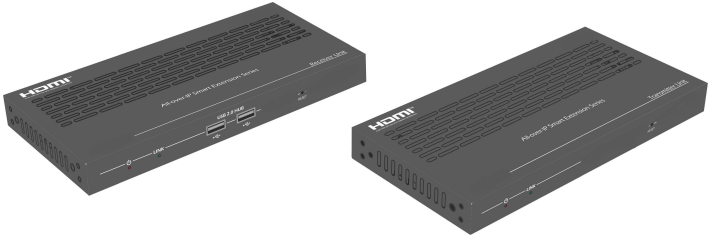
ADERTECH

NVX-CP SERIES



4K All-over-IP Smart Extension System
User Manual Version 1.1

Thank you for purchasing this product

We have done everything possible to ensure that our equipment pleases our consumers. When solving any problems in the operation and connection ADERTECH equipment, it is best to contact authorized companies and specialists who work with our equipment. Our equipment is intended for professional use, so you have professional skills in using such equipment. ADERTECH is a manufacturer of a wide range of multimedia solutions.

Surge protection device recommended

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lighting strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

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1. Introduction

This product is based on Aspeed Hardware Chipset with JPEG2000 technology. Transmitter's input supports up to 4K60, audio embedding or audio out. Receiver output supports up to 4K30, audio extracting or audio in transmitted to Transmitter audio out (only for point-to-point direct connection). The product supports USB2.0/KVM, 1G Ethernet, bidirectional RS-232, two-way IR control and POE function. Guest mode control of RS-232, IR, CEC supported. Built-in secondary H.265 stream which supports plenty API commands to achieve flexible configurations is useful for 3rd party control Apps to preview video content. As the H.265 stream can be accessed in a different domain from JPEG2000 main stream via tagged its LAN ID, this makes it possible to isolate the network systems of main stream which works in Video LAN and secondary stream which works in Control LAN.
The system is based on Linux for software development, provides flexible control methods, that are based on the intelligent networking of 1G Ethernet Switch.

2. Features

- ☆ HDMI 2.0b, HDCP 2.2 compliant
- ☆ Support 18Gbps video bandwidth
- ☆ Input supports up to 4K60 4:4:4, output supports 4K30 4:4:4
- ☆ Transmit video, audio, IR , RS-232, CEC and USB signals over Ethernet
- ☆ Support unicast and multicast functions
- ☆ Support point-to-point, video matrix and video wall functions (video wall supports up to 9x9)
- ☆ Intelligent video wall class management
- ☆ JPEG2000 Main Stream and standard H.265 codec Secondary Stream (SS)
- ☆ Support Secondary Stream VLAN ID and parameters configuration
- ☆ Support 1G Ethernet Switch, router and hub device transmission
- ☆ Support POE function
- ☆ Flexible control through Web GUI/TCP/RS-232/IR and third-party controller
- ☆ HDMI audio formats: LPCM 2.0/5.1/7.1CH, Dolby Digital/Plus/EX, Dolby True HD, Dolby Atmos, DTS, DTS-96/24, DTS-EX DSD, DTS High Res, DTS-HD Master, DTS:X
- ☆ Smart networking design for easy and flexible installation

3. Package Contents

Qty	Transmitter Set
1	4K over IP 1GbE Encoder
1	IR Receiver cable (1.5 meters)
1	IR Blaster cable (1.5 meters)
3	3-pin 3.81mm Phoenix connectors
1	12V/1A Locking Power adapter
2	Mounting ears
4	Machine screws (KM3*4)
1	User Manual

Qty	Receiver Set
1	4K over IP 1GbE Decoder
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3	3-pin 3.81mm Phoenix connectors
1	12V/1A Locking Power adapter
2	Mounting ears
4	Machine screws (KM3*4)
1	User Manual

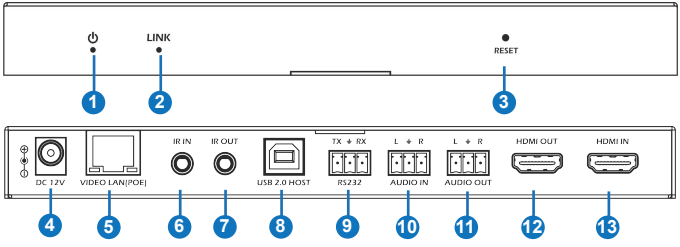
4. Specifications

Technical	
HDMI Compliant	HDMI 2.0b
HDCP Compliant	HDCP 2.2
Video Bandwidth	18Gbps
Video Compression Standard	JPEG2000
Video Network Bandwidth	1G
Video Resolution	480i ~1080p@50/60Hz, 4K@24/30Hz, support 4K@50/60Hz input
Color Depth	8/10/12-bit
Color Space	RGB, YCbCr 4:4:4 / 4:2:2, YUV 4:2:0
HDMI Audio Formats	LPCM 2.0/5.1/7.1CH, Dolby Digital/Plus/EX, Dolby True HD, Dolby Atmos, DTS, DTS-96/24, DTS-EX DSD, DTS High Res, DTS-HD Master, DTS:X
Transmission Distance	100M CAT5E/6/6A/7
IR Level	12Vp-p
IR Frequency	Wideband 20K - 60KHZ
ESD Protection	Human body model — ±8kV (Air-gap discharge) & ±4kV (Contact discharge)

Connection			
Transmitter	Input: 1 x HDMI IN [Type A, 19-pin male] 1 x L/R AUDIO IN [3.81mm Phoenix connector] 1 x IR IN [3.5mm Audio Jack] Output: 1 × HDMI OUT [Type A, 19-pin male] 1 x L/R AUDIO OUT [3.81mm Phoenix connector] 1 x IR OUT [3.5mm Audio Jack] Control: 1 x RS-232 [3.81mm Phoenix connector] 1 x LAN [RJ45 jack] 1 x USB [USB TypeB]		
Receiver	Input: 1 x IR IN [3.5mm Audio Jack] 1 x MIC IN [3.81mm Phoenix connector] Output: 1 x HDMI OUT [Type A, 19-pin male] 1 x IR OUT [3.5mm Audio Jack] 1 x L/R AUDIO OUT [3.81mm Phoenix connector] Control: 1 x LAN [RJ45 jack] 2 x USB1.1 [USB-A male] 2 x USB2.0 [USB-A male] 1 x RS-232 [3.81mm Phoenix connector]		
Mechanical			
Housing	Metal enclosure		
Color	Black		
Dimensions	204mm [W] x 100mm [D] x 21.5mm [H]		
Weight	TX:509g, RX:496g		
Power Supply	Input: AC100 - 240V 50/60Hz, Output: DC 12V/1A (US/EU standards, CE/FCC/UL certified)		
Power Consumption	Encoder: < 8W, Decoder: < 4W		
Operating Temperature	32 - 104°F / 0 - 40°C		
Storage Temperature	-4 - 140°F / -20 - 60°C		
Relative Humidity	20 - 90% RH (no condensing)		
Resolution / Cable Length	**4K60 - Feet / Meters**	**4K30 - Feet / Meters**	**1080P60 - Feet / Meters**
HDMI IN / OUT	16ft / 5M	32ft / 10M	50ft / 15M
The use of "Premium High Speed HDMI" cable is highly recommended.			

5. Operation Controls and Functions

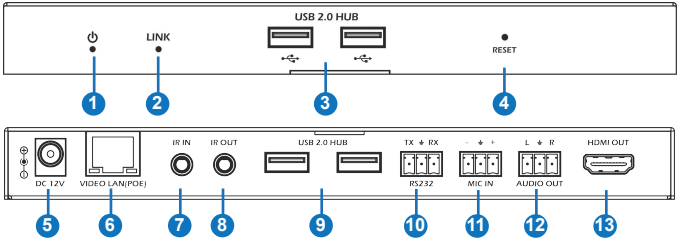
5.1 Transmitter Panel



No.	Name	Function Description
1	POWER LED	When the power is connected normally, Red LED flashes: the system is booting Red LED illuminates: booting successfully
2	LINK LED	When the system starts up normally, Green LED flashes: no signal Green LED illuminates: signal input
3	RESET button	After powering on the device, press and hold the RESET button until the POWER LED and LINK LED flash simultaneously, release the button to reset the device to factory settings.
4	DC 12V	DC 12V/1A power input interface.
5	LAN (POE)	1G LAN port, which can be connected to a third-party network Switch to form a distributed system. **NOTE: When network switch delivers POE power supply, DC 12V adapter doesn't need to apply on the unit.**
6	IR IN	12V IR signal input interface.
7	IR OUT	IR signal output interface.
8	USB HOST	USB-B connector for connecting a PC as KVM function.
9	RS-232	Bidirectional serial signal interface.
10	AUDIO IN	Analog audio input interface, which can be embedded into the HDMI stream for pass-through over to HDMI output and Audio out on Decoder, or be loopout by the AUDIO OUT port on Encoder.

11	AUDIO OUT	Analog audio output interface. It can output the audio extracted from the HDMI IN port or the audio from the local AUDIO IN port of the Encoder. Also it can output the audio transmitted from the MIC IN port of the Decoder in unicast mode (point-to-point direct connection).
12	HDMI OUT	HDMI loop out for display.
13	HDMI IN	HDMI signal input interface.

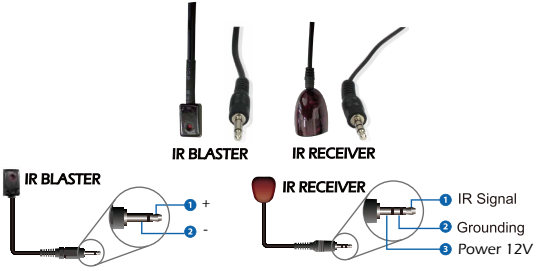
5.2 Receiver Panel



No.	Name	Function Description
1	POWER LED	When the power is connected normally, Red LED flashes: the system is booting Red LED illuminates: booting successfully
2	LINK LED	When the Decoder and Encoder is connected normally, Green LED flashes: no signal Green LED illuminates: signal input
3	USB DEVICE 1.1	Two USB1.1 device interface.
4	RESET button	After powering on the device, press and hold the RESET button until the POWER LED and LINK LED flash simultaneously, release the button to reset the device to factory settings.
5	DC 12V	DC 12V/1A power input interface.
6	LAN (POE)	1G LAN port, which can be connected to a third-party network Switch to form a distributed system. **NOTE: When network switch delivers POE power supply, DC 12V adapter doesn't need to apply on the unit.**
7	IR IN	12V IR signal input interface.
8	IR OUT	IR signal output interface.

9	USB DEVICE 2.0	Two USB2.0 device interface.
10	RS-232	Bidirectional serial signal interface.
11	MIC IN	Microphone interface (only for point-to-point direct connection)
12	AUDIO OUT	Analog audio output interface. It outputs the same audio of it on HDMI OUT in case audio format is LPCM.
13	HDMI OUT	HDMI signal output interface.

5.3 IR Pin Definition



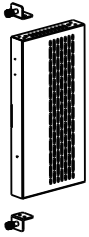
NOTE: When the angle between the IR receiver and the remote control is ± 45 °, the transmission distance is 0-5 meters; when the angle between the IR receiver and the remote control is ± 90 °, the transmission distance is 0-8 meters.

6. Rack Mounting Instruction

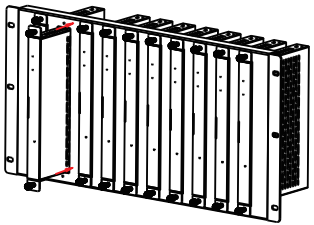
6.1 6U Rack Mounting

This product can be mounted in a standard 6U rack (Please contact your supplier for 6U rack sale). The mounting steps are as follows:

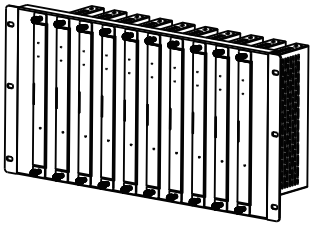
Step 1: Use included screws to fix two mounting ears on the product, as shown in the figure below:



Step 2: Insert the product with mounting ears into a 6U rack (up to 10 units can be installed vertically), as shown in the figure below:



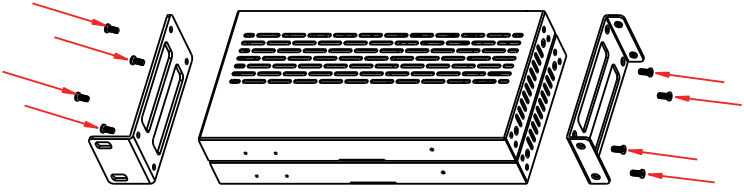
Step 3: Use screws to fix mounting ears on the rack to complete the mounting, as shown in the figure below:



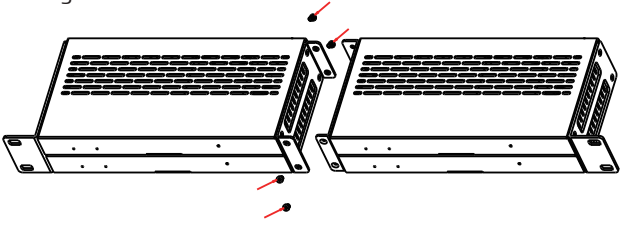
6.2 1U Rack Mounting

This product also can be mounted in a standard 1U rack (up to 4 units can be installed horizontally). The mounting steps are as follows:

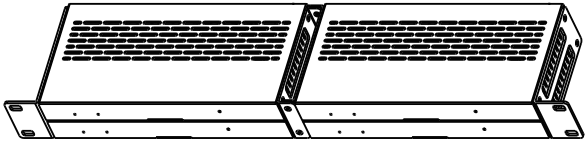
Step 1: Stack two products on top of each other, then use included screws to fix two 1U rack panels on the products, as shown in the figure below:



Step 2: Fix two 1U rack panels on another two stacked products in the same way, then use screws to fix two 1U rack panels together, as shown in the figure below:



Step 3: Fasten screws between two 1U rack panels, so that four products are mounted in a 1U rack, as shown in the figure below:



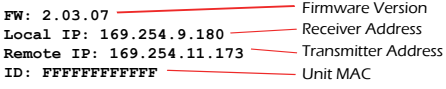
7. WebGUI Control

7.1 Connecting Web for Control

All major functions of the unit, including status, streaming method, streaming channel selection, output resolution, video wall configuration, EDID management, Ethernet settings, and reset/firmware functions are controllable via multiple tabs in the WebGUI interface allowing for reasonably intuitive operation.

Use OSD menu of the Receiver unit or the NVX-CP-CTRL hardware controller to find information about IP address. Enter the IP address in the browser to get access to the unit's WebGUI. Once you have connected to a unit's WebGUI, you will be presented with a screen containing multiple tabs for each functionality area of the unit. To view the contents of a tab, click on the appropriate button at the top of the window. The individual tabs and functions will be introduced in the following sections.

Receiver Unit OSD

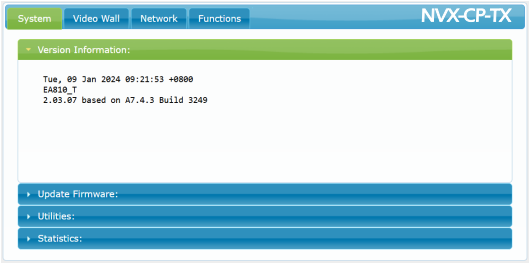


7.2 System Tab

The System tab contains 4 windows that provide access to firmware version information, a firmware update interface, utilities for rebooting and resetting the unit, basic EDID management, Telnet command entry, and a variety of statistics and information about the operational state of the unit.

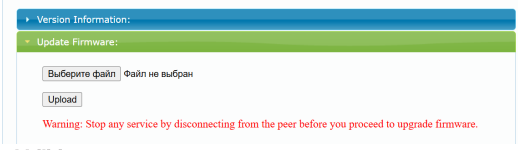
- **Version Information**

This window displays detailed information about the version of firmware.



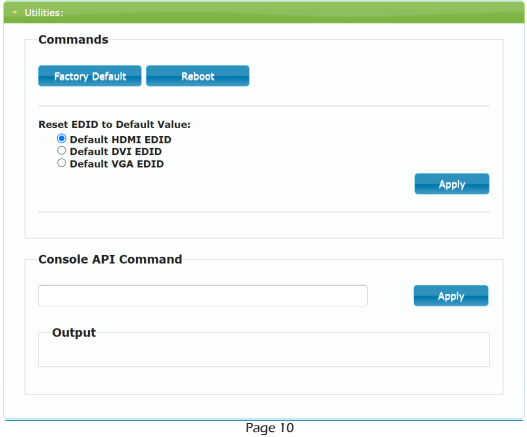
- **Update Firmware**

Provides a way to update the Transmitter's firmware. Click "Choose File" to select the firmware update file from the local PC (*.bin format). After selecting an appropriate file, click the "Upload" button to begin the update process.



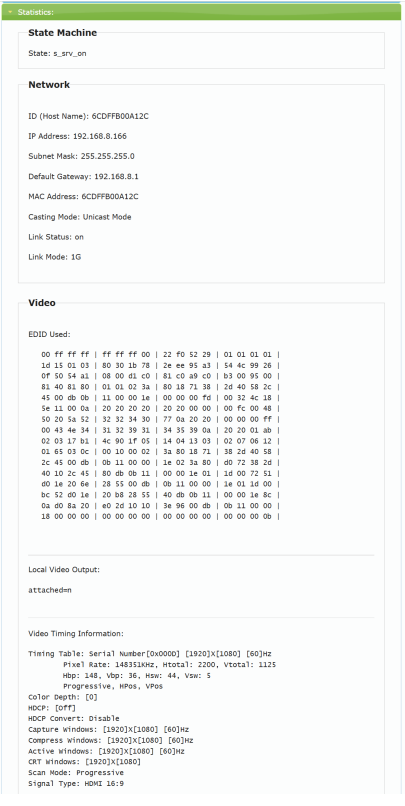
- **Utilities**

The Utilities window allows users to reset the unit back to the factory defaults by clicking "Factory Default". The unit may be rebooted (without resetting settings) by pressing the "Reboot" button. If the EDID received from the primary Receiver unit has compatibility issues with the connected HDMI source, the internal HDMI/DVI/ VGA can be selected. Please press "Apply" after making the selection. API commands may be sent to the unit by using the "Console API Command" text entry field and pressing "Apply". Any responses from the unit will be displayed in the "Output" field.



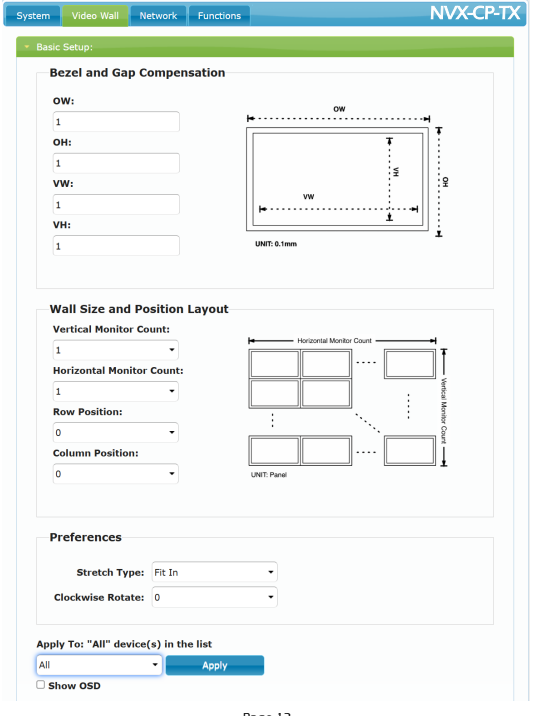
- **Statistics**

The Statistics window shows all available information about the operational status of the unit, including current Host ID Name, Ethernet information, MAC address, unicast/multicast mode, link status and mode. Video block shows EDID data, Video Timing Information and HDCP Mode.



7.4 Video Wall Tab

The Video Wall tab allows user to design, edit and manipulate a video wall system created using multiple Receiver units connected to identical displays. The bezel and video size of the displays being used, as well as the horizontal and vertical monitor count, is defined here. Video stretch and rotation can also be controlled on this tab. Receivers in the video wall group sharing the same channel can be controlled by any other unit within the same group. The Video Wall settings may only be applied to Receiver units.



- **Bezel and Gap Compensation**

This section of the Video Wall tab is used to define the physical dimensions of each display being used in the video wall. Accurate measurements are needed of the monitor's outer frame (OW, OH) and the video screen (VW, VH). The measurements may be made using any unit of measurement (inches, mm, cm, etc.) as long as ALL measurements in the same wall are made using the exact same units and the numbers are integers.

- **OW (Outer Width)**: This is the horizontal measurement of the display's outer case.

- **OH (Outer Height)**: This is the vertical measurement of the display's outer case.

- **VW (Video Width):** This is the horizontal measurement of the display's video screen.

- **VH (Video Height):** This is the vertical measurement of the display's video screen.

- **Wall Size and Position Layout**

This section of the Video Wall tab is used to define the number of displays used in the video wall as well as the location of the specific display within the video wall. A typical video wall consists of an equal number of horizontal and vertical monitors (for example: 2×2 or 3×3), however it is possible to create video walls using this system with a wider variety of dimensions as long as the end result is still a rectangle (for example: 5×1 or 2×3). Both horizontal and vertical dimensions are limited to a maximum of 8 displays.

- **Vertical Monitor Count:** Define the number of displays in the video wall, measured vertically. (Maximum is 8 displays)

- **Horizontal Monitor Count**: Define the number of displays in the video wall, measured horizontally. (Maximum is 8 displays)

- **Row Position:** Set the vertical location of the currently controlled display. (Counts top to bottom, from 0 to 7)

- **Column Position**: Set the horizontal location of the currently controlled display. (Counts left to right, from 0 to 7)

- **Preferences**

This section of the Video Wall tab provides additional controls over how the source video is displayed on the video wall as well as providing a drop down to determine which Receiver to apply changed settings to.

- **Stretch Type**: Set the video stretch method.

- Selecting "Fit In" will expand the video to exactly fit the dimensions of the video wall regardless of the source's original aspect ratio.

- Selecting "Stretch Out" will zoom the video until the video wall is filled in all 4 dimensions while maintaining the aspect ratio of the original source.

- **Clockwise Rotate**: Set the rotation of the video output to 0, 180 or 270 degrees.

- **Apply To**: Select which unit(s) to send updated settings to when "Apply" is pressed.

- Selecting "All" will direct updates to the video wall settings of all units in the current video wall group (Transmitter and Receivers).

- Selecting "This" will direct updates to the video wall settings of the unit whose WebGUI you are currently connected to.

- Selecting an IP address from the "Hosts" list will direct updates to the video wall settings of the Transmitter with that IP address.

- Selecting an IP address from the "Clients" list will direct updates to the video wall settings of the Receiver with that IP address.

- **Show OSD:** Enables or disables the OSD display of the current channel selection.

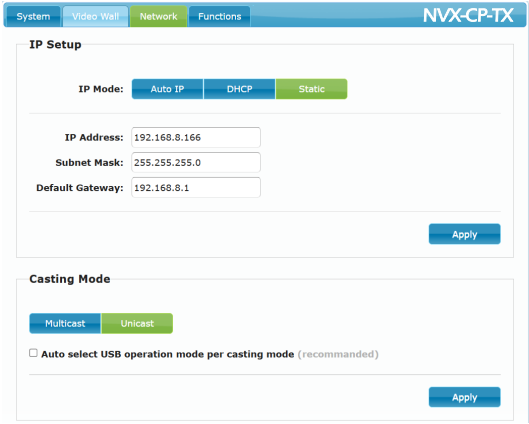
NOTE: When setting up a new video wall, or changing the configuration of an existing one, remember to update the configuration of each Receiver in the system.

7.5 Network Tab

The network tab provides controls over the Transmitter's broadcast channel, IP confiuration, and network broadcast mode. Changes made to the network settings will require a reboot of the unit.

- **IP Setup**

The IP mode may be switched between "Auto IP", "DHCP" or "Static IP". When the unit is set to Auto IP mode it will automatically assign itself an APIPA address from the 169.254.xxx.xxx range. When the unit is set to DHCP mode it will attempt to automatically obtain an IP address from a DHCP server. When the IP mode is set to static IP, you can manually set the IP address, netmask and gateway address. Click the "Apply" button to save changes made to the IP Mode or Configuration.

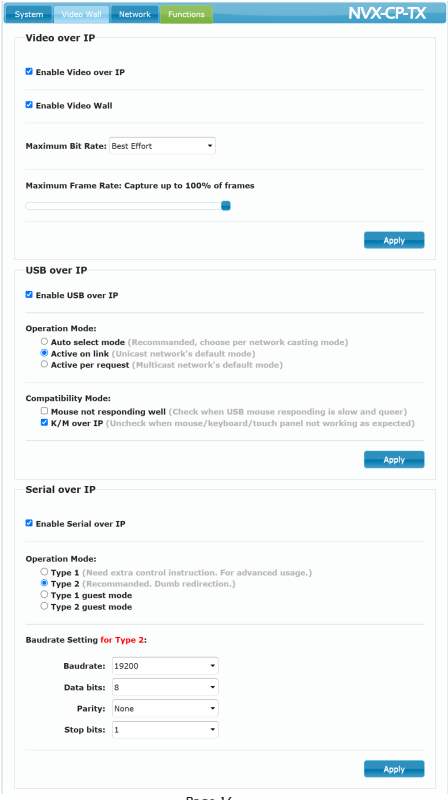


- **Casting Mode**

Multicast: This mode sends a single video stream that can be viewed imultaneously by multiple receivers without increasing bandwidth usage. Unicast: This mode uses a discrete video stream for every connected Receiver and is ideal for simple, point-to-point, streaming setups.

7.6 Functions

The Functions tab provides control over the Transmitter's video source selection, streaming bandwidth/quality settings, as well as a wide variety of optional features and functions, including USB and Serial control extension. Please be noted that this tab view and some functions have difference for Transmitter and Receiver.



- **Video over IP (Transmitter)**

This section allows control over many critical functions of the Transmitter including: selection of the input source, enabling/disabling the VoIP stream, enabling access to the Video Wall tab, and controlling the streaming bit rate and quality.

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

- **Enable Video Wall**: Checking this box will enable the Video Wall tab in the WebGUI.

- **Maximum Bit Rate:** Set the maximum bit rate that can be used by a single video stream. Available options are: Best Effort, 200 Mbps to 10 Mbps. Selecting "Best Effort" will use up to the maximum available bandwidth in order to maintain a full framerate video stream.

- **Maximum Framerate:** Adjusting this slider will set the percentage of frames from the source video to encode (2–100%). This is ideal for reducing the bandwidth requirements of high-resolution, but limited motion, sources such as power point presentations or information screens.

- **USB over IP**

This section provides controls for the USB over IP extension functionality, including enabling/disabling USB support, changing the USB operational mode, and enabling special compatibility modes.

- **Enable USB over IP**: Unchecking this checkbox will completely disable support for USB over this stream. This option should generally remain checked, but, if USB support is not required, disabling this feature can save some bandwidth.

- **Operation Mode**: Sets the USB extension mode. Available options are Auto, Active on link (Unicast optimized), and Active per request (Multicast optimized). Auto mode is set by default and will automatically select the correct mode depending on the broadcast mode of the unit.

- **Compatibility Mode**: These troubleshooting options enable specialized optimizations to solve issues when a mouse or touch panel is not responding properly. They should normally be left unchecked.

- **Serial over IP**

This section provides controls for the Serial over IP extension functionality, including enabling/disabling Serial support and setting the RS-232 data configuration.

- **Enable Serial over IP**: Unchecking this checkbox will completely disable support for sending RS-232 commands over this stream. This option should generally remain checked, but, if serial support is not required, disabling this feature can save a very small amount of bandwidth.

- **Serial Settings**: Set the desired baud rate, data bits, parity, and stop bit for the RS-232 signal to extend.

NOTE: The Transmitter and Receiver must have the same serial settings. Use Type 2 Mode.

- **Video over IP (Receiver)**

This section allows control over many critical functions of the Receiver including: enabling/disabling the VoIP stream, enabling access to the Video Wall tab, controlling the scaler/output resolution, and controlling the behavior upon signal loss.

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

- **Enable Video Wall**: Checking this box will enable the Video Wall tab in the WebGUI.

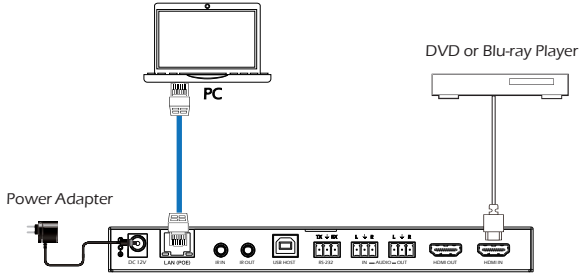
- Scaler Output Mode: Use the drop down list to select the preferred output resolution for the scaler. Selecting one of the specific resolutions will output all video at that resolution. Selecting "Pass-Through" will output the source video at its original resolution. Selecting "Native" will attempt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

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

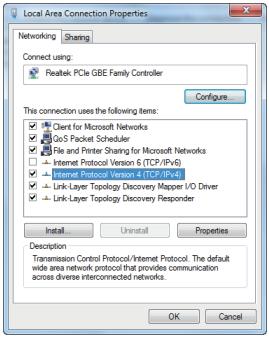
7.7 Connecting WebGUI for Secondary Stream Control

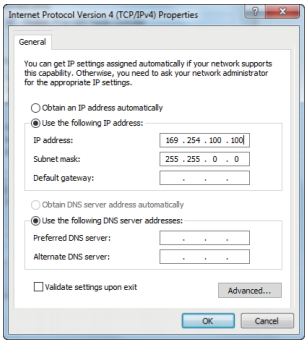
The product supports playing Secondary Stream on computer through the corresponding software such as VLC media player, simultaneously you can access the build-in Web GUI to configure the Secondary Stream. Follow the steps below to enter the Web GUI.

Step 1: Connect Receiver with a PC, HDMI source device and power supply. The connection diagram is shown as below.



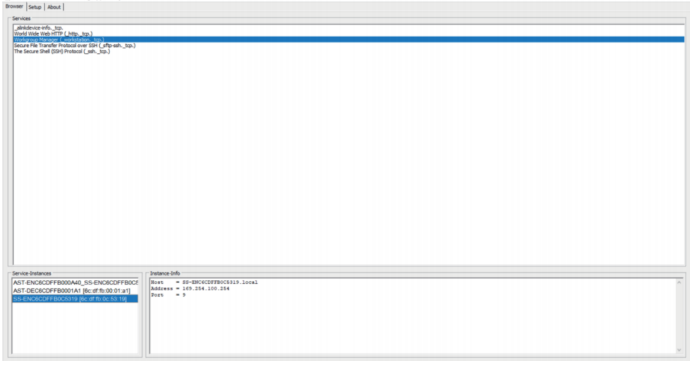
Step 2: Set the PC's IP address to be 169.254.100.100, and the Subnet mask to be 255.255.0.0.





Step 3: Install a bonjour protocol checking tool (such as zeroconfService Browser) on PC to find the IP address of the Encoder.

Take zeroconfServiceBrowser as an example. After opening the software, you can select "Workgroup Manager" in Services of Browser, select the Host name in Service-Instances, and find the IP address in the Address item in of Instance-Info.



NOTE:

(1) The window in the lower left corner displays the Host names of all devices in the current network. Because Encoder contains a Secondary Stream chip (SS), it will be displayed as two Host names with corresponding IP addresses.

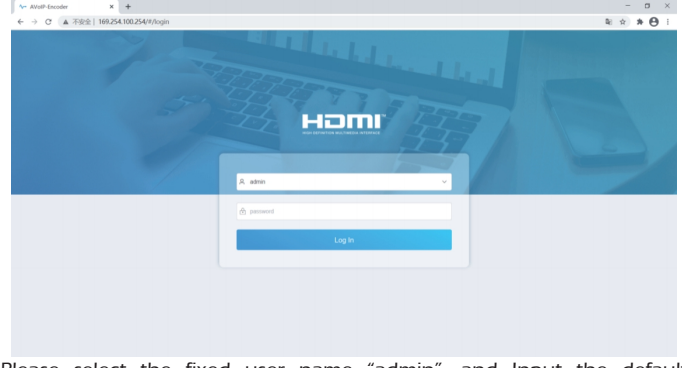
(2) The window in the lower right corner displays the Host name, IP address and Port number of the device.

(3) The Host name of Encoder starts with AST-ENC; the Host name of Decoder starts with AST-DEC; the Host name of Encoder Secondary Stream chip
(SS) starts with SS-ENC.

(4) The Host name of Encoder contains the Host name of the Encoder Secondary Stream chip (SS).

Step 4: Set the PC's IP address to the same network segment with IP address of the Encoder Secondary Stream (SS). (If these two IP addresses are in the same network segment, you can skip this step.)

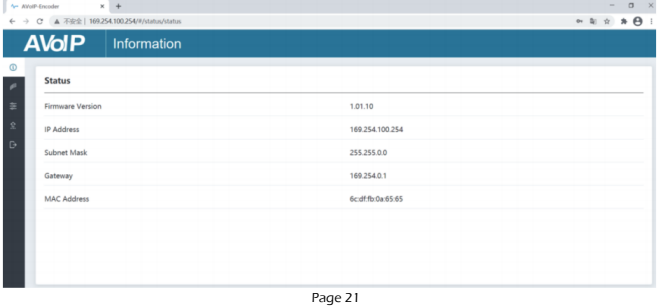
Step 5: Input the IP address of the Encoder Secondary Stream (SS) found through the bonjour protocol checking tool into the web browser on PC. The following login interface will appear.



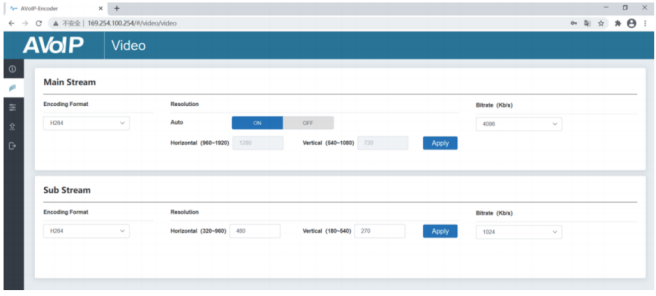
Please select the fixed user name "admin", and Input the default password "admin". Then click "Log In" to enter the Status page.

■ Status Page

The Status page provides basic information about the installed firmware version and the network settings.

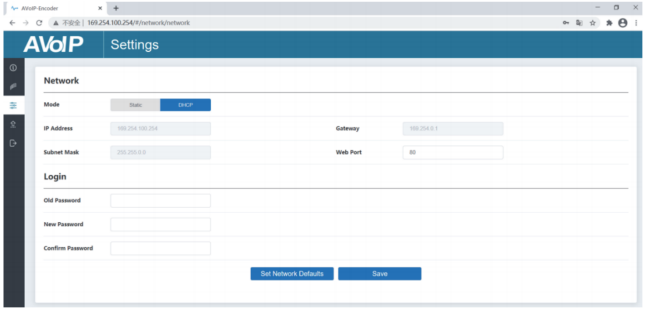


■ Video Page



On the Video page, you can set the Main Stream and Sub Stream separately. Encoding Format can be set to H.265/H.264 according to the decoding protocol used in the 3rd party software which decodes the Secondary Stream. Pull the drop-down box to select it to take effect. The Resolution of the Main Stream includes Auto, Horizontal and Vertical. If Auto is set to ON, the resolution will follow the input resolution. At this time, Horizontal and Vertical display the current input resolution and are grayed out and cannot be set. If Auto is set to OFF, then Horizontal and Vertical can be set to the resolution of the Main Stream encoding. The horizontal range is 960~1920, the vertical range is 540~1080, and it needs to be an even number. Click the "Apply" button to take effect. The Resolution of the Sub Stream includes Horizontal and Vertical. Horizontal and Vertical can be set to the resolution of the Sub Stream encoding. The horizontal range is 320~960, the vertical range is 180~540, and it needs to be an even number. Click the "Apply" button to take effect. Bitrate is used to set the bit rate of the encoding.

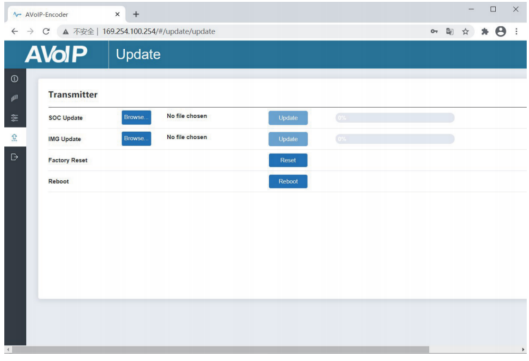
■ Setting Page



The Setting page includes two parts: Network and Login. Network can be set to Static or DHCP. When set to Static, you can enter IP address, gateway and subnet mask; When set to DHCP, the IP address, gateway and subnet mask are grayed out and cannot be edited. A DHCP server (e.g. network router which automatically assigns IP related settings should be installed in the system. Web Port is the port of the Web page. After setting, click "Save" to take effect. After setting the IP address, the page will automatically switch to the set IP address. Click "Set Network Defaults", it will be restored to the default DHCP state.

The Web login password can be changed on the "Login" part. Enter the old password in "Old Password", enter the new password in "New Password", enter the new password again in "Confirm Password", and click the "Save" button to take effect.

■ Update Page



The SOC Update column is used to upgrade firmware. Click the "Browse" button to select the firmware, and then click "Update". When the progress bar reaches 100%, the upgrade completes and the machine restarts automatically. The IMG Update column is used to upload the no-signal picture, click the "Browse" button to select the picture in jpg format (the resolution of the picture should be less than or equal to 1920x1080, and the width should be a multiple of 8, the height should be a multiple of 2, and the size of the picture should be less than 512kB), and then click "Update". When the progress bar reaches 100%, the upload completes, and the machine takes effect without rebooting.

7.6 Instruction for Playing the Secondary Stream

After the Web GUI is successfully connected, open a media player on PC (VLC or any other). Enter a MainStream or SubStream network URL, then start playing.

Stream	Network URL
MainStream	rtsp://169.254.100.254/live/main/av_stream
SubStream	rtsp://169.254.100.254/live/sub/av_stream.

8. Switch Model

A network Switch used to set up the system should support below features:

1. Type of layer 3/managed network Switch.
2. Gigabit bandwidth.
3. 8KB jumbo frame capability.
4. IGMP snooping.

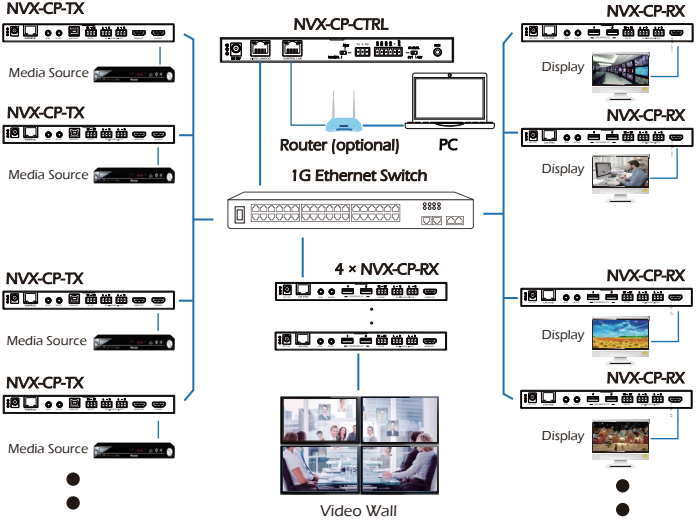
The following Switch models are highly recommended.

Manufacturer	Model Number
CISCO	CISCO SG500
CISCO	CATALYST series
HUAWEI	S5720S-28X-PWR-LI-AC

9.All-over-IP System Control

To achive the full functionality of this product it is recommended to use the hardware controller unit NVX-CP-CTRL. Controller has ability to automatically search and configure all the connected VIP-COP familty units. It gives not only webGUI interface for Matrix Routing Control, VideoWall and system management, but the full functional open API interface for third-party system controllers. For more details about All-over-IP harware controller features, please refer to the user manual of NVX-CP-CTRL.

10. Application Example



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