PARTILINK

User manual

P4K-HUL4E1 4K UHD HDMI & USB Over IP Extender
P4K-HUL4E1-P 4K UDH HDMI & USB Over IP Extender with PoE

P4K-HRSUL4E1 / P4K- LHRSU1E4
P4K-HRSUL4E1-P/ P4K-LHRSU1E4-P

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1. INTRODUCTION

The 4K HDMI & USB over IP Extender is a solution for audio, video and USB signal extension via Local Area Network (LAN). It can be used as audio, video and KVM extender over IP and applied to point to point, point to multi-point, multi-point to multi-point and screen wall broadcast system controlled by USB, RS-232, IR and configured the 4K HDMI & USB over IP Extender by web browser. An easy installation system built up with Giga Ethernet switch which has IGMP function and CATx cable for extension or broadcast. The P4K-HUL4E1-P supports PoE (Power over Ethernet) function.

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2. FEATURES & APPLICATIONS

- 4K HDMI over IP extension
- USB 2.0 over IP extension
- RS-232 bi-directional extension
- 4-bit DIP switch for 16 stream channel selection
- HDCP 1.4 compliant and Blu-Ray ready
- Support two-way IR extension
- Output video rotation
- Output video partial enlargement
- Automatic EDID configuration
- Networking environment under Giga Ethernet switch and CATx cable
- Point to point extension, unicast, multicast and screen wall system.
- Point to point extension via CAT5e cable without Ethernet switch up to 100M
- Ethernet webpage management
- RS-232 Serial control command management
- P4K-HUL4E1-P supports Power over Ethernet

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3. SPECIFICATION

P4K-HUL4E1 P4K-HUL4E1-P 4K UHD HDMI Over IP Extender	P4K-HRSUL4E1 P4K-HRSUL4E1-P Transmitter	P4K- LHRSU1E4 P4K-LHRSU1E4-P Receiver
VIDEO INPUT	HDMI Type-A female connector	None
VIDEO OUTPUT	HDMI Type-A female connector for loop through VGA DB-15 female local output	HDMI Type-A female connector
IR	2x 3.5mm phone jack for IR emitter and receiver to control video source device	
COMPRESSION	Visual lossless compression	
HDMI INPUT RESOLUTION	3840x2160 30/24, 1080p 60/50, 1080p 30/25, 1080i 60/50 720p 60/50, 480i 60/50, 480p 60/50	
HDMI OUTPUT RESOLUTION	3840x2160 30/24, 1080p 30/25, 1080i 60/50,720p 60/50 480i 60/50, 480p 60/50	
VGA OUTPUT RESOLUTION	1080p 30/25, 1080i 60/50, 720p 60/50 480i 60/50, 480p 60/50	
AUDIO FORMAT	Stereo 192Kbps	
IP PROTOCOL	TCP, UDP, RTSP, RTP, DHCP, IGMP, Multicast, IPV4	
LAN PORT	RJ45 connector for Giga Ethernet	
SERIAL	DB-9 male connector for RS-232 extension	
MANAGEMENT	LAN port	None
	Embedded webpage management	HDMI Type-A female connector
POWER INPUT	2.0mm power jack for DC12V/2A input	
OPERATING TEMPERATURE	0~55℃	
OPERATING HUMIDITY	5%~90% RH	
POWER SUPPLY	Power adapter AC in 100~240V (50~60Hz)	
ESD	ESD protection air gap discharge ±8KV, contact discharged ±4KV	
DIMENSION	194 x 114 x 28 mm	
WEIGHT	TX 620g, RX 610g	

** Product specifications are subject to change without notice.

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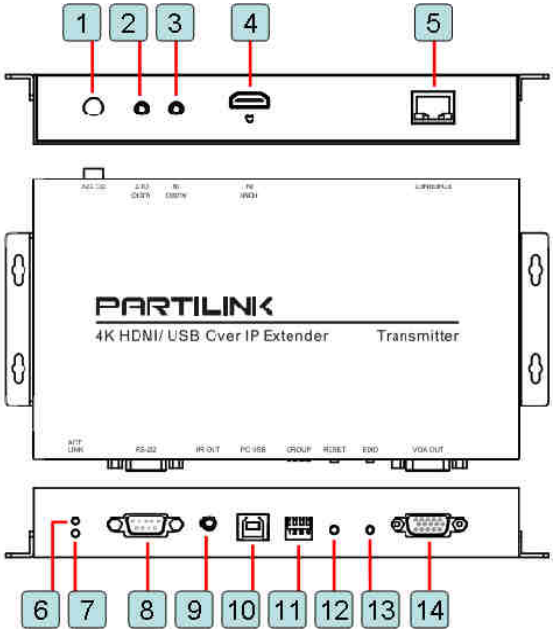
4. HARDWARE DESCRIPTION

4.1 Transmitter
P4K-HUL4E1/ 4K-HUL4E1-P (TX)



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1. 12 VDC power supply with locking for 4K HDMI & USB over IP Extender.
2. RCA connector for stereo audio output.
3. RCA connector for stereo audio input.
4. HDMI video input connector
5. 10/100/1000 Mbps self-adaptive Ethernet interface.
6. ACT LED indicator turns green when 4K HDMI & USB over IP Extender is powered up.
7. LINK LED indicator flickers green when network connection is waiting for video source, turns green when network connection and video source is functioning properly
8. DB9 connector for RS-232 remote extension
9. Connect IR extension cable to IR port and position the emitters near the devices you want to control
10. PC USB port for remote additional device such as USB mouse, USB keyboard and USB pen drive connecting to PC
11. Group configuration, 4-bit DIP switch to set up the group ID
12. Restart the 4K HDMI & USB over IP extension by pressing RESET button

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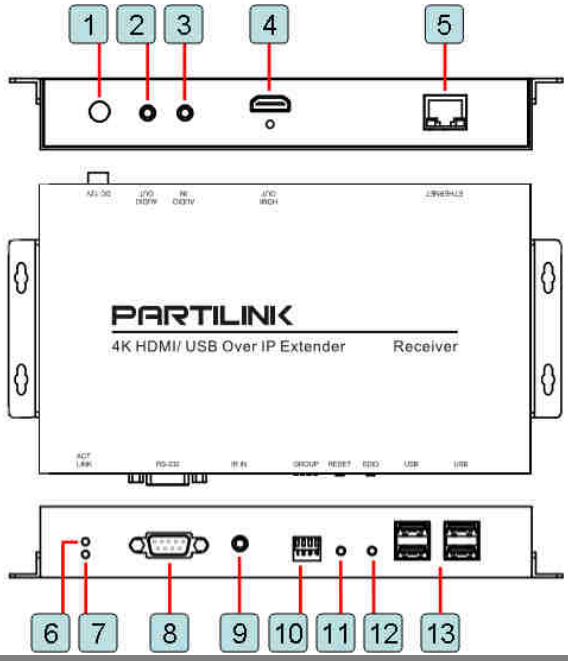
13. Press EDID button for manual EDID copy function
14. DB9 connector for VGA local display

4.2 Receiver
P4K-LHRSU1E4/ P4K-LHRSU1E4-P (RX)



1. 12 VDC power supply with locking for 4K HDMI & USB over IP Extender.
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7. LINK LED indicator flickers green when network connection is waiting for video source, turns green when network connection and video source is functioning properly
8. DB9 connector for RS-232 remote extension
9. Connect IR extension cable to IR port and position the emitters near the devices you want to control
10. Group configuration, 4-bit DIP switch to set up the group ID
11. Restart the 4K HDMI & USB over IP extension by pressing RESET button
12. Press EDID button for manual EDID copy function
13. 4 USB ports for additional USB devices such as USB mouse, USB keyboard and USB pen drive.

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Group Setting via 4-bit DIP switch

TX

RX

Setting the Transmitter and Receiver group ID via the 4-bit DIP switch. The correspondent receivers are required to switch to the same ID as the receiver. It can set up maximum 16 Group IDs. Reboot the system to apply the group setting.

5. INSTALLATION

5.1 Device Connection

1. Check the power supply is unplugged.
2. Set up the group of the transmitter with the correspondent receiver for signal extension and display.
3. Connect the Transmitter to video source with HDMI cable, and connect Receiver to a monitor or display with HDMI cable.
4. Connect the USB cables from Transmitter to PC, and connect the USB additional devices such as USB mouse, USB keyboard and USB pen drive to

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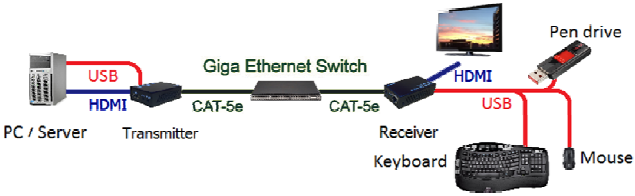
Receiver.

5. Connect Transmitter and Receiver to the Ethernet switch with network cable.
6. Power on the Transmitter, Receiver and all the connected devices.
7. Power on and activate all the connected devices.
8. Connect the IR extension cable with Transmitter and the IR receiver cable with Receiver for remote control.



◆ Configuration

P4K-HRSUL4E1 Transmitter

P4K- LHRSU1E4 Receiver

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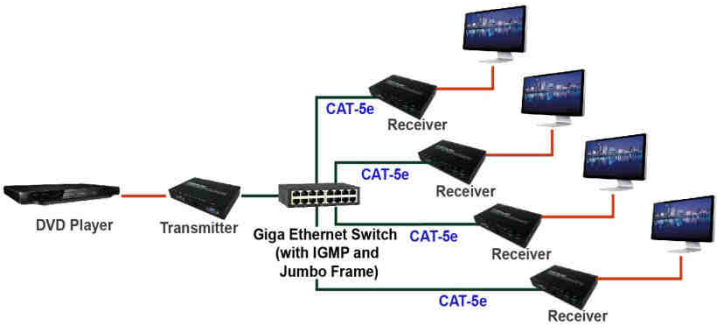
◆ Application Pattern

■ Unicast

■ Multicast

a. Video Distribution



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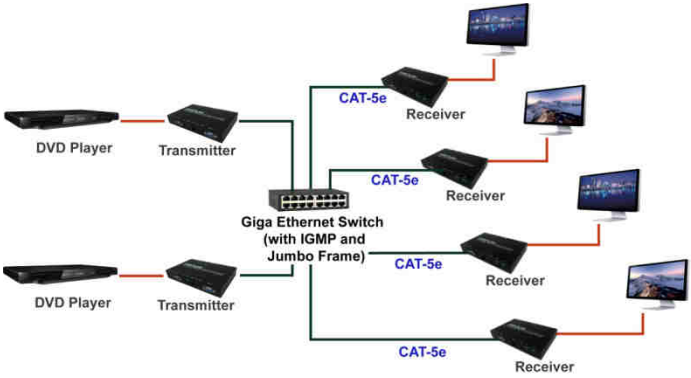
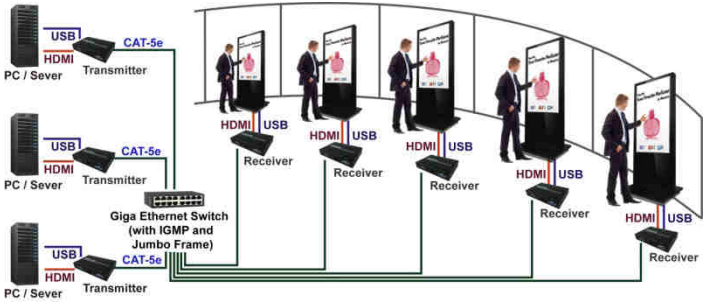
b. Matrix Distribution



c. Billboard & Kiosk, PC to HDMI and USB Interactive Monitor



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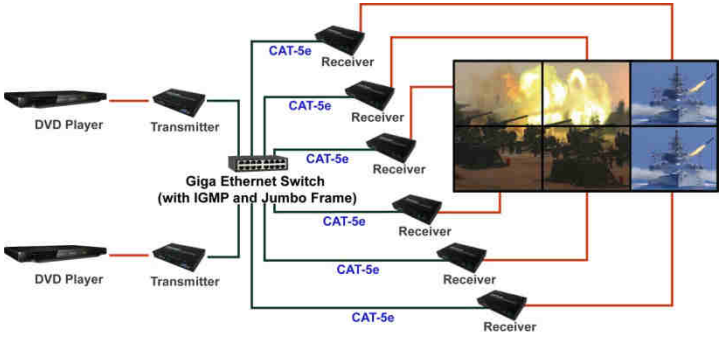
■ Screen Wall



5.2 IP Configuration

The 4K HDMI & USB Over IP Extender can configure via LAN in the same subnet.

1. Assign a LAN IP address to the computer in the same subnet. The IP address default of the Transmitter and Receiver is B class Networking: 169.254.xxx.xxx.

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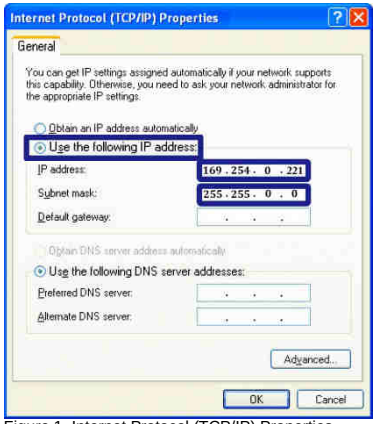

Figure 1. Internet Protocol (TCP/IP) Properties

2. Connect all devices with proper cables except video source, please refer to Figure 2

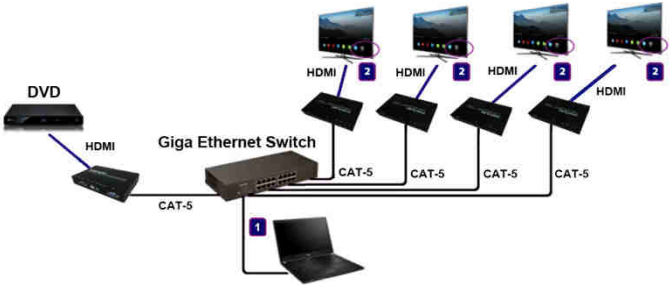

Figure 2. Demonstrate the 4K HDMI & USB Over IP Extender

3. After activation, the device information including the Transmitter and Receiver IP address will be shown in the lower right corner. Remember the Transmitter and Receiver IP address on monitor screen and then plug HDMI video source cable into Transmitter.

Figure 3. Device IP Indication

4. The administrator can input Transmitter or Receiver IP address into address bar of web browser to enter the Extender Web UI. If link success, administrator will see the Web UI as shown in Figure 4.

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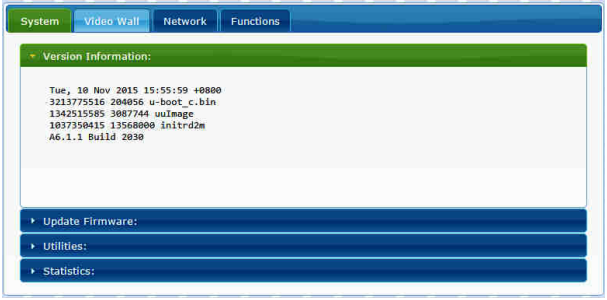

Figure4. Web User Interface

6. WEB USER INTERFACE CONFIGURATION

6.1 System

The relevant information of the connected extender and setting

6.1.1 [Version Information]

Indicating the firmware version and relevant information of the devices

Figure 5. Version Information of the Extender

6.1.2 [Update Firmware]

To update the firmware of the connected extender, please click on the [Select File] to select the firmware and click on [Upload] to upload the firmware and update accordingly.

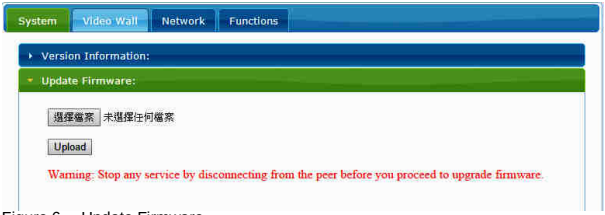

Figure 6. Update Firmware

- **Transmitter Firmware Update**: please select

[webfw.bin] to update

- **Receiver Firmware Update**: please select [webfwc.bin] to update

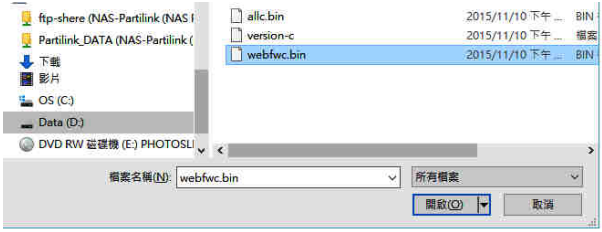

Figure 7. Select File to Update Firmware

It takes time to update the firmware. During the process of update, the Web user interface shows the status as below diagram. The extender system will reboot automatically after updating firmware. If it doesn't reboot automatically, please reboot to apply the new firmware manually.

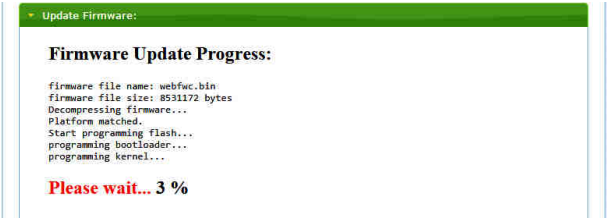

Figure 8. Firmware Update Progress

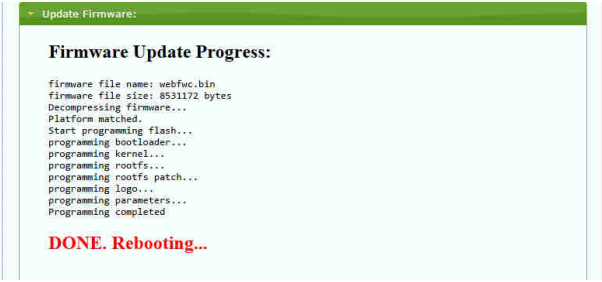

Figure 9. Firmware Upgrade Complete and Reboot

6.1.3 [Utilities]

There are some functions

- **Factory Default**:

  Click on to return to the factory default when necessary

- **Reboot**:

  Click on to reboot the extender system

- **Console API Command:**

  Input Linux command for advanced setting

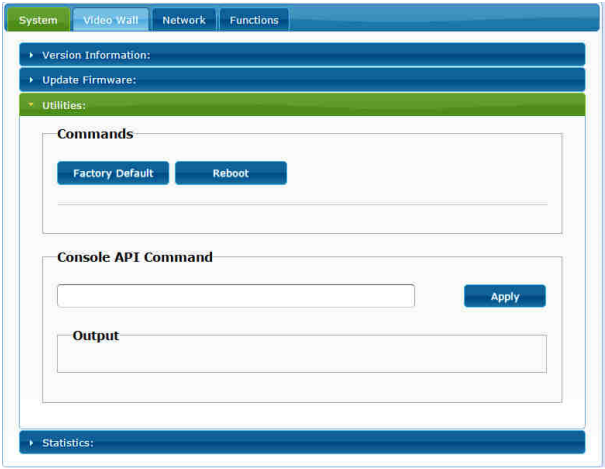

Figure 10. Utilities

6.1.4 [Statistics]

Indicating the extender linking and working status

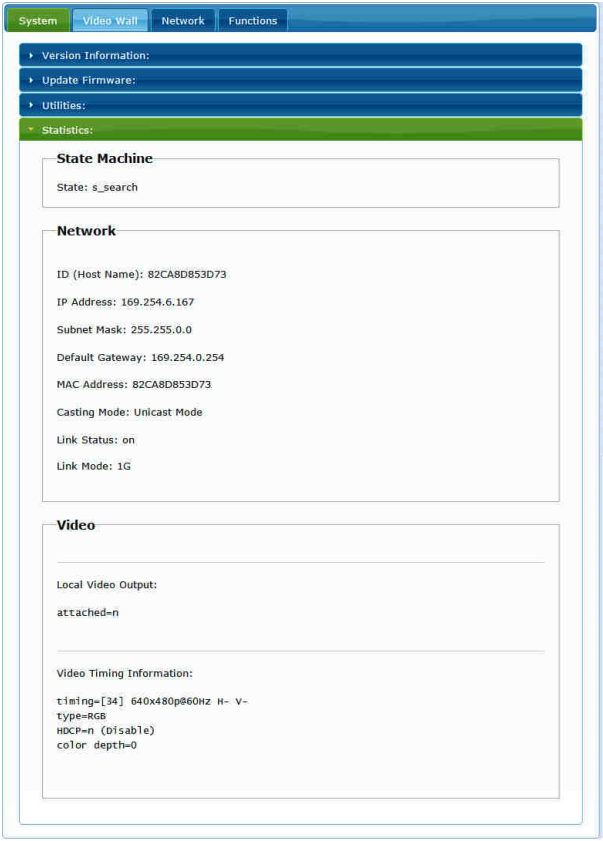

Figure 11. Statistics of Linking and Working Status

6.2 Video Wall

To set up the video wall application

6.2.1 [Basic Setup]

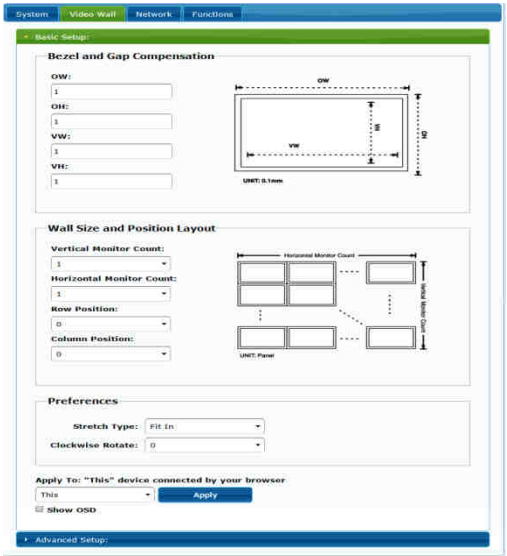

Figure 12. Basic Setup page

Bezel and Gap Compensation:

Dimension of the screen (inside and outside width and height)

OW: outside width
OH: outside height
VW: viewable width
VH: viewable height

Please NOTE:

1) The viewable width must be less than the outside width, and the viewable height must be less than the outside height.
2) If administrator doesn't need this, just set all values to 0.
3) The unit is 0.1mm and the value MUST be integer.

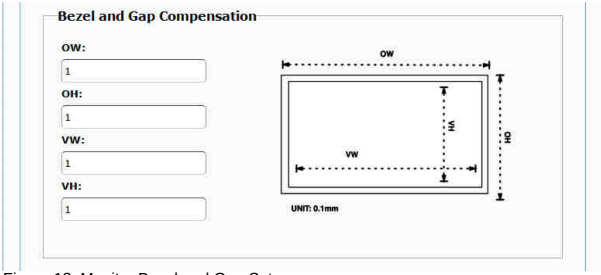

Figure 13. Monitor Bezel and Gap Setup

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- **Wall Size and Position Layout**:
  Select number of vertical and/ or horizontal monitors, row position and column position. Vertical monitor number 1~8, horizontal monitor number 1~16

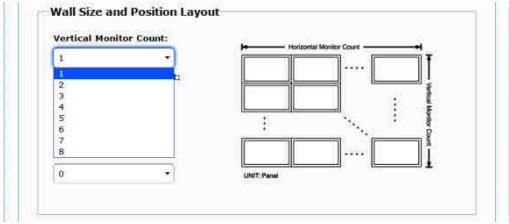

Figure 14. Vertical Monitor Number Setup

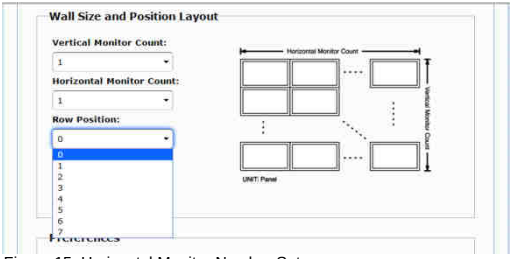

Figure 15. Horizontal Monitor Number Setup

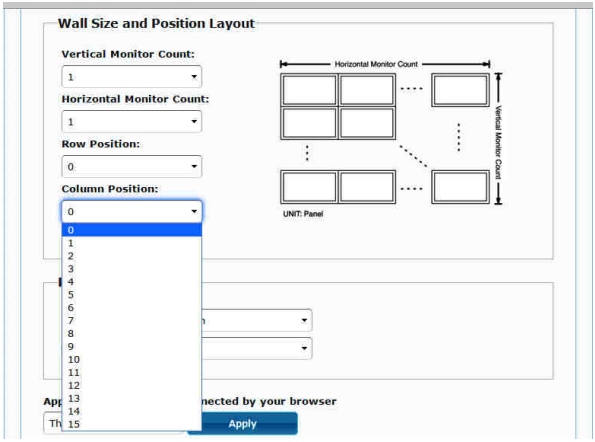

Figure 16. Column Position Setup

- **Preferences**:

  Select the video fit in the screen or stretch out and the rotate angle

Figure 17. Video Stretch or Fit Screen Setup

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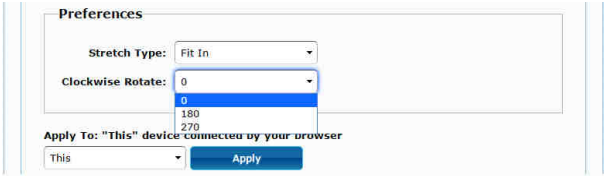

Figure 18. Video Rotation Angle Setup

- **Apply To:**

  1) All: Configure all Transmitter and Receiver in the same Group IP.
  2) This (Local): The IP you input into address bar of web browser.
  3) Hosts or Clients: select which Transmitter or Receiver you want to configure.

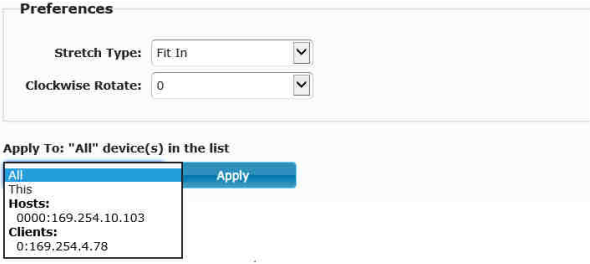

Figure 19. Monitor Setting Application

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- **Show OSD:**

  Check this box to output each receiver's specific number to the connected monitor

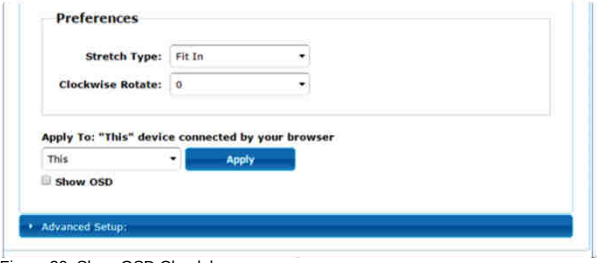

Figure 20. Show OSD Check box

6.2.2 [Advance Setup]

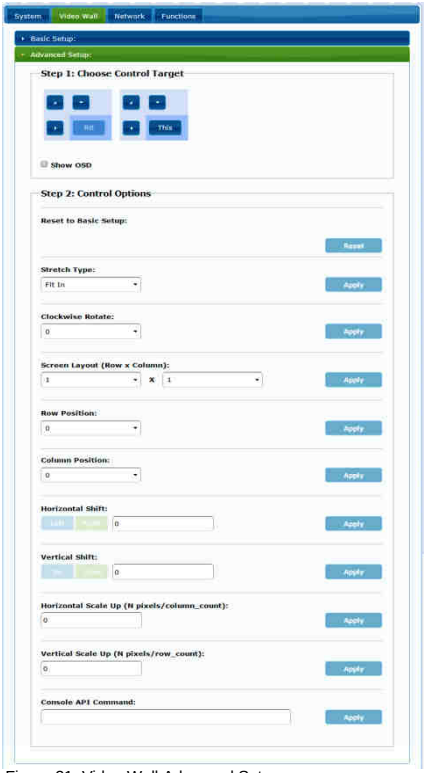

Figure 21. Video Wall Advanced Setup

Before entering “Advanced Setup”, please complete the “Basic Setup” as follows:

Step1: In “Basic Setup”, select Vertical and Horizontal Monitor Count. For example, Vertical Monitor Count = 3, Horizontal Monitor Count = 5

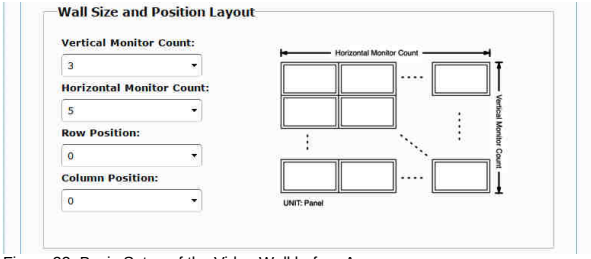

Figure 22. Basic Setup of the Video Wall before Access

Sept2: In “Advanced Setup”, choose the target of the video wall to control

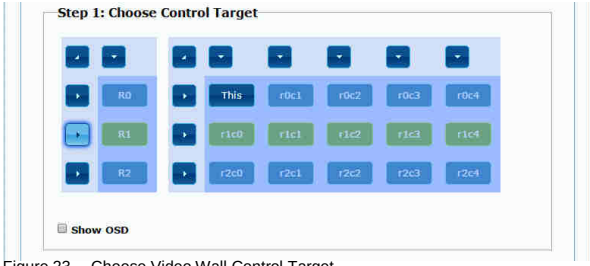

Figure 23. Choose Video Wall Control Target

If user make incorrect operations, press “Reset” in Reset to Basic Setup function.

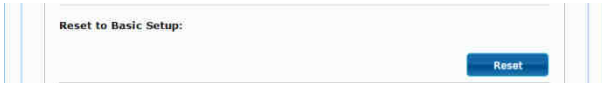

Figure 24. Reset to Basic Setup

Setup the video output to “Fit In’ or “Stretch Out” mode in the screen

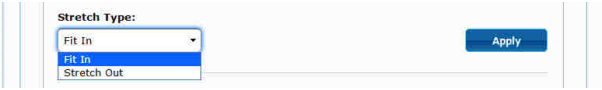

Figure 25. Video Stretch Type

Setup the rotation angle of the video output

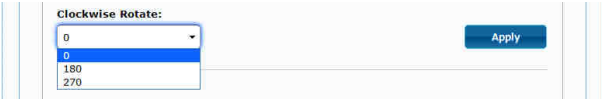

Figure 26. Clockwise Rotate

Set up the number of vertical and horizontal monitor based on the video wall layout. Vertical number 1~8 and horizontal number 1~16.

Setup the row postion of monitor, number from 0 to the total number of vertical monitor.

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Figure 27. Setup the Vertical and Horizontal Number of Monitor

Setup the column position of monitor, number from 0 to the total number of horizontal monitor.

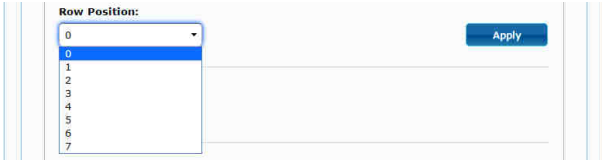

Figure 28. Seup the Row Position of the Monitor

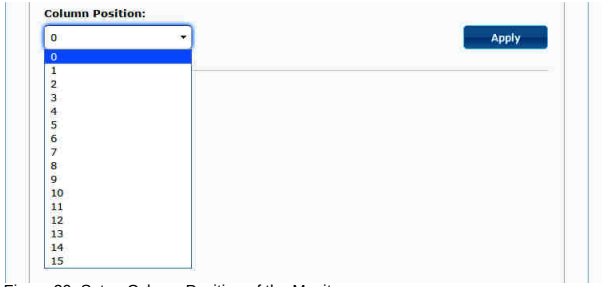

Figure 29. Setup Column Position of the Monitor

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Setup the video position shift and video enlarge.

- **Horizontal Shift:** Setup the video horizontal shift, Left or Right
- **Vertical Shift**: Setup the video vertical shift, Up or Down
- **Horizontal Scale Up**: Setup the video horizontal scale up.
- **Vertical Shift Scale Up**: Setup the video vertical scale up.

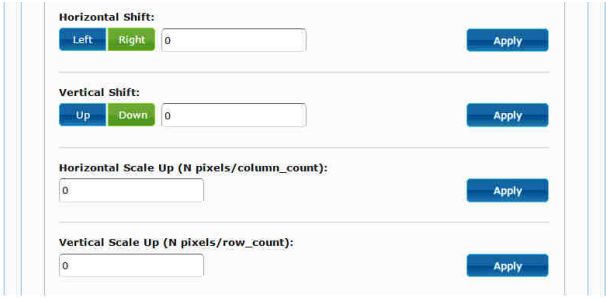

Figure 30. Output Video Adjustment

- **Consol API Command**: Input Linux command to do advanced setup.

Figure 31. Consol API Command Input

6.3 Network: **Update the network setup of the extender system**

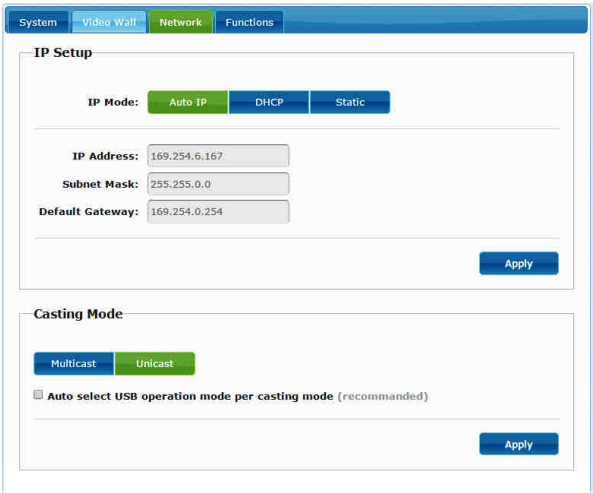

Figure 32. Network Setup

6.3.1 [IP Setup]

- **Auto IP**: use automatically Extender assign IP system for example: 169.254.xxx.xxx

Figure 33. Auto IP Setup

- **DHCP**: use the DHCP of the external device such as the IP sharer to assign IP

Figure 34. DHCP

- **Static**: use the static IP to assign manually

Figure 35. Assign Static IP

6.3.2 [Casting Mode]

Select the broadcast mode of the extender application

- **Multicast:** point to multiple points or multiple point to multiple points broadcast
- **Unicast:** point to point broadcast

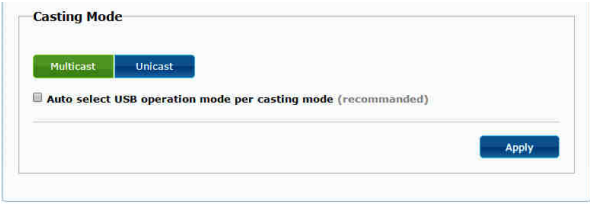

Figure 36. The Casting Mode Setup

6.4 Functions:

Setup the video output and USB extension mode

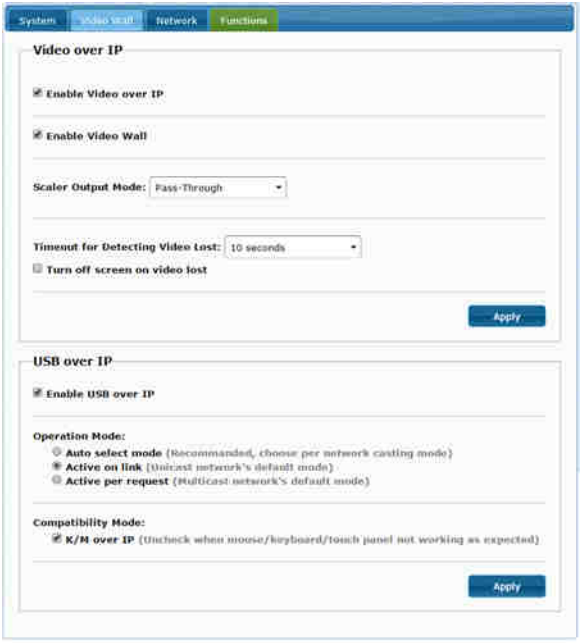

Figure 37. Video and USB over IP Functions

6.4.1 [Video over IP]: Setup the video output mode

- **Enable Video over IP:** Check to enable video extension over IP
- **Enable Video Wall:** Check to enable the video extension for building up video wall
- **Enable EDID Copy:** This function is limited to copy one of the receivers.
- **Scaler Output Mode:**

  Select the required scalar output mode or select "customize" and input 8 Hex values for more video output resolution and refresh rate selections.

  1) 80000004: HD 720p60
  2) 81000061: WXGA 1366x768@60
  3) 81000040: WXGA+ 1440x900@60
  4) 81000051: WUXGA 1920x1200@60
  5) 8100003C: SXGA+ 1400x1050@60

- **Timeout for Detecting Video Lost:** Setup the time of stop the video storage when detecting video lost to transmit

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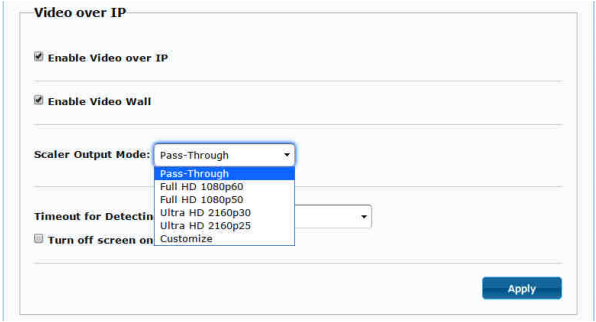

Figure 38. Video over IP Setup

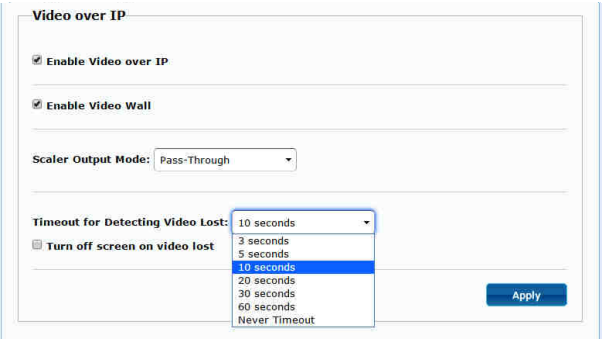

Figure 39. Customize Scaler Output Mode

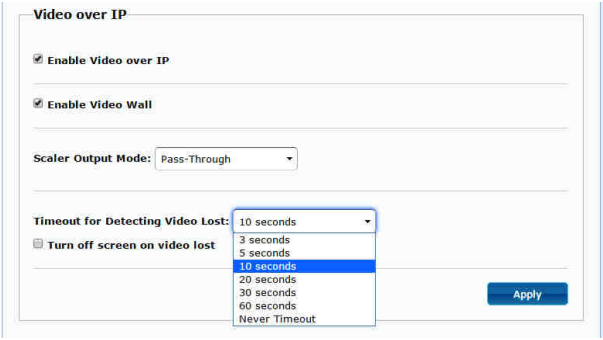

Figure 40. Timeout for Detecting Video Lost

6.4.2 [USB over IP]: **Setup the USB extension mode**

- **Enable USB over IP:** Check to enable USB extension mode over IP
- **Operation Mode:** Including “auto select mode”, “active on line” and “active per request” modes for option.
- **Compatibility Mode:** Check to enable USB keyboard, USB mouse transmission mode.

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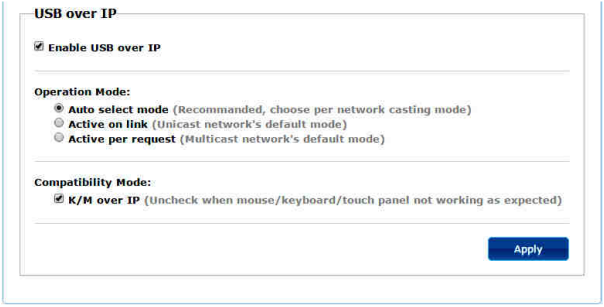

Figure 41. USB over IP Functions

6.4.3 [Serial over IP]: **set up the serial extension mode**

- Select Type 2 as operation mode
- Set up the baud rate for Type 2.

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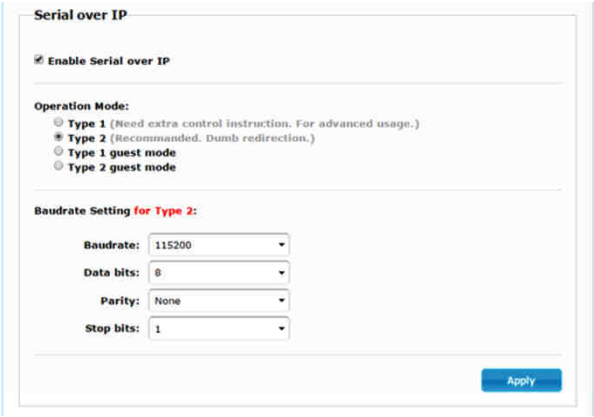

Figure 42. Serial over IP

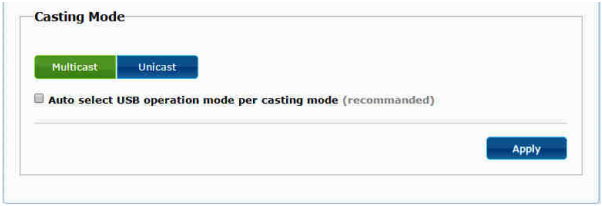

Figure 43. Broadcast Mode Setting

7. BROADCAST CONFIGURATION SETTING

There are some examples to show the setup for unicast, multicast, matrix and video wall.
Broadcast setting including unicast and multicast

7.1 Multicast :

To enable the USB interactive devices controlled by turns, please check “Auto select USB operation mode per casting mode”

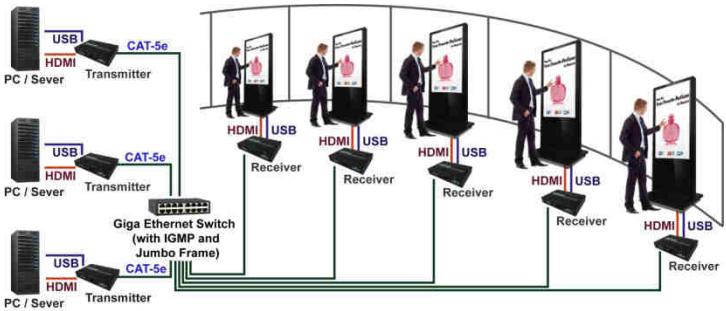

Figure 44. USB Interaction Application

7.2 Unicast:

Figure 45. Unicast Application

7.3 Matrix:

Install multiple transmitters and setting ID of these transmitters individually, edit the group of transmitters and receivers. The correspondent receivers will output the video from the transmitter belonged to the same group ID.

Figure 46. Transmitter and Receiver Unit Grouping

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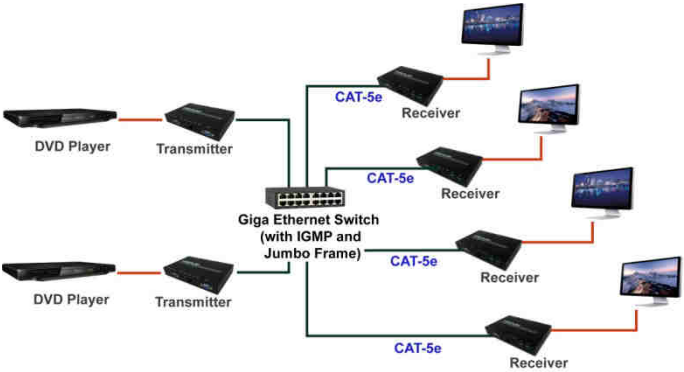

Figure 47. Multicast Application

7.4 Video Wall:

A 3x5 (row x column) video wall setting example here for reference. In multicast and matrix application mode, access the Web user interface of correspondent receiver to setup

7.4.1 [Basic Setup]

Please refer to “Section 6.2.1 Basic setup” and follow the steps as below.

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Step1: Set up the vertical monitor count to “3”

Step2: Set up the horizontal monitor count to “5”

Step3: Set up the row position of the monitor to 0

Step4: Set up the column position to 0

Step5: Apply the setting to the extender system

Administrator can complete each Extender position setting after following 5 steps in above. And then follow the above steps to set the other Extenders to the rest of row and column positions from 0x1, 0x2, 0x3 to 3x5.

After the basic setup of the video wall, please access the advanced setup to proceed other detailed setting of the video output

7.4.2 Advanced Setup

Select the monitor you want to control. The one you select will show “This” in green in video wall matrix layout. Take below diagram for example, the monitor we select to control here is the

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monitor in the upper left corner.

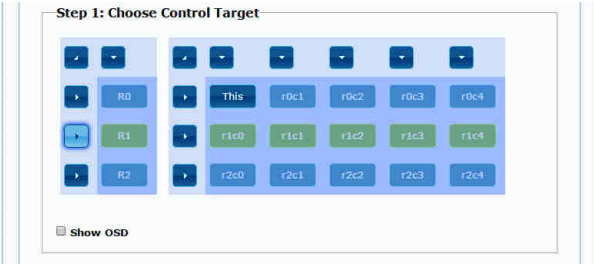

Figure 53. Example for the Video Wall Control

Here's the diagram of the actual video wall layout showing the selected monitor in the upper left corner with green outline.

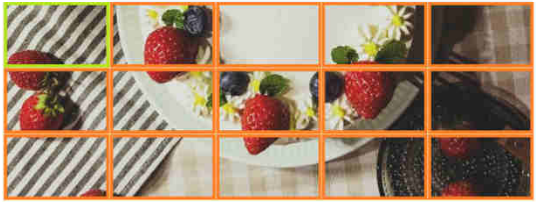

Figure 54. Example for the Video Wall Control

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Return to the previous setup of video wall quickly when incorrect operation was input.

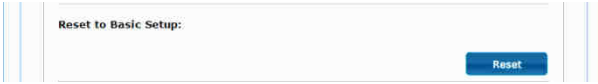

Figure 55. Reset

Adjust the horizontal position of the video output, “Left/ Right Shift”, the selected monitor to adjust is shown with green outline.

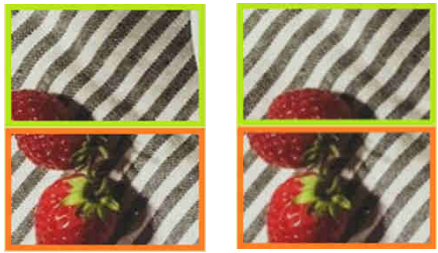

Figure 56. Example for Adjust the Monitor of Video Wall

Adjust the vertical position of the video output, “Up/ Down Shift”, the selected monitor to adjust is shown with green outline.

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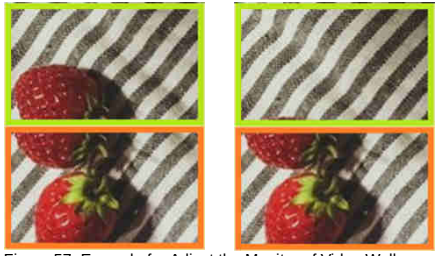

Figure 57. Example for Adjust the Monitor of Video Wall

Horizontal Scale Up: To scale up the video output horizontally as the monitor shown with green outline

Figure 58. Example for Adjust the Monitor of Video Wall

Vertical Scale Up: To scale up the video output vertically as the monitor shown with green outline

Figure 59. Example for Adjust the Monitor of Video Wall

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8. PACKAGE CONTENTS

1. P4K-HRSUL4E1 / P4K-HRSUL4E1-P HDMI & USB extender over IP transmitter (1)
2. P4K-LHRSU1E4 / P4K-LHRSU1E4-P HDMI & USB extender over IP receiver (1)
3. DC12V 2A power adapter, one comes with the transmitter P4K-HRSUL4E1 (1) and one comes with receiver P4K-LHRSU1E4 (1). Please NOTE: The standard package of PoE model doesn't include power adapter.
4. IR receiver cable comes with receiver (1)
5. IR emitter cable comes with transmitter (1)
6. User manual (1)
7. Rear bracket (2)

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