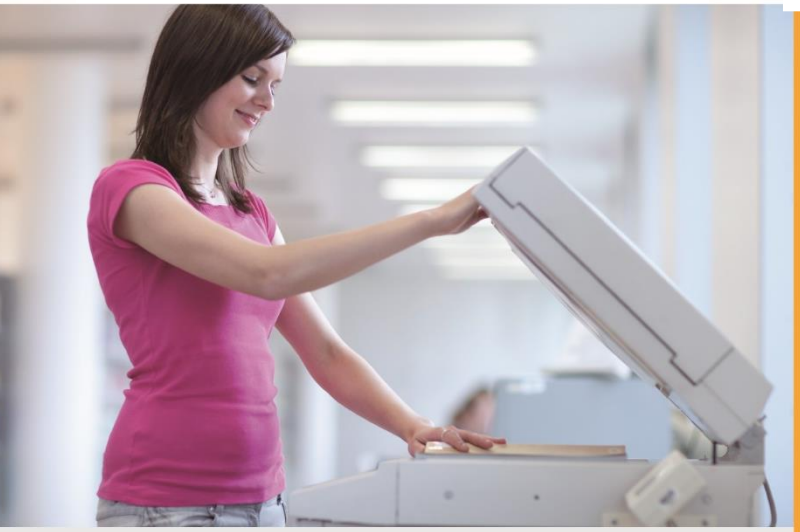
PLANET
Networking & Communication

User's Manual

Video Wall 4K/60 HDMI & USB over IP Transmitter/Receiver with PoE

► IHD-420PT / IHD-420PR



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This Equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment 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 mark Warning

This device is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

WEEE

To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

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Revision

User's Manual of PLANET Video Wall 4K/60 HDMI & USB over IP Transmitter/Receiver with PoE
Model: IHD-420PT / IHD-420PR
Rev.: 1.0 (November, 2024)
Part No. EM-IHD-420 Series_v1.0

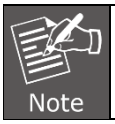
Table of Contents

Chapter 1. Product Introduction

1.1 Package Contents

The package should contain the following:

- Media Extender x 1
- Quick Installation Guide Sheet x 1
- IR Blaster/Receiver Cable x 1
- Screws x 2



If any of the above items are missing, please contact your dealer immediately.

1.2 Overview

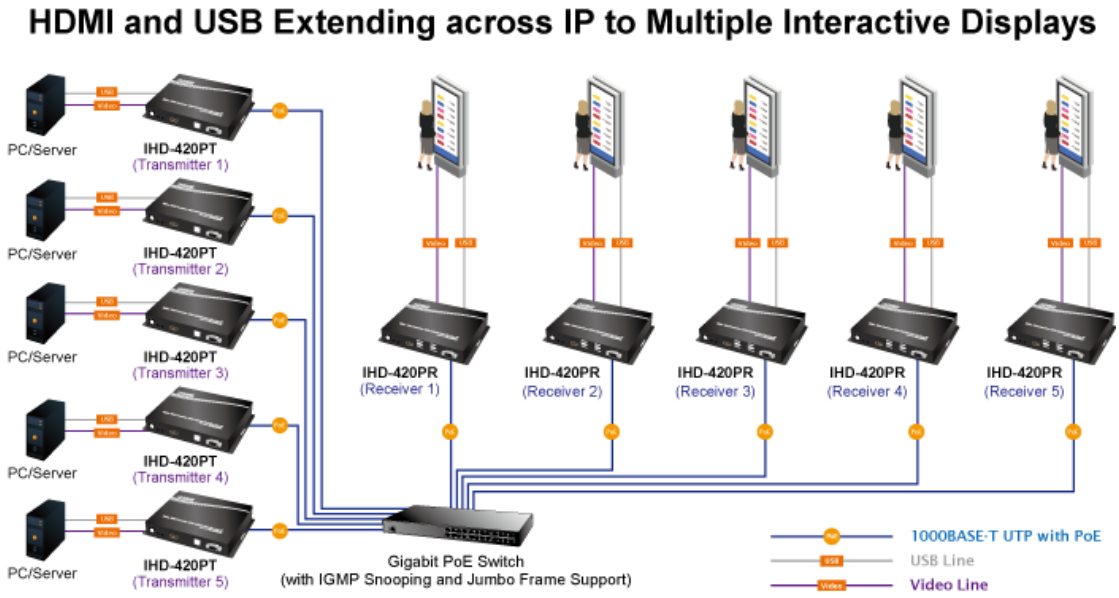
Ultra High-quality 4K/60 HDMI Video Wall

PLANET IHD-420 HDMI/USB Extender Video Wall over IP with PoE delivers a great 4K video distribution solution with refreshing **60 frames per second** for an efficient and effective advertising deployment. The IHD-420 series is the combination of the transmitter, IHD-420PT, and the receiver, IHD-420PR. They can be used as an audio, video and IR extender over IP, and applied to point to point, point to multi-point, multi-point to multi-point and eye-catching video walls of up to 16 by 8 displays.

IR Extension for Controlling Video Source

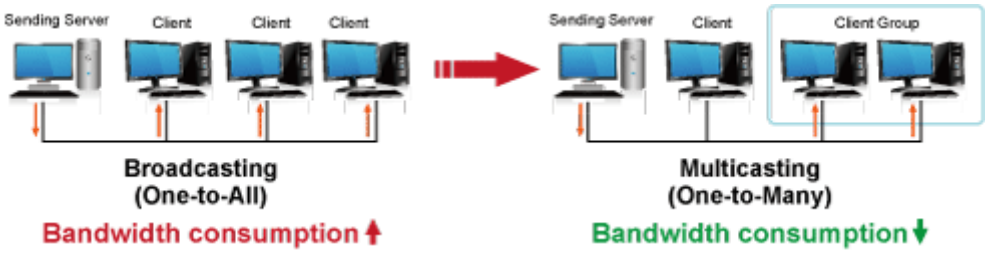
The IHD-420 series is a perfect solution for audio and video signal extension via the Gigabit LAN. Designed with IR transmitter and receiver interface, it allows users to control the video source at the terminal destination. The IHD-420 series features **bi-directional IR extension and RS232 pass-through** which allow users to cascade the system enabling them to extend the transmission distance without signal loss or delay.

They come with USB interfaces, which support basic KVM applications, such as touch screens, keyboards and mice, enabling users to achieve KVM PC control easily. Besides, with PoE function, there is no additional power supply needed, and the IHD-420 series thus reduces the complexity of cable installation.



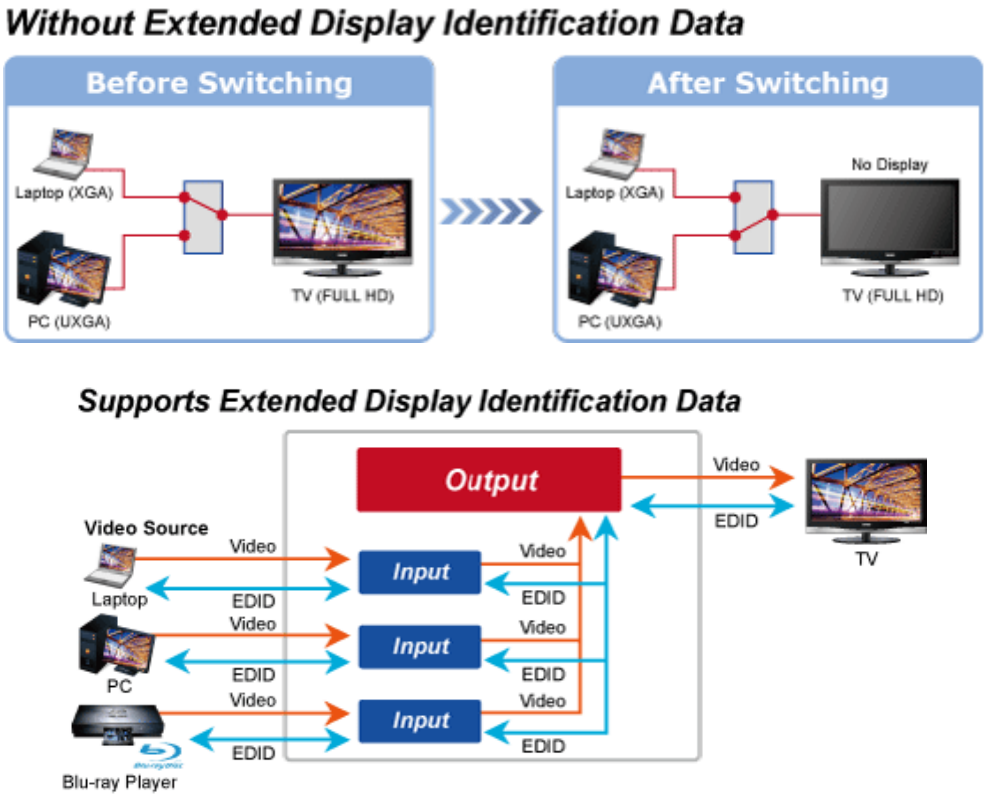
Exclusive Video Transmission by IGMP Snooping Technology

One IHD-420PT at the local site can drive multiple IHD-420PRs at remote sites without adding extra load to the network. Integrated with a Gigabit PoE switch that includes IGMP snooping functions, the IHD-420 series allows for selectable channels, enabling simultaneous transmission of video and audio. IGMP snooping is a crucial component of IP multicast, serving as a communication protocol for hosts and adjacent routers on IP networks to establish multicast group memberships. This functionality is ideal for one-to-many and many-to-many networking applications, such as online streaming and gaming, facilitating exclusive transmission and more efficient resource utilization.



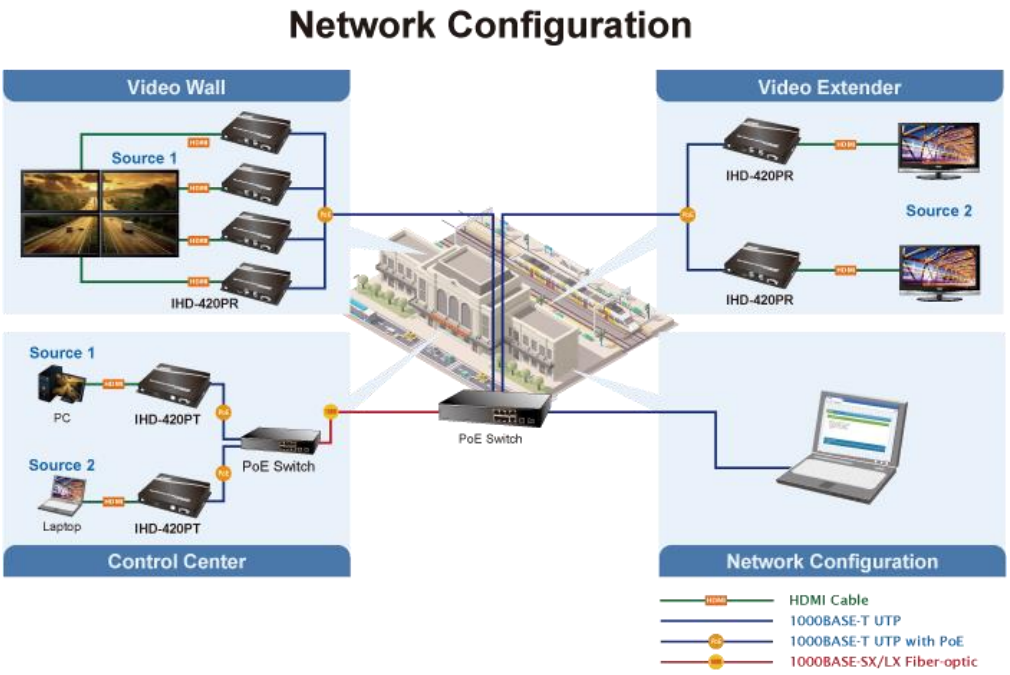
Extended Display Identification Data (EDID) Support

The IHD-420 series adopts Automatic EDID (Extended Display Identification Data) Copy function to make smooth video distribution over different types of display units. EDID is greatly important as it contains information about resources' manufacturer names, serial numbers, product types, maximum image sizes, color characteristics, factory pre-set timings, frequency range limits, etc. In some cases, display problems may occur due to incorrect EDID communication between the display monitor and the transmitting unit or inappropriate EDID data programmed by display manufacturers. Therefore, with Automatic EDID Copy function, the IHD-420 series allows the system to copy EDID information from EDID compliant displays and assures accurate display performance.



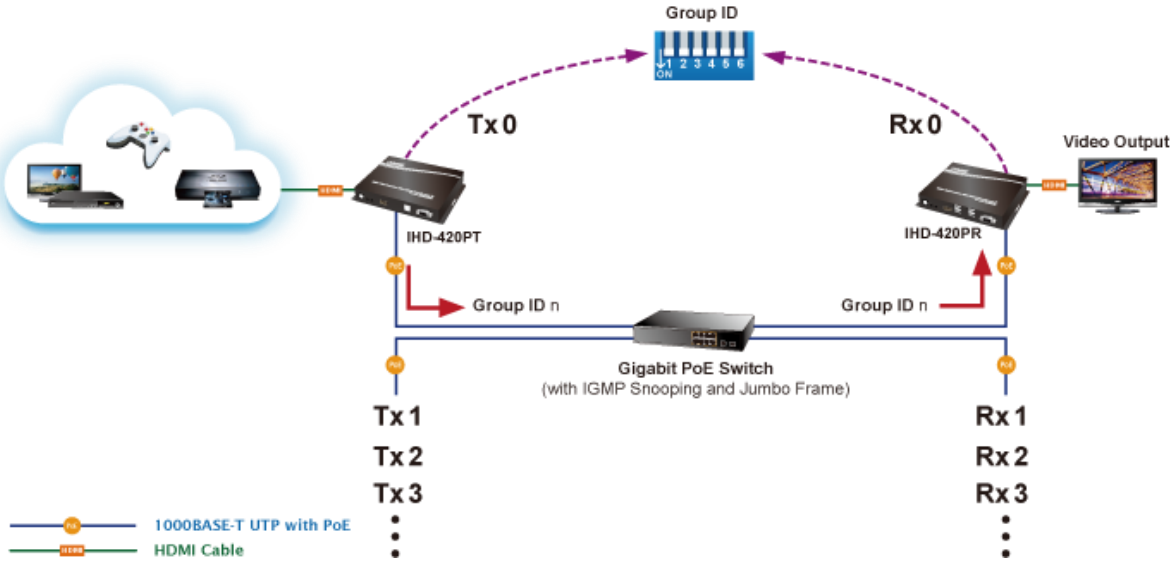
Video Channel Setting Matches Well through Network Configuration

The IHD-420 series allows a network configuration via a central computer over the same LAN within a certain distance. By fully leveraging the Gigabit Ethernet switches with 802.1Q VLAN function, multi-casting can be performed to allow more video sources/senders in the network and be remotely managed. Adjusting and matching video channel setting is simple with the DIP switch on both the IHD-420PT and IHD-420PR. The video distribution is easily deployed through Plug and Play.



Efficient Control via Selectable 64-Channel DIP Switch

Where there is more than one transmitter in the video extend system, the DIP switch in the IHD-420PT and IHD-420PR facilitates distinguishing the pair of the transmitter and receiver units in the same channel. It further enables the broadcasting system to perform multiple video extend systems simultaneously through matching of the IHD-420PT and IHD-420PR.



1.3 Features

➢ HDMI Network

- 4K ultra high-quality video transmitter with refreshing 60 frames per second
- Supports IR extension for controlling video source
- Supports RS232 bi-directional remote extension
- Assigns video sources to any monitor of the video wall system
- The selectable 64-channel DIP switch is easily applied for multi-casting group matching
- 1-to-1,1-to-many and multi-casting broadcasting architectures allow to add more displays without increasing LAN bandwidth loading

➢ Video Output Characteristics

- Supports 1080p or 4K (3840 x 2160) HDMI resolution
- HDCP compliant and blu-ray ready
- Compatible with common screen resolutions from XGA, SXGA, UXGA, WSXGA and Full HD to the latest 4K system
- Output video rotation
- Supports HDMI with 2-ch. uncompressed audio or external audio in and out

➢ Easy Installation and Management

- Supports USB for KVM PC control
- IEEE 802.3af/at PoE+ function supported; no additional power supply needed
- Supports 802.1X function (Future feature)
- Automatic EDID (Extended Display Identification Data) configuration
- Friendly Web UI for ease of use
- Supports multi-casting group with Gigabit Ethernet Managed Switch (IGMP snooping and Jumbo Frame functions required)

1.4 Product Specifications

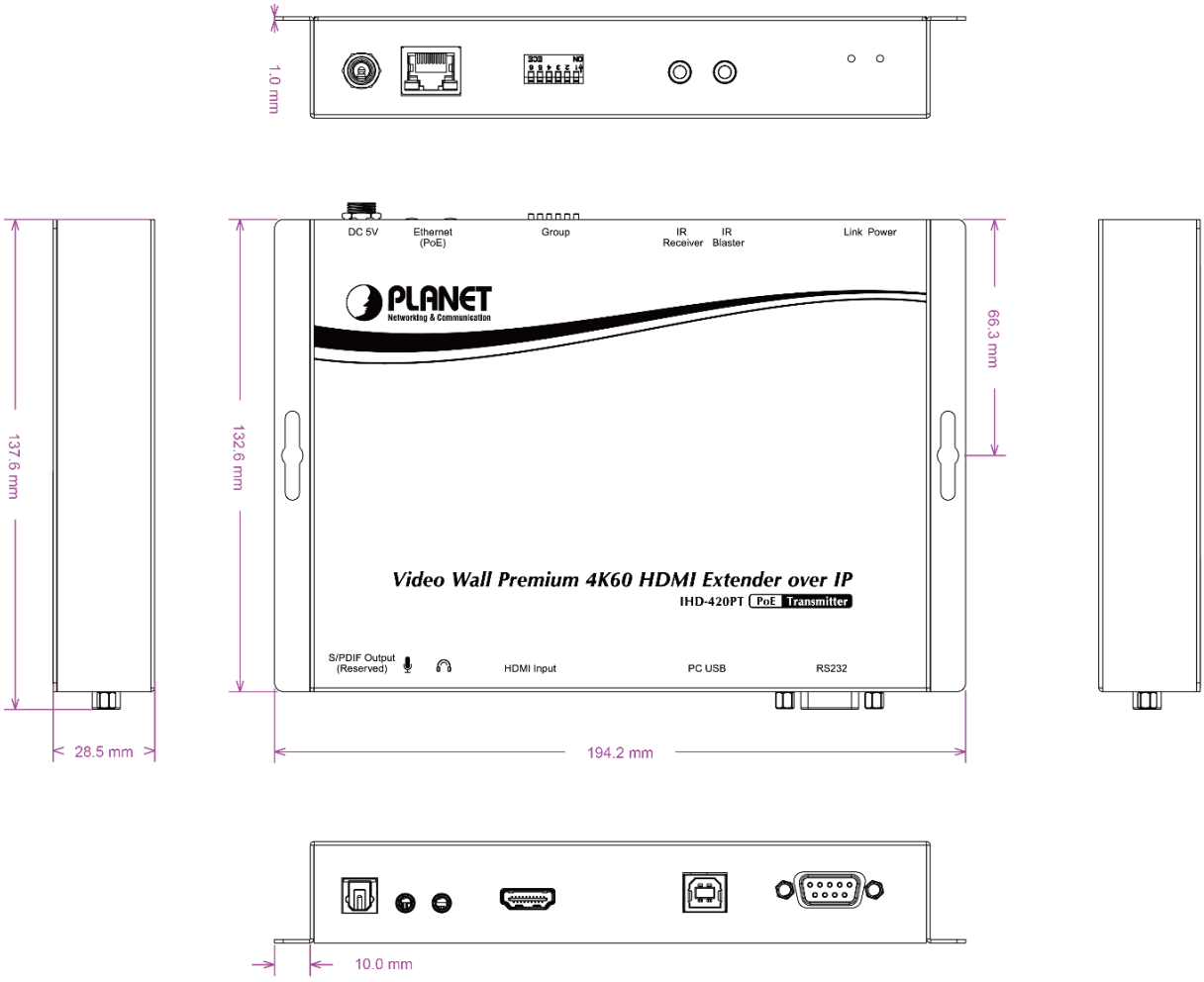
Model	IHD-420PT	IHD-420PR
Function	Transmitter Connecting to HDMI video source device	Receiver Connecting to HDMI Display device
Hardware Specifications		
Network Interface	RJ45 port (10/100/1000BASE-T Ethernet) x 1	
Serial Interface	DB-9 female connector for RS232	
LED	Power LED x 1 Link LED x 1	
Video In Interface	HDMI A Type female connector x 1	N/A
Video Out Interface	N/A	HDMI A Type female connector x 1
External Audio In Interface	3.5mm jack x 1	
External Audio Out Interface	3.5mm jack x 1	
IR	3.5mm jack for IR blaster/receiver cable	
RS-232	Yes, you need to adjust the DIP switch at the bottom of both devices to the "1" position. Setting it to "ON" activates the debug mode.	
Channel Switching	DIP (64 channels)	
USB	USB 2.0 type B x 1 (For PC/server)	USB 1.1 type A x 2 USB 2.0 type A x 2 (For mouse/keyboard)
S/PDIF Input	Reserved	
Power Supply	IEEE 802.3af/at PoE+ 5V DC, 2A	
CASE	Metal	
Power Consumption	7W (Max.)	
ESD Protection	15KV for air-gap discharge 8KV for contact discharge	
Dimensions (W x D x H)	194.2 x 132.6 x 28.5 mm	
Weight	645 g	
Video and Audio		
Maximum Video Wall	8 x 16 (row x column)	
HDMI Video In Resolution	4K (3840x2160) @ 60/50 Hz 4K (3840x2160) @ 30/25/24 Hz 1080p @ 60/50 Hz XGA, SXGA, UXGA, WSXGA	N/A
HDMI Video Out Resolution	N/A	4K (3840x2160) @ 60/50 Hz 4K (3840x2160) @ 30/25/24 Hz 1080p @ 60/50 Hz XGA, SXGA, UXGA, WSXGA
HDMI Video Out Rotation	0 degrees/90 degrees/180 degrees/270 degrees	
Compression	Visual lossless compression	
Audio	HDMI: 2-ch uncompressed audio	
General		
Management Interfaces	Web management	
System Expandability (max.)	64 groups	
Resolution Identification	EDID (Extended Display Identification Data)	

Security	HDCP compliant (2.2)
Media Stream Bandwidth	Approximately 500Mbps@ 4K 60Hz
Maximum Distance (between unit and PoE switch)	100 meters (330 feet) over CAT5e/6 cable
Standards Conformance	
Standards Compliance	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3ab 1000BASE-T IEEE 802.3af/at PoE+
HDMI Interface Compliance	HDMI 2.0a
Protocol	TCP, UDP, RTSP, RTP, DHCP, IGMP Snooping, Multicast, IPv4, 802.1X (Future feature)
Cabling	Cat5e/6 UTP cable
Environment Specifications	
Operating	Temperature: 0~55 degrees C Relative Humidity: 5~90% (non-condensing)
Storage	Temperature: -10~60 degrees C Relative Humidity: 5~90% (non-condensing)
Emission	FCC, CE
Standard Accessories	
Packet Contents	■ Media Extender x 1 ■ Quick Installation Guide Sheet x 1 ■ Screws x 2 ■ IR Blaster/Receiver Cable x 1

1.5 Hardware Interface

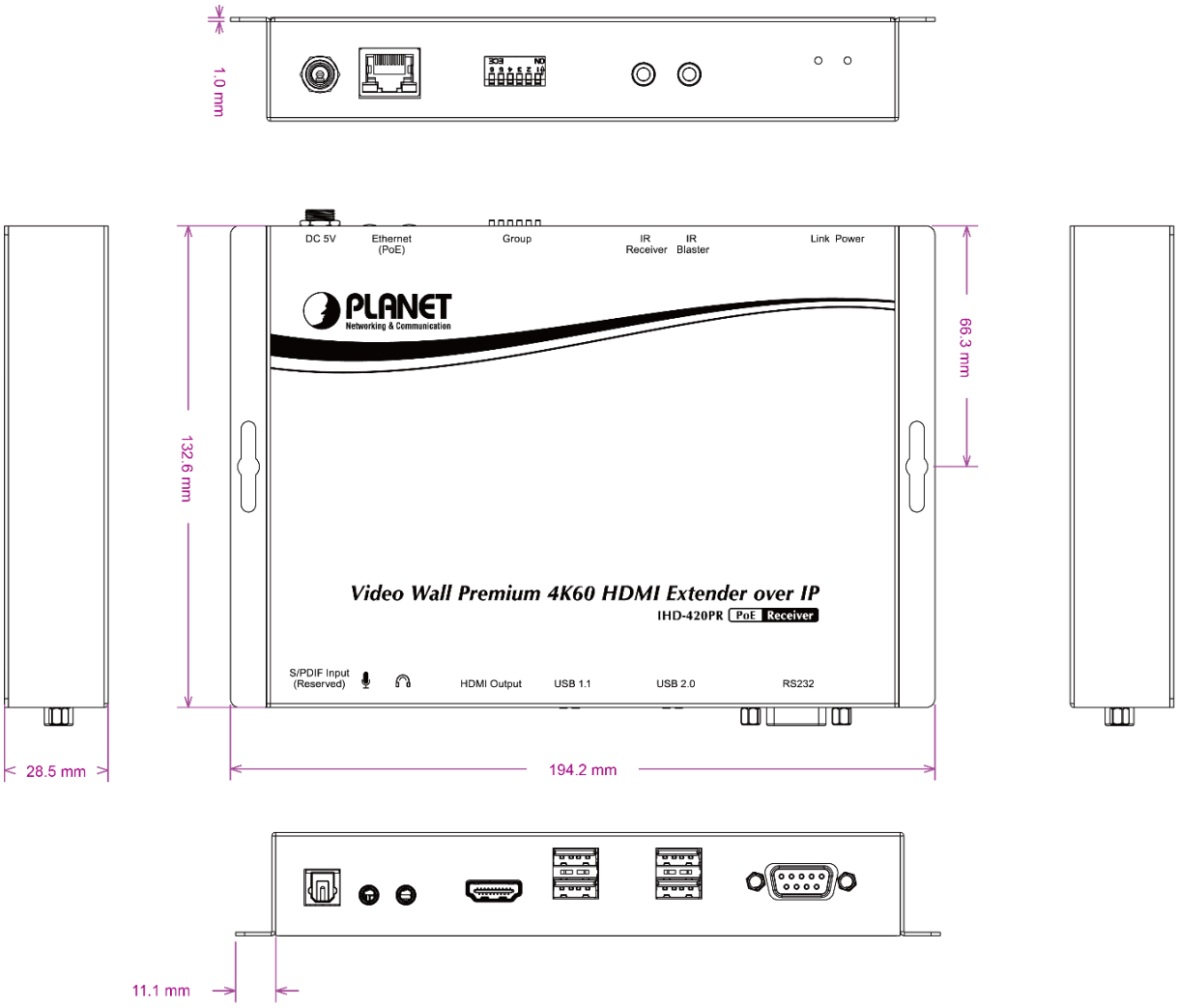
1.5.1 Diagrams:

IHD-420PT Transmitter:



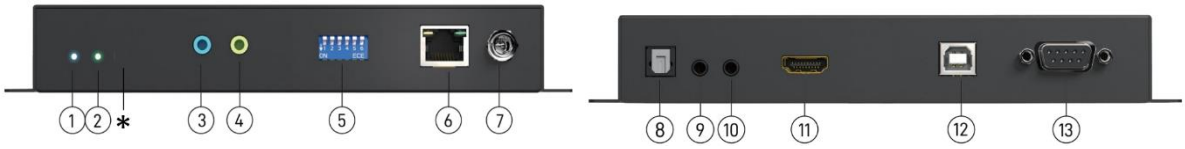
Dimensions (W x D x H): 194.2 x 132.6 x 28.5 mm

IHD-420PR Receiver:

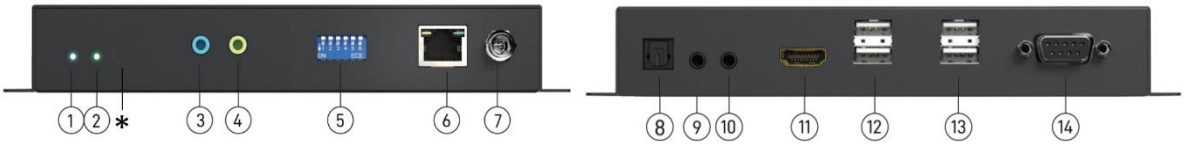


Dimensions (W x D x H): 194.2 x 132.6 x 28.5 mm

1.5.2 Interfaces:



Transmitter
(IHD-420PT)

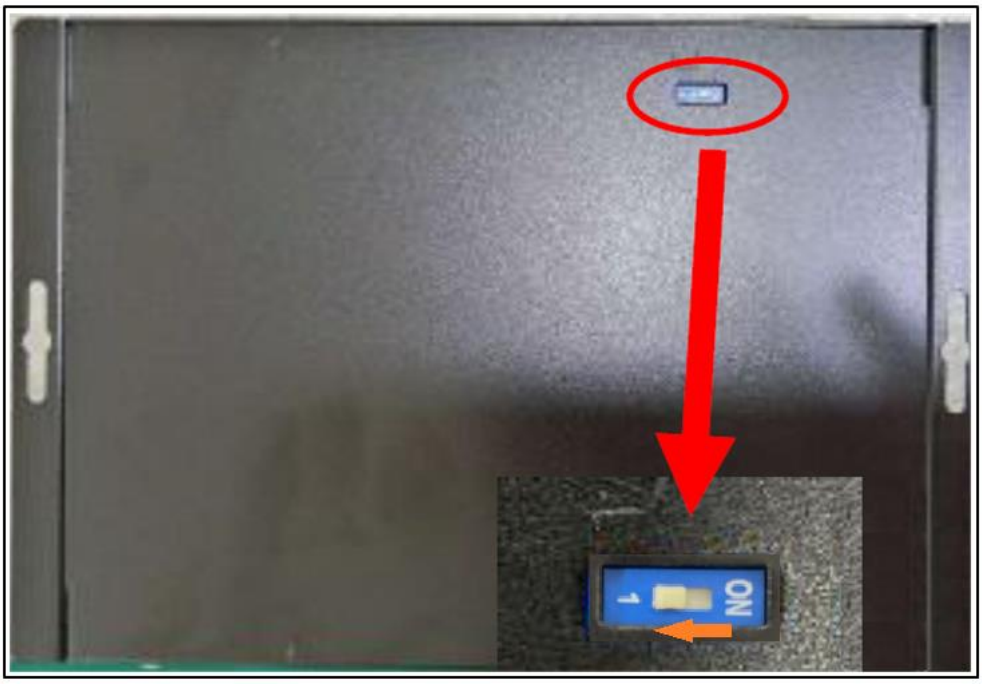


Receiver
(IHD-420PR)

Interfaces Definition:

Position	Description	Function
1	Power LED Indicator	Blink to indicate the unit is connected to a power supply. Stable Blue to Indicate the device has completed booting and is operating normally.
2	Link LED Indicator	Blink to indicate a Cat-5/5e/6 cable is connected to the unit. Stable Green to indicate the transmitting unit is connected to an HDMI source and successfully linked to the receiving unit. PS: *LED is for a future feature
3	IR Blaster	Infrared 3.5mm socket is for connecting the IR blaster extension cable.
4	IR Receiver	Infrared 3.5mm socket is for connecting the IR receiver extension cable.
5	Group	6-bit DIP switch for a group configuration, allowing selection of 64 different stream channels.
6	Ethernet (PoE)	Gigabit Ethernet port with powered device (PD) function
7	DC 5V	Connect to 5V DC power supply
8	S/PDIF Output	Reserved
9	Analog Audio Line In	Connect to an audio source such as a microphone (for unicast only).
10	Analog Audio Line Out	Connect to a headphone.
11	HDMI Input (IHD-420PT)	Connect to an HDMI source using an HDMI male-to-male cable.
	HDMI Output (IHD-420PR)	Connect to an HDMI display using an HDMI male-to-male cable.
12	PC USB (IHD-420PT)	Connect to a PC USB 2.0 port.
	USB (IHD-420PR)	Connect to a keyboard or mouse.
13	USB (USB 2.0 port):	Connect to a USB flash driver.
14	RS-232	Connect to a PC serial port using a DB-9 male-to-male cable.

Note	Before testing the RS232 function, please set the DIP switch at the **bottom** of the IHD-420PT and IHD-420PR **to 1** (**ON** is for debug mode).

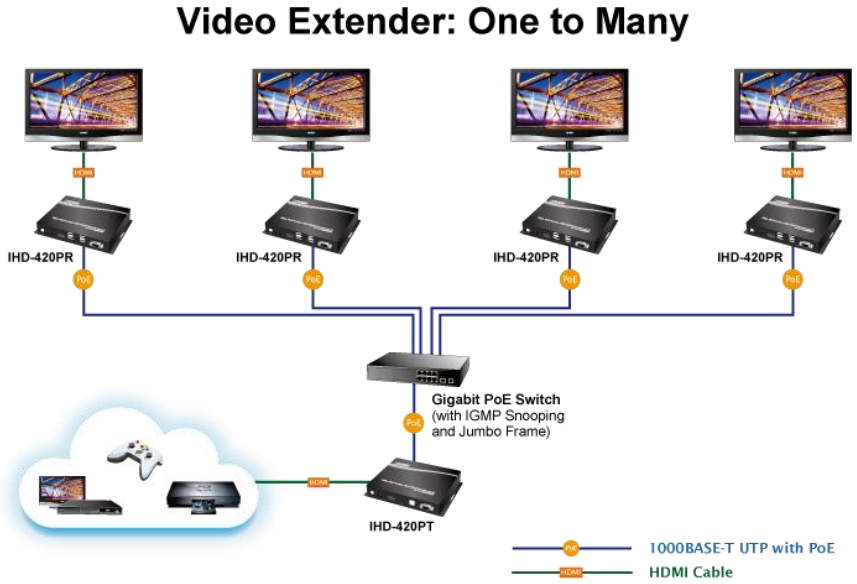


1.6 Device Connection Topology

PLANET IHD-420PT and IHD-420PR work as a pair to facilitate the management tool and HDMI display over IP Ethernet with PoE.

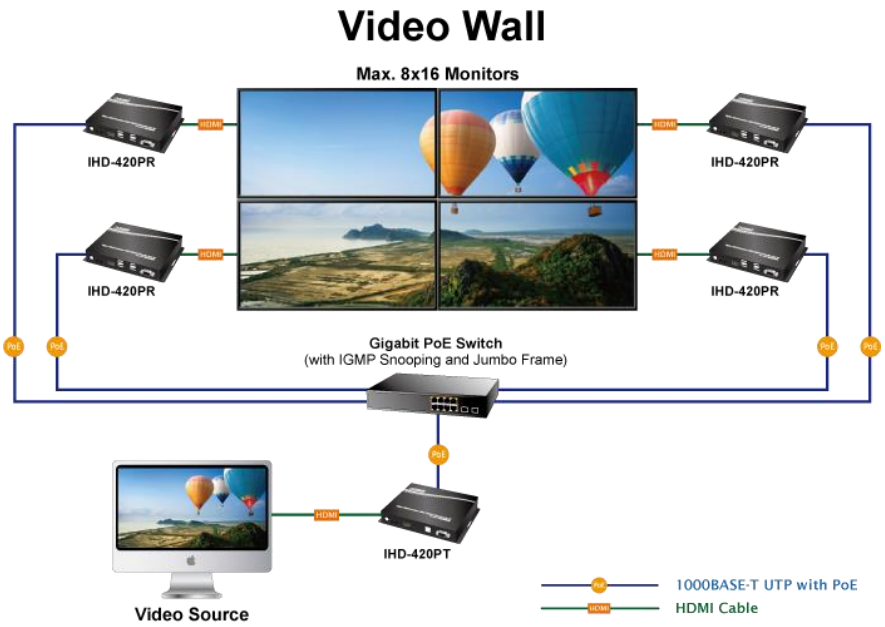
Video Extender

The IHD-420PT and IHD-420PR are able to send the same video signal to multi-monitors in different locations at the same time. It helps to quickly extend the image and commercial to the public efficiently in such places as expos, food courts, boardrooms, and any public areas.



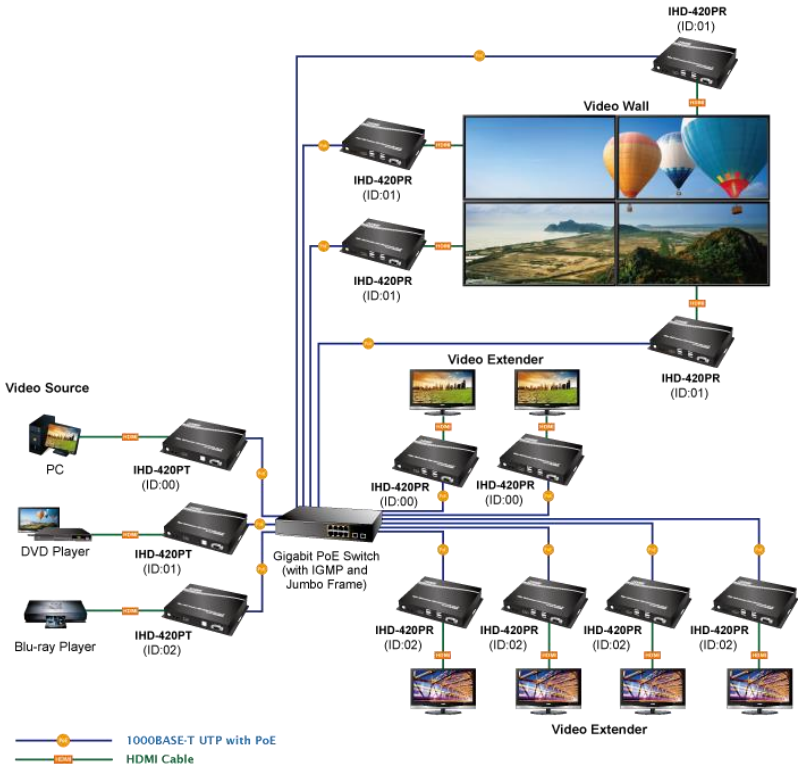
Video Wall

To bring the image and picture in larger size over video wall, the IHD-420PT and IHD-420PR are the ideal solution to distributing one specified image, picture, or video to multiple screens which are usually applicable for sports, department stores, movie theaters, etc.



Ideal Solution for Wide Variety of Commercial Installation Environments

The IHD-420 series supports 100m over single cat5e/6 cable at point to point, as well as point to many and many to many over Gigabit Ethernet switch. With so many practical features, the IHD-420 series is ideal for live presentations, public broadcasting, education training, boardrooms, etc.

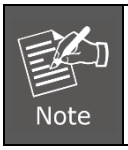


Chapter 2. Hardware Installation

2.1 Devices Requirements

1. Monitor: HDCP compliant monitors with HDMI interface for the HDCP video source.
2. Ethernet cable: Cat5/5e/6 UTP cable (EIA / TIA 568B industry standard compliant).
3. PoE Switch: Please see the recommended PoE switch.
4. PC OS: Workstations running Windows 7/8/10/11, macOS 10.12 or later, Linux Kernel 2.6.18 or later, or other modern operating systems are compatible with TCP/IP protocols.

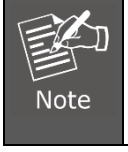
Application	Recommended Ethernet Switch
Video Wall/Video Extend Application	Gigabit PoE Switch with IGMP snooping function and jumbo frame function.
Multiple Video Wall Application	10 Gigabit PoE Switch with IGMP snooping function, jumbo frame function and VLAN function.



The quality of the output signal will depend largely upon the quality of video source, cable and display device used. Low-quality cables degrade output signal causing elevated noise levels. Please use the proper cable and make sure the display device is capable of handling the resolution and refresh rate selected.

2.2 Installation Instructions

1. Connect a video source to the Transmitter/Sender (**IHD-420PT**) Unit's **HDMI Input** port.
2. Connect a display to the Receiver (**IHD-420PR**) Unit's **HDMI Output** port.
3. Set **the same ID number** on the DIP switch for all units within the same group.
4. Connect the self-prepared USB cable from Transmitter to PC, and connect additional USB devices such as a USB mouse, USB keyboard or USB flash drive to the Receiver.
5. Use Cat5e/6 cables (Compliant with EIA/TIA 568B industry standards) to connect the Transmitter and Receiver to the IEEE 802.3at PoE+ switch.
6. Supply sufficient power to all connected devices.
7. Connect the IR blaster cable to the Transmitter and the IR Receiver cable to the Receiver for remote control (optional)



Ensure that all devices are powered off before connecting to the unit.
Make sure all devices connected are properly grounded.
Place cables away from fluorescent lights and air conditioners that are likely to generate electrical noise.
Please allow adequate space around the unit for ventilation.

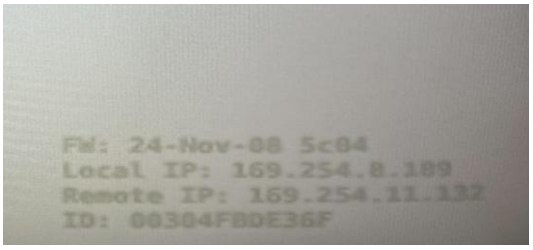
Chapter 3. Preparation

Before getting into the unit's web UI, user has to find out the device's IP address and configure PC's IP address.

3.1 Find the IP Address via Monitor

User is able to find the device's IP address via monitor. Please refer to the steps below:

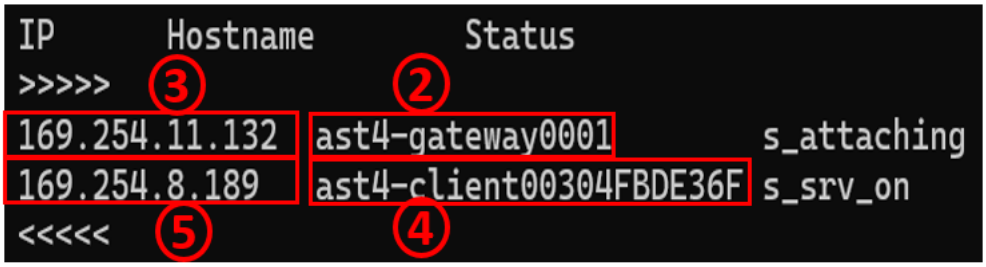
1. Connect HDMI monitor to the Receiver (IHD-420PR) unit's HDMI Out interface.
2. Set an identical ID number on DIP switch for all units of the same group.
3. Use Cat5e/6 cables (EIA/TIA 568B industry standard compliant) for connection between Transmitter/Receiver and the IEEE 802.3af/at PoE+ switch.
4. Apply the proper power to the Transmitter, Receiver, switch and monitor.
5. The monitor will show the information shown below.



Description	Function
FW	Show the date of firmware.
Local IP	Show the IHD-420PR's IP address.
Remote IP	Show the connected IHD-420PT's IP address.
ID	Show the IHD-420PR's MAC address.

3.2 Find the IP Address via node_list tool

The node_list tool is a free software. User is able to download it from Planet Web page. The following image is the interface of the node_list tool shown as an example.



1. Click the node_list tool and you can see all the devices connected to the same hub/switch (in the same LAN).
2. Ast-gateway: It represents transmitter.
   The four digits after ast-gateway depend on the position of the DIP switch you've set. Default DIP switch is 0 and the four digits are 0000. Please refer to the form below. For example, if the position is set to "↓ ↑ ↑ ↑ ↑ ↑" , then you'll see ast-gateway 0001. Please refer to the table shown below.
3. The IP address of transmitter.
4. Ast-client: It represents receiver. The 12 digits after ast-client is MAC address of receiver.
5. The IP address of receiver. Beware, even though the name of receivers are the same, you can tell the difference by the IP address.

ID	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6
0	↑	↑	↑	↑	↑	↑
1	↓	↑	↑	↑	↑	↑
2	↑	↓	↑	↑	↑	↑
3	↓	↓	↑	↑	↑	↑
4	↑	↑	↓	↑	↑	↑
5	↓	↑	↓	↑	↑	↑
6	↑	↓	↓	↑	↑	↑
7	↓	↓	↓	↑	↑	↑
8	↑	↑	↑	↓	↑	↑
9	↓	↑	↑	↓	↑	↑
10	↑	↓	↑	↓	↑	↑
11	↓	↓	↑	↓	↑	↑
12	↑	↑	↓	↓	↑	↑
13	↓	↑	↓	↓	↑	↑
14	↑	↓	↓	↓	↑	↑
15	↓	↓	↓	↓	↑	↑
16	↑	↑	↑	↑	↓	↑
17	↓	↑	↑	↑	↓	↑
18	↑	↓	↑	↑	↓	↑
19	↓	↓	↑	↑	↓	↑
20	↑	↑	↓	↑	↓	↑
21	↓	↑	↓	↑	↓	↑
22	↑	↓	↓	↑	↓	↑
23	↓	↓	↓	↑	↓	↑
24	↑	↑	↑	↓	↓	↑
25	↓	↑	↑	↓	↓	↑
26	↑	↓	↑	↓	↓	↑
27	↓	↓	↑	↓	↓	↑
28	↑	↑	↓	↓	↓	↑
29	↓	↑	↓	↓	↓	↑
30	↑	↓	↓	↓	↓	↑
31	↓	↓	↓	↓	↓	↑

ID	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6
32	↑	↑	↑	↑	↑	↓
33	↓	↑	↑	↑	↑	↓
34	↑	↓	↑	↑	↑	↓
35	↓	↓	↑	↑	↑	↓
36	↑	↑	↓	↑	↑	↓
37	↓	↑	↓	↑	↑	↓
38	↑	↓	↓	↑	↑	↓
39	↓	↓	↓	↑	↑	↓
40	↑	↑	↑	↓	↑	↓
41	↓	↑	↑	↓	↑	↓
42	↑	↓	↑	↓	↑	↓
43	↓	↓	↑	↓	↑	↓
44	↑	↑	↓	↓	↑	↓
45	↓	↑	↓	↓	↑	↓
46	↑	↓	↓	↓	↑	↓
47	↓	↓	↓	↓	↑	↓
48	↑	↑	↑	↑	↓	↓
49	↓	↑	↑	↑	↓	↓
50	↑	↓	↑	↑	↓	↓
51	↓	↓	↑	↑	↓	↓
52	↑	↑	↓	↑	↓	↓
53	↓	↑	↓	↑	↓	↓
54	↑	↓	↓	↑	↓	↓
55	↓	↓	↓	↑	↓	↓
56	↑	↑	↑	↓	↓	↓
57	↓	↑	↑	↓	↓	↓
58	↑	↓	↑	↓	↓	↓
59	↓	↓	↑	↓	↓	↓
60	↑	↑	↓	↓	↓	↓
61	↓	↑	↓	↓	↓	↓
62	↑	↓	↓	↓	↓	↓
63	↓	↓	↓	↓	↓	↓

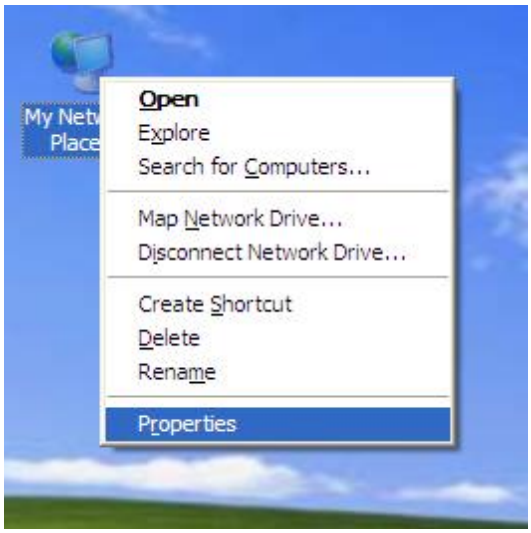
3.3 Setting TCP/IP on your PC

The default IP address of the IHD-420 series is B class Networking:168.254.xxx.xxx, please set the IP address of the connected PC as static IP, such as 169.254.xxx.xxx and the sub mask as 255.255.0.0. Please refer to the following to set the IP address of the connected PC.

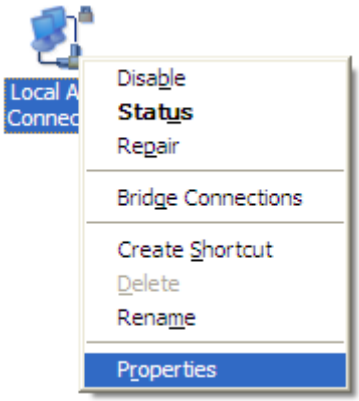
3.3.1 Windows XP

If you are using Windows XP, please refer to the steps below:

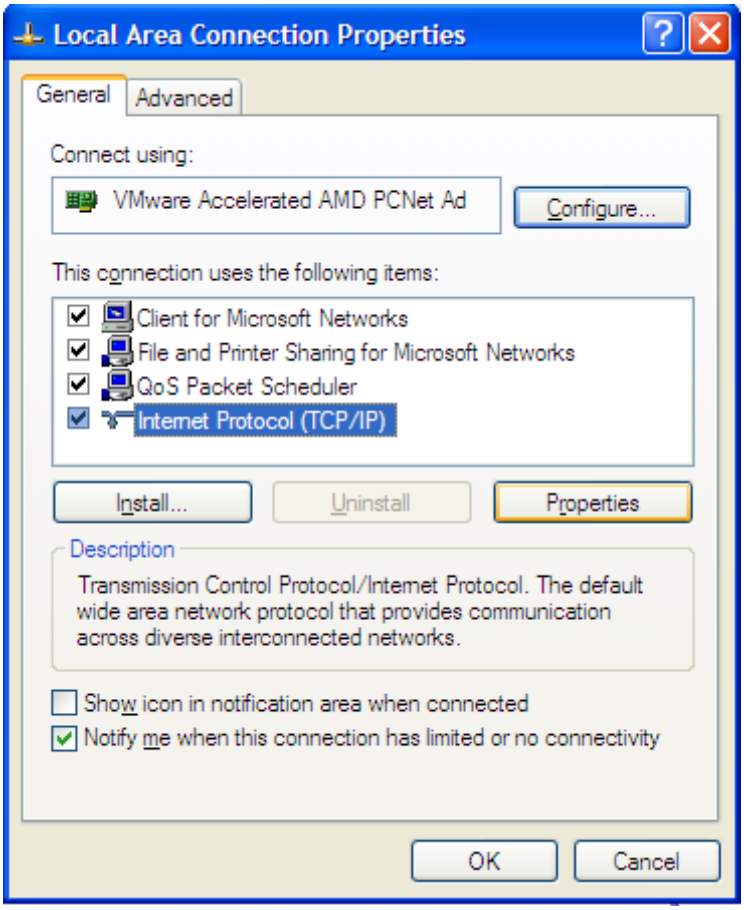
1. From the desktop, right-click My Network Places > Properties.



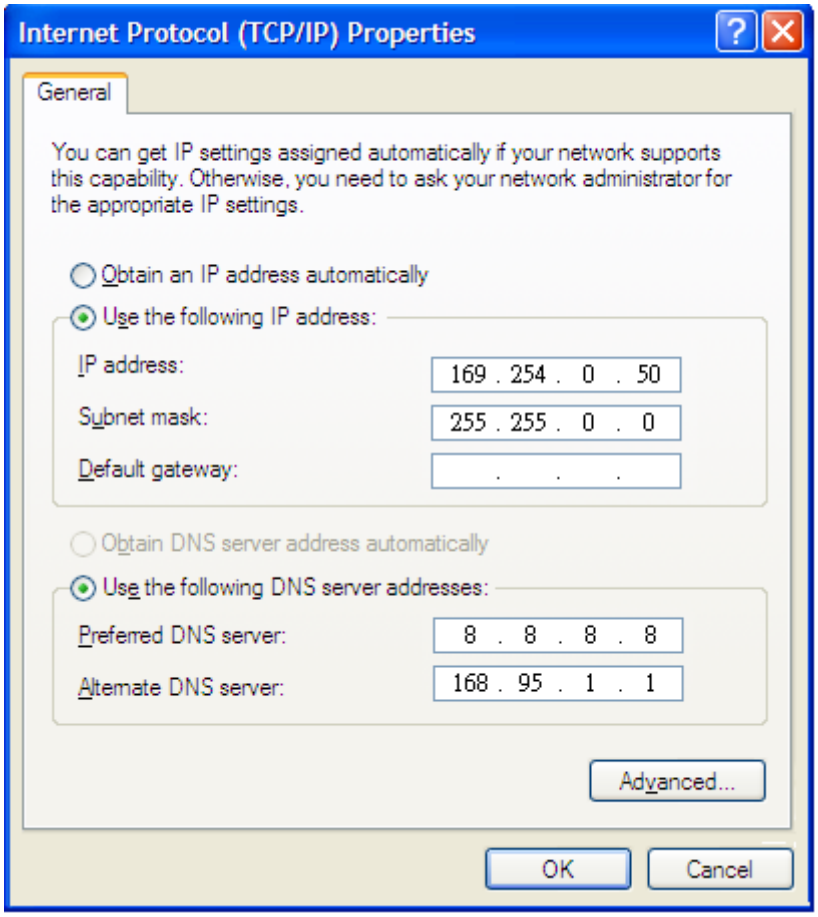
2. Right-click on the Local Area Connection and select Properties.



3. Select Internet Protocol (TCP/IP) and click Properties.



4. Select "Use the following IP address".



IP address: You have to set the same network segment between your PC's IP address and the transmitter/receiver.

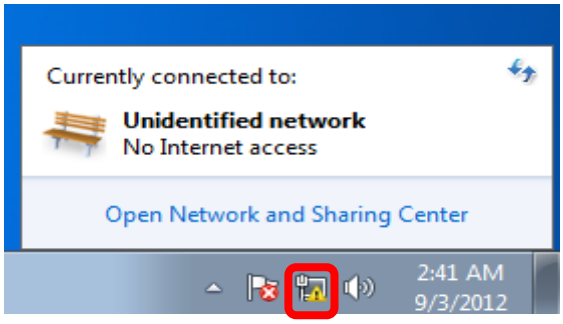
For example, if the transmitter's IP is 169.254.0.1, then you should set your PC's IP address to 169.254.0.xxx where xxx can be any number between 2 and 253. (Same as receiver)

Subnet mask: Enter 255.255.0.0.

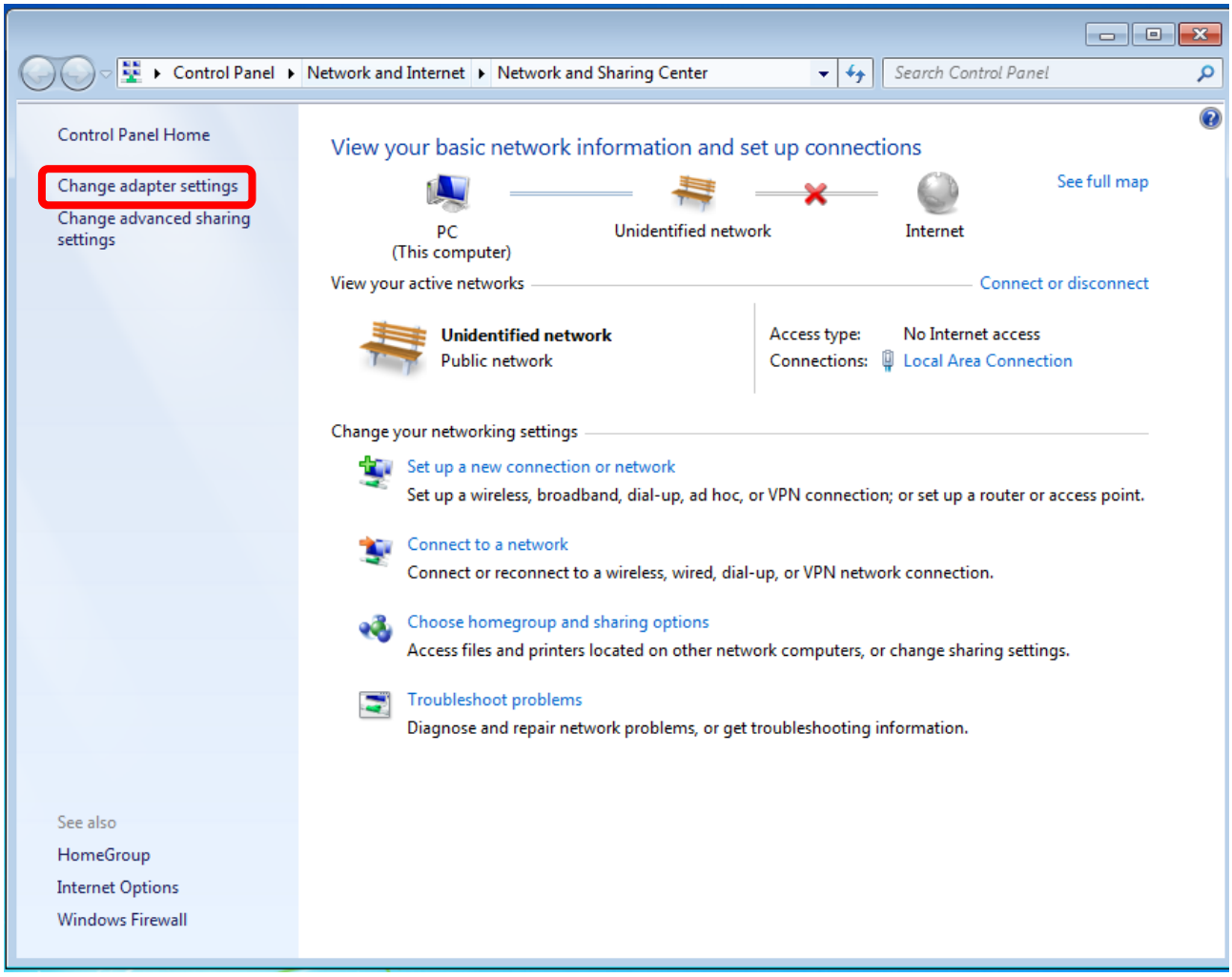
3.3.2 Windows 7

If you are using Windows 7, please refer to the following:

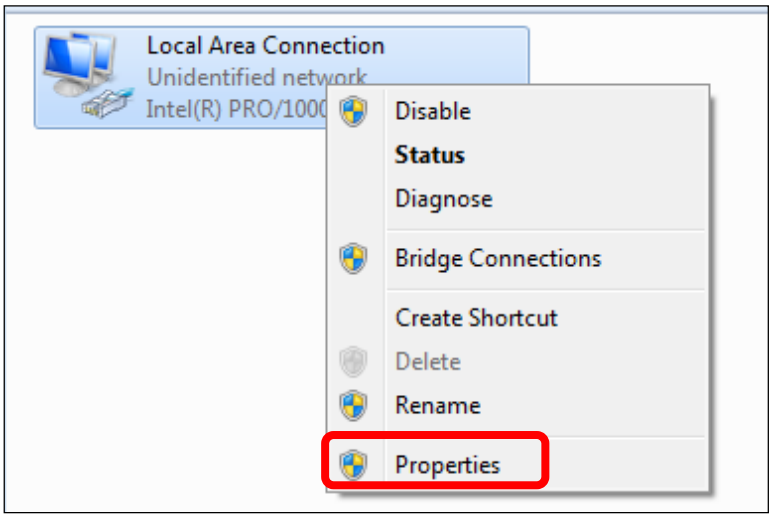
1. Click on the network icon from the right side of the taskbar and then click on “Open Network and Sharing Center”.



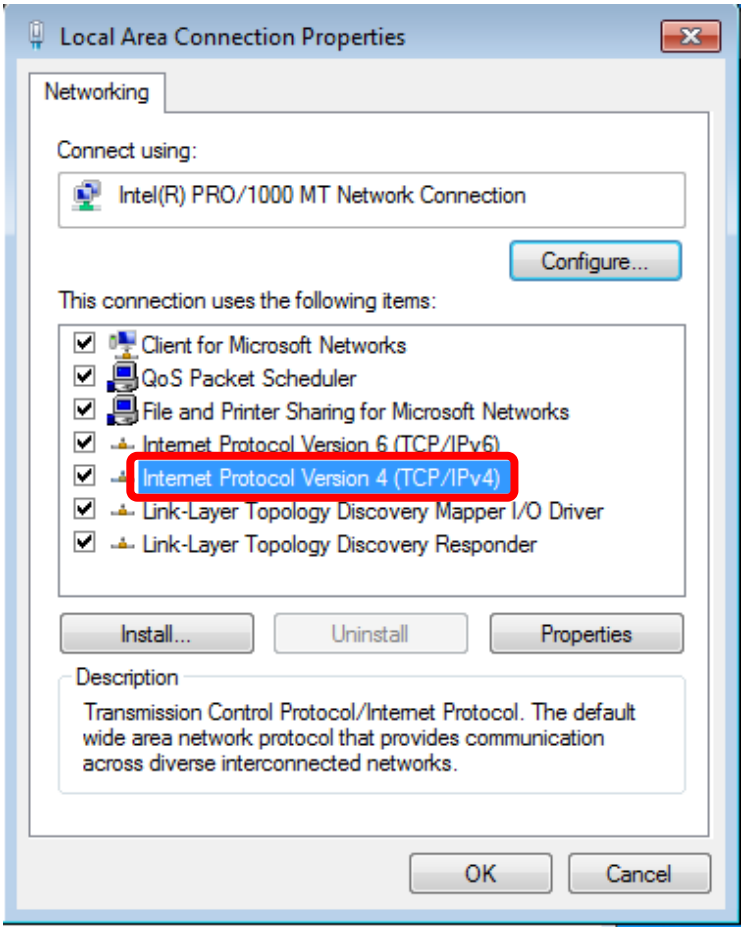
2. Click "Change adapter settings".



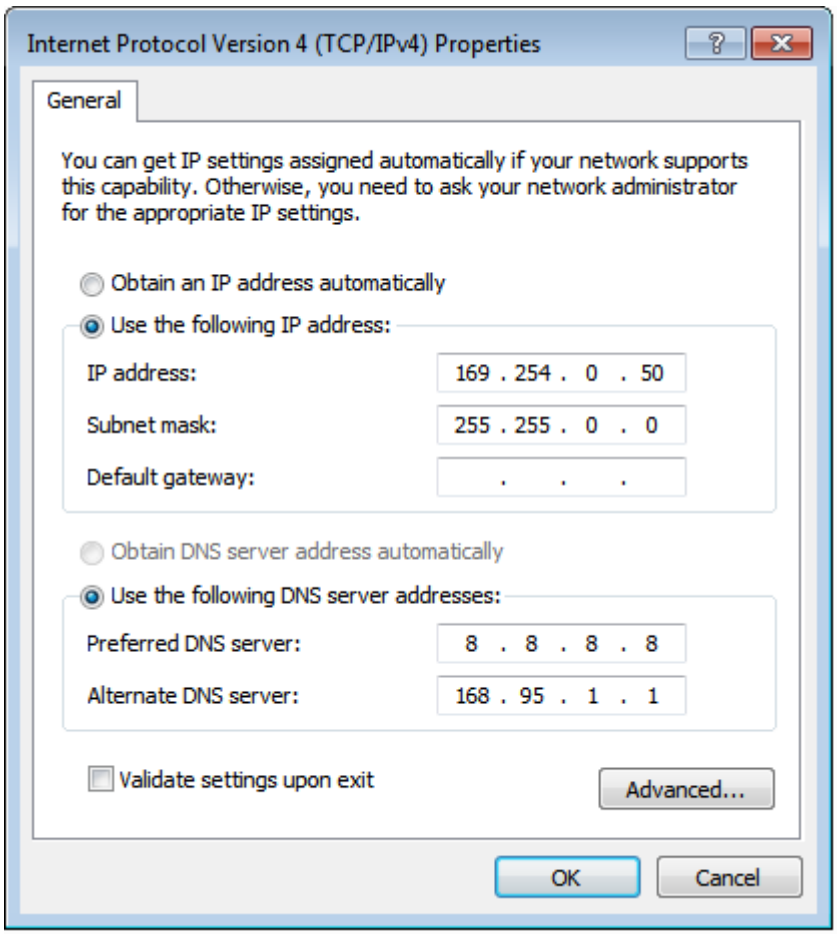
3. Right-click on the Local Area Connection and select Properties.



4. Select Internet Protocol Version 4 (TCP/IPv4) and click Properties or directly double-click on Internet Protocol Version 4 (TCP/IPv4).



5. Select "Use the following IP address".



Select "Use the following IP address".

IP address: You have to set the same network segment between your PC's IP and the transmitter/receiver.

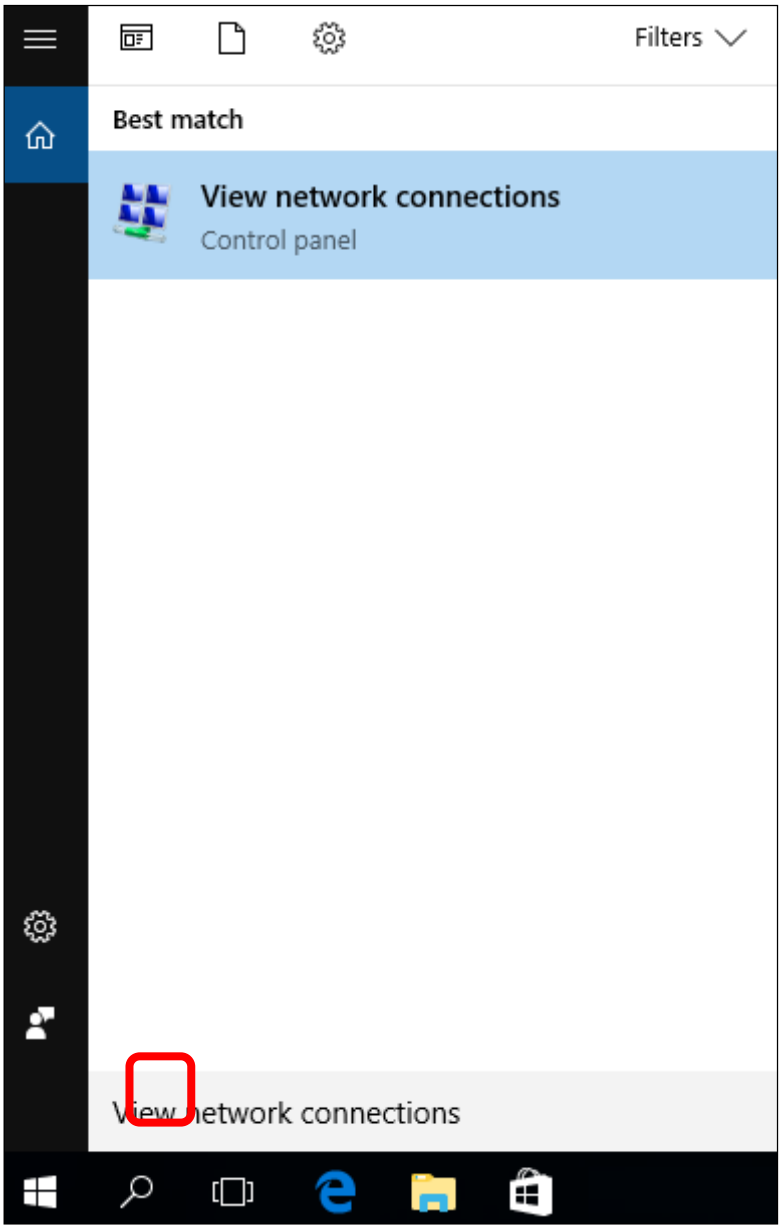
For example, if the transmitter's IP is 169.254.0.1, then you should set to 169.254.0.xxx where xxx can be any number between 2 and 253. (Same as receiver)

Subnet mask: Enter 255.255.0.0.

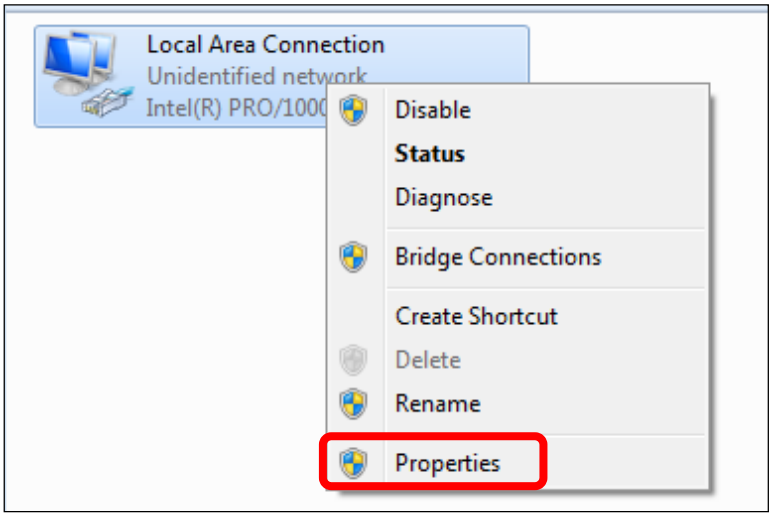
3.3.3 Windows 10

If you are using Windows 10, please refer to the following:

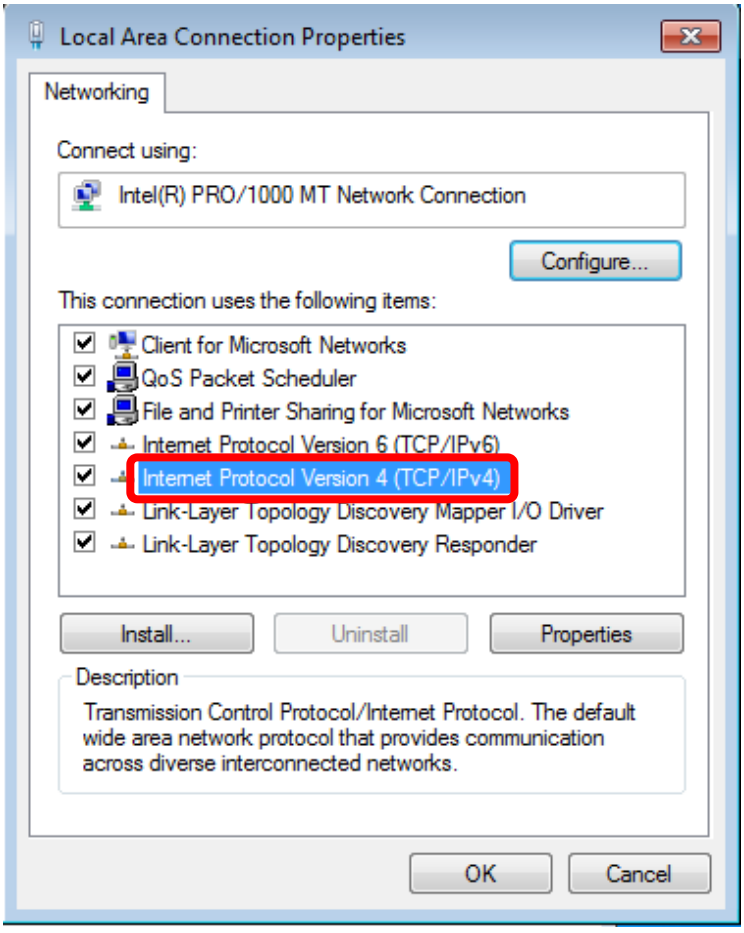
1. In the search box on the taskbar, type View network connections, and then select View network connections at the top of the list.



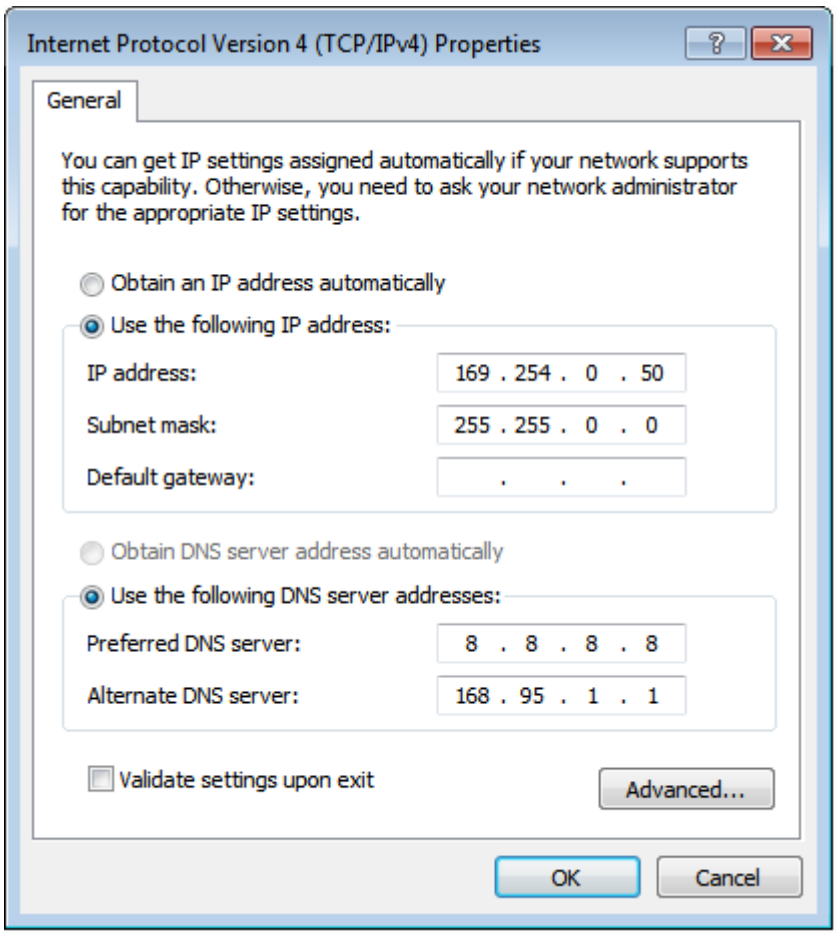
2. Right-click on the Local Area Connection and select Properties.



3. Select Internet Protocol Version 4 (TCP/IPv4) and click Properties or directly double-click on Internet Protocol Version 4 (TCP/IPv4).



4. Select "Use the following IP address".



Select "Use the following IP address".

IP address: You have to set the same network segment between your PC's IP and the transmitter / receiver.

For example, if the transmitter's IP is 169.254.0.1, then you should set to 169.254.0.xxx where xxx can be any number between 2 and 253. (Same as receiver)

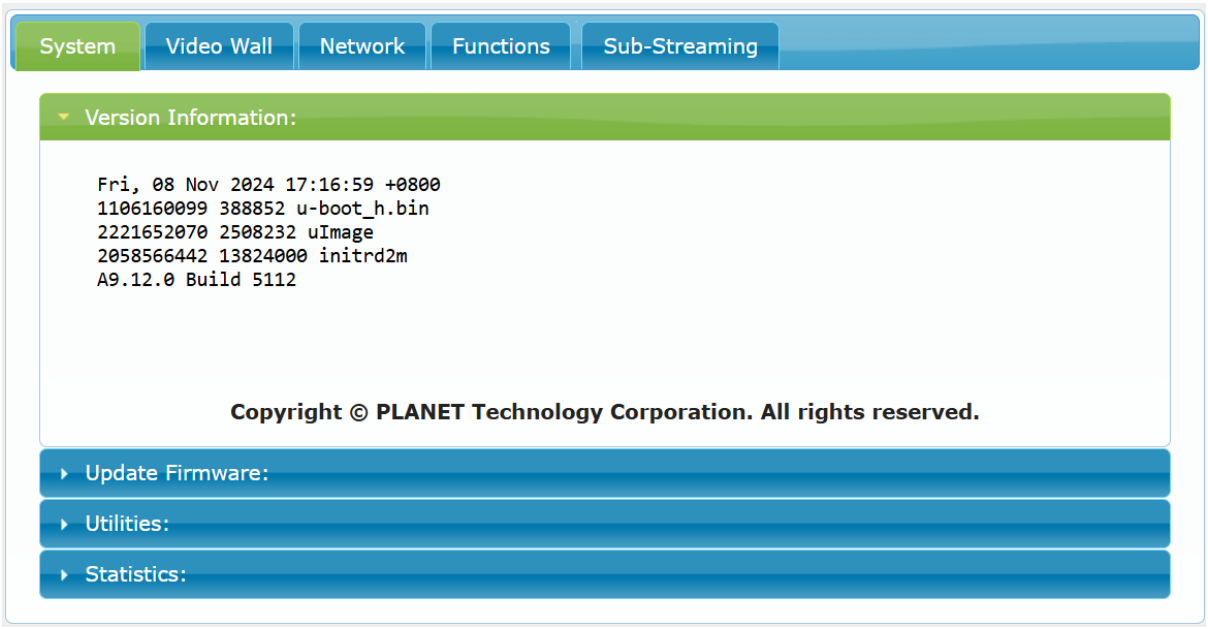
Subnet mask: Enter 255.255.0.0.

Chapter 4. Web-based Management

Before doing configuration, ensure that all remote displays and all network cables are connected correctly. (Video source is required.)

Double-click the device's name in Bonjour Browser and then get to the Web UI, or you can simply type the device's IP in the address bar. For example, input http://169.254.xxx.xxx.

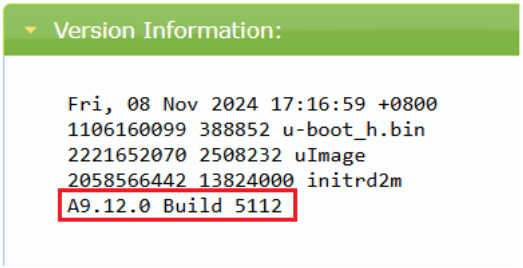
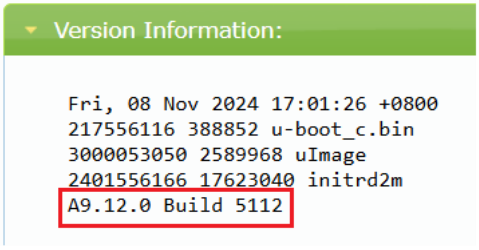
If the link is successful, user will see the web page as follows:



4.1 System

4.1.1 Version Information

Here user can see the current date and the firmware version information.

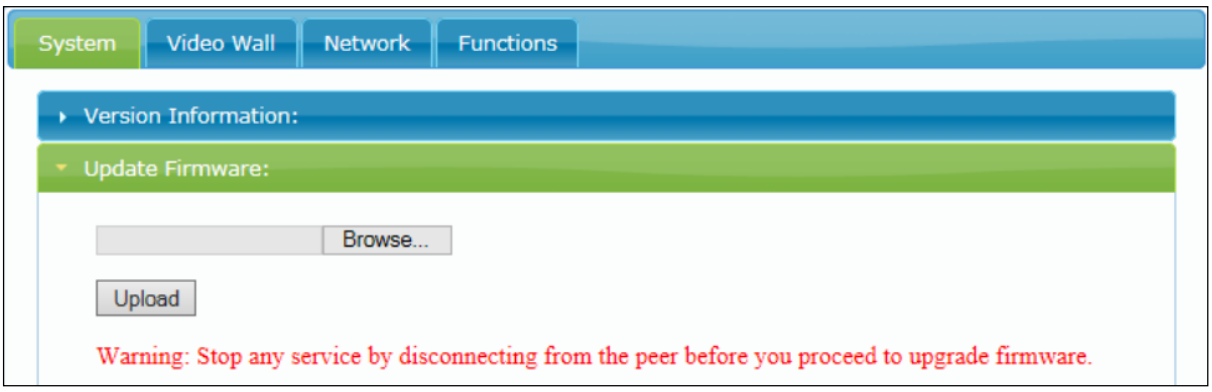
IHD-420PT	IHD-420PR
	

Note

Make sure the FW version of IHD-420PT and IHD-420PR are the same; otherwise, the screen cannot display properly.

4.1.2 Update Firmware

Here is for user to update firmware. Some functions or issues may have to be improved by updating the firmware.

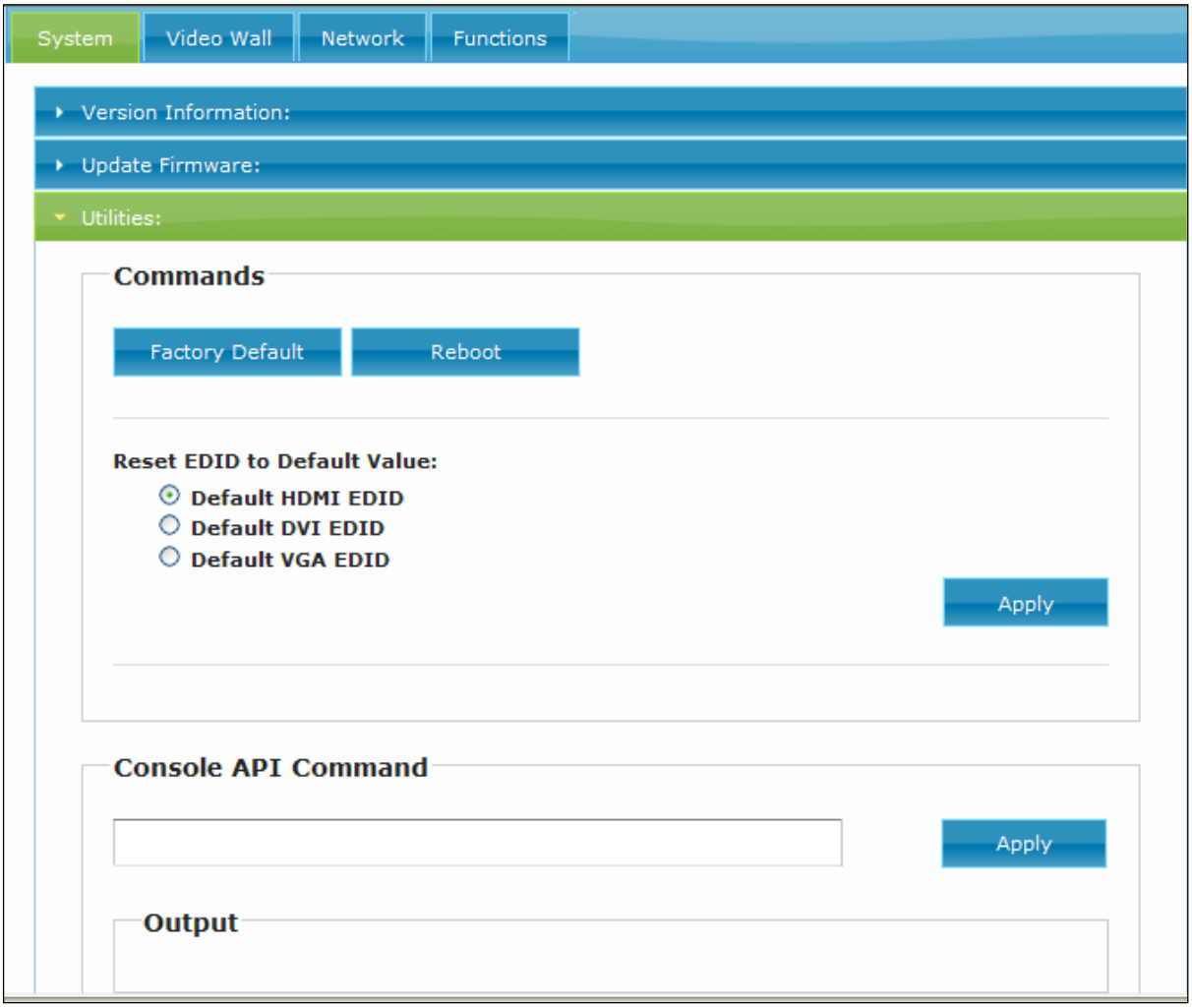


Note

1. If you want to update firmware for transmitter, please get to transmitter's Web UI; if you want to update firmware for receiver, please get to the receiver's Web UI.
2. There are two different kinds of firmware available: one for transmitter and the other for receiver. The transmitter firmware must be uploaded to the transmitter unit, and the receiver firmware must be uploaded to the receiver unit. Uploading the wrong firmware to the wrong unit will cause the unit to malfunction.

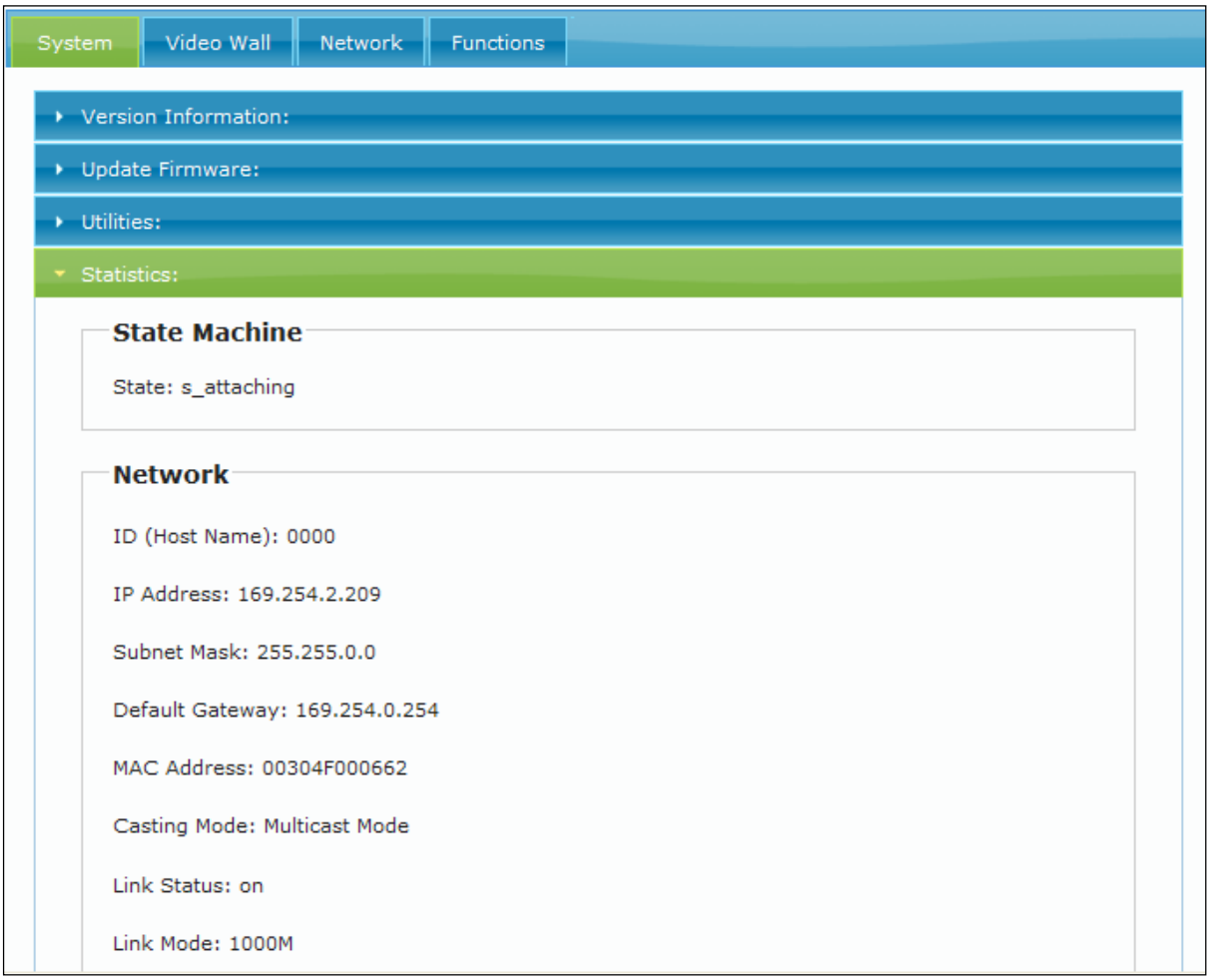
4.1.3 Utilities

User can restore the device to factory default setting, reboot device, reset EDID, even console API command is issued here. Usually, the API command is for engineers to use, but not for end users.



4.1.4 Statistics

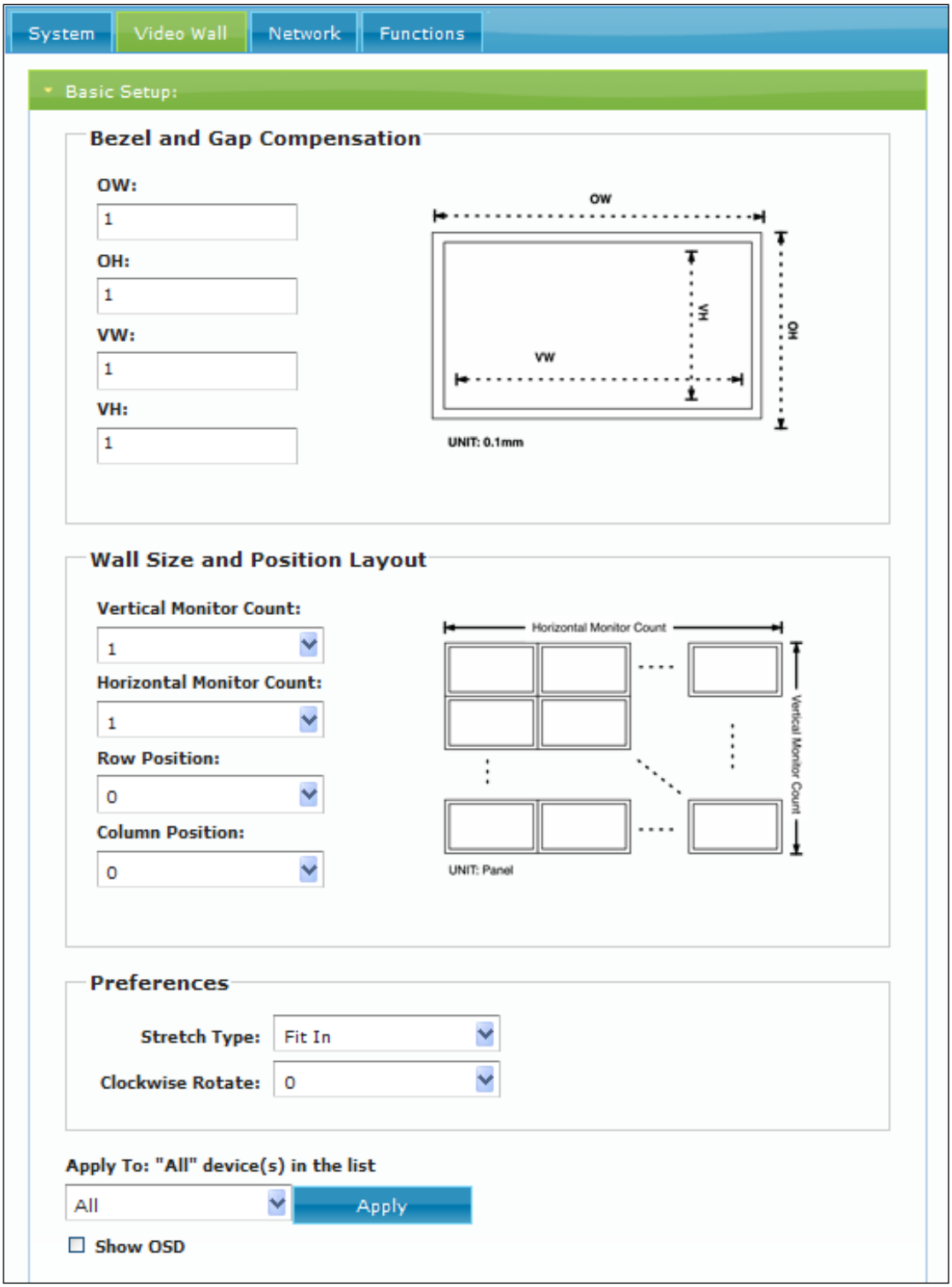
Below is the detailed information on ID, IP, unit status, casting mode, etc.



4.2 Video Wall

4.2.1 Basic Setup

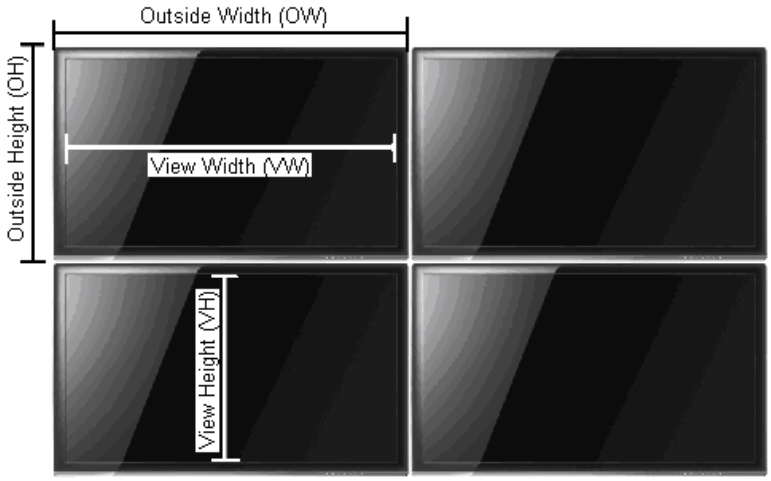
Click on Video Wall Setup tab for Basic Setup first.

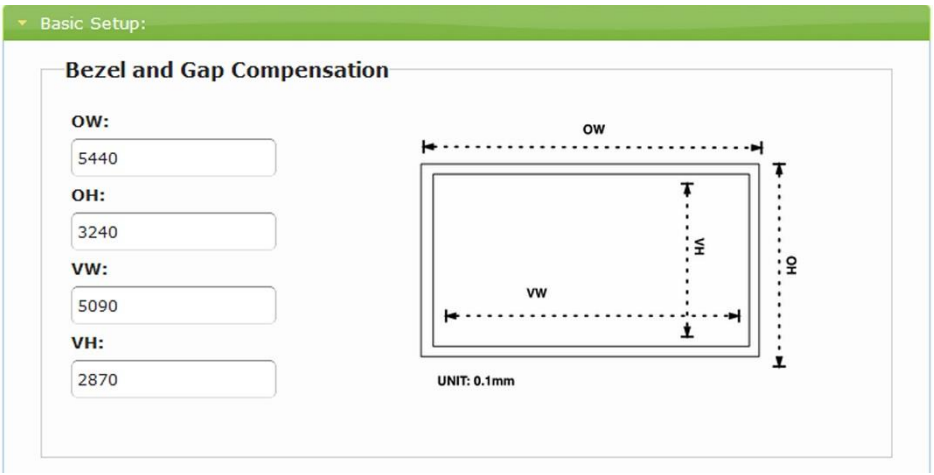


4.2.1.1 Bezel and Gap Compensation:

OW = Outside Width	OH = Outside Height
VW = View Width	VH = View Height

Adjust dimensions (mm) for the monitors of video wall. If you don't need this, just set all values "OW=VW, OH=VH." And please note that the unit is 0.1mm and the value must be an integer.

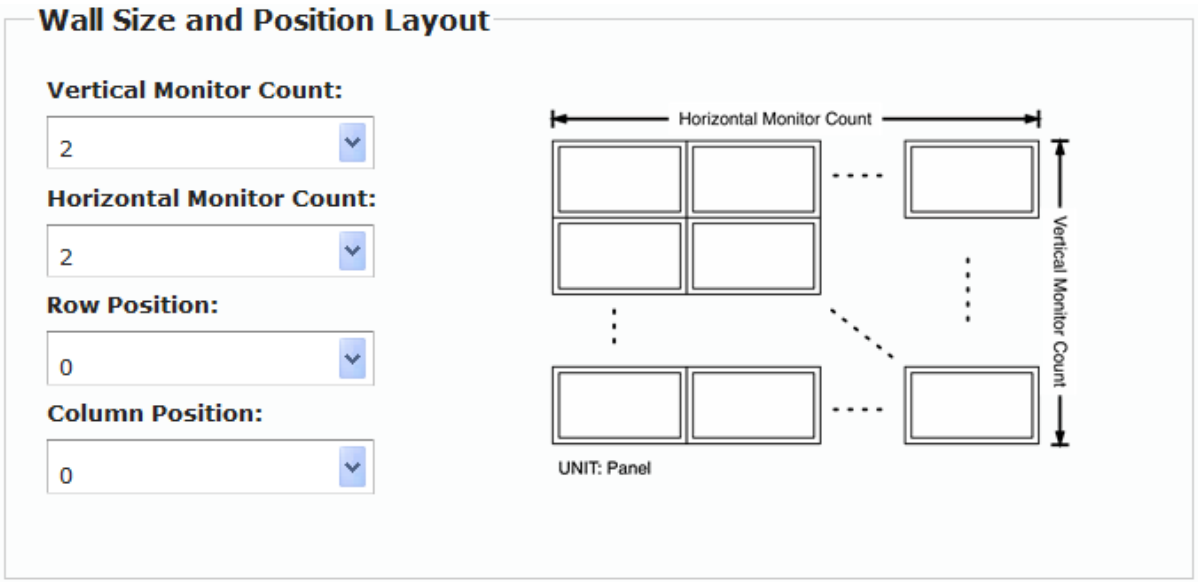




4.2.1.2 Wall Size and Position Layout:

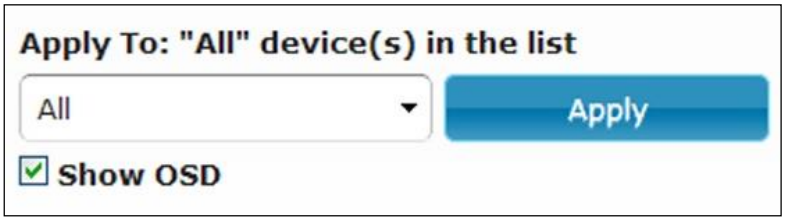
Step 1

Vertical Monitor Count x Horizontal Monitor Count: If the video wall is 2 x 2, then set up Vertical Monitor Count and Horizontal Monitor Count as 2. (Maximum: 8 x 16)



Step 2

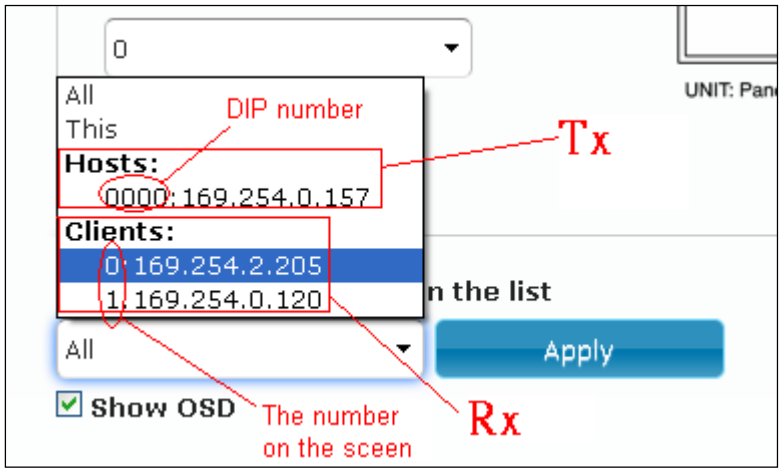
Apply To: Select “All” and check the “Apply” button for your settings and all screens will refresh.



4.2.1.3 Configuring row and column position for each display

- OSD: On-Screen Display. The system automatically assigns a number to each monitor.

User can according to the number do individual control with the corresponding receiver's IP.



- Vertical Monitor Count: The number of monitors on vertical line.

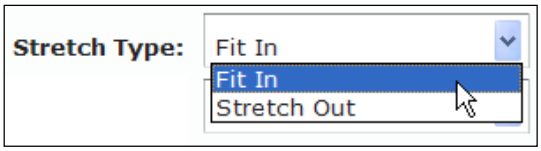
- Horizontal Monitor Count: The number of monitors on horizontal line.

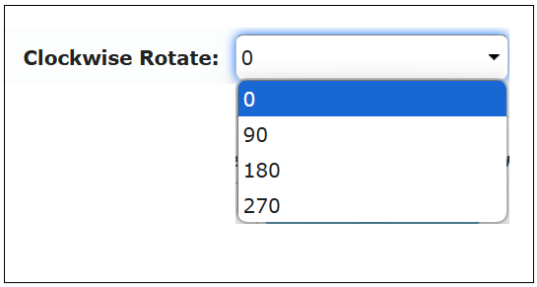
- Row Position: Set up row position for a monitor. For example, if the monitor is situated on the 1st row, the row position should be 0; if the monitor is situated on the 2nd row, the row position should be 1.

- Column Position: Set up column position for a monitor. For example, if the monitor is situated on the 1st column, the column position should be 0; if the monitor situated is on the 2nd column, the column position should be 1.

4.2.1.4 Preferences:

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

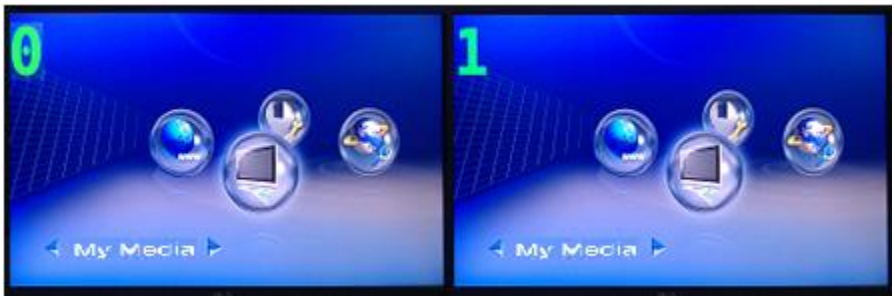




4.2.2 Setup Steps (Examples)

4.2.2.1 1 x 2 video extender

If you want to set a 1 x 2 “video extender” as shown in the following picture, you may refer to the following table and see the steps below:



OSD	0	1
Vertical Monitor Count	1	1
Horizontal Monitor Count	1	1
Row Position	0	0
Column Position	0	0

4.2.2.2 1 x 2 video wall

If you want to set a 1 x 2 “video wall” as shown in the following picture, you may refer to the following table and see the steps below:

Step 1

Show OSD: Check this item and all monitors will show their number on the screen.

Step 2

Wall Size and Position Layout: Decide which part of the screen will be applied to a monitor.

OSD	0	1
Vertical Monitor Count	1	1
Horizontal Monitor Count	2	2
Row Position	0	0
Column Position	0	1

Step 3

Apply To: Select one of the clients by the OSD number for configuring the video wall setting one by one.

Note	After all settings are done, you can uncheck OSD item.

4.2.2.3 2 x 2 video wall

Step 1

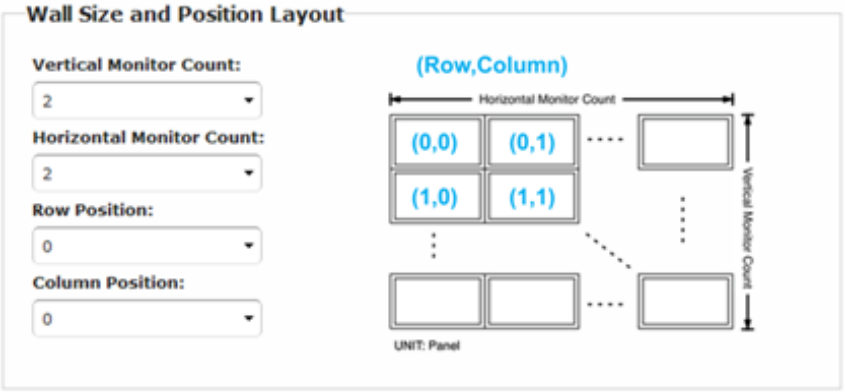
Show OSD: Check this item and all monitors will show their number on the screen.

Step 2

Wall Size and Position Layout: Decide which part of the screen will be applied to a monitor.

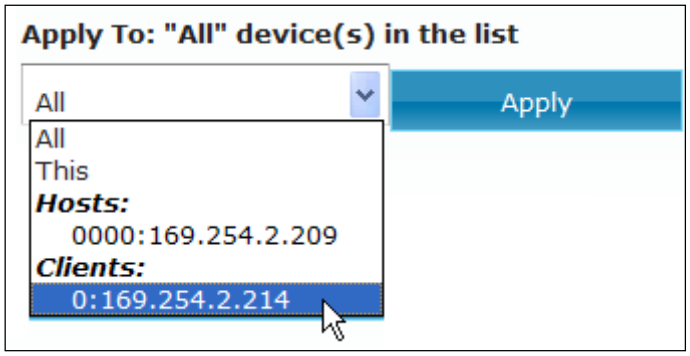
OSD	0	1	2	3
Vertical Monitor Count	2	2	2	2
Horizontal Monitor Count	2	2	2	2
Row Position	0	0	1	1
Column Position	0	1	0	1

To set up “Row Position” and “Column Position”, you are able to refer to the coordination below:



Step 3

Apply To: Select one of the clients by the OSD number for configuring the video wall setting one by one.



Note

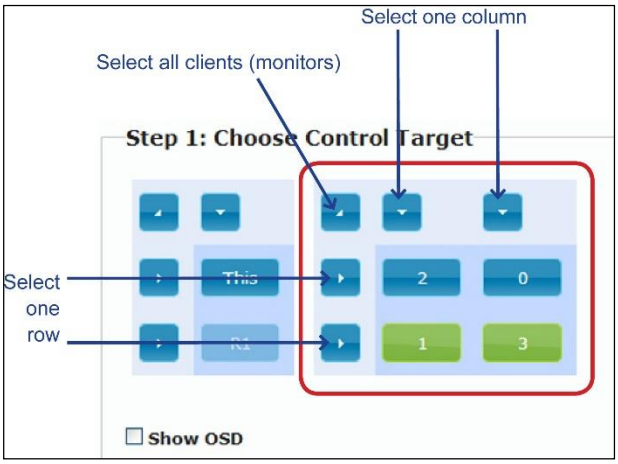
For video wall application, it is NOT suggested to set up your screen array as N (row) x 1 (column) when horizontal resolution is greater than 1280 pixels.

4.2.3 Advanced Setup

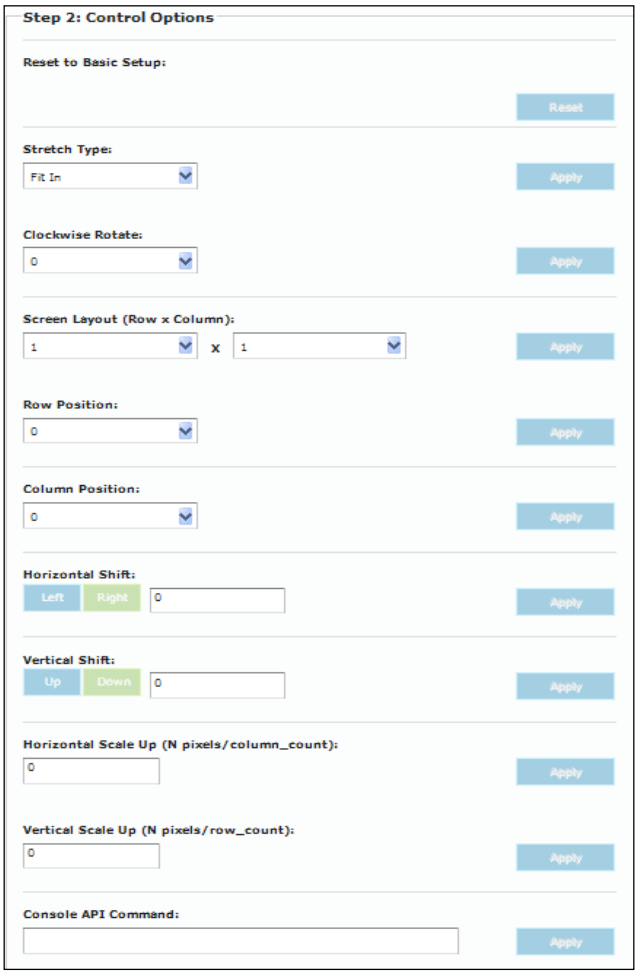
After the Basic Setup is done, users may enter this tab for advanced setting. Please note that each monitor should have its own part of the screen section and does not overlap.

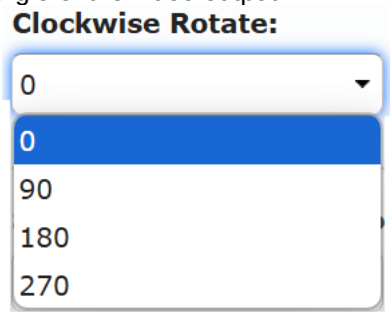
Step 1: Choose Control Target

Show OSD: Check this item and all monitors will show their number on the screen



Step 2: Control Options

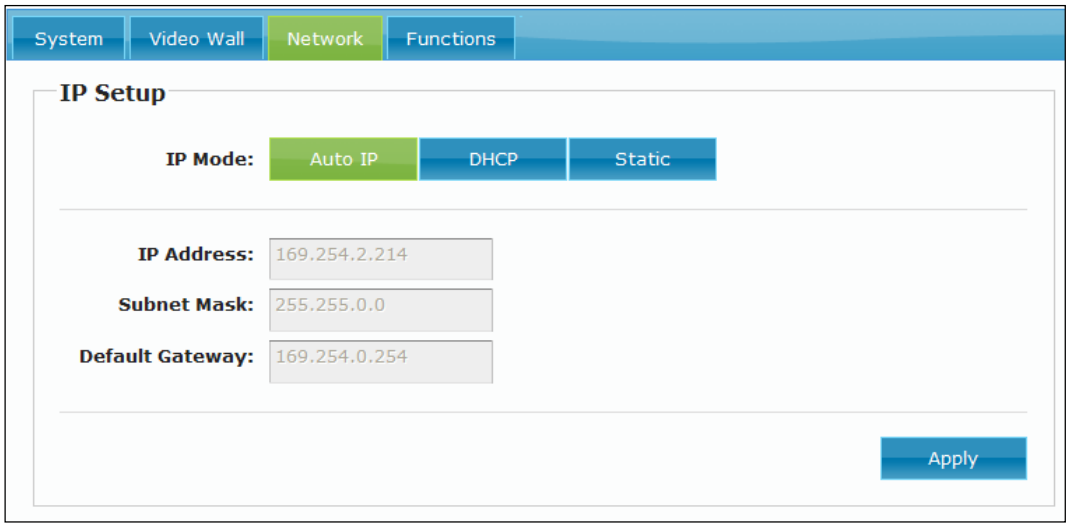


Description	Function
Reset to Basic Setup	If users make incorrect operations, press “Reset” to restore basic setup.
Stretch Type	Set up the video output to “Fit In’ or “Stretch Out” mode in the screen.
Clockwise Rotate	Set up the rotation angle of the video output. 
Screen Layout	Set up the number of vertical and horizontal monitor based on the video wall layout. Vertical number 1~8 and horizontal number 1~16.
Row Position	Set up the row position of monitor, number from 0 to the total number of vertical monitor.
Column Position	Set up the column position of monitor, number from 0 to the total number of horizontal monitor.
Horizontal Shift	Set up the video horizontal shift, left or right.
Vertical Shift	Set up the video vertical shift, up or down.
Horizontal Scale Up & Vertical Scale Up	It is not suggested to configure these two items for it may result in flickering images.
Console API Command	Input Linux command to do advanced setup. The API command is usually for engineers to use, but not for end users.

4.3 Network

User can set the IP mode of each unit here and also can change the casting mode.

4.3.1 IP Setup



Description	Function
Auto IP	By default, each device is auto IP mode; the IP is 169.254.xxx.xxx.
DHCP	IP dispatched from DHCP server.
Static	Set the IP address manually.

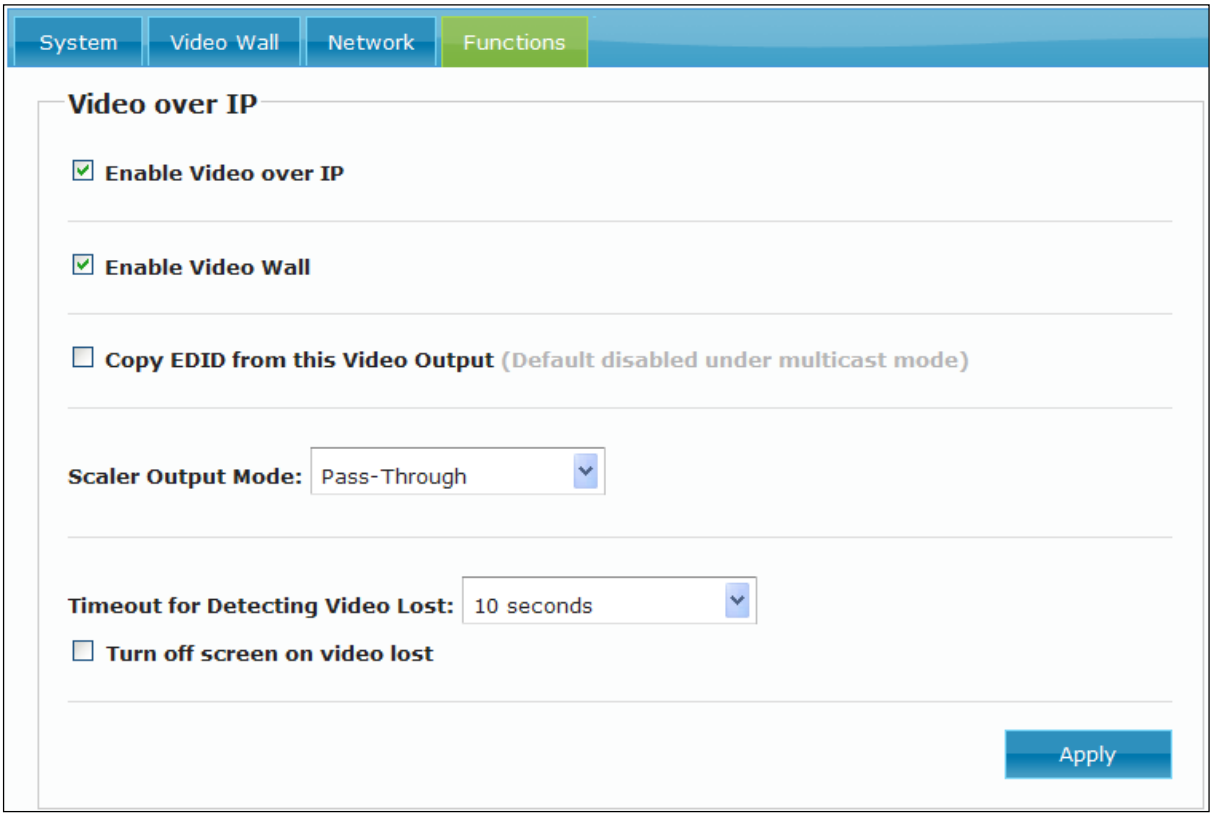
4.3.2 Casting Mode

Description	Function
Multicast	Multicast is a true broadcast. The multicast source relies on multicast-enabled routers to forward the packets to all client subnets that have clients listen. Please make sure all the client's IP addresses have the same subnets.
Unicast	Unicast is a one-to-one connection between the client and the server. Unicast uses IP delivery methods such as Transmission Control Protocol (TCP) and User Datagram Protocol (UDP), which are session-based protocols.

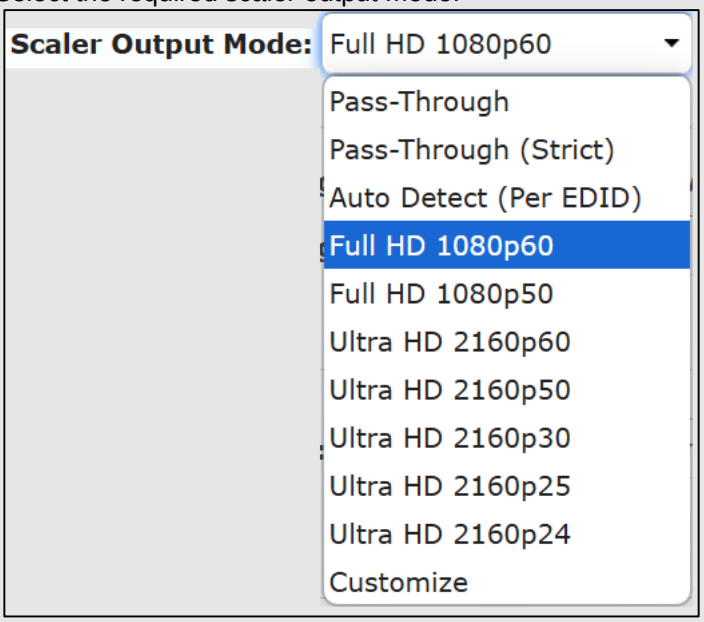
4.4 Function

Here user can make settings for IHD-420 series.

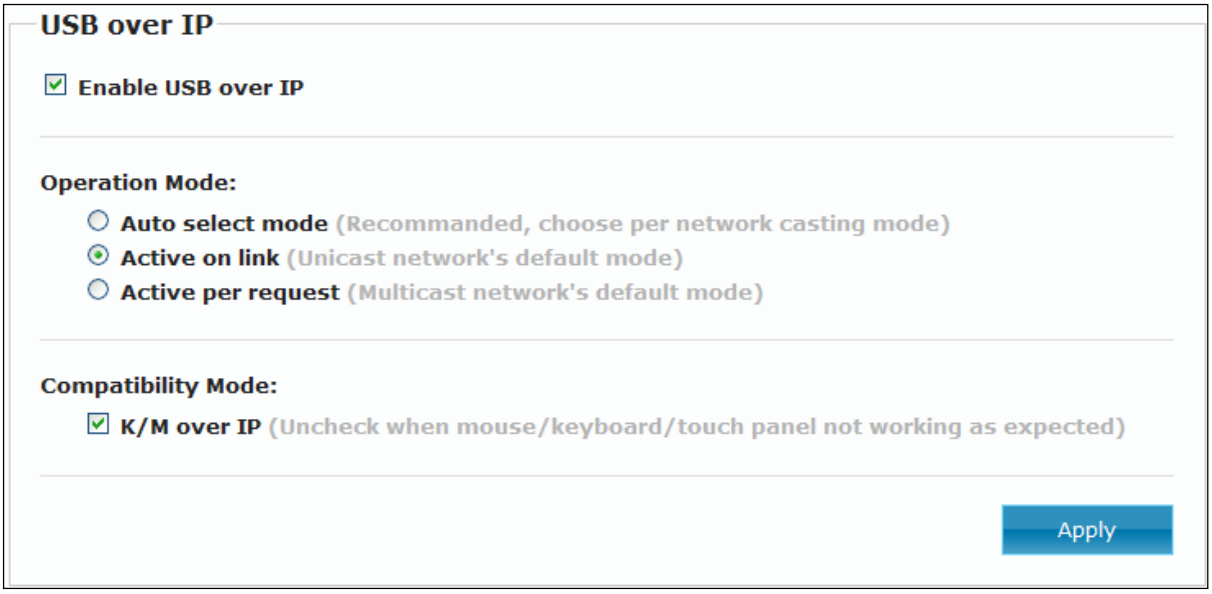
4.4.1 Video over IP



Description	Function
Enable Video over IP	By default, the function is set as enable. If users uncheck this item, then it can't work.
Enable Video Wall	By default, the function is set as enable. If users uncheck this item, then video wall function can't be used.
Copy EDID from this Video Output	User can copy the EDID from this Rx to other Rxs (the same group) with the same ID.

Description	Function
Scaler Output Mode	Select the required scaler output mode. 
Timeout for Detecting Video Lost	Set up the time of stopping the video when detecting video lost. By default, the time is 10 seconds. 

4.4.2 USB over IP



Description	Function
Enable USB over IP	Check it 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.

4.4.3 Audio over IP

Description	Function
Enable Audio over IP	By default, the function is set as enable. If users uncheck this item, then it can’t work.
Enable Audio Return Path	By default, the function is set as enable. If users uncheck this item, then it can’t work.

APPENDIX A. Troubleshooting & Frequently Asked Questions

Q1: What kind of switch should user use for this product?

A:
It is recommended to use the switch which supports Gigabit PoE, Jumbo Frame functions and IGMP snooping function (V2 is fine).

Q2: What is the default IP address of IHD-420PT and IHD-420PR?

A:
The default IP address of IHD-420PT and IHD-420PR is B class Networking: 169.254.xxx.xxx. Please set the IP address of the connected PC as static IP, such as 169.254.xxx.xxx and the sub mask as 255.255.0.0.

Q3: How to find the IHD-420PT's or IHD-420PR's IP address

A:
User is able to find the device's IP address via the monitor or node_list utility.

- Via the monitor:

1. Connect HDMI monitor to the Receiver (IHD-420PR) unit's HDMI Out interface.
2. Set an identical ID number on DIP switch for all units of the same group.
3. Use Cat5e/6 cables (EIA/TIA 568B industry standard compliant) for connection between Transmitter/Receiver and the IEEE 802.3af/at PoE+ switch.
4. Apply the proper power to the Transmitter, Receiver, switch and monitor.
5. The monitor will show the information shown below.

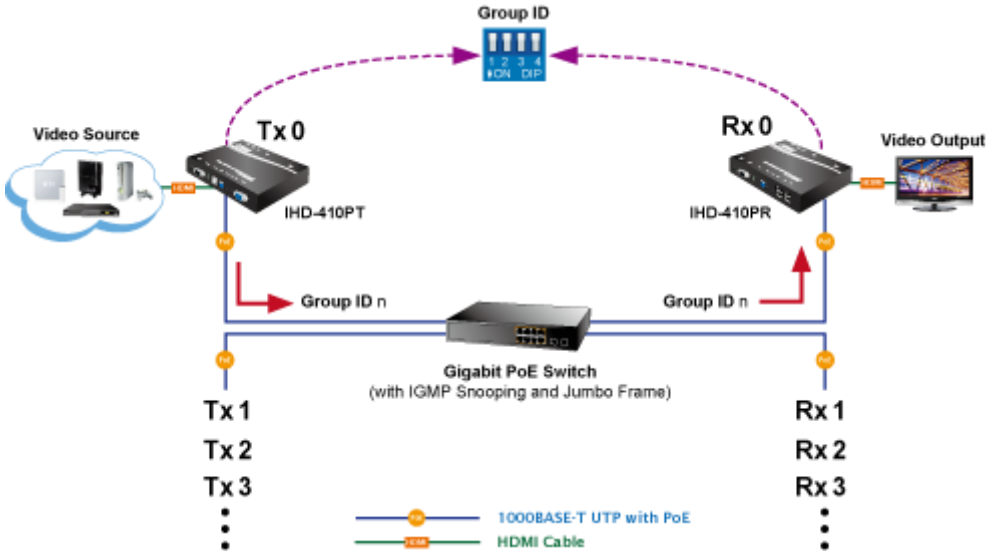
- Via node_list utility:

1. Please refer to the **2.2 section**.

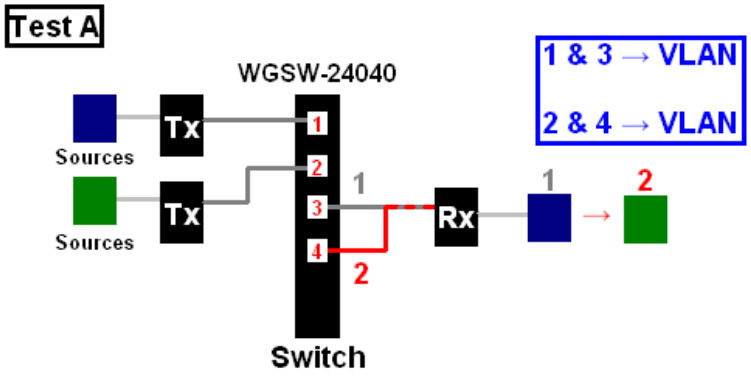
Q4: How can I convert the video source?

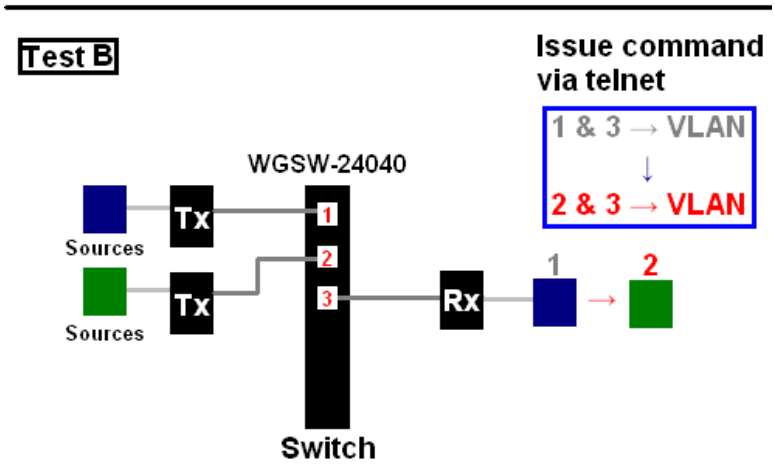
A:
There are three ways to convert the video source. One is to use DIP switch, while the other two are to set VLAN port and go with HDMI splitter (matrix).

1. A Tx (transmitter) supports DIP switch for 16 channels, and every time when you convert the source, you have to switch DIP of all units to the same number.



2. You can set VLAN to convert the video source. Please refer to the topology below and imagine that the concept is based on your issue.





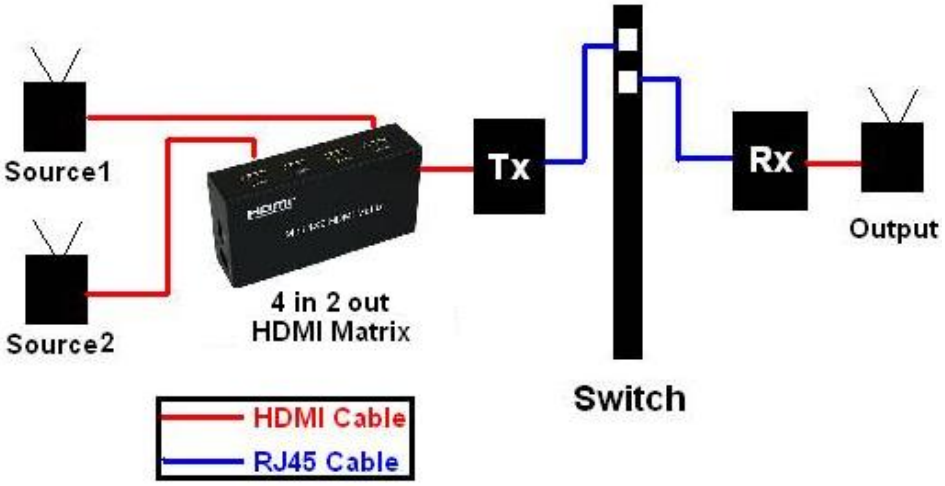
You can set port-based VLAN for the Transmitter (IHD-420PT), and then for the receiver (IHD-420PR). You can just dynamically swap the receiver port to a different VLAN for video source change. You can swap VLAN via Web interface of the switch.

Instructions about the topology above:

As for Test A, we set port1 and port3 to a VLAN, and set port2 and port4 to another VLAN. The Rx will convert the source if we change the connection of Rx and switch from port3 to port4.

As for Test B, we set port1 and port3 to a VLAN, and the Rx will convert the source if we issue the command via telnet to set port2 and port3 to a VLAN.

3. You also could use HDMI splitter (matrix) to convert the source.



As you see, two sources connect to the input of HDMI matrix, and output to Tx, and then Tx and Rx all connect to the switch.
In this case, we use the HDMI matrix controller to select the source.

Q5: Users encounter no screen display in computer connection.

A:

1. Make sure the FW version of IHD-420PT and IHD-420PR are the same.
2. Make sure the device cables are correctly and firmly attached.
3. Set your display device's (TV, monitor, etc.) input source as HDMI.
4. Check the PC BIOS configuration about the video output setting.
5. Slide the DIP Switch to the correct position.
6. Please reboot or disconnect and connect again.

Q6: What's the maximum limit distance between input video source and output video?

A:

The distance from the Tx to PoE switch and the distance from the Rx to PoE switch are both 100 meters. So the maximum distance between Tx and Rx is 200 meters.

Q7: What's the maximum Rx units that can be linked via one Tx unit?

A:

Video Wall: 8 x 16.
Video Extender: Theoretically, 1000 are the most, as long as each Rx unit is assigned to an IP from 65534 IP.

Q8: Why did it fail when upgrading firmware?

A:

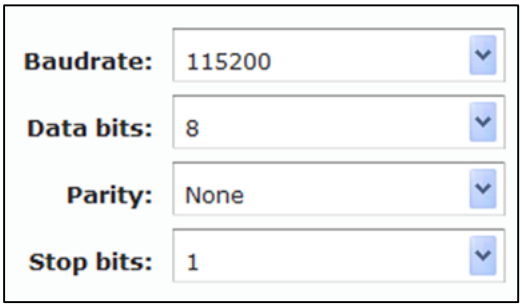
1. The IHD-420PT has a different firmware from the IHD-420PR. Please choose the correct firmware before upgrading the firmware.
2. Do not interrupt the upgrading procedure.
3. User should upgrade the firmware to every unit. (For example, if there are 3 Rx's, user should update for 3 times.)

Q9: Why can't I send data via RS232?

A:

Please check the following:

1. Set the dip switch at the **bottom** of the IHD-420PT and IHD-420PR **to 1** (**ON** is for debug mode).
2. The Tx and Rx should connect to each other successfully.
3. The baud rate of Tx and Rx should be the same. Please refer to the following information for baud rate setting.

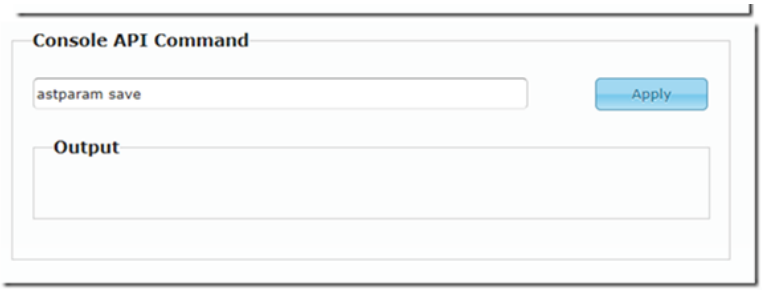


4. Check the RS-232 function of IHD-420PT/PR is enabled via entering the command in the WEB as following steps.

Enable the RS-232 function:

Step1: On the "System→ Utilities" page, enter the command "**astparam s no_soip n**" → click "**Apply"**.

Step2: Enter the command "**astparam save**" → click "**Apply".**



Step3: Enter the command "**astparam dump**" → click "**Apply"** for checking the setting is successfully.

Step4: Please reboot the device to apply the settings.

Q10: About HDCP issue.

A:
The system will disable the video output signal when it detects non-HDCP compliant display(s) playing the HDCP video source. All the connected output displays must be HDCP compliant while the video source is HDCP compliant.

Q11: Why is 4K video source watched on a non 4K monitor so blur or choppy?

A:
We suggest user do not use the low-resolution monitor to watch the higher quality video source. The screen resolution can only be backward compatible, not forward compatible. So please adjust the video source resolution appropriate for the output screen resolution.

Q12: How to use IR extension on IHD-420PT and IHD-420PR?

A:
Please refer to the steps below:

1. Connect the IR blaster cable to IHD-420PT, and make IR blaster cable focus to video source device.
2. Connect the IR receiver cable to IHD-420PR.
3. Power on IHD-420PT and IHD-420PR.
4. Make them connect to each other.
5. Use the remote controller of video source device to control video source device via IR receiver cable.

Q13: Do I have to use the same screen resolution to set video wall?

A:
We suggest user to use the same screen resolution to set video wall so that user can get the best performance.

Q14: How can I connect one video source to two or more Tx ?

A:
It is recommended to use HDMI splitter with two or more ports.

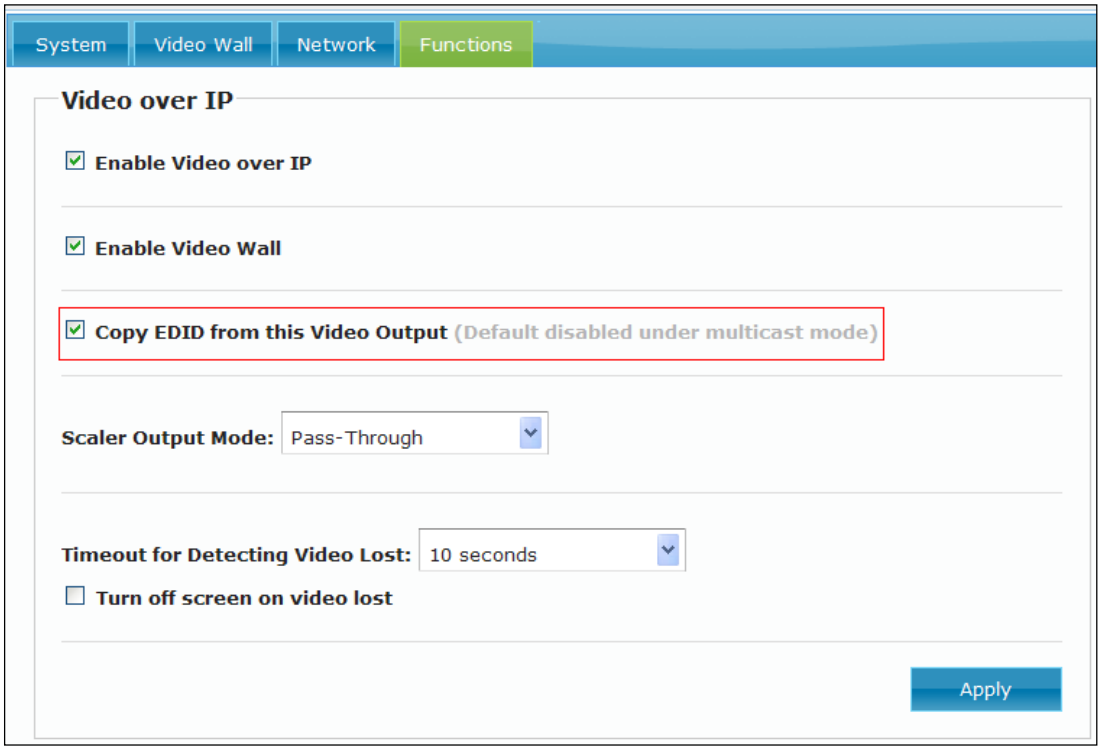
Q15: The output monitor which is connecting to IHD-420PR does not display any video or show wrong color video. How can I fix it?

A:
The IHD-420PR might not copy correct EDID. Please refer to the following:

1. The output monitor should be a real HDMI monitor; do not use DVI-to-HDMI or any converter. EDID is important for it contains information about manufacturer name and serial number, product type, maximum image size, color characteristics, factory pre-set timings, frequency range limits, etc. In some cases display problems may occur due to the incorrect EDID communication between the display monitor and the unit or inappropriate EDID data programmed by display manufacturers. Therefore, by adopting the “EDID COPY” function, it will allow the system to copy EDID information from EDID compliant displays in order to assure accurate display performance.

However, owing to various monitor models, EDID data may not be usable to all. For example, if you use a DVI-to-HDMI converter to a real DVI monitor, the copied EDID (HDMI) data may not be applicable to DVI monitors.

2. Please get into the IHD-420PR’s web management to copy EDID manually.



Q16: Please specify the traffic bandwidth based on one pair of IHD-420PT and IHD-420PR stream.

A:

There are too many factors that are able to affect the bandwidth and compression ratio that depends on your video format, resolution, etc.