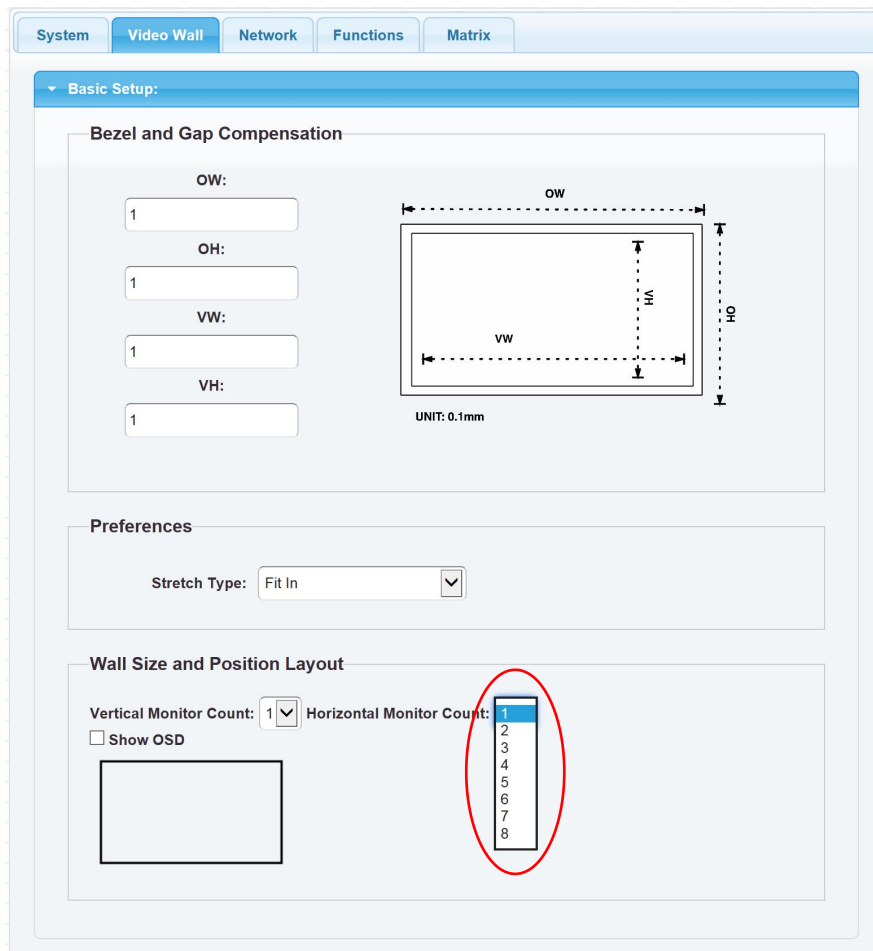
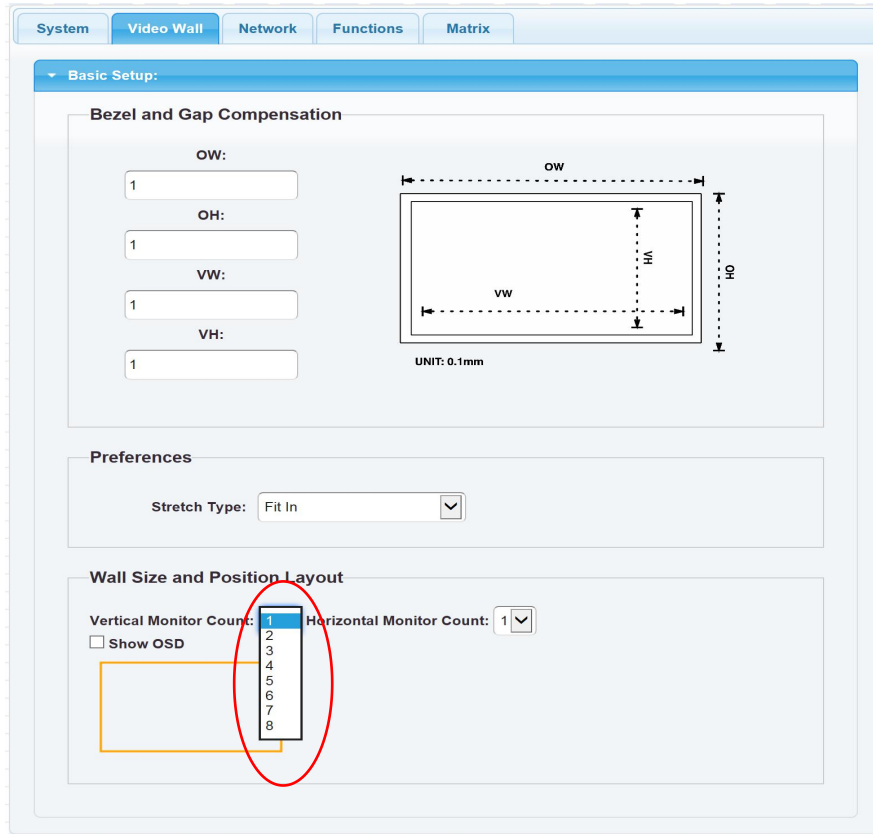
◦ Set Bezel and Gap Compensation:

- i. This step is used to configure the bezel and gap compensation. If user doesn't need this, just set all values to 0.
- ii. Follow the picture and input the size of the monitor used. Note that its unit is 0.1mm and the value MUST be integer.



◦ Set Wall Size:

- i. Set "Vertical Monitor Count" from 1 to 8 based on the real application
- ii. Set "Horizontal Monitor Count" from 1 to 8 based on the real application



2. Step 2: Setup Row and Column Position for Each Display attached to RX

- Check “Show OSD” to show the index number on each RX’s display in order to identify each RX.
- After setting the video wall size, move the mouse cursor to each display diagram, and click the right button of the mouse to assign the RX mapped to the display’s position in video wall.

System Video Wall Network Functions Matrix

Basic Setup:

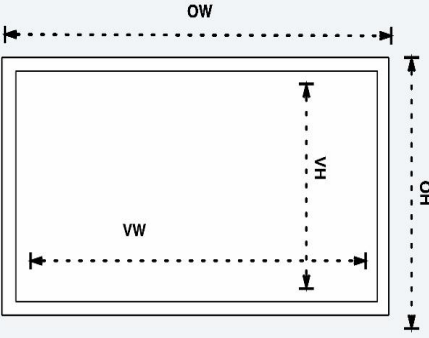
Bezel and Gap Compensation

OW:

OH:

VW:

VH:



UNIT: 0.1mm

Preferences

Stretch Type:

Wall Size and Position Layout

Vertical Monitor Count: Horizontal Monitor Count:

Show OSD

Select Receiver

- Go through all RXs one by one by following the above steps.

System **Video Wall** Network Functions Matrix

Basic Setup:

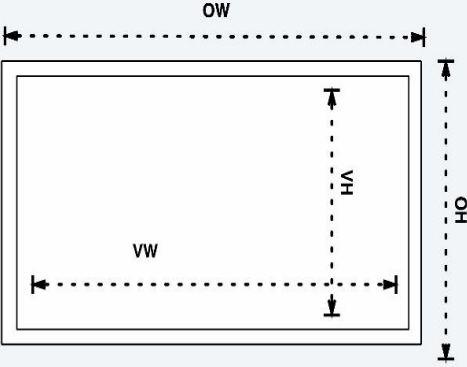
Bezel and Gap Compensation

OW:

OH:

VW:

VH:



UNIT: 0.1mm

Preferences

Stretch Type: ▼

Wall Size and Position Layout

Vertical Monitor Count: ▼ Horizontal Monitor Count: ▼

Show OSD

Select Receiver

- 1:169.254.10.148
- 2:169.254.12.198
- 3:169.254.11.118

- Un-check "Show OSD" when completed.

3. Basic Video Wall setup is completed

Output Extended Image Scale Up/Down

On the RX site, the output image can be scaled up to 4K/2K and scaled down to 1080p.

System Video Wall Network **Functions** Matrix

Video over IP

Enable Video over IP

Enable Video Wall

Automatically Copy EDID from this Receiver Video Output

Scaler Output Mode: Pass-Through
Full HD 1080p60
Full HD 1080p50
Ultra HD 2160p30
Ultra HD 2160p25
Customize

Timeout for Detecting ▼

Turn off screen on video lost

Apply

Video Orientation: Standard 90° 180° 270°

USB over IP

Enable USB over IP

Compatibility Mode:

K/M over IP (Uncheck when mouse/keyboard/touch panel not working as expected)

Apply

Serial over IP

Enable Serial over IP

Baudrate Setting:

Baudrate: 115200 ▼

Data bits: 8 ▼

Parity: None ▼

Stop bits: 1 ▼

Apply

Frozen Image Delay Setting for Source Content Lost

When the TX's source content lost, the RX's video output will be frozen in the last image for a time period from 3 sec to 60 sec.

The screenshot displays a configuration window with three tabs: System, Video Wall, Network, Functions (selected), and Matrix. The 'Video over IP' section includes the following settings:

- Enable Video over IP
- Enable Video Wall
- Automatically Copy EDID from this Receiver Video Output
- Scaler Output Mode: Pass-Through
- Timeout for Detecting Video Lost: 3 seconds (dropdown menu is open, showing options: 3 seconds, 5 seconds, 10 seconds, 20 seconds, 30 seconds, 60 seconds, Never Timeout)
- Turn off screen on video lost
- Video Orientation: Standard, 90°, 180°, 270°

The 'USB over IP' section includes:

- Enable USB over IP
- Compatibility Mode:
 - K/M over IP (Uncheck when mouse/keyboard/touch panel not working as expected)

The 'Serial over IP' section includes:

- Enable Serial over IP
- Baudrate Setting:
 - Baudrate: 115200
 - Data bits: 8
 - Parity: None
 - Stop bits: 1

Each section has an 'Apply' button.

Output Extended Image Rotation

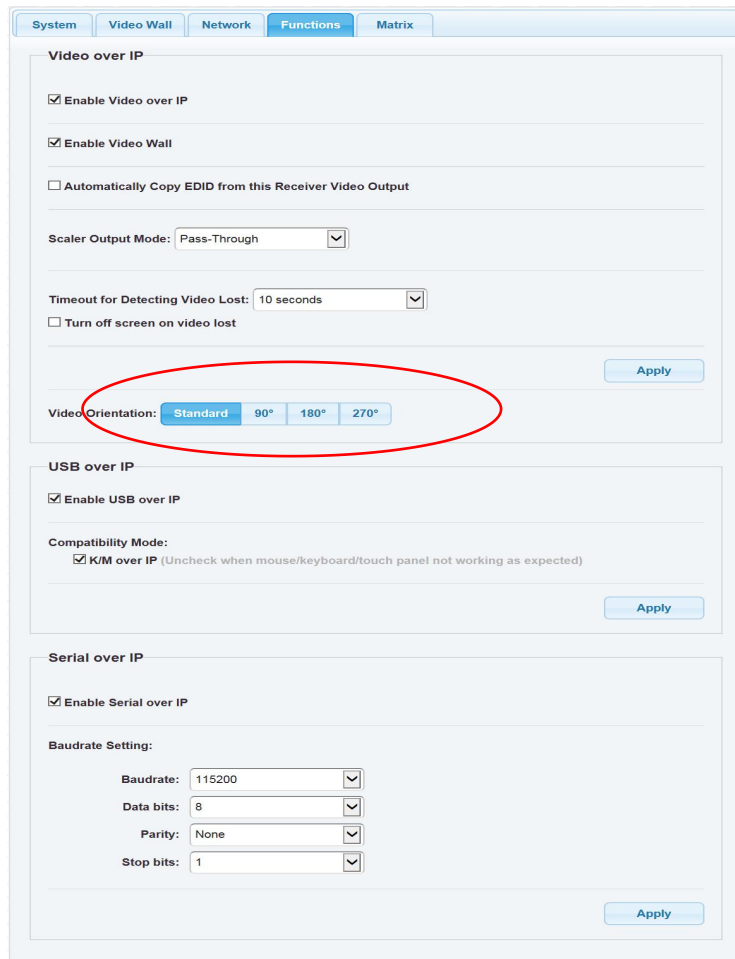
The output image of the individual RX can rotate by 90°, 180° and 270°.

- Access the Web UI of the RX whose output image needs to rotate, and then click the tab “Functions”.
- Unlink a RX from the network and get this RX’s IP & MAC address shown on the display connected to this RX as follows. Use this RX’s IP address <http://169.254.XXX.XXX/> to access the Web UI (Web Interface Control Software).
- Re-link the RX to the network.



Selected RX's IP address

- Select the rotation angle between 90°, 180° and 270°.



Appendix A. Fiber modules and cables

1000Mbps SFP Fiber transceiver is used for high-speed connection expansion.

1000Mbps LC, Multi-Mode, SFP Fiber transceiver

1000Mbps LC, Single-Mode 10km, SFP Fiber transceiver



Disclaimer

Information in this document is subject to change without notice. The manufacturer does not make any representations or warranties (implied or otherwise) regarding the accuracy and completeness of this document and shall in no event be liable for any loss of profit or any other commercial damage, including but not limited to special, incidental, consequential, or other damages.

No part of this document may be reproduced or transmitted in any form by any means, electronic or mechanical, including photocopying, recording or information recording and retrieval systems without the express written permission of the manufacturer.

All brand names and product names used in this document are trademarks, or registered trademarks of their respective holders.

FCC Statement

This device generates and uses radio frequency and may cause interference to radio and television reception if not installed and used properly. This has been tested and found to comply with the limits of a Class B computing device in accordance with the specifications in Part 15 of the FCC Rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by plugging the device in and out, the user can try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the device and receiver.
- Connect the computer into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CE / FCC

