4K AV over IP with Video Wall Processing

User Manual

VER 1.0

Thank you for purchasing this product

For optimum performance and safety, please read these instructions carefully before connecting, operating or adjusting this product. Please keep this manual for future reference.

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.

Table of Contents

1. Introduction

This product adopts Aspeed JPEG200 solution and supports USB2.0 KVM function. It supports up to 4K60 444 input, 4K60 420 output. Encoder supports 4K60 444 HDMI loop output and H.264/H.265 coding auxiliary stream (for image echo). It can realize multi-channel digital audio and analog audio transmission. It supports 1G Ethernet (Network GbE conversion), bidirectional RS-232, two-way IR control and POE power supply.

2. Features

- ☆ HDCP 2.2 compliant
- ☆ Support 10.2Gbps video bandwidth
- ☆ Support up to 4K60 4:4:4 input, 4K60 4:2:0 output
- ☆ Color space: RGB, YCbCr 4:4:4, YCbCr 4:2:2
- ☆ JEPG2000 main stream and standard H.265 codec auxiliary stream
- ☆ Transmit video, audio, infrared, USB2.0 KVM over Ethernet
- ☆ Support unicast, multicast, video segmentation and TV wall function
- ☆ Support 1000 Ethernet switch, router and hub device transmission
- ☆ Flexible control by Web, IOS tablet and the third-party
- ☆ HDMI audio formats: LPCM, Dolby Digital/Plus/EX, Dolby True HD, DTS, DTS-EX,DTS-96/24, DTS High Res, DTS-HD Master Audio, DSD
- ☆ Smart networking design for easy and flexible installation.

3. Package Contents

Qty	Item
1	AV over IP Encoder
1	AV over IP Dncoder
1	12V/1A Power adapter
1	User Manual
1	12V IR Receiver cable
1	5V IR Receiver cable
1	5V IR Blaster cable
1	2-pin 3.81mm phoenix connector
4	3-pin 3.81mm phoenix connector

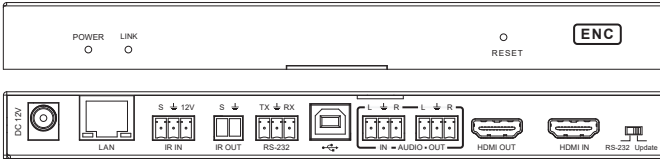
4. Specifications

Technical	
HDCP Compliant	HDCP 2.2
Video Bandwidth	10.2 Gbps (297MHz)
Video Resolution	480i ~1080p50/60Hz, 4Kx2K@24/30Hz, support 4k2k@60Hz input
Color Depth	8/10/12-bit (1080P60Hz) 8-bit (4K60Hz)
Color Space	RGB, YCbCr 4:4:4 / 4:2:2, YUV 4:2:0
HDMI Audio Formats	LPCM 2/5.1/7.1CH, Dolby Digital, DTS 5.1, Dolby Digital+, Dolby TrueHD, DTS-HD Master Audio, Dolby Atmos, DTS:X
ESD Protection	Human body model — ±8kV (Air-gap discharge) & ±4kV (Contact discharge)

Connection			
Input ports	1x HDMI Type A (19-pin female) 1x IR IN phoenix connector (3-pin female) 1x 12V 1A bolt power socket 1x RS232 phoenix connector (3-pin female) 1x USB HOST Type B (5-pin female) 1x AUDIO IN phoenix connector (3-pin female)		
Output ports	1x HDMI Type A (19-pin female) 1x IR OUT phoenix connector (2-pin female) 1x AUDIO OUT phoenix connector (3-pin female)		
Mechanical			
Housing	Metal enclosure		
Color	Black		
Dimensions	200mm [W] x 100mm [D] x 20mm [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	TX: 9.8W, RX: 7W		
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.			

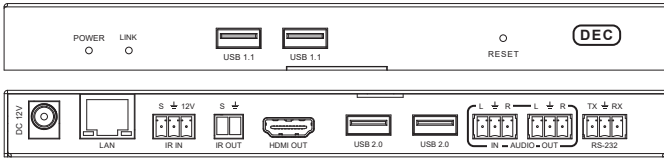
5. Operation Controls and Functions

5.1 Encoder Panel



Name	Function Description
POWER LED	When the power is connected normally, Red LED flashes: the system is booting Red LED illuminates: booting successfully
LINK LED	When the system starts up normally, Green LED flashes: no signal Green LED illuminates: signal input
RESET button	Power on the device while pressing this button, when POWER LED and LINK LED flash simultaneously, release the button to reset the device to factory settings.
DC 12V	DC 12V power input interface
LAN	1G LAN port, which can be connected to a third-party network switch to form a distributed system.
IR IN	IR signal input interface.
IR OUT	IR signal output interface.
RS-232	Bidirectional serial signal interface.
USB HOST	USB-B connector for connecting a PC as KVM function.
AUDIO IN	3-pin phoenix connector for analog audio input, which can be embedded in the HDMI stream or directly transmitted.
AUDIO OUT	3-pin phoenix connector for analog audio output.
HDMI OUT	HDMI loop out for display.
HDMI IN	HDMI source input.
RS-232+Update Dip Switch	RS-232: the port is for serial port passthrough. Update: the port is for MCU update.

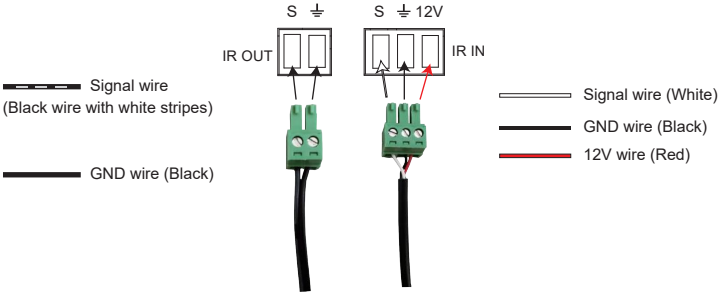
5.2 Decoder Panel



Name	Function Description
POWER LED	When the power is connected normally, Red LED flashes: the system is booting Red LED illuminates: booting successfully
LINK LED	When the system starts up normally, Green LED flashes: no signal Green LED illuminates: signal input
USB1.1 x 2	USB1.1 device interface.
RESET button	Power on the device while pressing this button, when POWER LED and LINK LED flash simultaneously, release the button to reset the device to factory settings.
DC 12V	DC 12V power input interface.
LAN	1G LAN port, which can be connected to a third-party network switch to form a distributed system.
IR IN	IR signal input interface.
IR OUT	IR signal output interface.
HDMI OUT	HDMI loop out for display.
USB2.0 x 2	USB2.0 device interface.
AUDIO IN	3-pin phoenix connector for analog audio input, only available in unicast mode, can be transmitted to the AUDIO OUT output on Encoder .
AUDIO OUT	3-pin phoenix connector for analog audio output, can output HDMI sound or the audio from the AUDIO IN on Encoder.
RS-232	Bidirectional serial signal interface.

5.3 IR Pin Definition

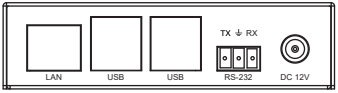
IR Blaster and IR Receiver wire's definetion as below:



IR Blaster

IR Receiver

6. Controller Box



Name	Function Description
Power LED	Power LED indicator. White LED indicates that the unit is powered on.
Reset button	Long press the button for 6 seconds to reset the controller to factory default mode. IP address will be reset to static 169.254.23.100.
LAN port	100M LAN port for connecting the switch with an UTP cable.
Two USB ports	Reserved ports.
RS-232	3-pin Phoenix connector for RS-232 command transmission.
DC 12V	Plug the 12V/1A DC power cord into this port and connect the power adapter to an AC outlet.

Note: The control system can use the RS-232 or LAN port to control video over IP products, please contact your supplier for detail API doc.

7. Controller Specifications

Technical	
Control ports	1× RS-232 [Phoenix jack] 1× LAN [RJ45] 4× USB [Tpye A, reserved port]
ESD Protection	Human-body Model: ±8kV (Air-gap discharge) , ±4kV (Contact discharge)
Housing	Metal enclosure
Color	Black
Dimensions	100mm(W)×130mm(D)×26mm(H)
Weight	371g
Power Supply	Input: AC100~240V 50/60Hz Output: DC12V/1A
Power Consumption	4W

Operating Temperature	0°C ~ 40°C / 32°F ~ 104°F
Storage Temperature	-20°C ~ 60°C / -4°F ~ 140°F
Relative Humidity	20~90% RH (non-condensing)

8. ASCII Control Command

The Controller supports ASCII control. There are two ways to send ASCII control command.

The first way: Connect the Controller with PC via the RS-232 phoenix connector on the Controller, and then use a Serial Command tool on PC such as “Docklight” to send command. The specific operation is as follows:

Step 1: Connect the Controller with PC via the RS-232 phoenix connector on the Controller, as shown in the following connection diagram.

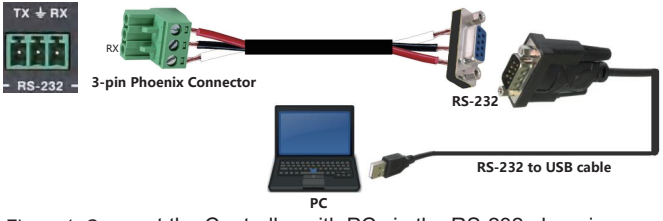


Figure 1. Connect the Controller with PC via the RS-232 phoenix connector

Step 2: Open a Serial Command tool on PC such as “Docklight” (Figure 3).

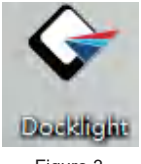
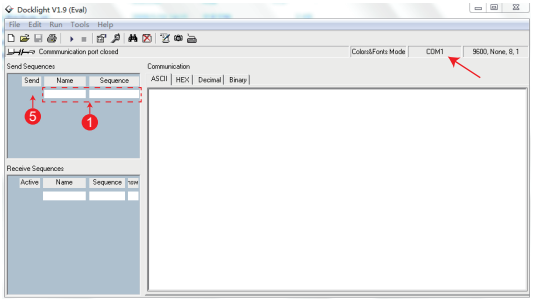
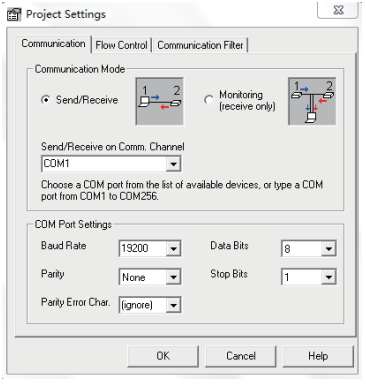


Figure 3

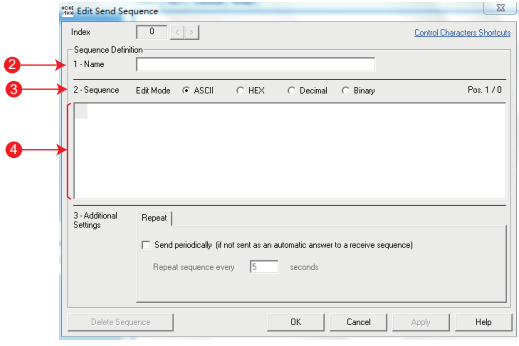
You will see the following page.



Step 3: Click the “COM” tab, there will be a “Project Settings” page. Choose the COM port to connect the software, set the Baud Rate, Data Bits, Parity, Stop Bits and then click the “OK” button, as shown in the following page.



Step 4: Double click the “label 1” blank area. You will see the following page. At “label 2”, you can explain sequence definition. At “label 3”, you need to choose the sequence mode. At “label 4”, you can input the RS-232 command of the product. Then click the “OK” button.



Step 5: Click the “Send” button at “label 5” to send the command.

The second way: Connect the Controller with PC via the LAN port on the Controller, and then use a TCP Command tool on PC such as “Hercules” to send command. The specific operation is as follows:

Step 1: Connect the Controller with PC via the LAN port on the Controller, as shown in the following connection diagram.

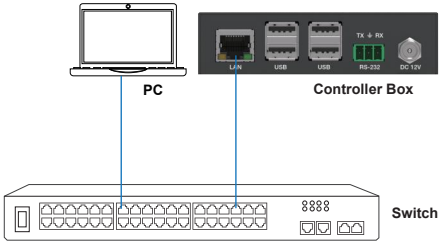
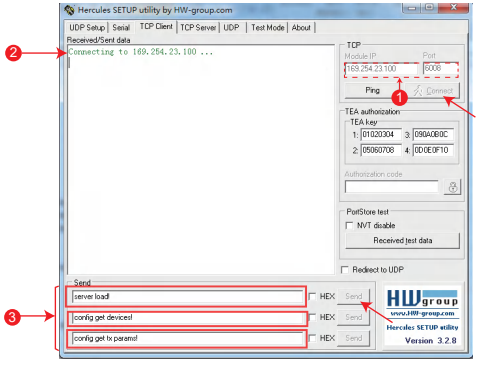


Figure 2. Connect the Controller with PC via the LAN port

Step 2: Open a TCP Command tool on PC such as “Hercules”. You will see the following page.



Step 3: Input the IP Address (169.254.23.100) and Port number (6008) of the Controller box at “label 1”, and then click the “Connect” button. PC will try to connect the Controller as shown in “label 2”.
Step 4: After successful connection, input commands at “label 3”, then click the “Send” button to send commands.

Please contact to our sales agent about API command list of the product.

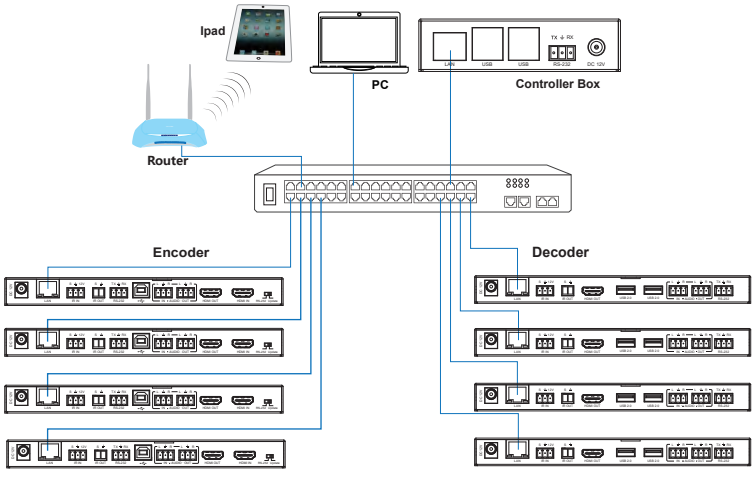
9. Web GUI User Guide

You can use Controller's Web GUI to control all products through the Switch. Firstly, you have to know Controller's current IP address. Please refer to the operation of "8. ASCII Control Command", input the command "server load" in "Docklight" or other Serial Command tool on PC, then you will get the command feedback as follows:

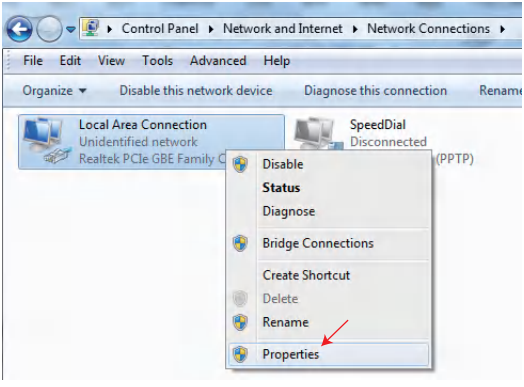

```
{
 "ack": [{
  "cmd": "ServerLoad",
  "status": "SUCCESS"
 }],
 "server": {
  "Baudrate": 4,
  "Parity": 0,
  "StopBits": 0,
  "DtaeBits": 1,
  "Dhcp": false,
  "HostIP": "169.254.23.100",
  "Mask": "255.255.0.0",
  "azGateWay": "169.254.23.1",
  "azHosMac": "b8:27:eb:21:c9:e7"
 }
}
```


As shown in the above figure, the Controller's current IP address is 169.254.23.100.
Secondly, you need to change the PC's IP Address. The operation method is shown as below:

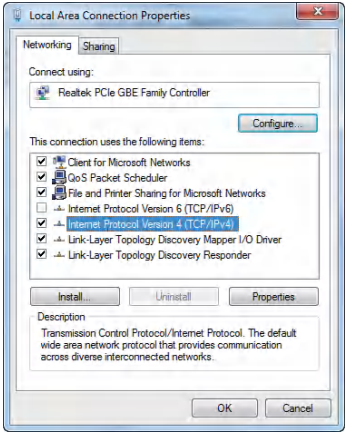
Step 1: The LAN port of the Controller is connected directly to a Switch, and a PC is also connected to the Switch. Other IP products you need to control are connected to the Switch. The connection diagram is shown as below.


Ipad
PC
Controller Box
Router
Encoder
Decoder

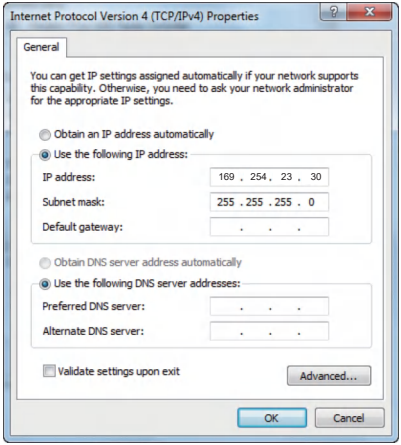
Step 2: On the PC, go to **Control Panel** > **Network and Internet** > **Network Connections** > **Local Area Connection**, right click on it, choose **Properties.**



Double click “Internet Protocol Version 4 (TCP/IPv4)”.



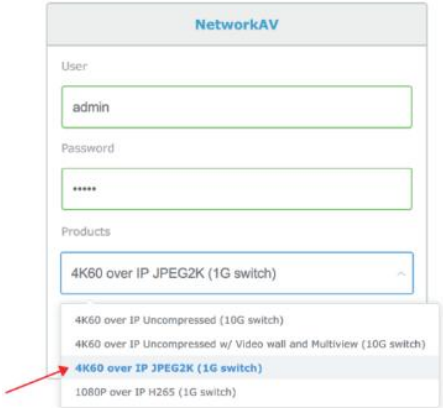
Choose “Use the following IP address”. For instance, input 169.254.23.30 as your PC’s IP address, 255.255.255.0 as Subnet mask, and then click on “OK” again.



Notice: The IP address of the PC, Controller and other IP products should be in the same network segment. As the Controller’s IP address is 169.254.23.100, the computer's IP should be set 169.254.23.X (X contains 1~255 except 100).

Step 3: Input the Controller’s IP address into your browser on the PC to enter the Web GUI page.

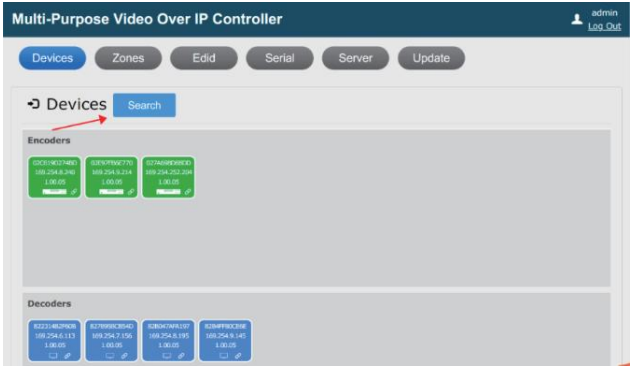
After entering the Web GUI page, there will be a Login page. Please enter the default User and Password “**admin**” to login .
Then, select the product “4K60 over IP JPEG2K(1G switch)”.
Finally, click the “Sign In” button to enter Web GUI function pages.



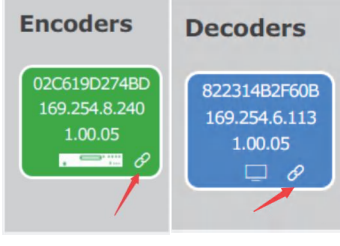
Notice: When you select a type of product on the Login page, you can only connect the type of products to the switch.

The Web GUI pages are shown as below:

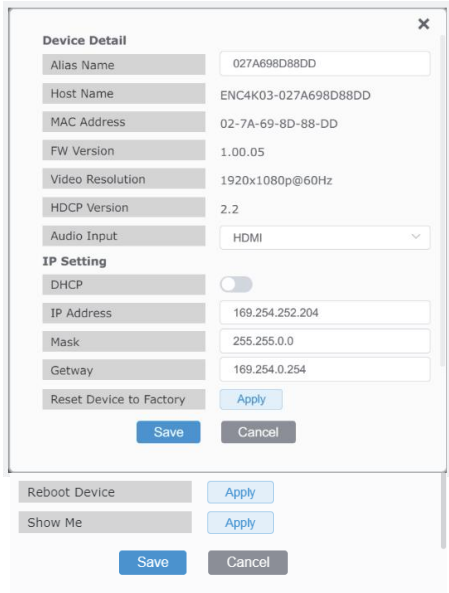
Devices Page



You need to click the “Search” button to search all products you have connected.
Encoders are shown in green on the top area and Decoders are shown in blue on the below area. Every small interface on Encoder or Decoder area shows the product’s name, IP address and software version.
You can obtain detail information about the encoder or decoder when you click the lower right corner of each small encoder or decoder interface.



Encorders Attributes



The above figure displays some basic information about Encoders, such as Mac address, software version, video resolution and HDCP version. The alias name can be modified as required.

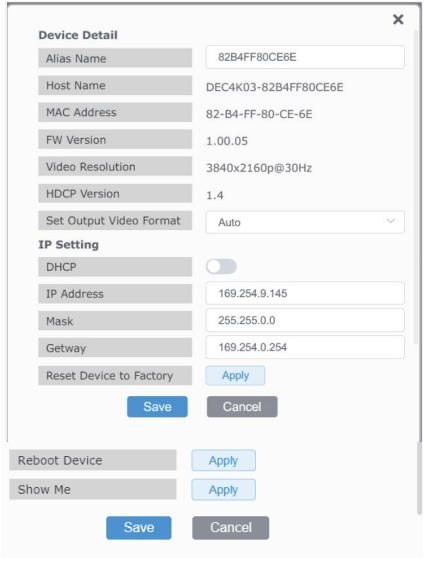
① **Audio Input**

You can choose the audio source of the video, either from HDMI itself or from external analog audio inserted.

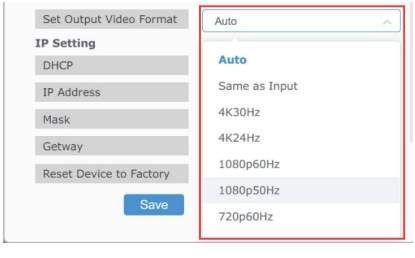
② **IP Setting**

You can set the device's IP Address, DHCP function, or just press the "Apply" button to add "Reset Device to Factory", "Reboot device" and "Show Me". After all the settings are completed, you can click the "Save" button to save.

Decorders Attributes



Decoders basically have the same properties as Encorders, except for “Set Output Video Format”.



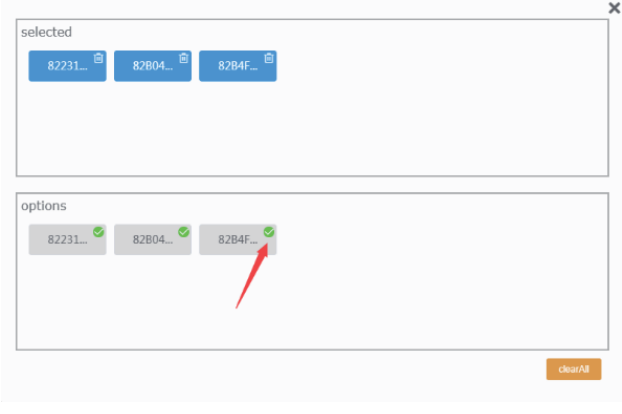
In the drop-down menu of “Set Output Video Format”:
Auto: It means that the decoder will adapt and output the best resolution according to the EDID of the display device.
Same as Input: It means that the resolution of the signal output from the decoder is the same as that of the signal input from the encoder.
The rest is to set fixed output resolution, such as 4K30-> 720P60Hz.
After all the settings are completed, click the “Save” button to save.

Zones Page

Click the + button to create new zones, and you can create no more than 16 zones. Each zone can set different application methods **matrix / video wall**.

Click the icons above to edit the zone name or delete the selected zone.

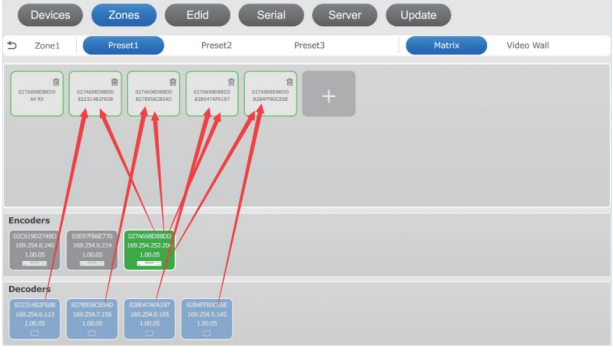
Click the + button to add Decoders for the zone, as shown in the figure below. After being selected, the Decoder will be in the corresponding zone.



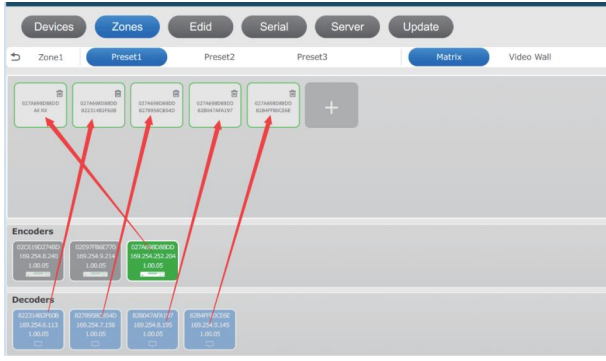
There are three “preset” in Zones, each preset can set Matrix, Videowall and Multiview.

■ Zones Matrix Editing

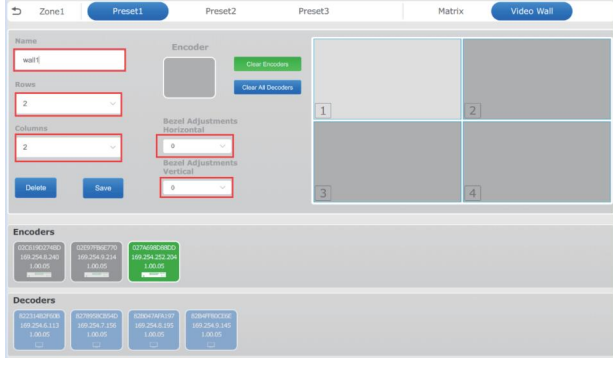
Click the + button to built new correspondence. Drag a Decoder to the corresponding frame, then drag the required Encoder to the same frame, as shown in the following figure.



You can also drag Encorder into the frame of ALL RX, so that you can match an Encorder video signal to ALL Decorders, as shown in the following figure:

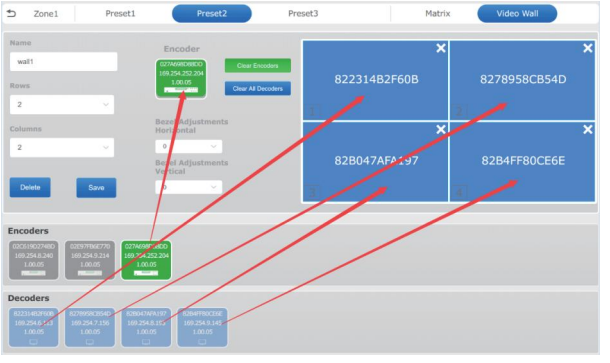


■ Video Wall Configuration



You can set the wall's name, rows, columns and Bezel adjustments. After completing the settings, click "Save" to save the configuration, or click "Delete" to delete.

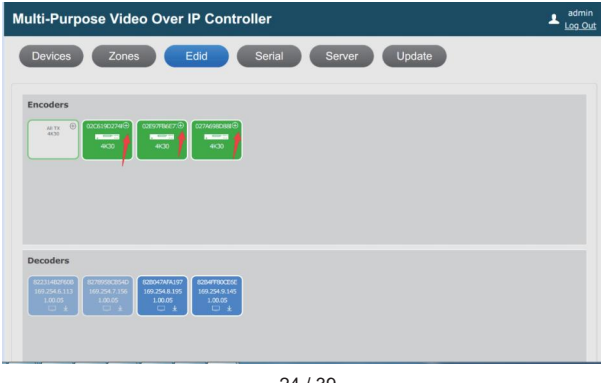
Then drag Decoders to the wall frames, and drag the signal sources in Encoders to the frame of Encoder, as shwon in the following figure:



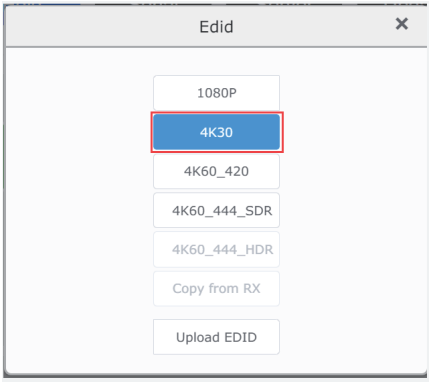
A 2 * 2 video wall setting is composed, and a maximum wall of 4 * 6 can also be set. If you need to delete this wall, just click the “Delete” button.

Edid Page

You can set the EDID of each Encoder, as shown in the following figure:



Click the + button, then select the EDID type.



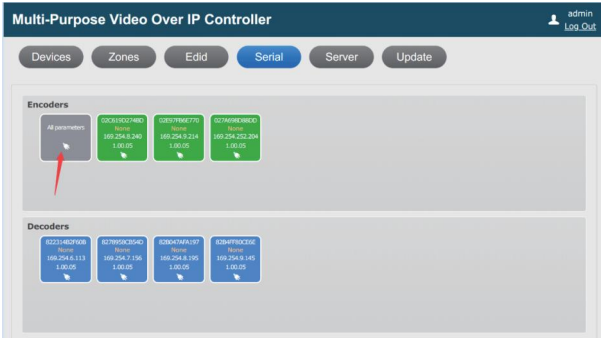
As shown in the figure, there are 7 types of EDID. When the Encorder has a connection relationship, you can choose “Copy from RX (Decorder)”. Another type is Upload EDID.

As shown in the figure above, click the arrow pointing icon in the Decorder frame to save the EDID of the display device connected to Decorder, and then you can upload the saved EDID on Encorder to Source.

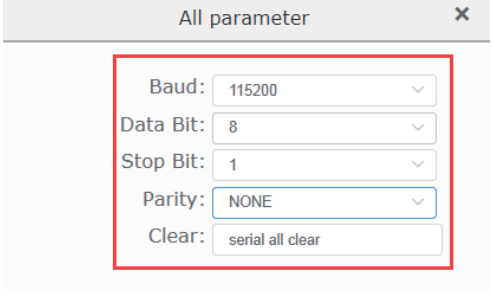
Serial Page

- RS-232 Page Configuration

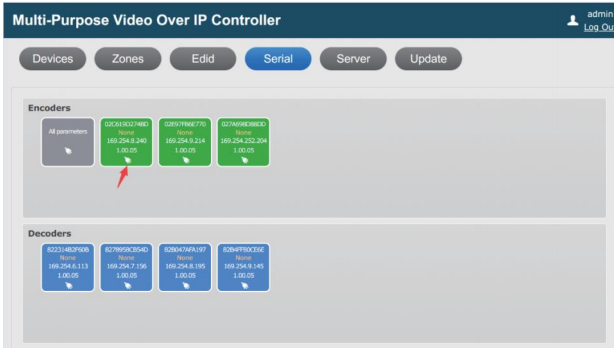
Configure all devices' RS-232 parameters, as shown in the following figure.



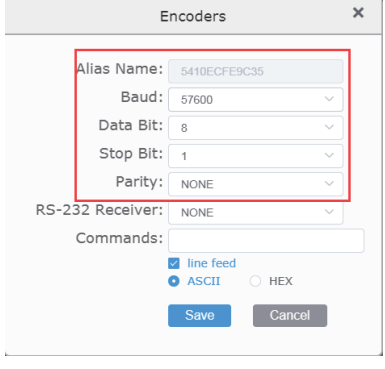
Click the arrow pointing icon to configure the RS232 parameters of all Decorders and Encorders in this system. The interface after clicking is as follows:



■ Individual Configuration for Decorders and Encorders



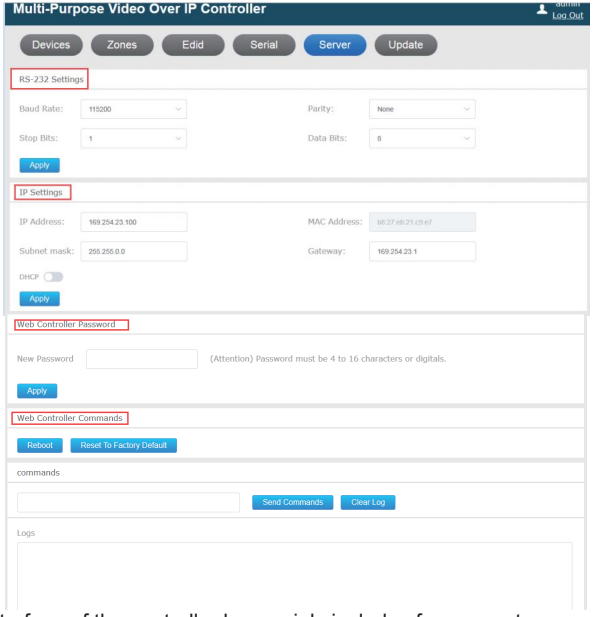
Click the arrow pointing icon in the above figure, and the following parameter configuration interface appears:



The basic parameters of RS232 are configured in the red box. Make sure the sending and receiving machines are consistent.

Server Page

The configuration interface of CTL100 controller box is shown as follows:



The interface of the controller box mainly includes four aspects:

① **RS-232 Settings**

You can set the basic parameters of the external physical RS-232 interface of the controller box. After setting, click “Apply”.

② **IP Settings**

You can set the IP Address information of the controller box. Make sure it is in the same IP segment as the device, otherwise you will lose the connection with the device. Click “Apply” after setting.

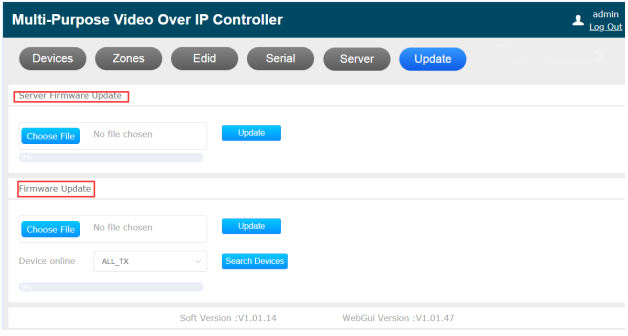
③ **Web Controller Password**

You can set the password of the controller box. After setting, click “Apply”.

④ **Web Controller Commands**
You can reboot the controller box or restore the factory settings.

⑤ **Commands**
You can send the corresponding API command through this window.

Update Page



This page has two upgrade features:

① **Server Firmware Update**
This interface is used to upgrade the software of the controller box. During the upgrade, a progress bar will be displayed from 0% to 100%. Please wait patiently during the process. When the progress bar reaches 100%, you need to click the “Update” button to complete upgrade.

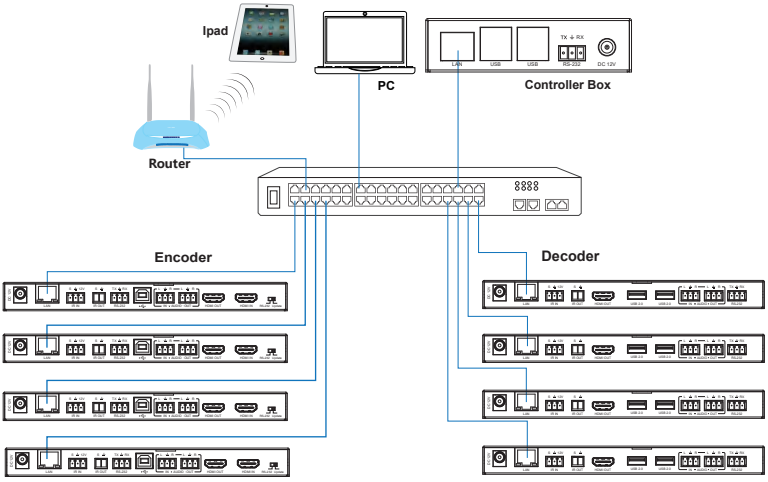
② **Firmware Update**
This interface is used to upgrade devices, you can choose ALL, ALL_TX, ALL_RX; you can also upgrade a single device, just select the Mac address of the corresponding device. As shown below:

10. Using PC Plays Video Stream

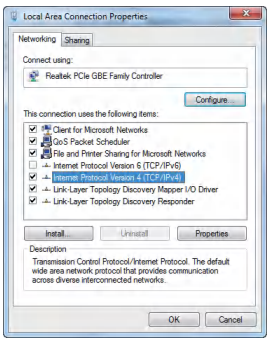
10.1 Connecting Web for Control

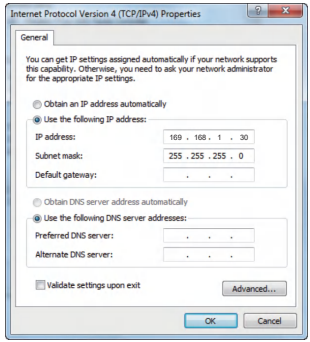
The prouduct supports play video stream on computer via the corresponding software such as **VLC media player**, simultaneously you need to connect build-in Web GUI to control the video stream play. Default IP of the Web GUI is 192.168.1.100. The operation method shows as below.

Step 1: The LAN port of controller is directly connected a switch and simultaneously connect a PC for control these IP products, and others IP products you need to control are connected the switch. You can use PC or ipad to play the video stream. The connection diagram shown as below.

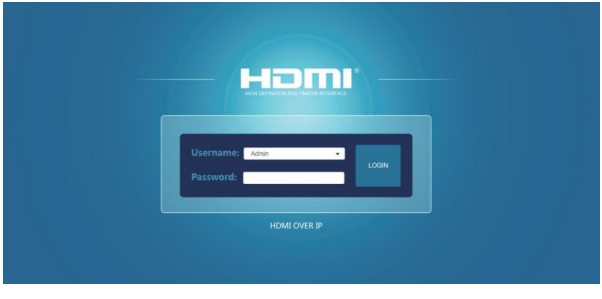


Step 2: Set the ipad's IP address to the same network segment with Switch, for instance set PC IP address to 192.168.1.30 and Subnet mask to 255.255.255.0.





Step 3: Using the IP address of encoder into the address bar of any web brower. The default IP address is 192.168.1.100. After entering the IP address the following log in screen will appear:



Select the Username from the list and enter the password. The default passwords are:

Username	**User**	**Admin**
Password	**user**	**admin**

After entering the log in details, click the LOGIN button and the following Status page will appear.

*Note: **Status, Video, Network** and **Update** pages are only accessible in Admin mode. When User mode is used, only the **Status** page is available.*

■ Status Page

The Status page provides basic information about the installed firmware version and the network settings. This page is visible in both User and Admin modes.

The buttons at the top right corner of the web interface are always available and provide the following function:

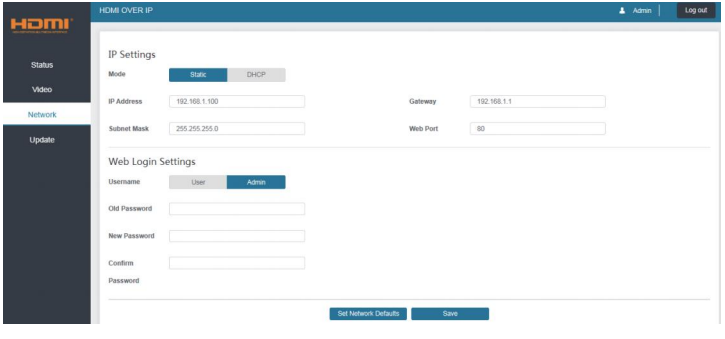
- The Log out button will disconnect the current user from the session and display the login screen.

■ Video Page

The Video page allows you to set the resolution and bitrate by setting H264 / H265 Dectype coding for MainStream and SubStream.

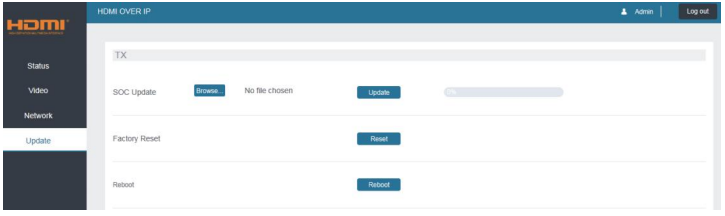
■ Network Page

The Network page allows the configuration of the network settings. Note that the IP address boxes are only accessible when the **Mode** button is set to **Static**.
The login password can be changed on this page.
Note that any changes to this page will require the new details into the web browser and/or the login screen.



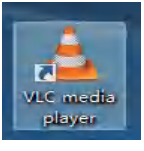
■ **Update Page**

This page is used to install new firmware for update, restore the factory default settings and reboot the product.

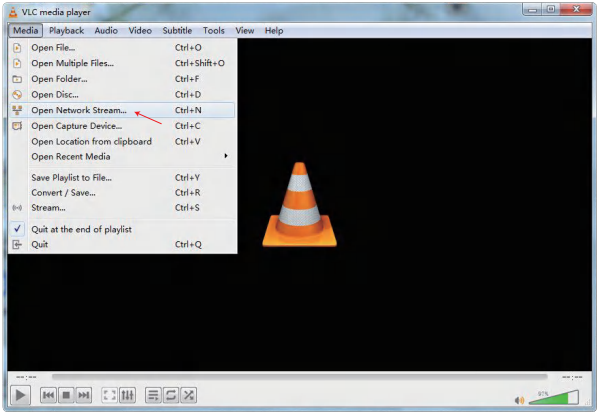


10.2 VLC Media Player Instruction

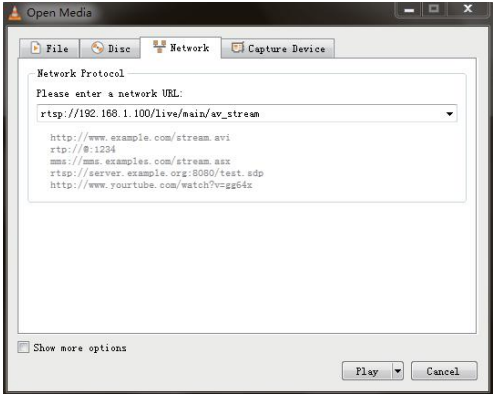
When the Web GUI has been connected, open the VLC media player software on the PC. Please see the following icon.



Click “Media > Open Network Stream”



After clicking the “Open Network Stream” option, the following page will appear.

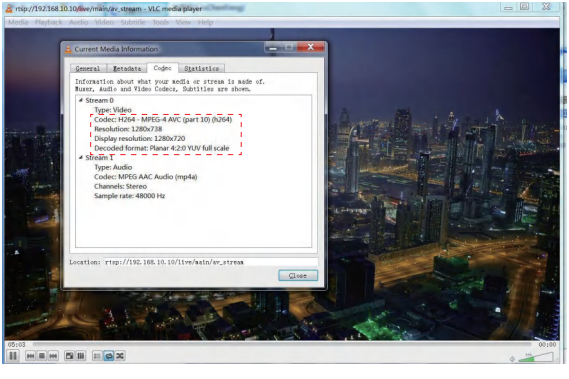


Enter a MainStream or SubStream network URL, then click “**Play**” button.

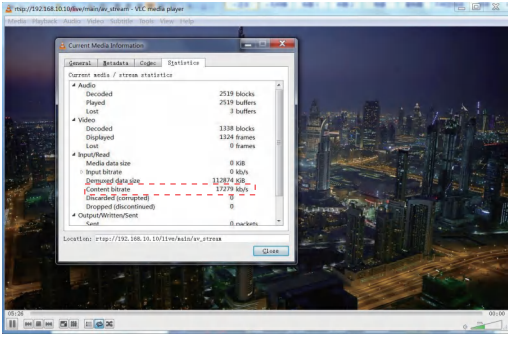
Stream	Network URL
MainStream	rtsp://192.168.1.100/live/main/av_stream
SubStream	rtsp://192.168.1.100/live/sub/av_stream.

If you enter a MainStream network, please use the MainStream of Web GUI to set the Dectype, Resolution and Bitrate value of the VLC media player.

At the same time, you can check the settings on VLC media player. Choose “**Tools>Codec information**” to check current codec and resolution. Please see the following picture.

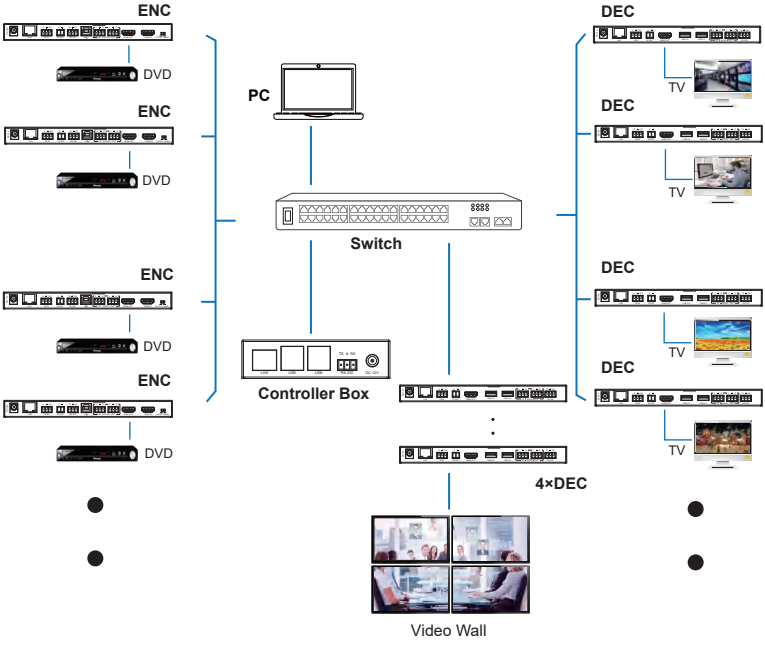


Choose “**Tools>Codec information>Statistics**” to check current bitrate. Please see the following picture.



Note that the Bitrate is floating up and down when you check it. This is a normal phenomenon.

11. Application Example



12. Notes

The following switcher model is highly recommended.

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

Note: When using a switch, you may need to set some configurations to match these products.