Marshall

Broadcast A/V Division

CV730-BHN/WHN

30x UHD30 Full-NDI, IP & 12GSDI PTZ Camera



User Manual

Understanding Quick setup of CV730-BHN with **NDI®**

This section explains how to quickly configure the Marshall CV730-BHN camera with NDI®.

It also explains how to update the device, and where you can find additional NDI software to extend your workflow. Complete NDI® Tools can be found here: https://www.ndi.tv/tools/

Here you will choose whether you will require NDI® Tools for Windows or Mac and download. After completing this short section, you will be all set to begin using your new NDI®|HX camera.

OVERVIEW: Unlike typical cameras, CV730-BHN leverages the easy plug-n-play benefits of the NDI-based IP workflow supported by leading video software and hardware developers around the globe.

GETTING READY: Your new CV730-BHN has full-NDI® (High Bandwidth) and NDI|HX3 protocols for audio/video transmission, and more. Your first step will be to install NDI® drivers if using a TriCaster, or Microsoft HEVC decode on non-TriCaster systems, as appropriate for your computer platform or device.

1. Navigate to ndi.tv/formats in your web browser and follow the relevant directions to download and install the drivers for your computer platform.
2. NDI Studio Monitor and other useful NDI|TOOLS can be found here: https://www.ndi.tv/tools/
3. Then simply plug the Ethernet (NDI) port to same Network your computer or Newtek equipment are plugged into and off you go.
4. The NDI driver also installs NewTek's NDI Studio Monitor application, which will display the output of your camera and provide easy access to its settings.
5. Also contains built-in PTZ controls.

PLEASE NOTE: The End User License Agreement under which you use the NDI® driver specifies that "you may use up to five (5), and no more than five, copies on separate machines at one time."

OPTIONAL – for Microsoft Windows® users, downloading and installing the NewTek NDI® Tools pack, available at no cost from ndi.tv/tools/, the download pack will provide learning tools and utilities to maximize your NDI® experience.

FINAL NOTE – if you are experiencing any problems with the NDI® platform, NDI® software, NDI® drivers please contact Newtek for technical assistance or join the NDI community to review HOW-TO videos, social media, forums, blogs: www.ndi.tv/community

If you are having a hardware problem, and need assistance please contact Marshall Electronics.

Marshall Customer Support
Toll Free: 800-800-6608 or 310-333-0606
email: support@marshall-usa.com

Table of Contents

Chapter 1: Package Contents 3

Chapter 2: Function Introduction 4

2.1 I/O functions Introduction 4

2.2 Description of LED indicator 6

2.3 Tally Lamp Function Description 6

Chapter 3: Instruction for installation 7

3.1 Camera Size 7

3.2 Preparation before installation 8

3.3 Instruction for installation 8

3.4 Connecting devices 13

Chapter 4: Remote Control and Setting Menu 15

4.1 Functions of remote control 15

4.2 Setting Menu 15

Chapter 5: Network Function Settings Description 20

5.1 Connecting Camera to Network 20

5.2 Web Page Function Description 21

Chapter 6: DIP Switch Setting 40

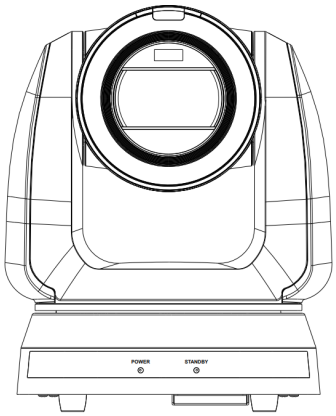
6.1 DIP SWITCH 40

Chapter 7: Troubleshooting & Safety 41

Copyright Information/Warranty 43

Chapter 1: Package Contents

PTZ Camera



Installation Instructions

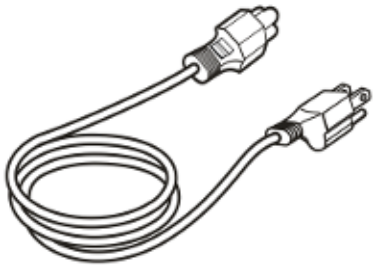
Click Here for Product Page:

https://marshall-usa.com/cameras/CV730-BHN-WHN/

Remote Control

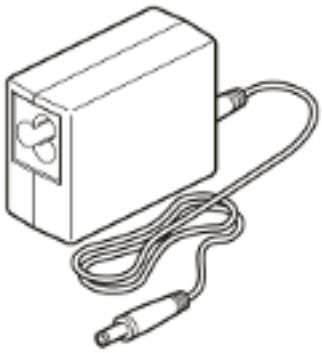


AC Power Cord

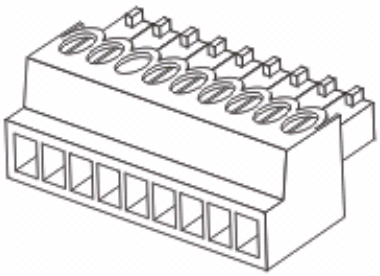


Appearance may vary depending on county/ region

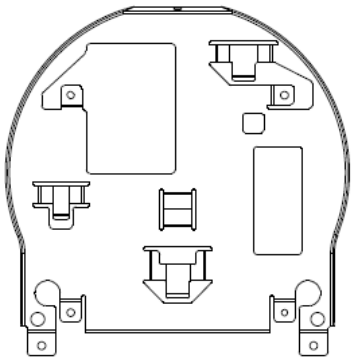
Power Adapter



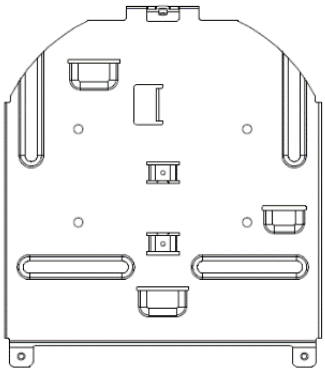
RS-422 Connector



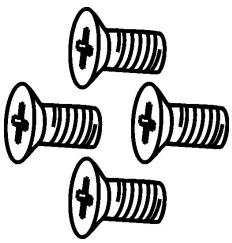
Metal Plate A



Metal Plate B



M3 Screws

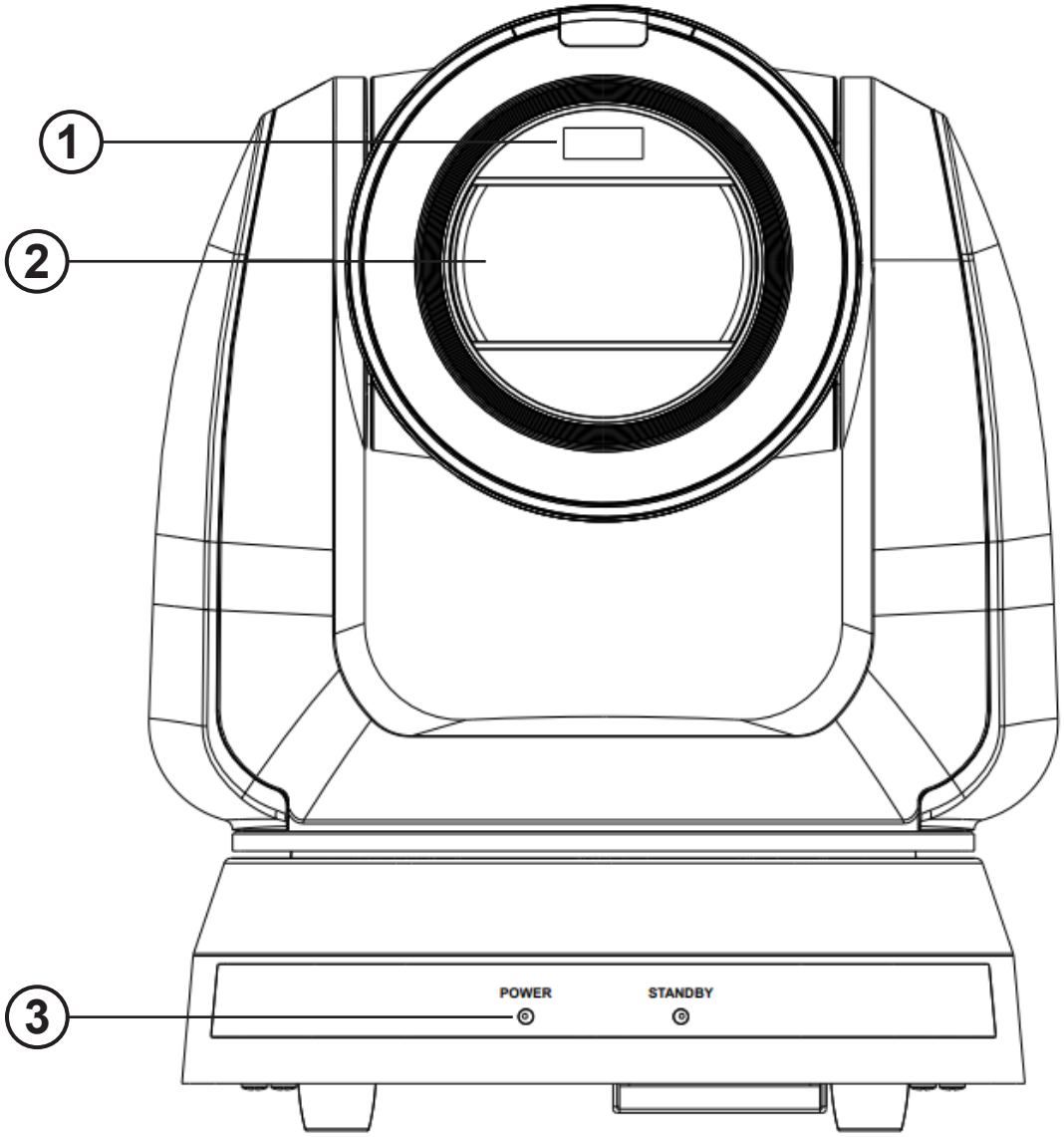


Silver x8/ Black x2

Chapter 2: Function Introduction

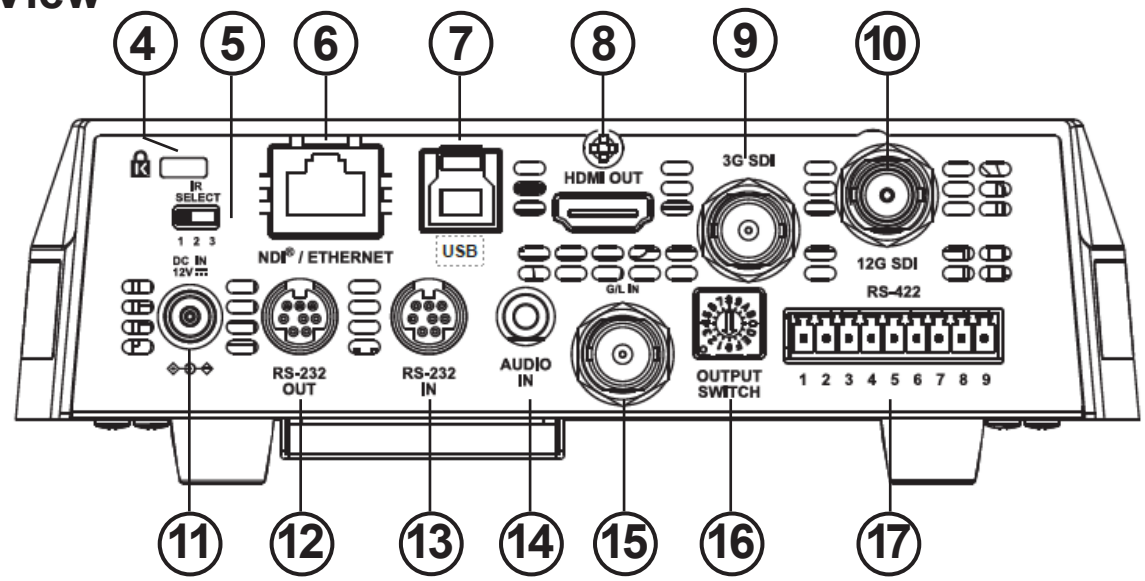
2.1 I/O functions Introduction

2.1.1 Front View



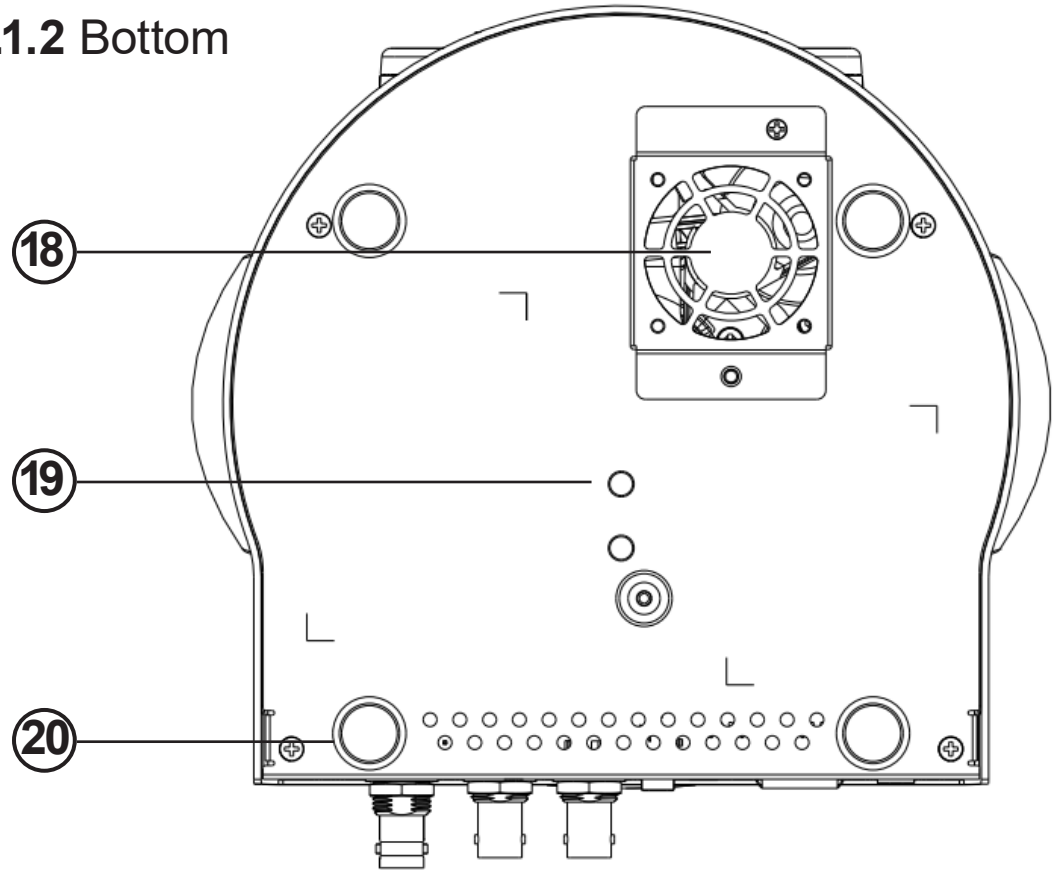
NO.	Item	Function Descriptions
1.	Tally Lamp	Displaying the Tally Lamp status of the camera
2.	Camera lens	30x HD camera lens
3.	Power/Standby LED indicator	For Camera Status LED, please refer to ***2.2 Description of LED indicator***

Front View



NO.	Item	Function Descriptions
4	Kensington Lock	Safety lock slot
5	IR SELECT	Adjust handheld remote IR channel to match IR remote controller
6	Network RJ45 port	Network port supports routers or hubs with PoE++ (IEEE802.3bt) for power, audio, video, tally and control via Ethernet (optional)
7	USB 3.0 port	The USB port is for connecting to a computer and providing USB interface for PC or Mac **<NOTE>** Supports up to UHD30 (3840x2160p at 29.97fps)
8	HDMI 2.0 output	HDMI 2.0 output (Audio embed supported)
9	3G-SDI output	3G-SDI output (Audio embed supported)
10	12G-SDI output	12G-SDI output (Audio embed supported)
11	DC 12V power connector	AC power IN to connect to power outlet instead of PoE++
12	RS-232 output	RS-232 OUTPUT port for daisy chain cameras, maximum of 7x cameras can be connected to 1x controller via Visca over RS232
13	RS-232 input	RS-232 INPUT port with a maximum of 7x cameras can be connected to a single serial connection source (Home Run from RS7-HR or daisy chain form one camara to another)
14	AUDIO input	Mic or Line level input with 2.5V bias (max 3mA)
15	Genlock IN	SDI Time Synchronous Source Input (Black Burst & Tri-Level)
16	OUTPUT SWITCH	Resolution/Framerate DIP switches. Default is 3840x2160/59.94p
17	RS-422 port	RS-422 phoenix connector with screw lock (raw copper wire)

2.1.2 Bottom



NO.	Item	Function Descriptions
18	Cooling Fan	Cooling fan self regulates temps and heat (silent operation)
19	Tripod lock hole	Keeps camera from rotating on tripod mount with lock option.
20	Removable Soft Foot Pads	Can be removed while using the Ceiling Mount Metal Plates, or keep for vibration absorbtion.

2.2 Description of LED Indicator

Status	Power	Standby
Startup in progress (initialization)	Green light	Orange light
In use	Green light	No indicator
In standby mode	No indicator	Orange light

2.3 Tally Lamp Function Description

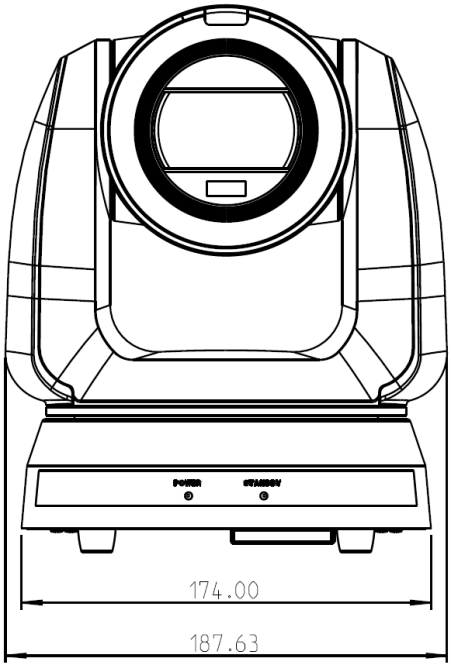
The Tally lamp function may be enabled through the RS232 command.
Please refer to RS-232 command set document

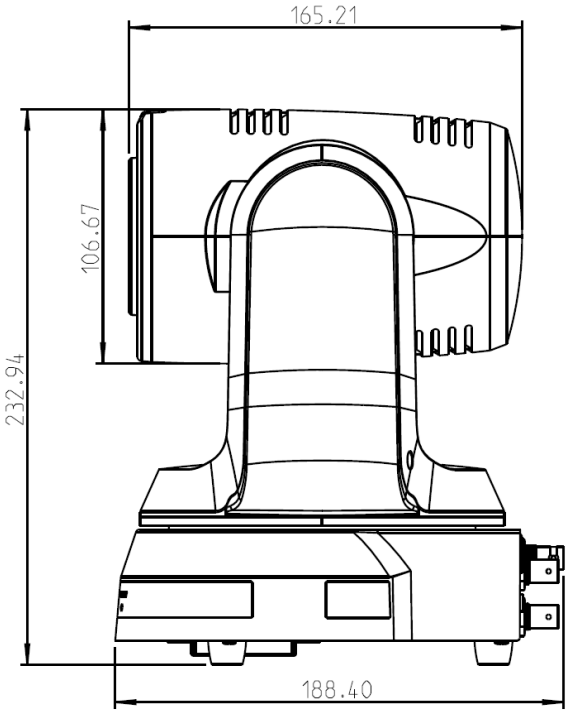
Chapter 3: Instruction for installation

3.1 Camera Size

3.1.1 Camera Front View and Side View

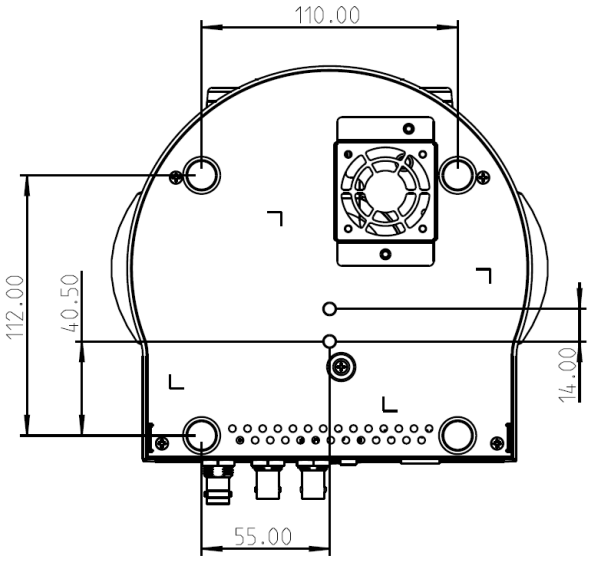
- Length x Width x Height: 232 x 188 x 189mm
- Weight: 3.0 Kg (without metal plates)

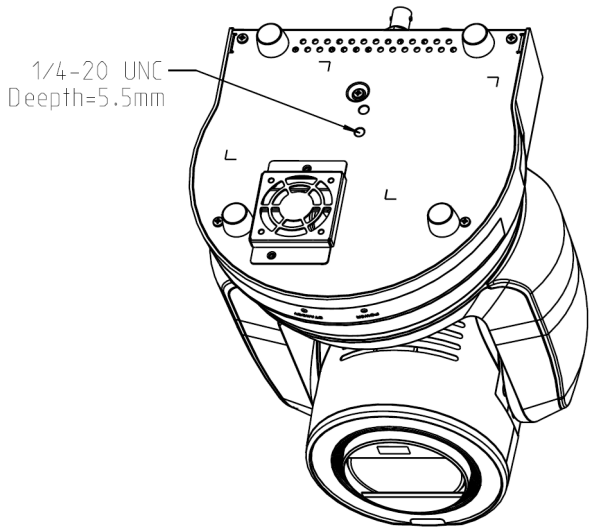




3.1.1.1 Camera Bottom View

The camera can be mounted on a 1/4”-20 UNC PTZ tripod deck by using the lock holes on the bottom for the tripod to secure in place.





3.2 Preparation Before Installation

Installation and connection of PTZ cameras sometimes requires special skill and more secure with two people. To install by yourself, please carefully follow steps, ensure tight and secure mounting, and follow safety guidelines to avoid any accidents.

3.2.1 Prepare the installation area and remove any debris or obstacles. Please don't install the device on unstable fixtures, ceilings, or walls. Ensure there's backup to avoid drops to ground where damage can occur during installation.

3.2.2 Please check packaging to remove all bits and peices. Please contact the supplier if there are missing items, and make sure to keep accessories for later use.

3.2.3 Please identify proper spot for installation of camera in advance, considering the following criteria to improve success of camera position.

3.2.3.1 Identify target area, distance and perspective of area to be captured.

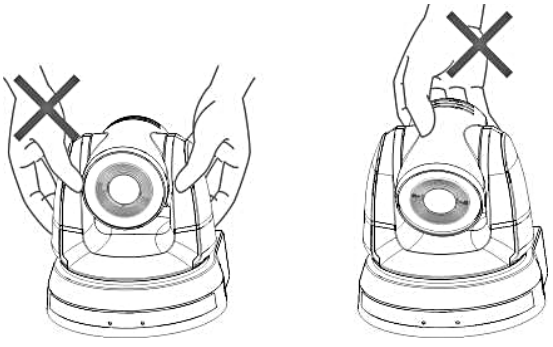
3.2.3.2 Consider lighting sources, special illumination and creative design.

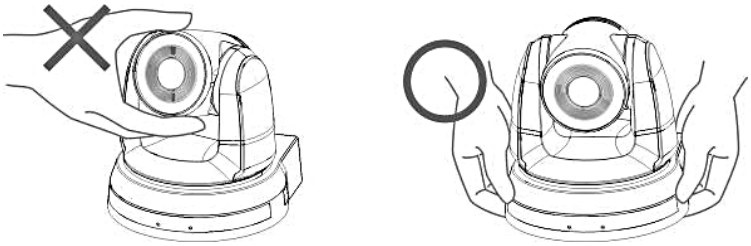
3.3 Instructions for Installation

3.3.1 Install PTZ camera on a desk

3.3.2 Precautions for installation

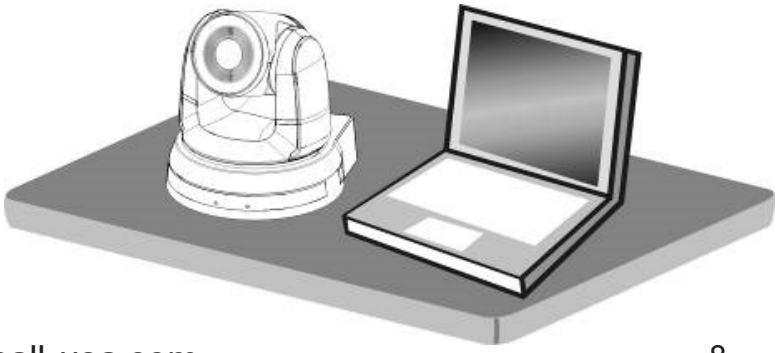
- Please install the camera on a flat desk or area.
- Never grab, lift or hold the PTZ camera by the Head
- Do not rotate the camera Head by hand. Improper rotation may result in breakdown of the camera gears.





3.3.3 Installation Steps

Please place the camera on a flat desk to allow normal vertical and horizontal operational axis are accurate and enough area for fan to cool when



3.3.2 I would like to install the camera on the ceiling

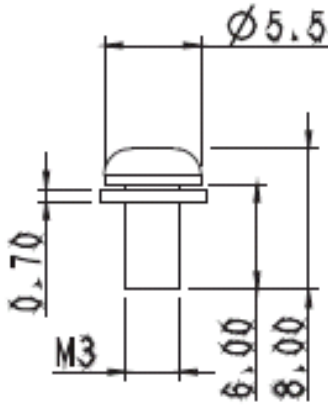
3.3.2.1 Prepare the parts, screws and equipment required for installation

Accessories in the box:

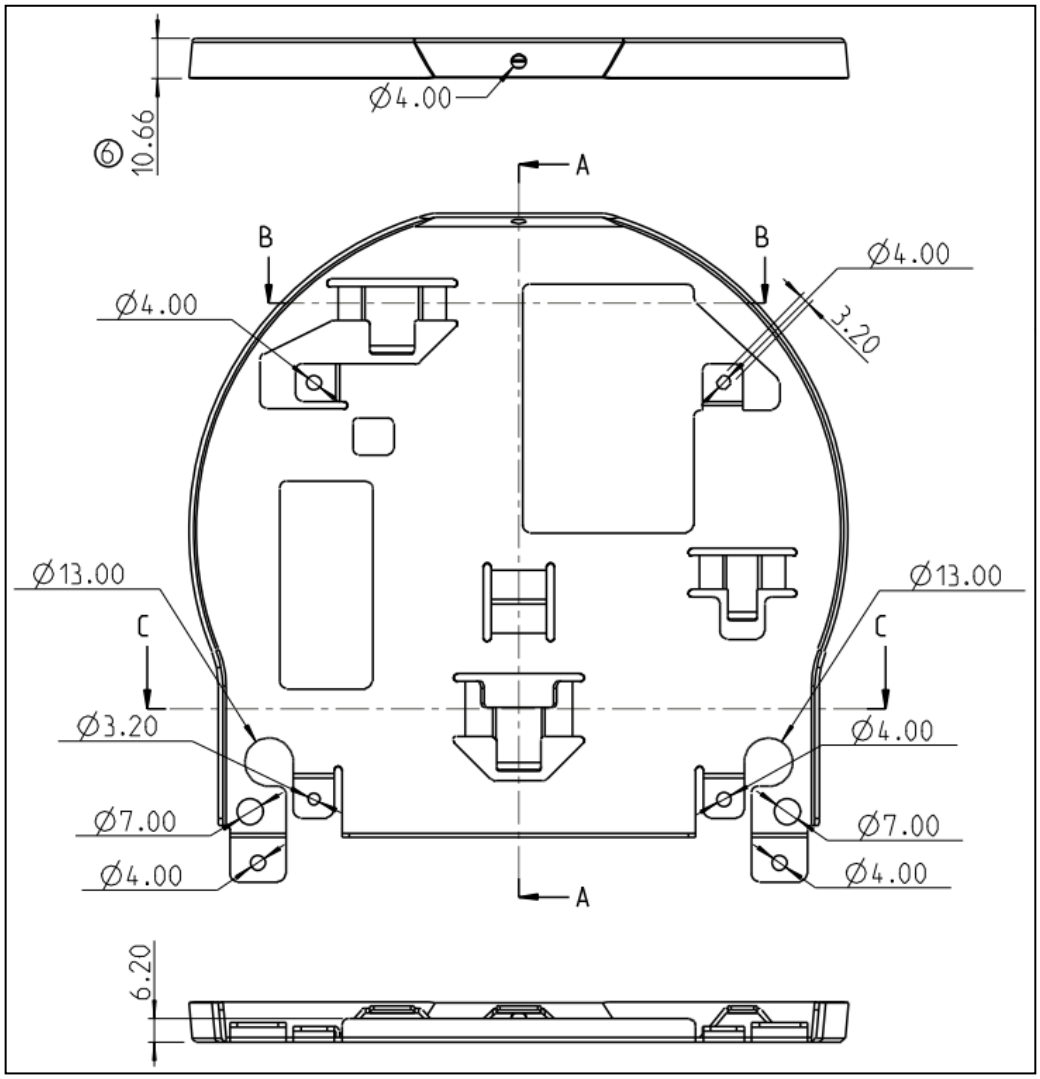
- (metal plates A, B, M3 screw silver x 8, black x 2)
- Screw for locking on ceiling mounted hanger x 4 Drill, screw driver, and ladder

3.3.2. Metal Plate size diagram

- Metal plate A - camera side

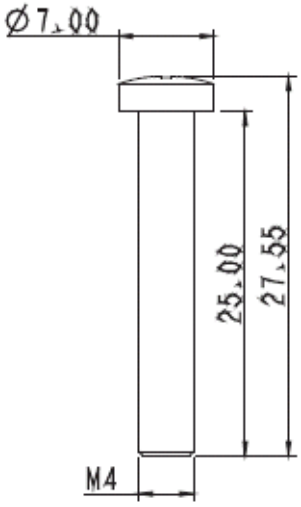


Metal plate A locking screw

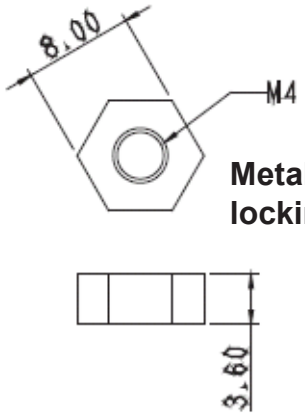


Metal Plate A - Camera Side

Metal plate A - Ceiling Side

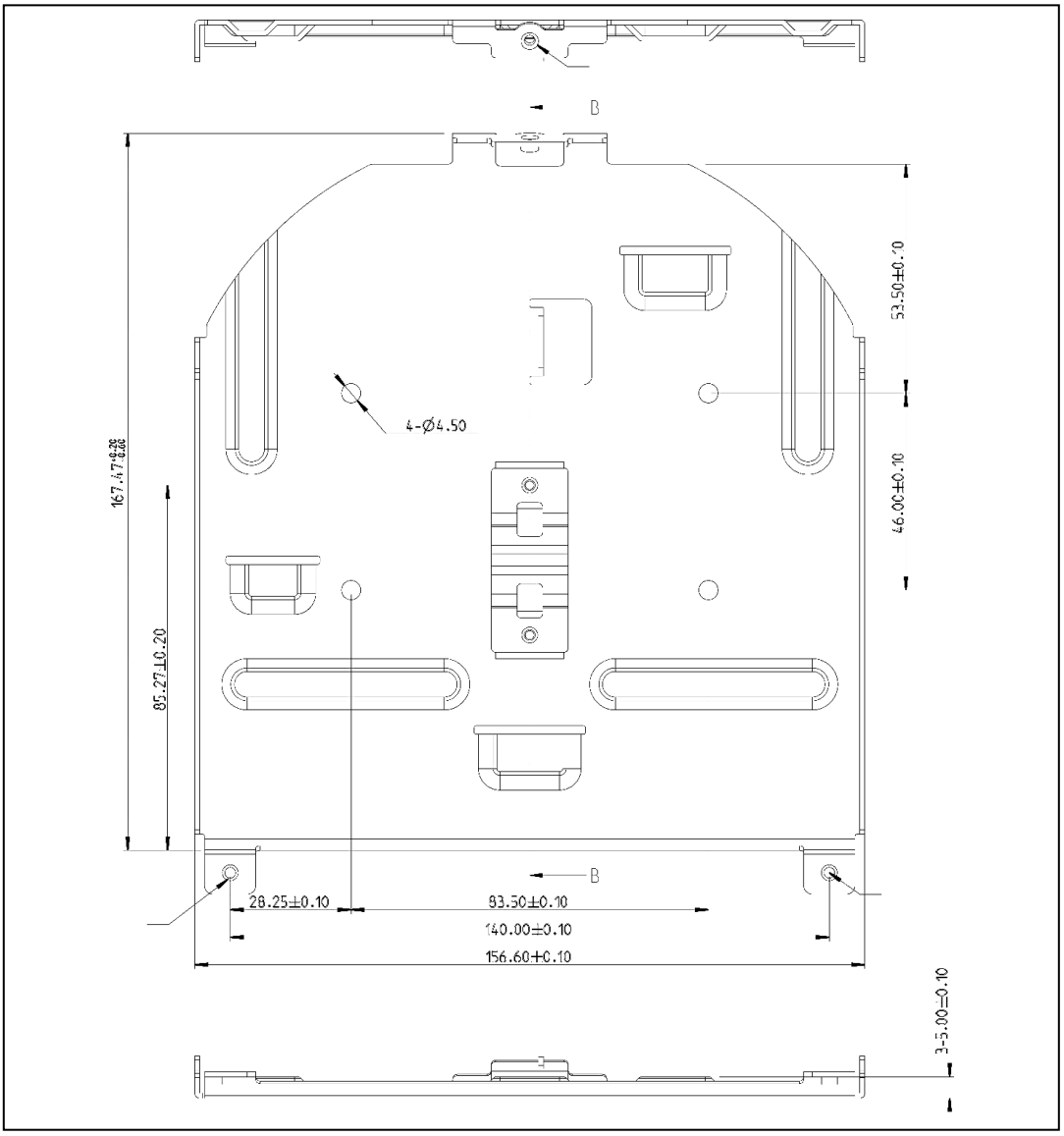


Metal plate B locking screw



Metal plate B locking bolt

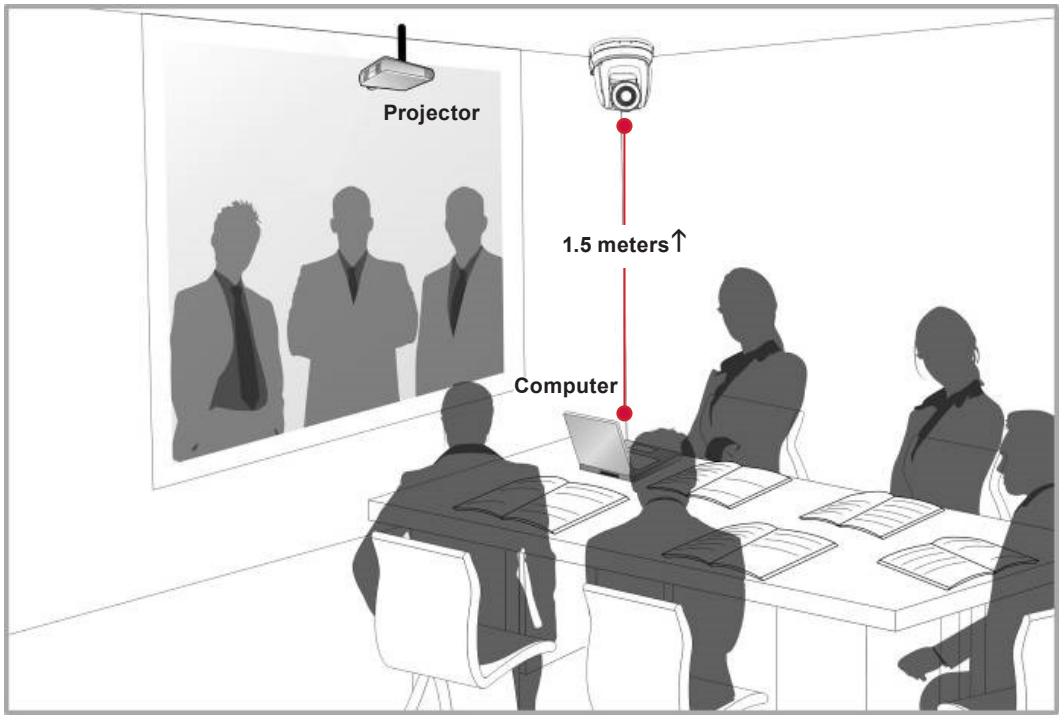
Metal Plate B Ceiling Side

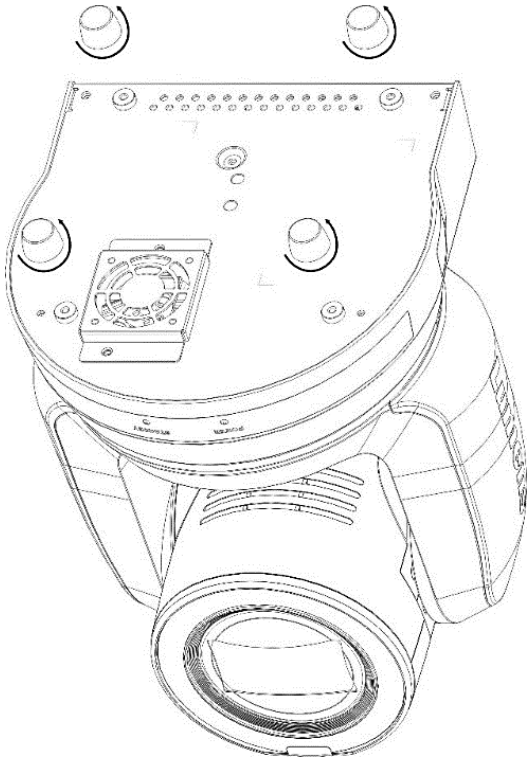


3.3.2.3 Precautions for Installation

1. Before installation, please identify the orientation of the camera relative to the object to be captured and ensure proper horizontal and vertical axis.

2. Minimum Object Distance (M.O.D.) is 1.5 meters from camera to subject to gain focus, so please optimize to focal lengths and subjects or targets being captured.





3. The camera including metal plates weighs roughly 3 kg, so if being hung from ceiling please use the UL approved hanger assembly with Kensington locks to secure.

4. Please check back regularly to ensure camera is secure and everything is tight.

5. Please clean fan vents regularly to ensure dust and dirt don't accumulate to maximize cooling and heat dispense.

3.3.2.4 Installation Steps

1. Remove the 4 pads on the machine base. The foot pads are designed to be detachable and can be removed by rotating them counterclockwise by hand.

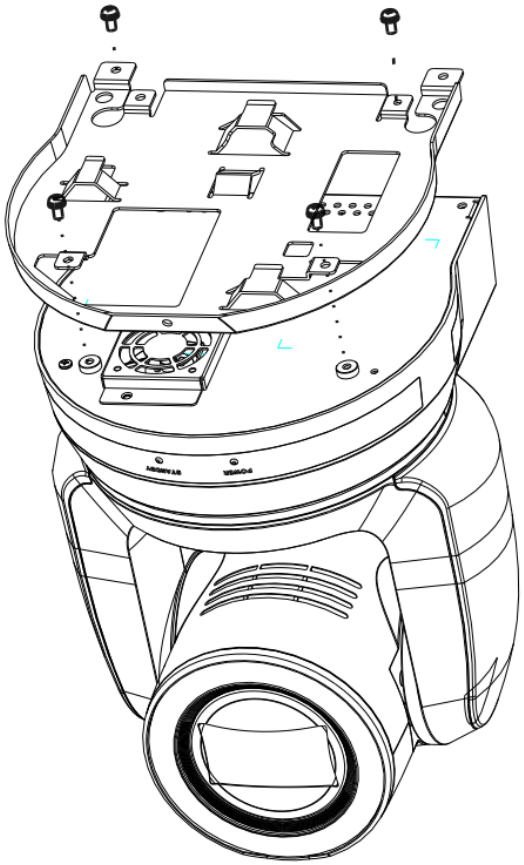
NOTE: Please keep the pads in a safe place for future use.

2. Fix the metal plate A on CAMERA base with 4x M3 silver screws

3. Lock the metal plate B on ceiling mounted hanger

NOTE:

- Please use a secure hanger with UL approval
- Please consider wire holes for connecting camera cables later.



4. Combine the metal plate A and the metal plate B

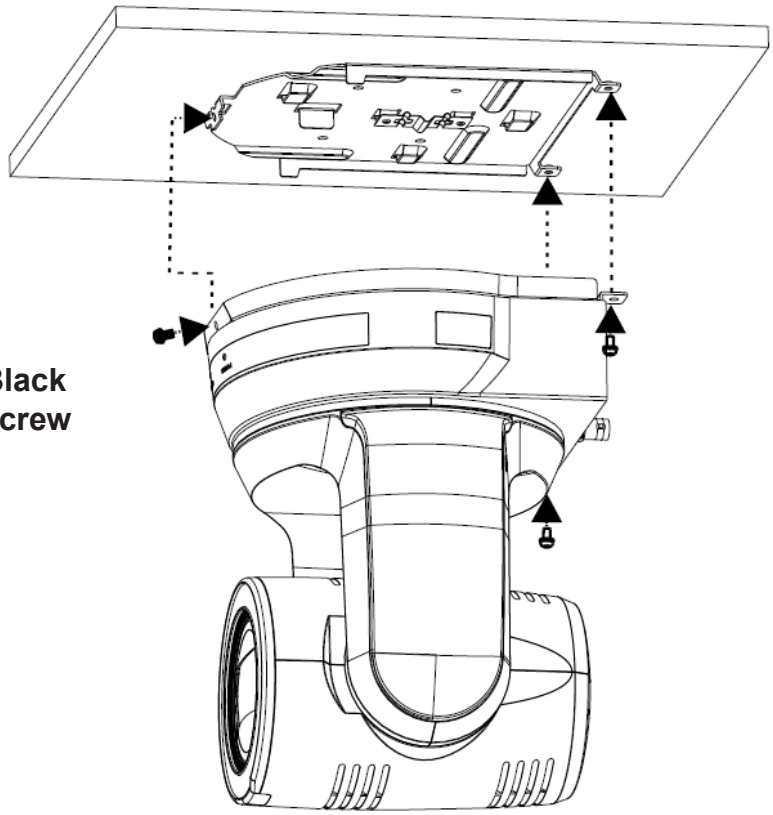
- LIFT the metal plate A up to the ceiling and then SLIDE into metal plate B
- SECURE with 2x M3 silver screws and 1x M3 black screw

3.3.2.5 How to remove

1. First remove the connecting wires from the camera

2. Then release CAMERA from ceiling bracket by loosening the three screws that fix the metal plates A and B together and slide to the left to remove the CAMERA.

3. Then remove the screws on the hanger and the CAMERA. metal plates A and B together and slide to the left to remove the CAMERA.

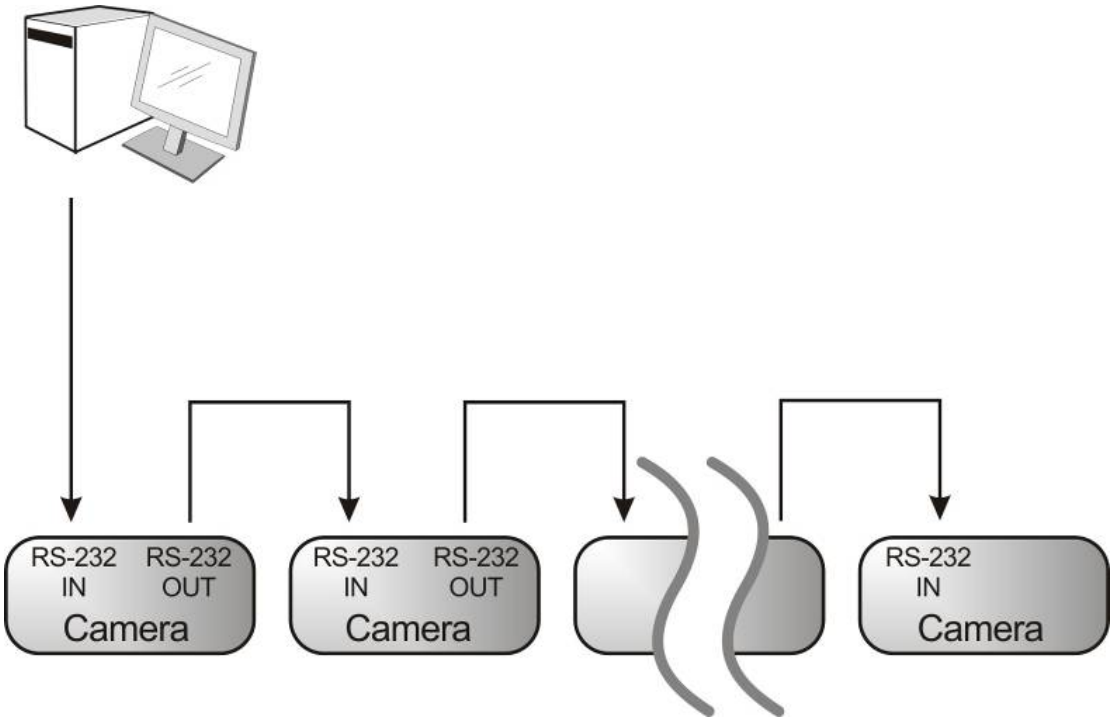


Black screw

3.4 Connecting devices

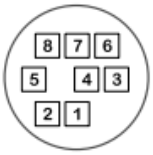
3.4.1 RS-232 Connection

• RS-232 IN/OUT has maximum of 7x Marshall cameras that can be connected.



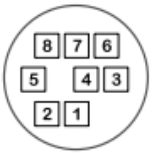
• **RS-232 pinout decriptions and instructions**

▼ RS-232 IN Pins Instructions



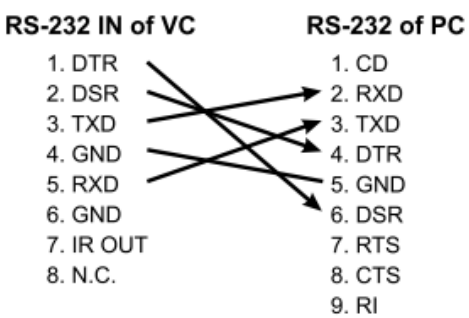
NO	Pins	Signals
1	DTR	Data Transmission Reade
2	DSR	Data Set Reade
3	TXD	Transmit Data
4	GND	Ground
5	RXD	Receive Data
6	GND	Ground
7	IR OUT	IR Commander Signal
8	N.C.	No Connection

▼ RS-232 OUT Pins Instructions

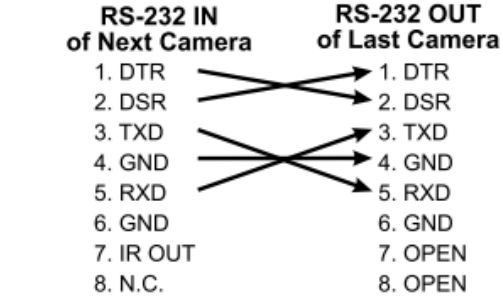


NO	Pins	Signals
1	DTR	Data Transmission Reade
2	DSR	Data Set Reade
3	TXD	Transmit Data
4	GND	Ground
5	RXD	Receive Data
6	GND	Ground
7	OPEN	Reserved
8	OPEN	Reserved

▼ RS-232 Connection Instructions

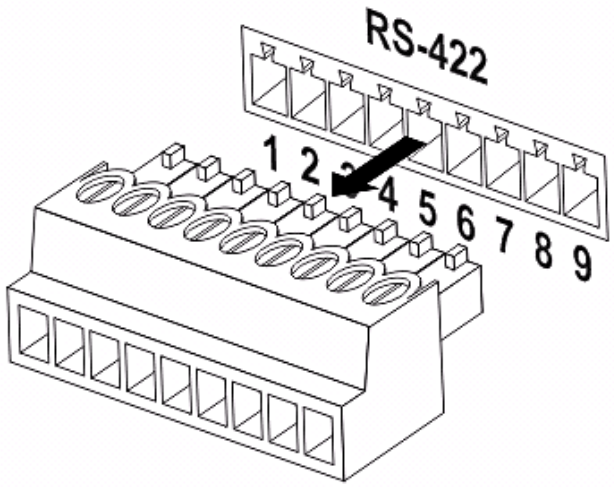


▼ RS-232 Connection Instructions

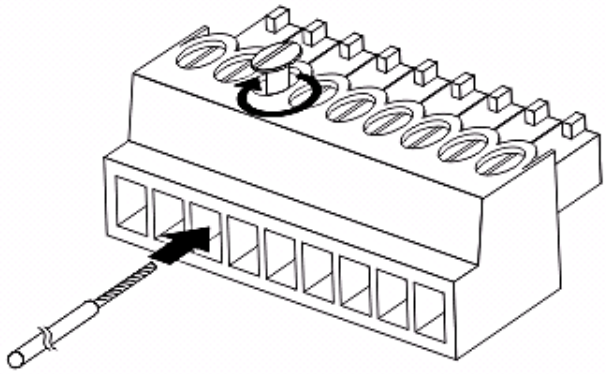


• **RS-422 Connection Instructions**

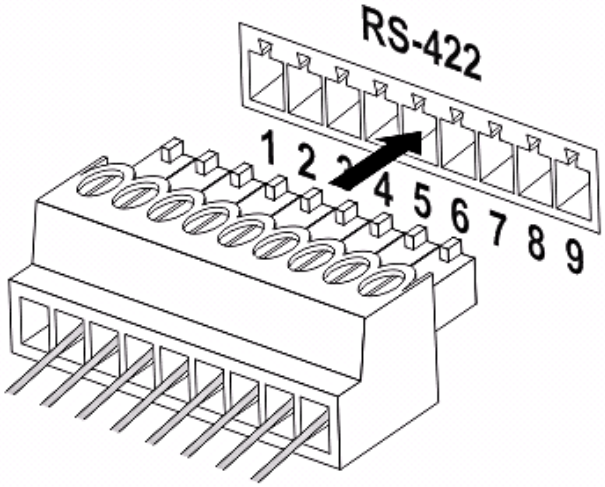
1. Hold the two sides of RS-422 pheonix connector and pull out in the direction shown by the arrow in the figure below



2. Splice and strip copper wire (AWG Nos. 28 to 18) and insert it into the connector hole; then use flat screw driver to tighten.

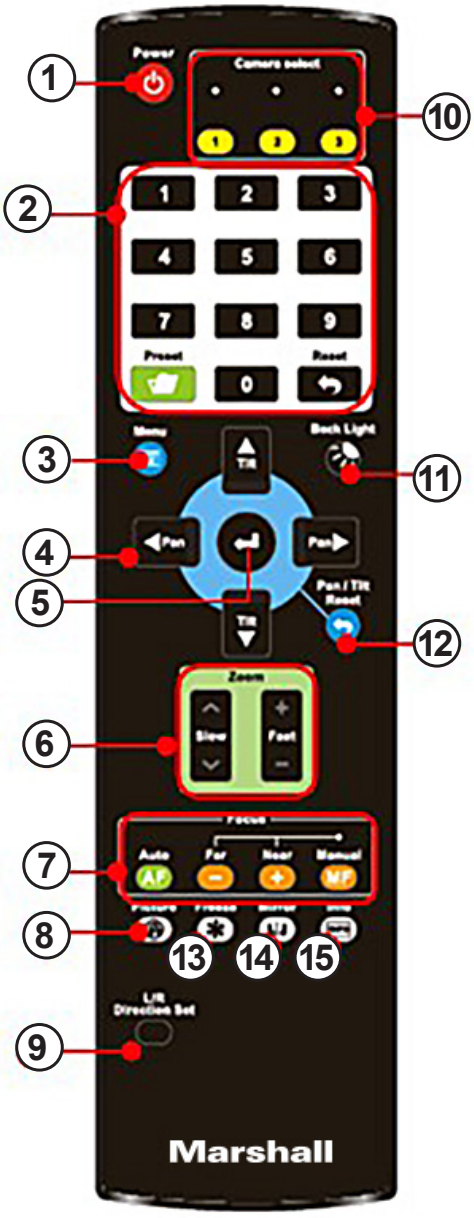


3. Insert the wired RS-422 connector back to the camera. Now the connection is completed and secure.



Chapter 4: Remote Control and Setting Menu

4.1 Functions of remote control



No.	Item	Description
1.	Power	Turn Camera ON and OFF
2.	Preset	■ Numeric Keys 0 - 9: Click to call the preset ■ Preset: Appoint an ID (0 ~ 9) to save the current position data ■ Reset: Appoint an ID (0 ~ 9) to delete the current position data
3.	Menu	Display On Screen Display (OSD) menu
4.	Pan/Tilt	Moves the Camera head to desired position
5.	Home-Enter	Go back to the main page / Execute
6.	Zoom	■ Fast: quickly adjust zoom position ■ Slow: fine-tune zoom position
7.	Focus	■ Auto: Auto focus ■ Manual: Enable Manual Focus ■ Far/ Near: Adjust the FOCUS far/near
8.	Picture	Switch image effect (OFF/ Neg/ B&W)
9.	L/R Direction Set	L/R Direction / Normal
10.	Camera select	Choose camera ID 1 ~ 3 for IR remote.
11.	Back Light	Turn ON/OFF back-light compensation
12.	Pan/ Tilt Reset	Clear the PAN/TILT settings
13.	Freeze	Freeze the screen
14.	Mirror	Rotate the image (OFF/ Mirror/ Flip/ Rotate)
15.	Info	Status information

4.2 Setting Menu

NOTE: Press **MENU** on the remote control to enter the OSD settings menu; the **bold underlined** values in the following table are DEFAULTS.

1st Level Major Items	2nd Level Minor Items	3rd Level Adjustment Values	Function Descriptions
Exposure	Mode	1. **Full Auto** 2. Shutter Pri 3. Iris Pri 4. Manual	Exposure mode setting
	Exposure Comp	On / **Off**	AE Level
	Exposure Comp. Level	-5~**C**~5	The value can be adjusted after ***Exposure Comp.*** is activated
	Spot Light	On / **Off**	
	Spot Light Position	X(0~6)Y(0~4)	The value can be adjusted after **Spot Light** is activated
	Shutter Pri	1/10000-1/1	Adjustable when the ***Exposure mode*** is set to ***Shutter Pri***
	Iris Pri	F1.6~**C**~F18/Off	Adjustable when the ***Exposure mode*** is set to ***Iris Pri***
	Manual Gain	**0**-45dB	Adjustable when the ***Exposure mode*** is set to ***Manual***
	Manual Speed	1/10000-1/1	Manually set the shutter
	Manual Iris	F1.6~**C**~F18/Off	Manually set the iris
	Gain Limit	9-**45** dB	Max. limit value of electron gain
	Iris Limit	**F2.2**-F11	Max. limit value of iris
	WDR	**Off** / 1 / 2 /	
White Balance	Mode	1. **Auto** 2. Indoor 3. Outdoor 4. One Push WB 5. ATW 6. Manual 7. Sodium Lamp 8. 3000K 9. 4300K 10. 5000K 11. 6500K 12. 8000K	Select the color temperature mode 1. 4000k ~ 7000k 2. 3200k 3. 5800k 4. 1700k ~ 10000k 5. 1700k ~ 10000k 6. Custom 7. 2800k
	One Push Trigger	**ENTER**	One push trigger
	Manual Red	0~**C**~128	Adjustable when the white balance mode is set to ***Manual***
	Manual Blue	0~**C**~128	Adjustable when the white balance mode is set to ***Manual***
Picture	Picture effect	**OFF** / Neg / B&W	
	Sharpness	0~**C**~14	
	2D NR	Off / **1** / 2 / 3	
	3D NR	Off / Low / **Typical** / Highest	
	Image Mode	**Default**/Custom	The user may customize his/her desired image mode
	Image Mode Load	**ENTER**	Adjustable when the ***Image mode*** is set to ***Custom***. After selected, the corresponding ***Image mode*** parameters will be read and applied to ***Custom***
	Brightness	0~**C**~15	Adjustable when the ***Image mode*** is set to ***Custom***

1st Level Major Items	2nd Level Minor Items	3rd Level Adjustment Values	Function Descriptions
	Hue	0~C~15	Adjustable when the ***Image mode*** is set to ***Custom***
	Saturation	0~C ~15	Adjustable when the ***Image mode*** is set to ***Custom***
	Gamma	0~C~3	Adjustable when the ***Image mode*** is set to ***Custom***
Pan Tilt Zoom	Pan/Tilt Limit	On / Off	Turn on/off the angle limit setting
	Pan Right Limit	0~170	Limit the right angle
	Pan Left Limit	-170~0	Limit the left angle
	Tilt UP Limit	0~90	Limit the upward angle
	Tilt Down Limit	-30~0	Limit the downward angle
	Pan Flip	On / Off	Activate the reverse Pan direction
	Tilt Flip	On / Off	Activate the reverse Tilt direction
	Preset Speed	5/ 25/ 50/ 80/ 120/ 160/ 200/ 300 deg/sec	Set the rotation speed of the cradle head when Preset is performed
	PTZ Speed Comp	On / Off	Set the Pan/Tilt moving speed to vary from the zoom position
	D-Zoom Limit	x1~x12	Set the D-zoom limit
	PTZ Motion Sync	On / Off	When activated, PTZ synchronization can be achieved by controlling with the ***Presets*** **<NOTE>** Refer to the Preset speed setting for this feature. The speed may be adjusted automatically due to the difference of PTZ range to next shot.
D-Effect	Mirror	OFF / Mirror / Flip / Mirror + Flip	Set the mode at which the image is mirror or flipped
Auto Focus	AF Sensitivity	Low / Mid / High	AF triggering speed, the higher the speed is, the faster AF is triggered
	AF Frame	Center Area / All Area / Auto	AF frame setting, when central area is set as AF frame, FOCUS will be on the center of the screen. When Full Frame is set as AF frame, FOCUS will consider full screen
	Zoom Tracking	Manual / Curve Tracing / Zoom Tracking	FOCUS mode during ZOOM operation (can be set to Manual Focus (MF) mode)
	PTZ Assist	On / Off	When PTZ Assist is enabled and PTZ control is in operation, the focus performs only once upon immediate execution. The focus will not be triggered afterward when the scene changes (It can be set in the Manual Focus (MF) mode)
	SMART AF	On / Off	Turn on this function and Auto Focus (AF) will focus on the face
Ethernet	DHCP	On / Off	Enable/Disable DHCP setting using left and right arrow keys and press **[ENTER]** to apply setting.
	IP Address	192.168.100.100	Press **[ENTER]** to be in modify mode; select the item to be modified using the up and down keys, and modify the value using the left and right keys or the numeric keys.

1st Level Major Items	2nd Level Minor Items	3rd Level Adjustment Values	Function Descriptions
	Subnet mask	255.255.255.0	Press **[ENTER]** to modify; select the item to be modified using the up and down keys, and modify the value using the left and right keys or the numeric keys.
	Gateway	192.168.100.254	Press **[ENTER]** to modify; select the item to be modified using the up and down keys, and modify the value using the left and right keys or the numeric keys.
Audio	Audio In	Line In/ Mic In	Set Audio In
	Audio Enable	On / Off	Turn ON/OFF audio output
	Audio Volume	0~C~10	Audio Volume Setting
	Audio Delay	On / Off	When the audio is not synchronized with the video, enable this function to set the audio delay time <NOTE> only supported when NDI|HX function is set to OFF
	Audio Delay Time(ms)	-1~-500ms	Set audio delay time <NOTE> only supported when NDI|HX function is set to OFF
	Encode Type	AAC/ G.711	Set audio encode type <NOTE> only supported when NDI|HX function is set to OFF
	Encode Sample Rate	1. 48 KHz(AAC) 2. 44.1 KHz(AAC) 3. 16 KHz(AAC) 4. 16 KHz(G.711) 5. 8 KHz(G.711)	Set the encode type and sample rate <NOTE> only supported when NDI|HX function is set to OFF
System	Prompt	On / Off	Turn ON/OFF the prompt information on the display
	IR Receive	On / Off	When it is OFF, the remote control will not be able to control the camera. If turned OFF simply power-cycle to restore control
	Tally Lamp	On / Off	Select to enable or disable Tally Lamp function.
	Tally CMMD Mode	General / Link	Set whether the indicator light is linked with RS232 command ■ **General** (Not linked): The indicator light switch and mode shall be set separately. · When the indicator light is on and the default mode is off, additional command is required to set the indicator light mode · Setting the indicator light mode when the indicator light is off will not trigger the indicator light ■ **Link:** · When the indicator light is on, the default mode is red light · Setting the indicator light mode when the indicator light is off will turn on the indicator light
	Language	English / Chinese	

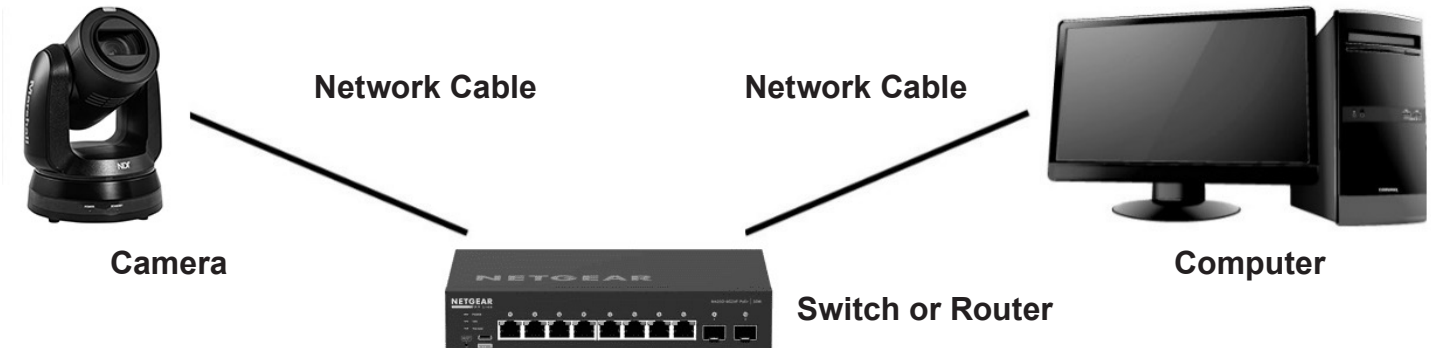
1st Level Major Items	2nd Level Minor Items	3rd Level Adjustment Values	Function Descriptions
	Initial Position	**Last operated** / First default position	Select the camera lens to return to the last operated position or the first default position after POWER ON <NOTE> First default position=Preset 0
	Control Device	Encoder / **Controller**	Control Device setting, Controller: for joystick Encoder: for tracking system
	Motionless Preset	On / **Off**	When the function is enabled, the screen will Freeze when Preset is executed. Freeze will be released after Preset is completed.
	Control Port	**RS-232**/ RS-422	Choose RS-232 or RS-422 control
	Protocol	**VISCA** / Pelco D	Choose Visca or PelcoD command
	Baud Rate	**9600**/ 38400	Choose the transmission speed of the control signals
	VISCA Address	**0**~7	The Protocol set to VISCA allows the camera ID address to be assigned. Select 0 for automation.
	PELCO D Address	**1** ~255	The Protocol set to Pelco D allows the camera ID address to be assigned.
	Genlock - Hor. Phase	500~**C**~-500	Set Genlock synchronized source parameters
	Output Mode	1. **3840x2160/59.94p** 2. 3840x2160/50p 3. 3840x2160/29.97p 4. 3840x2160/25p 5. 1080p/59.94 6. 1080p/50 7. 1080p/29.97 8. 1080p/25 9. 720p/59.94 10. 720p/50 11. 1080i/59.94 12. 1080i/50	Choose the output resolution
	Color Space	**Standard Profile** / REC.709/ BT.2020	Set the standard for color space
	Factory Reset	On / **Off**	Resume the factory default setting
Status			Display the current setting status

Chapter 5: Network Function Settings Description

5.1.1 Connecting to Internet

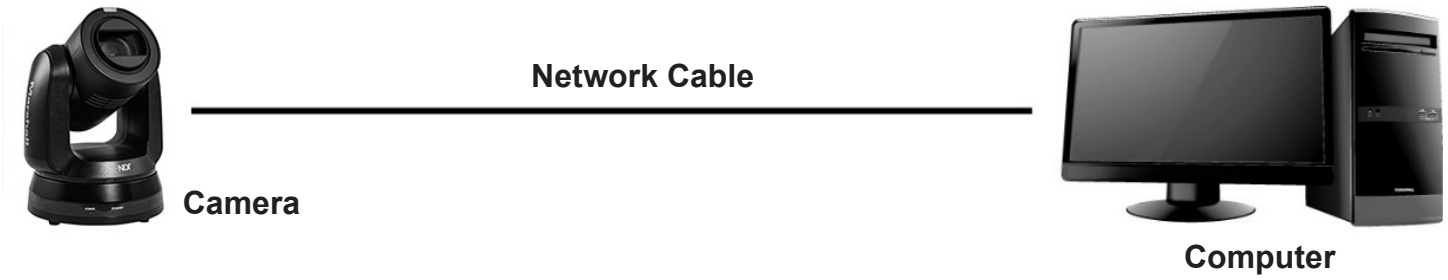
Two common connection methods are shown below:

1. Connecting via IP network switch or router

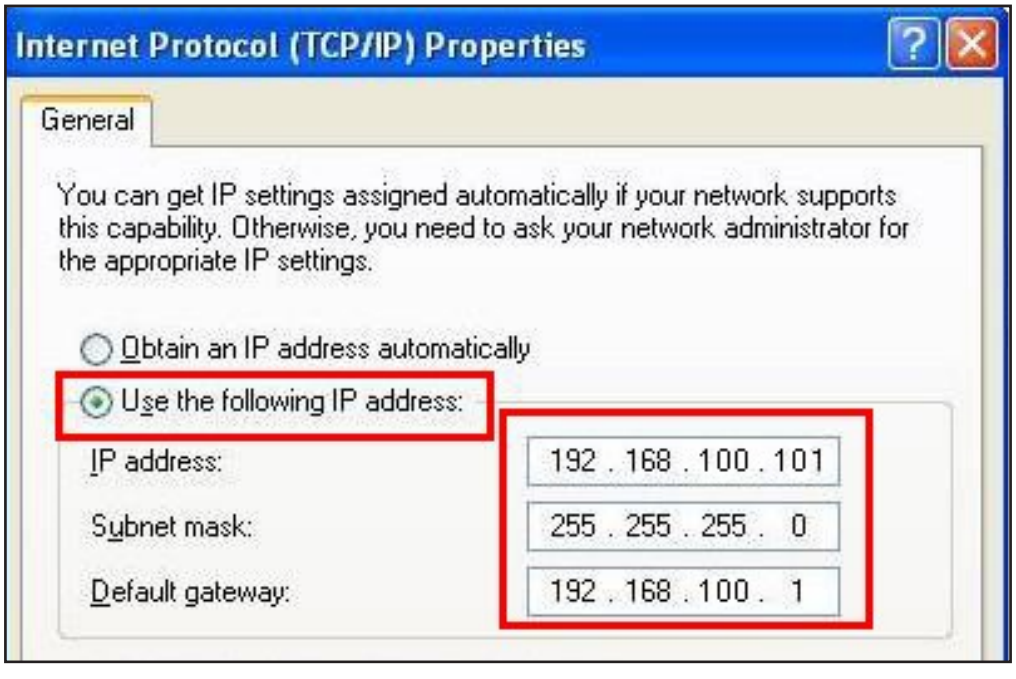


2. To connect directly through network cable, the IP address of the computer should be changed so that it is on the same network segment as the camera

E.g.: The factory-preset default IP address of the camera is 192.168.100.100. The computer IP address must be set with the same network segment, such as 192.168.100.101, so that the computer can be connected correctly with the camera



Change network settings



5.1.2 Using the Browser to View the Images

• Open the browser, and enter the IP address of the camera in the address bar

E.g.: http://192.168.100.100 (default IP address)

• Enter administrator's account and password

For the first-time login, please refer to **5.2.12** Settings - User to change the default password



Marshall Network Camera

• Account: admin (Default)

• Password: 9999 (Default)

5.1.3 Using Marshall Video Management (VMS) Software to View the Images

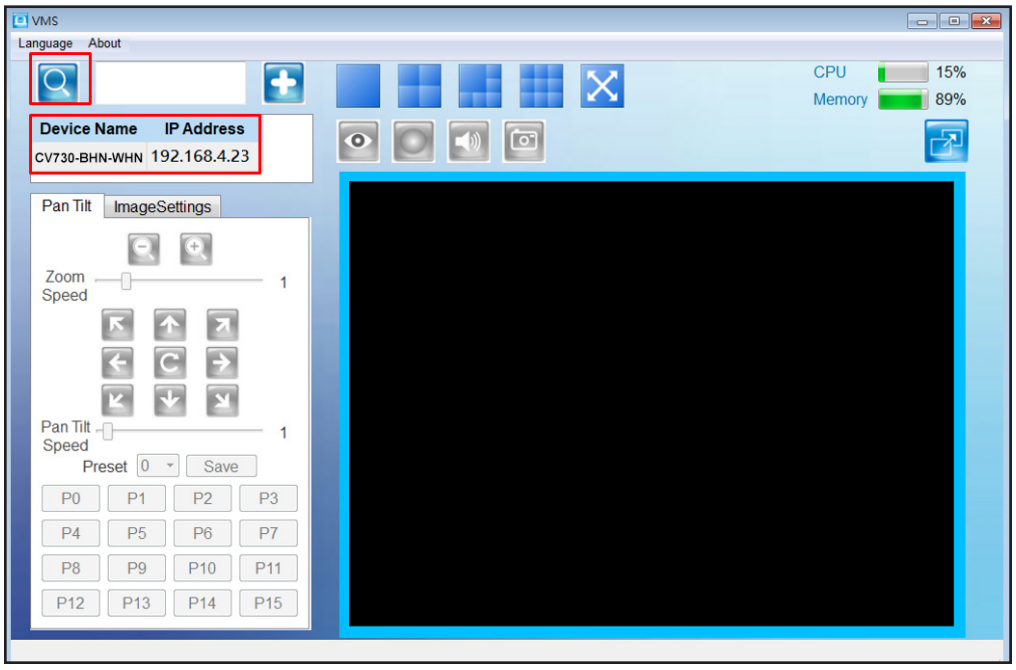
NOTE: Supported when NDI|HX function is OFF (refer to 5.2.5 Streaming - NDI)

• Open Marshall VMS software (Please download from the Marshall website)

• Search Camera: Press [automatically searches for device] to locate the Camera

• Click camera in the list and start operation after connecting to network

NOTE: When using automatic search, the camera and computer must be in the same network segments, e.g., 192.168.4.X



RTSP connection address formats are as follows:

- RTSP Main Streaming (4K@H.265)=> rtsp://camera IP:8554/hevc
- RTSP Sub1 Streaming (1080P@H.264)=> rtsp://camera IP:8557/h264
- RTSP Sub2 Streaming (720P@H.264)=> rtsp://camera IP:8556/h264

If password authentication is enabled, the RTSP connection address is as follows:

- RTSP Main Streaming

rtsp://Username:Password@CV IP address:port/hevc

- RTSP Sub1/ Sub2 Streaming

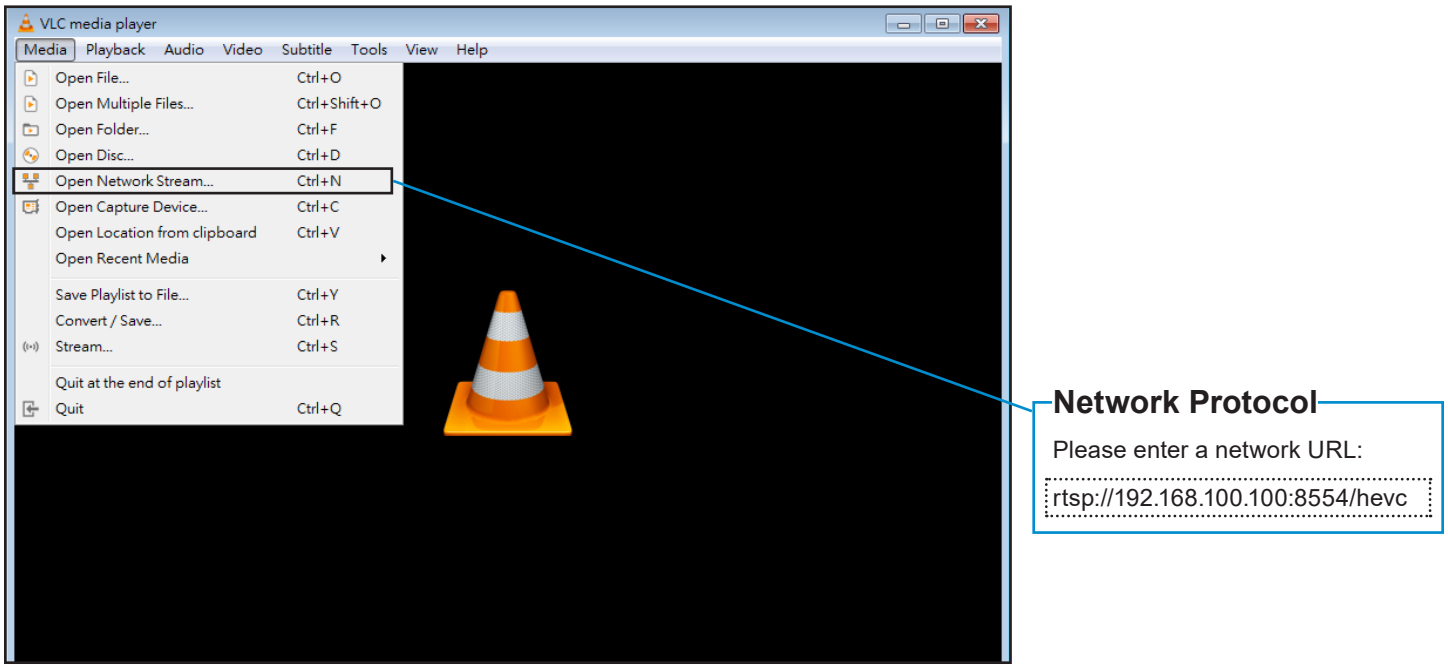
rtsp://Username:Password@CV IP address:port/h264

- To enable password authentication function, please refer to 5.2.4 Stream

Example:

Open the VLC software, click [Open Network Streaming], and enter the URL:

rtsp://192.168.100.100:8554/hevc



5.1.5 Using NDI Studio Monitor to View the Images

NOTE: To support this function, please turn NDI|HX **ON (Please refer to 5.2.5 Streaming NDI)**

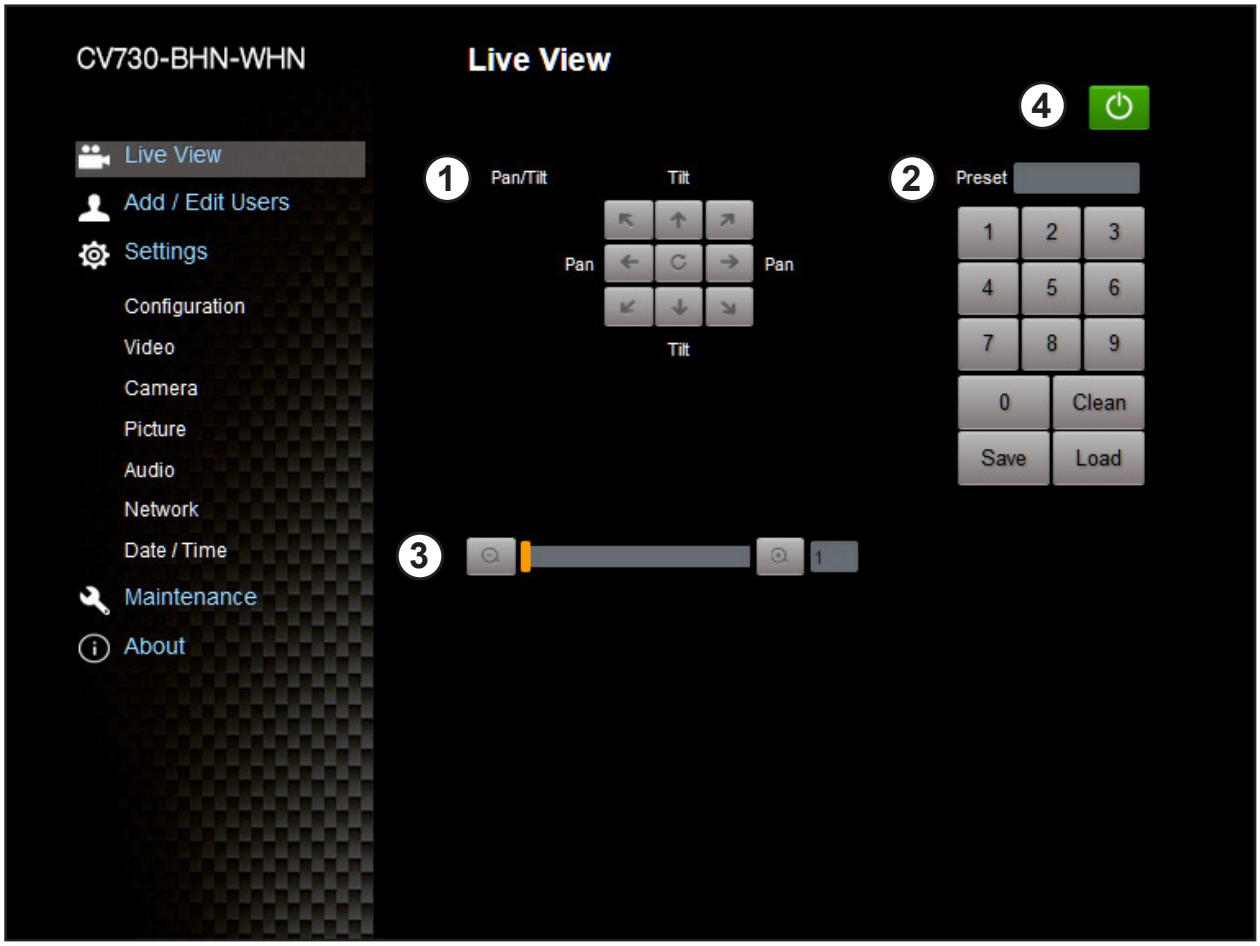
For operation or description of NewTek, please visit the website https://www.newtek.com/

NDI5.5 Tool Download link http://new.tk/NDIHX-Driver-Win

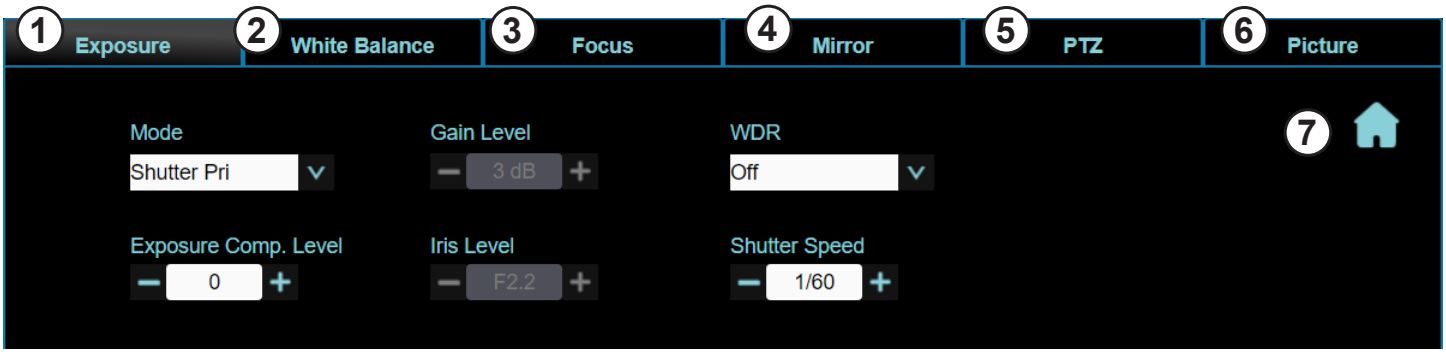
5.2 Web Page Function Description

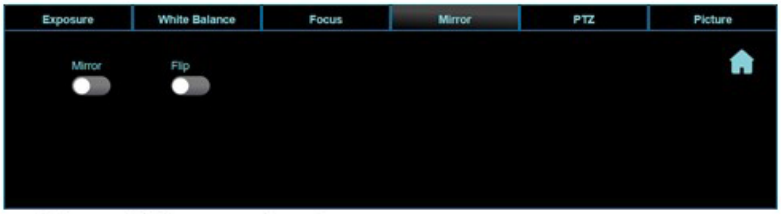
5.2.1 Live View

NOTE: The preview window is not supported when NDI|HX is ON

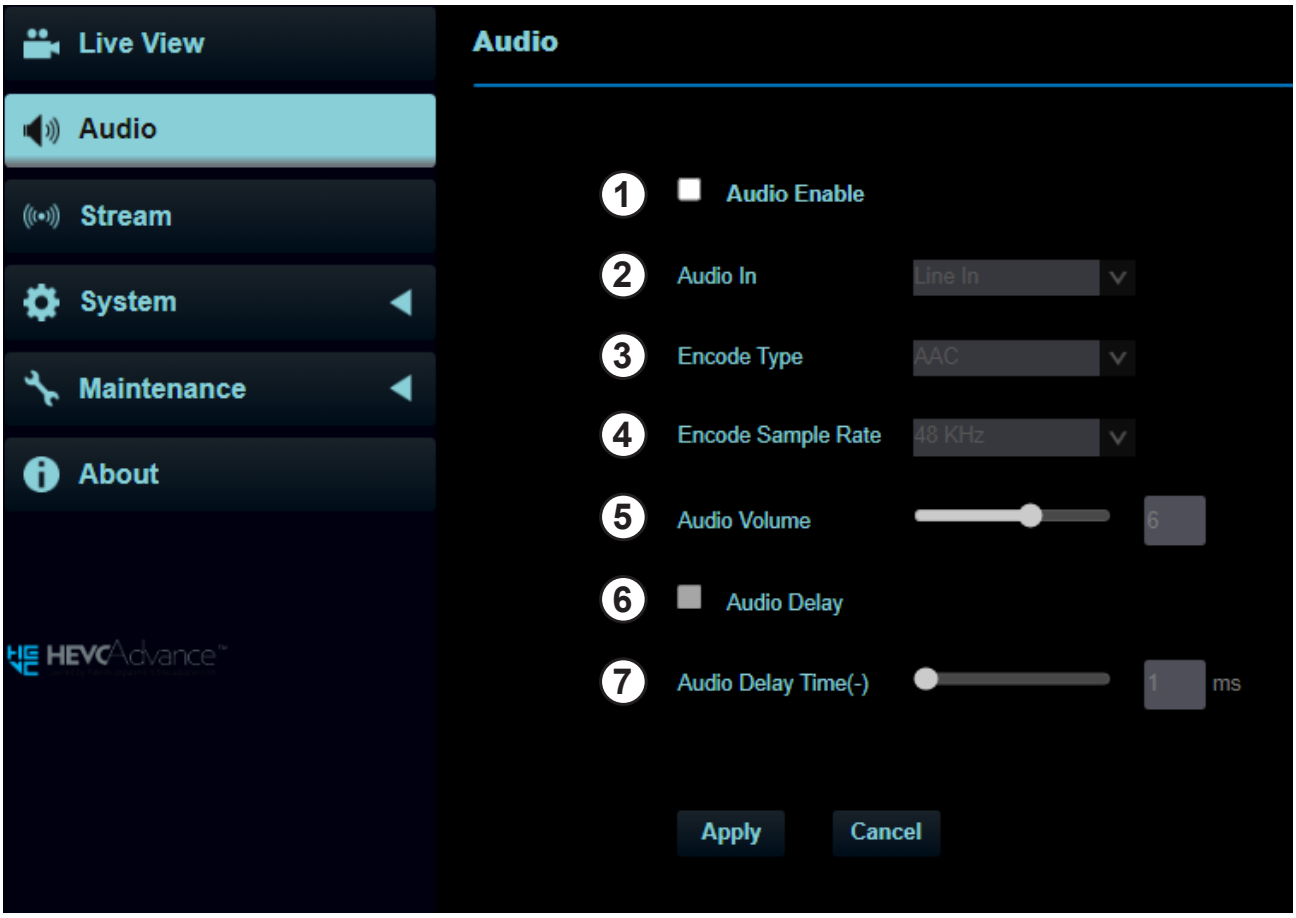


No	Item	Function Descriptions
1	Pan / Tilt setting	Adjust the Pan/Tilt position of the camera screen
2	Preset setting	Select the number first and then select SAVE or LOAD
3	Zoom ratio	Adjust the zoom-in or zoom-out ratio via scroll bar
4	Power button	Turn on or turn off the camera power

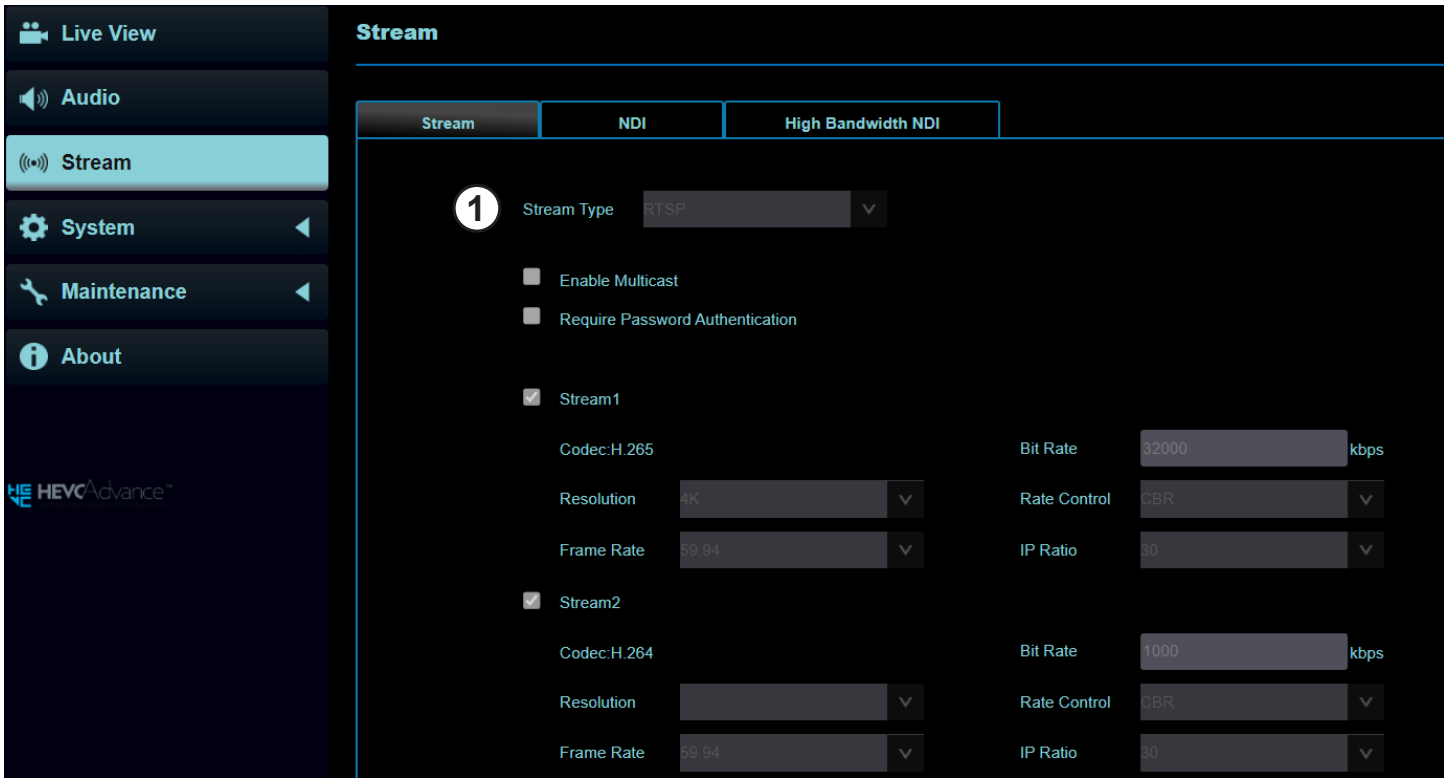


No	Item	Function Descriptions
1	Exposure	■ Mode: Select exposure mode (Full Auto / Shutter Pri / Iris Pri / Manual) ■ Gain Level: Adjust the gain level (adjustable under the "Manual") ■ WDR: Set the level of wide dynamic range (WDR) in order to obtain better images ■ Exposure Comp. Level: Select exposure compensation level ■ Iris Level: Adjust the size of iris (adjustable under the "Manual" or "Iris Priority") ■ Shutter Speed: Adjust the shutter speed (adjustable under the "Manual" or "Shutter Priority")
2	White Balance	 ■ Mode: Select the color temperature mode ■ One Push WB: Single color temperature execution adjustment (adjustable only under the "One Push WB") ■ Manual Red/Blue: Manually adjust blue/red color temperature
3	Focus	 ■ AF Sensitivity: Set automatic focus sensitivity ■ AF Frame: Set automatic focus range ■ Zoom Tracking: The focus mode during lens zooming (can be set in "Manual") ■ PTZ Assist: Check whether auto focus is enabled if there is any changes of PTZ (can be set in "Manual") **<NOTE>** When PTZ Assist is enabled and PTZ control is in operation, the focus will triger. The focus will not be triggered when the scene changes ■ Smart AF: AF will mainly focus on the face ■ One Push AF: When the manual focus mode is on, click the button to perform one auto focus
4	Mirror	 ■ Mirror: Set image mirroring

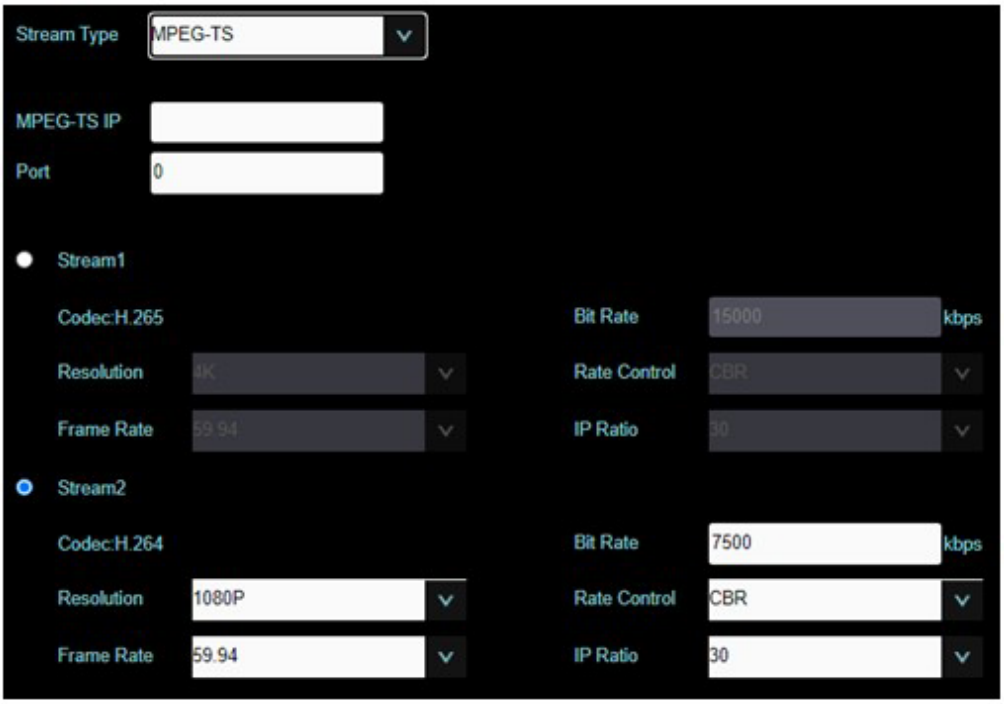
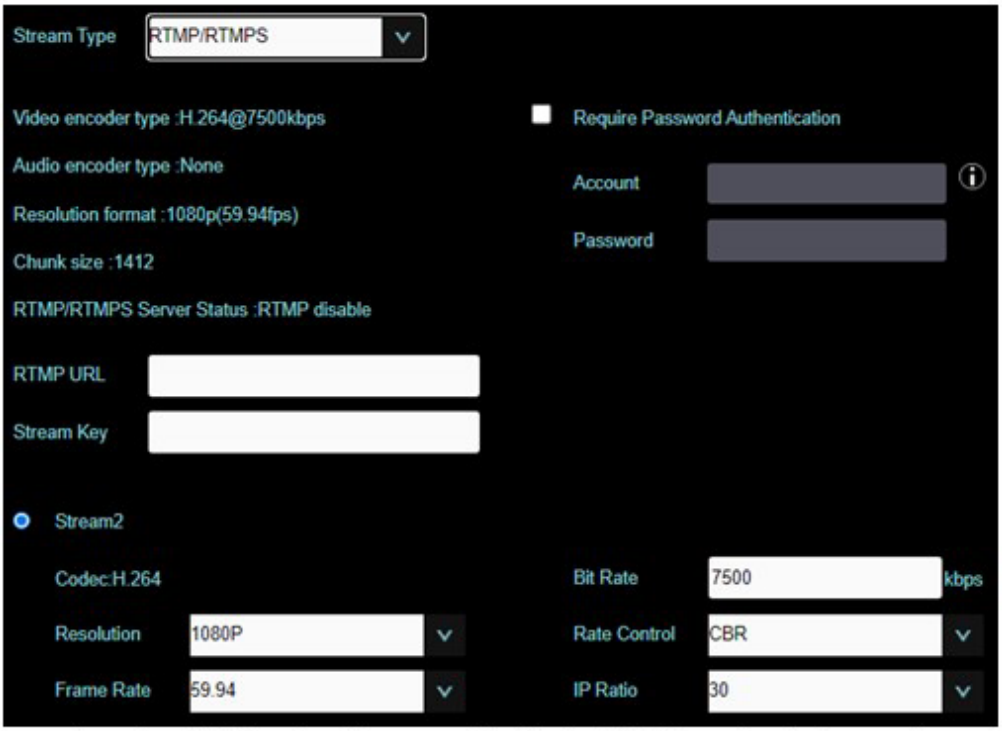
		■ Flip: Set the mirror/flip mode
5	PTZ	 ■ Pan/Tilt limit: Enable, and set the pan/tilt limit ■ Pan/Tilt flip: When it is set, the Pan/Tilt direction will go oppositely ■ Preset Speed: Set the rotation speed of the cradle head when Preset is executed ■ PTZ Speed Comp: After it is activated, the Pan/Tilt moving speed will vary from the zoom position ■ Initial Position: Set the camera lens to return to the last operated position or the first default position after POWER ON **<NOTE>** First default position = Preset 0 ■ Motionless Preset: When the function is enabled, the screen will Freeze when Preset is executed. Freeze will be released after Preset is completed ■ D-Zoom Limit: Set the D-zoom limit ■ PTZ Motion Sync: When activated, PTZ synchronization can be achieved by controlling with the ***Presets*** **<NOTE>** Refer to the Preset speed setting for this feature. The speed may be adjusted automatically due to the difference of PTZ moving range.
6	Picture	 ■ Picture Effect: Set picture effect, Off/Neg/Black and White ■ Image Mode: The user may customize his/her desired image mode ■ Image Mode Load: Adjustable when the Image mode is set to Custom. After selected, the corresponding Image mode parameters will be read and applied to Custom ■ 2D noise reduction: 2D noise reduction settings ■ 3D noise reduction: 3D noise reduction settings ■ Gamma: Gamma Level adjustment (Adjustable when the image mode is set to Custom) ■ Brightness: Brightness adjustment of the image (Adjustable when the image mode is set to Custom) ■ Hue: Hue adjustment of the image (Adjustable when the image mode is set to Custom) ■ Saturation: Saturation adjustment of the image (Adjustable when the image mode is set to Custom) ■ Sharpness: Adjust the sharpness of the image
7	PTZ Control	Go back to PTZ Control page



No	Item	Function Descriptions	NDI|HX OFF	NDI|HX ON
1	Audio Enable	Enable/disable audio	v	v
2	Audio In	Set MIC or LINE Level In	v	v
3	Encode Type	AAC / G.711	v	
4	Encode Sample Rate	Set Encode sample rate ➢ 48 KHz (AAC) ➢ 44.1 KHz (AAC) ➢ 16 KHz (AAC) ➢ 16 KHz (G.711) ➢ 8 KHz (G.711)	v	
5	Audio Volume	Adjust Audio Volume	v	v
6	Audio Delay	Turn ON/OFF audio delay	v	
7	Audio Delay Time	Set the audio delay time (-1 ~ -500 ms)	v	



No	Item	Function Descriptions
1	Stream Type	Support types: MPEG-TS/RTMP/RTMPS/RTSP/SRT
	RTSP	■ Enable/Disable Multicast **<NOTE>** It is suggested to enable Multicast when the number of users online watching the image simultaneously is more than 4 ■ Enable/Disable Username/Password Authentication ➢ RTSP connection format ***5.1.4 Using RTSP Player to View the Images*** ➢ The username/password is the same as the web login password of the camera, please refer to ***5.2.12 Settings - User*** to add/modify account information ■ Stream 1 / 2 / 3: Please refer to ***5.2.4.1 Streaming Parameter Setting*** for streaming parameters

	MPEG-TS	 ■ Set MPEG-TS format **<NOTE>** Port must be set in the range above 1024 with a maximum value of 9999 **<NOTE>** The following port is used by the camera. Setting of the port may not connect correctly 8557, 8556, 8555, 1935 ■ Stream 1 / 2: Please refer to ***5.2.4.1 Streaming Parameter Setting*** for streaming parameters
	RTMP/ RTMPS	 ■ Copy the RTMP web address provided by the RTMP service platform and paste it to the RTMP connection address to publish the camera images on the RTMP service platform **<NOTE>** To upload to YouTube for live streaming, please refer to ***5.2.3 Audio*** ■ Stream 2: Please refer to ***5.2.4.1 Streaming Parameter Setting*** for streaming parameters

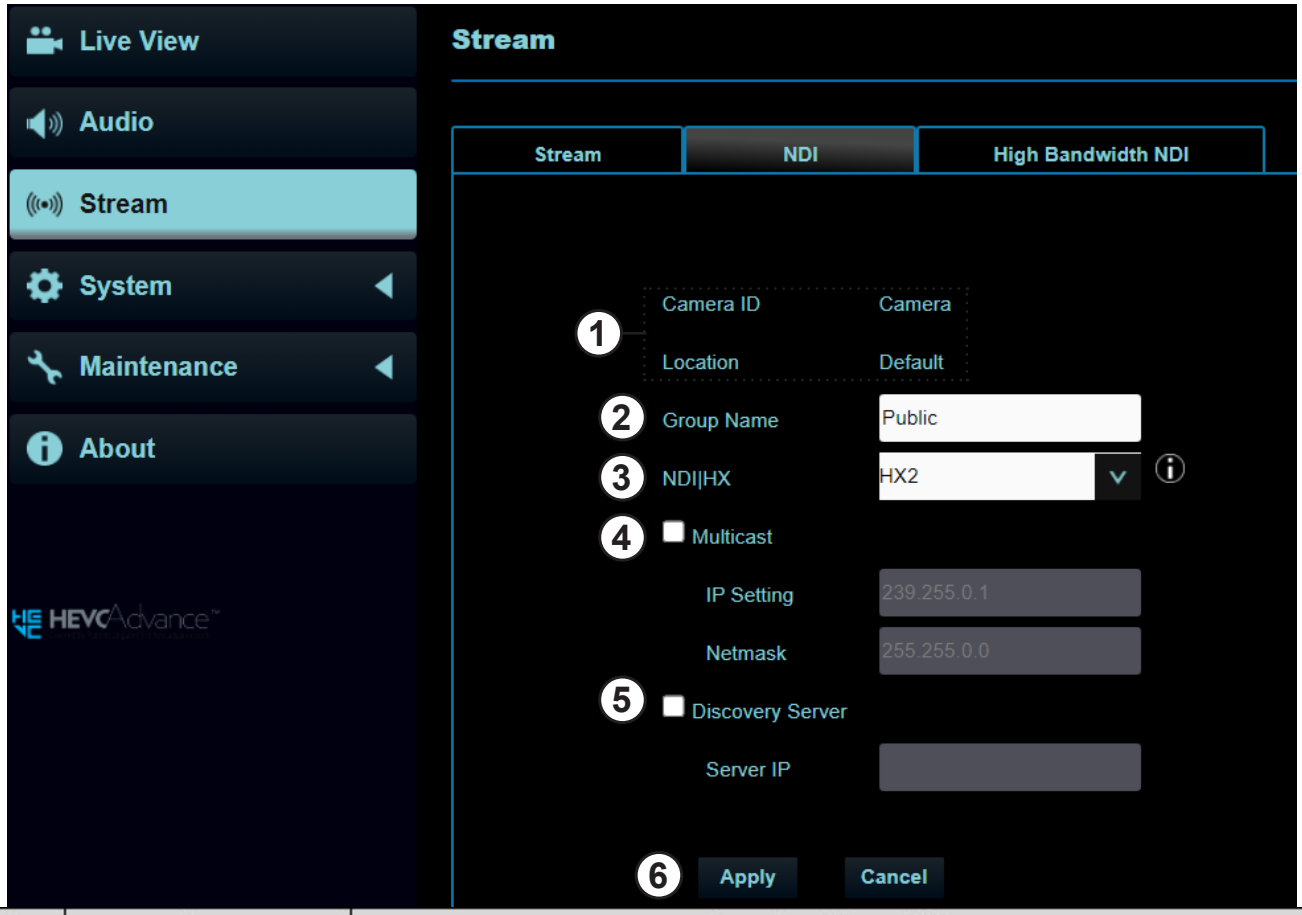
	SRT	 ■ The port number must be set in the range above 1024 with a maximum value of 9999 **<NOTE>** The following port is used by the camera. Setting of the port may not connect correctly 8554, 8557, 8556, 8555, 19353 ■ Delay time is for 20 to 8000 microseconds. The default value is 120 microseconds ■ Stream1 / 2: Please refer to ***5.2.4.1 Streaming Parameter Setting*** for streaming parameters

5.2.4.1 Streaming parameter setting

Function		Stream 1	Stream 2	Stream 3
Encode Format		H.265	H.264	
Resolution		4K	1080p / 720p /1080i	640x360
Frame Rate		Setting according to the supported resolution		
Bit Rate(kbps)	Range	2,000~20,000	2,000~20,000	512~5,000
	Factory Default	15,000	7,500	1,000
Rate Control		CBR / VBR		
IP Ratio		Setting according to the supported resolution		

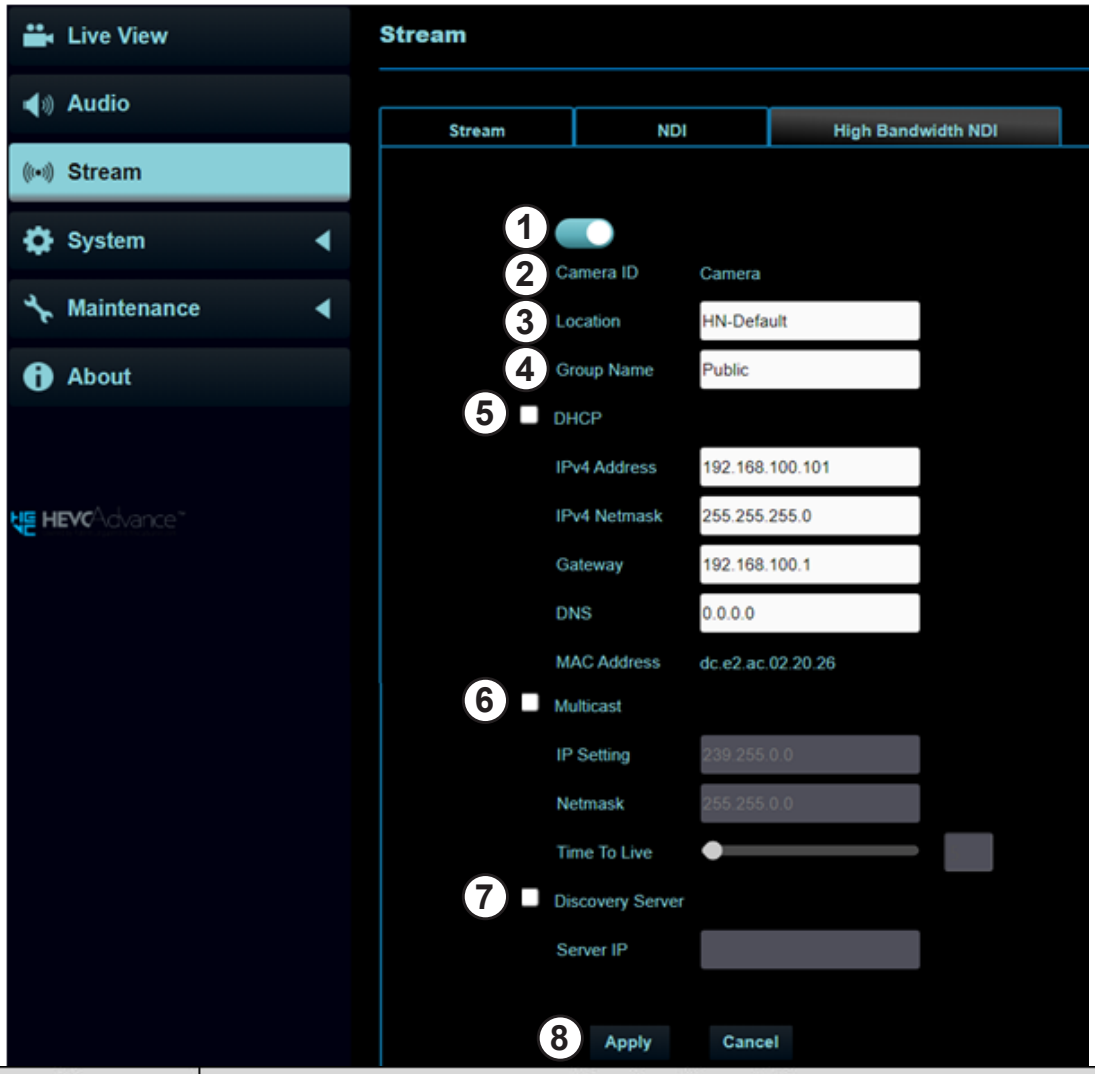
5.2.5 Streaming – NDI

NOTE: The setting is only available when NDI|HX is turned ON



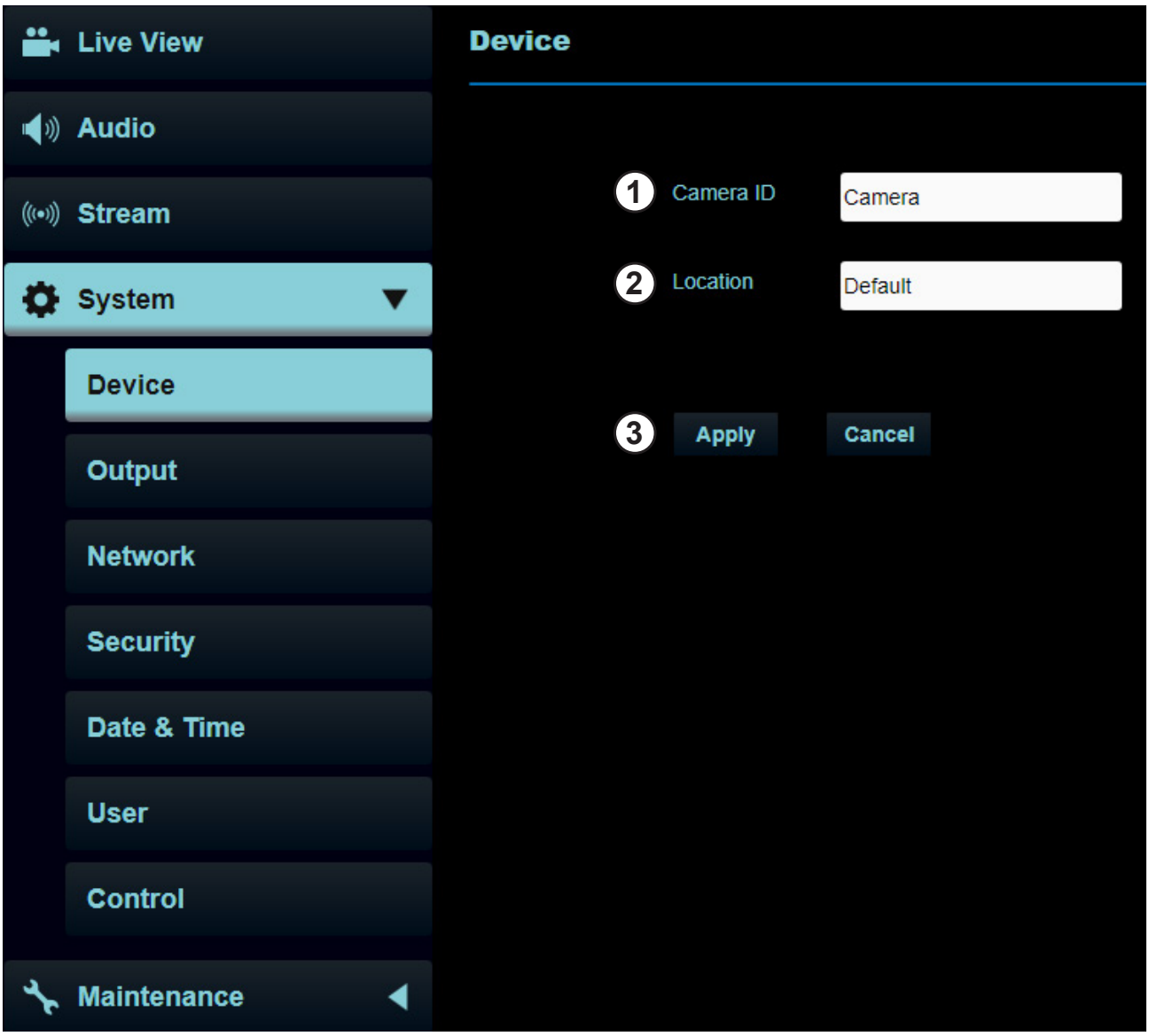
No	Item	Function Descriptions
1	Camera ID/ Location	Displaying ID/location according to [System Settings] > [Device] setting content
2	Group Name	The group name can be modified here and set with Access Manager - Receive in NDI Tool ■ If no group is assigned, the machine belongs to Public. As the default of Access Manager includes Public, Studio Monitor can discover this machine. ■ If a group is assigned, but this group is not added into Access Manager, Studio Monitor cannot discover this machine. ■ If a group is assigned and this group is added into Access Manager, Studio Monitor can discover this machine. **<NOTE>** The name can contain commas (,) to distinguish different groups Example: "default, 123, abc" means this machine belongs to three groups at the same time (default/ 123/ abc)
3	NDI|HX	NDI|HX Off/HX2/HX3 can be set on CV730-BHN, CV730-ND3 ■ Off: Support RTSP/RTMP/RTMPS/MPEG-TS/SRT, and ONVIF can find devices but cannot be used with NDI Tool ■ HX2: HX2 is supported ■ HX3: HX3 is supported **<NOTE>** HX3 only supports 1080p 60/59.94/50 resolutions **<NOTE>** When HX2/ HX3 is on, ONVIF cannot find devices, and RTSP/ RTMP/ RTMPS/ MPEG-TS/ SRT streams cannot be used
4	Multicast	Multicast Setting It is suggested to enable Multicast when the number of users online watching the image simultaneously is more than 4
5	Discovery Server	Check to enter the Server IP address
6	Apply	After the setting has been modified, select this button to apply the setting

5.2.6 Streaming – High Bandwidth NDI



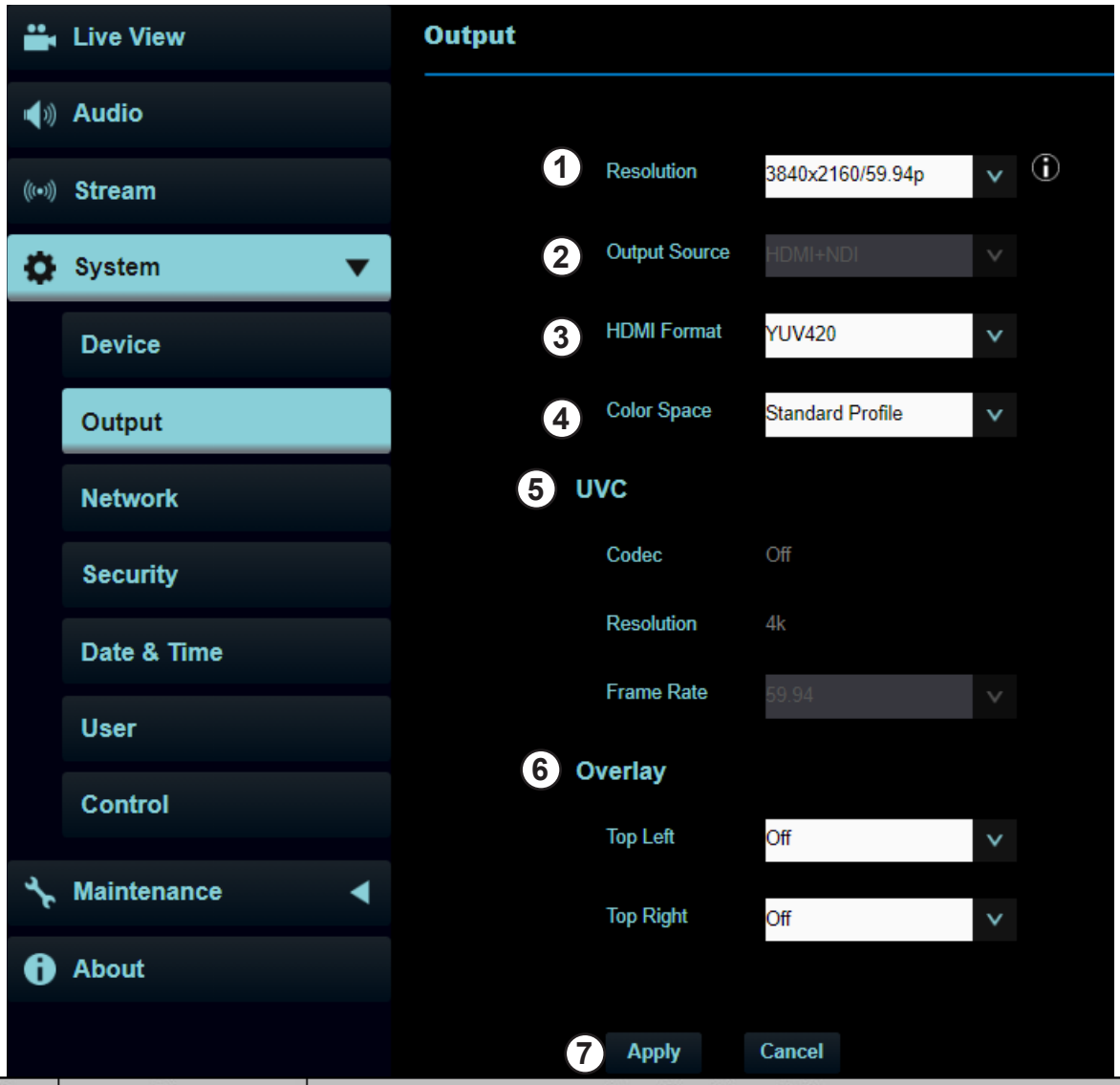
No	Item	Function Descriptions
1	On / Off	Enable / Disable High Bandwidth NDI or Full NDI
2	Camera ID	Displaying ID according to [System Settings] > [Device] setting content
3	Location	Modify the location of the camera, such as Room 1 ■ Camera location is limited to 1 - 11 characters ■ Please mix uppercase and lowercase letters or numbers for characters. Special symbols such as "/" and "space" cannot be used
4	Group Name	The group name can be modified here and set with Access Manager - Receive in NDI Tool ■ If no group is assigned, the machine belongs to Public. As the default of Access Manager includes Public, Studio Monitor can discover this machine. ■ If a group is assigned, but this group is not added into Access Manager, Studio Monitor cannot discover this machine. ■ If a group is assigned and this group is added into Access Manager, Studio Monitor can discover this machine. **<NOTE>** The name can contain commas (,) to distinguish different groups Example: "default, 123, abc" means this machine belongs to three groups at the same time (default / 123 / abc)
5	DHCP	Network setting of camera. Change of setting is available when DHCP function is closed.
6	Multicast	Multicast Setting It is suggested to enable Multicast when the number of users online watching the image simultaneously is more than 4
7	Discovery Server	Check to enter the Server IP address
8	Apply	After the setting has been modified, select this button to apply the setting

5.2.7 System Device – Device



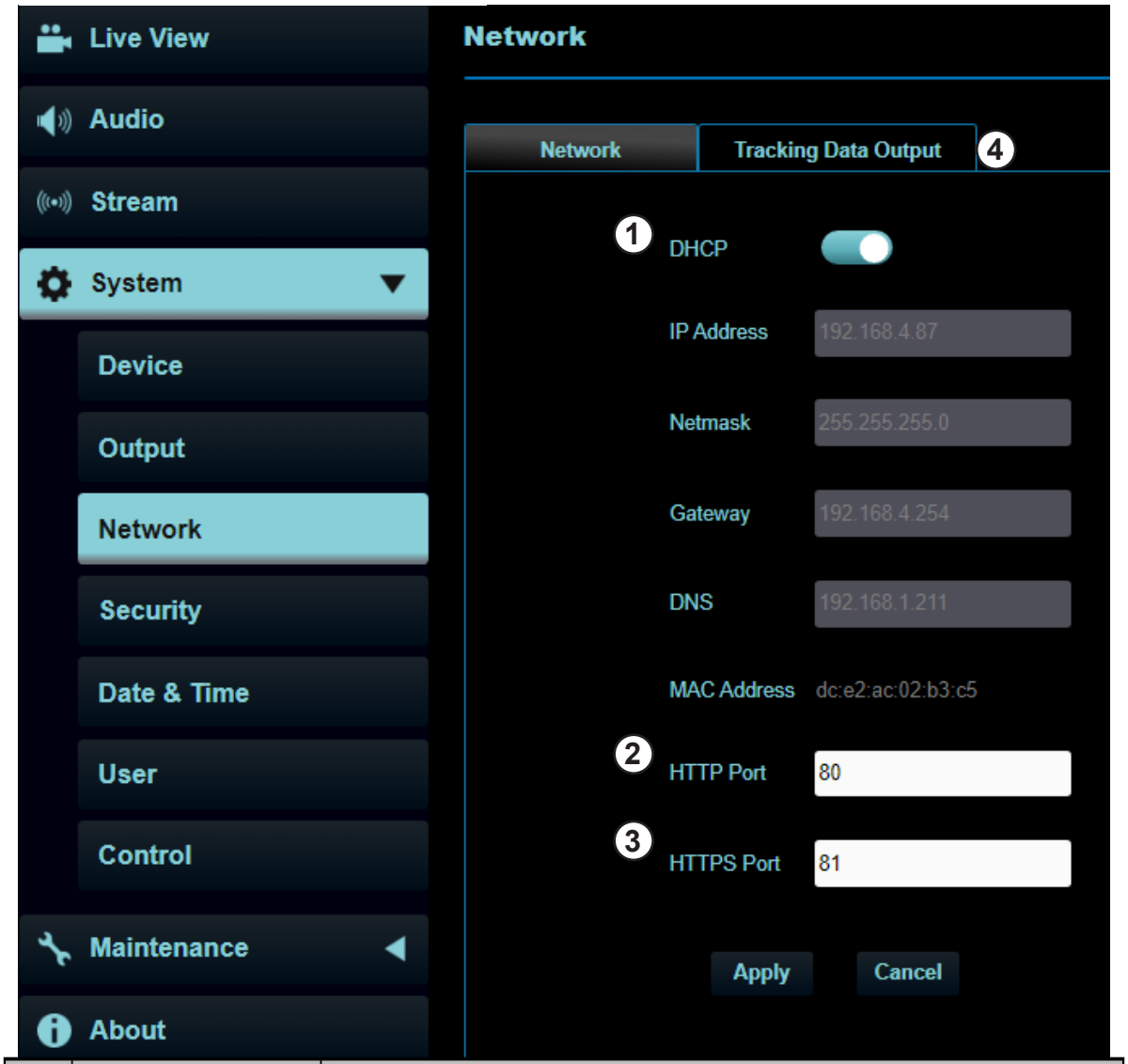
No	Item	Function Descriptions
1	Camera ID	Change camera ID here ■ Camera IDs are limited to 1 - 12 characters ■ Please mix uppercase and lowercase letters or numbers for characters. Special symbols such as **"/"** and **"space"** cannot be used **<NOTE>** Modifying this field will modify the Onvif device name synchronously
2	Location	Modify the location of the camera, such as Room 1 ■ Camera location is limited to 1 - 11 characters ■ Please mix uppercase and lowercase letters or numbers for characters. Special symbols such as "/" and "space" cannot be used **<NOTE>** Modifying this field will modify the Onvif device location synchronously
3	Apply	After the setting has been modified, select this button to apply the setting

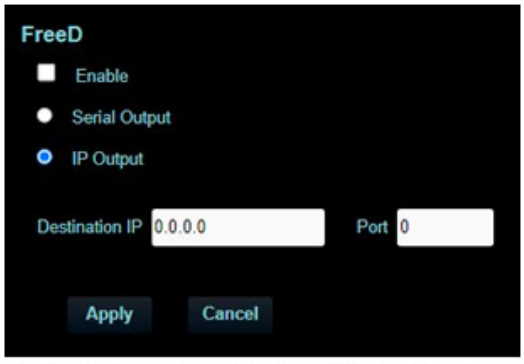
5.2.8 Settings – Audio



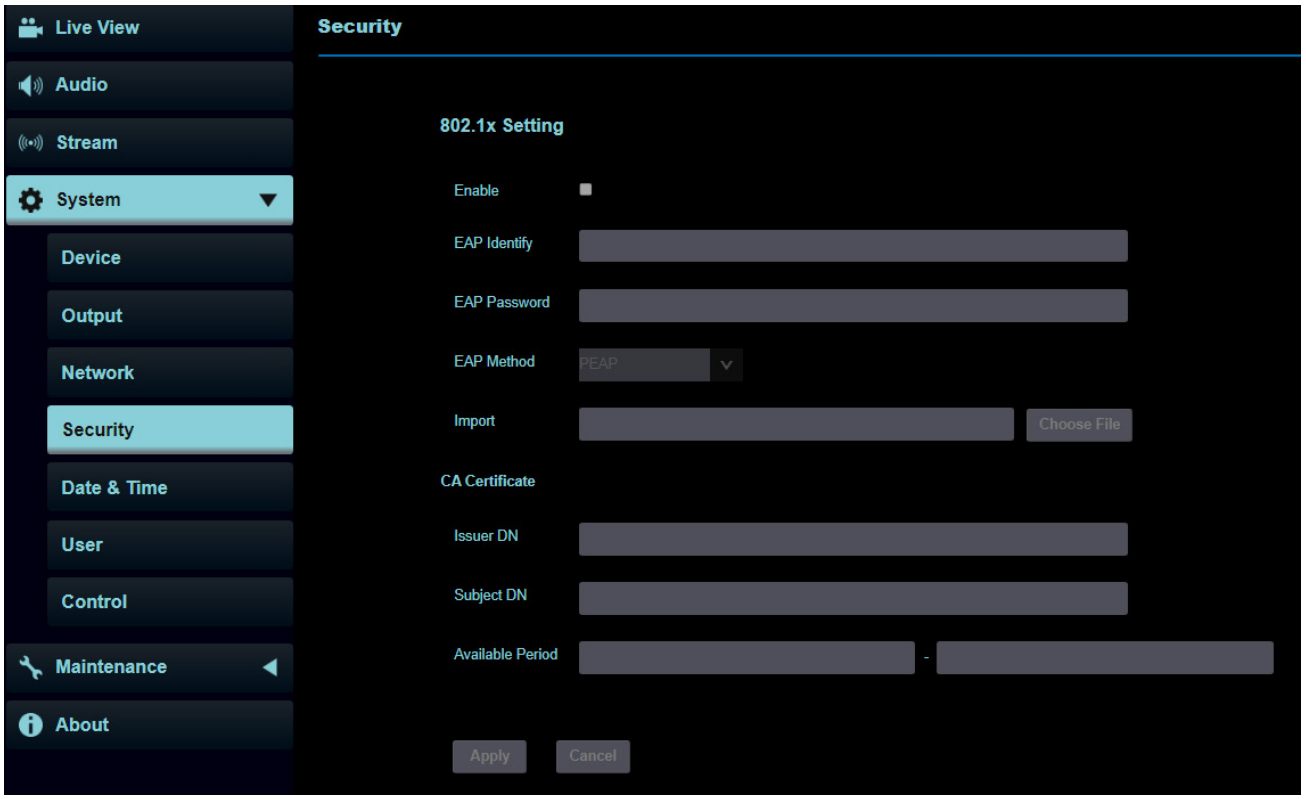
No	Item	Function Descriptions
1	Resolution	Set the resolution of the camera After switching the resolution, the camera will restart. Please refresh the browser
2	Output Source	According to the output protocol, you can select HDMI + Streaming, HDMI+NDI or HDMI + UVC output **<NOTE>** When it is set to UVC output, 3840 x 2160 30p or lower resolutions are supported **<NOTE>** 1080i does not support UVC
3	HDMI format	Select YUV422 / YUV420 / RGB **<NOTE>** 3840x2160 59.94/50 resolutions are applicable to YUV420
4	Color Space	Set the standard for color space Standard Profile/REC.709/BT.2020
5	UVC	This can be set when ***Settings - System Settings - Output Source*** is set as HDMI + UVC ■ **Encode Format:** ➢3840 x 2160 29.97/25 fps: H.264 ➢Less than 1080p (inclusive): H.264/MJPEG ■ Resolution: It is shown based on *Settings - System Settings - Resolution* Frame Rate: 3840 x 2160 can only select the highest 29.97 fps
6	Overlay	Set the stream to display "date and time" or "custom content" and to display location
7	Apply/Cancel	Apply/Cancel Setting

5.2.9 Settings – Network



No	Item	Function Descriptions
1	DHCP	Network setting of camera. Change of setting is available when DHCP function is closed
2	HTTP port	Set HTTP port. The default Port value is 80
3	HTTPS port	Set HTTPS port. The default Port value is 81
4	Tracking Data Output	 When enabled, PTZ position information can be reported when the camera moves 1. Serial Output: Please set the protocol to VISCA and the baud rate to 38400 2. IP output: Set the destination IP address and port 3. The port numbers should be > 1024. 1935, 8555, 8556, 8557 cannot be used. **<NOTE>** When Tracking Data Output is enabled, the camera performance may be affected.

5.2.10 Settings – Maintenance- Security

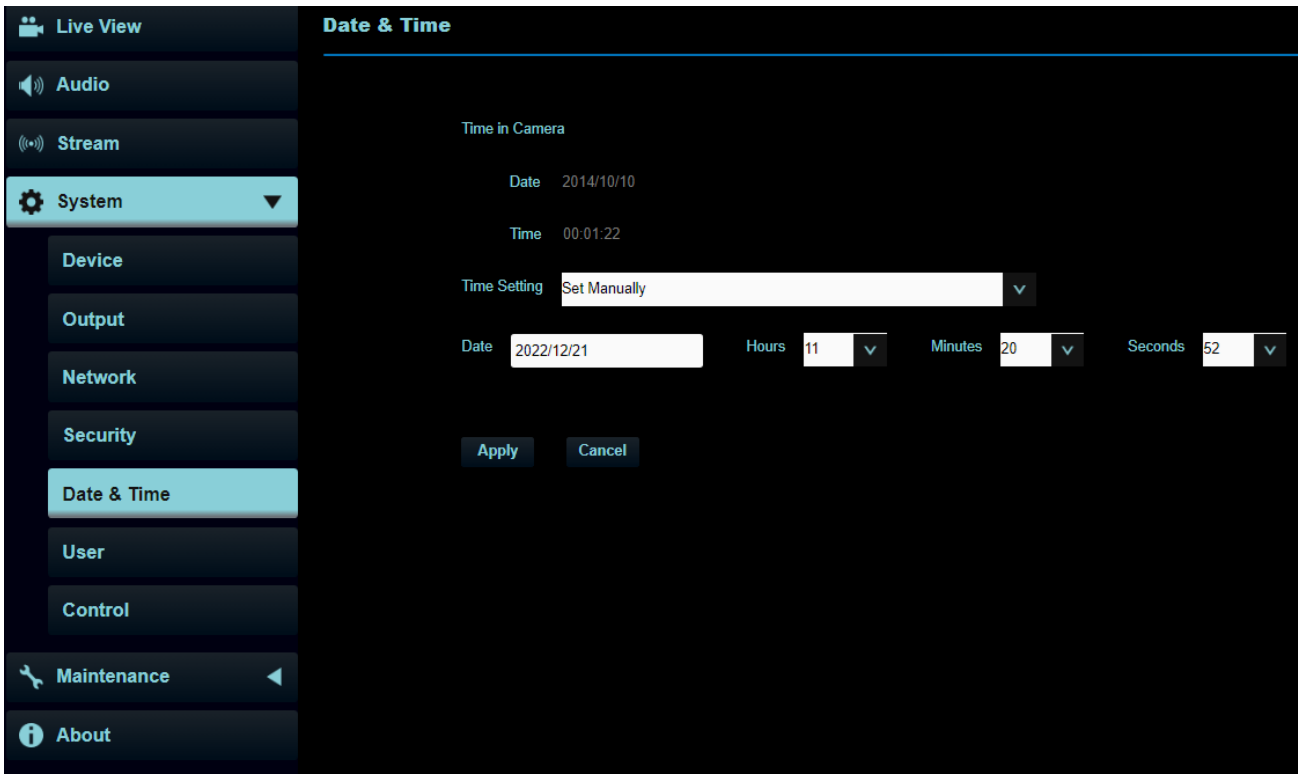


Function Descriptions

Enable/disable 802.1x protocol, and configure settings when enabled

NOTE: The router must support 802.1x protocol to enable this feature

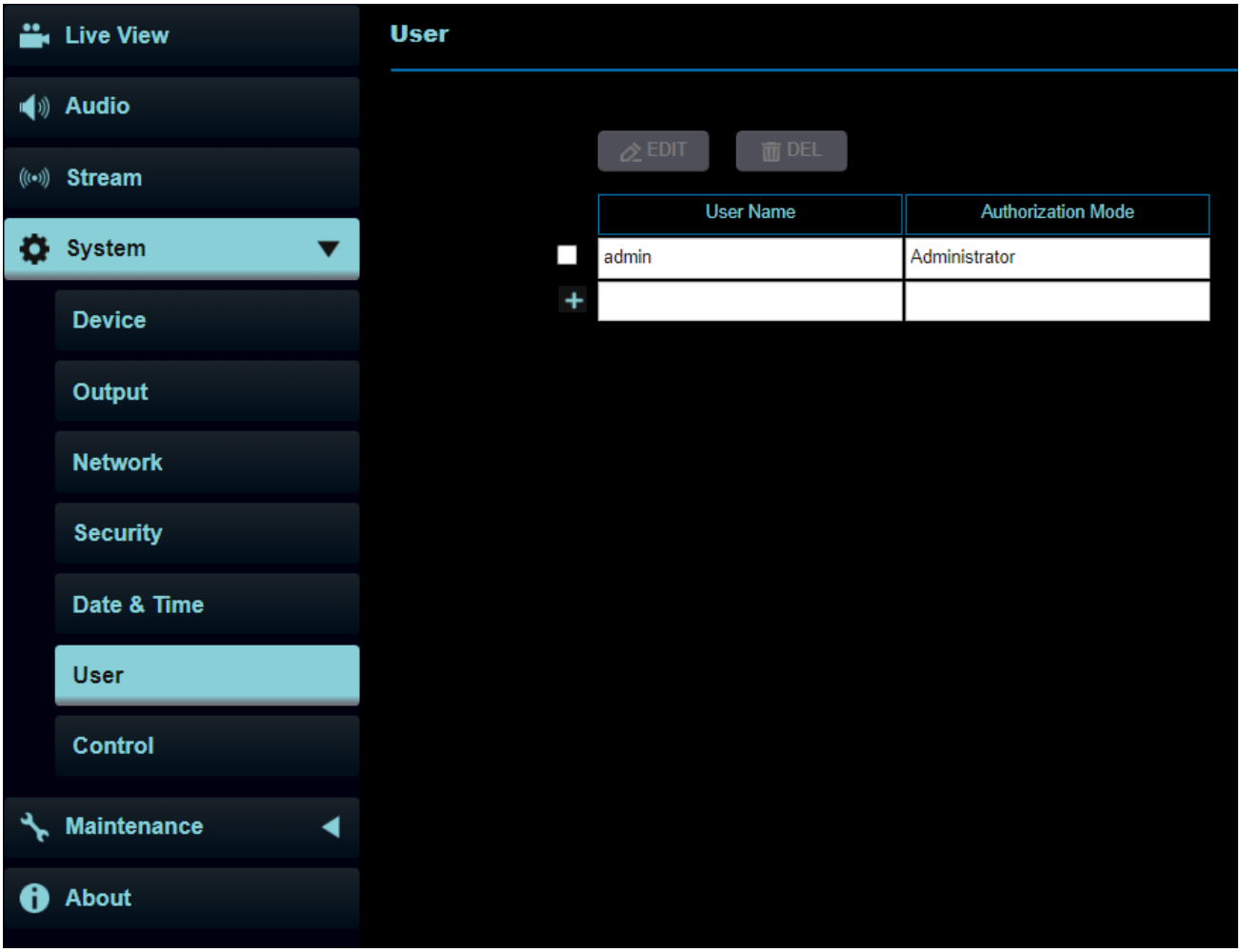
5.2.11 Setting – Date & Time



Function Descriptions

Display date and time of the current camera/ PC. You may set the synchronization method and modify date and time

5.2.12 Settings – User



Function Descriptions

Add/ Modify/ Delete user account

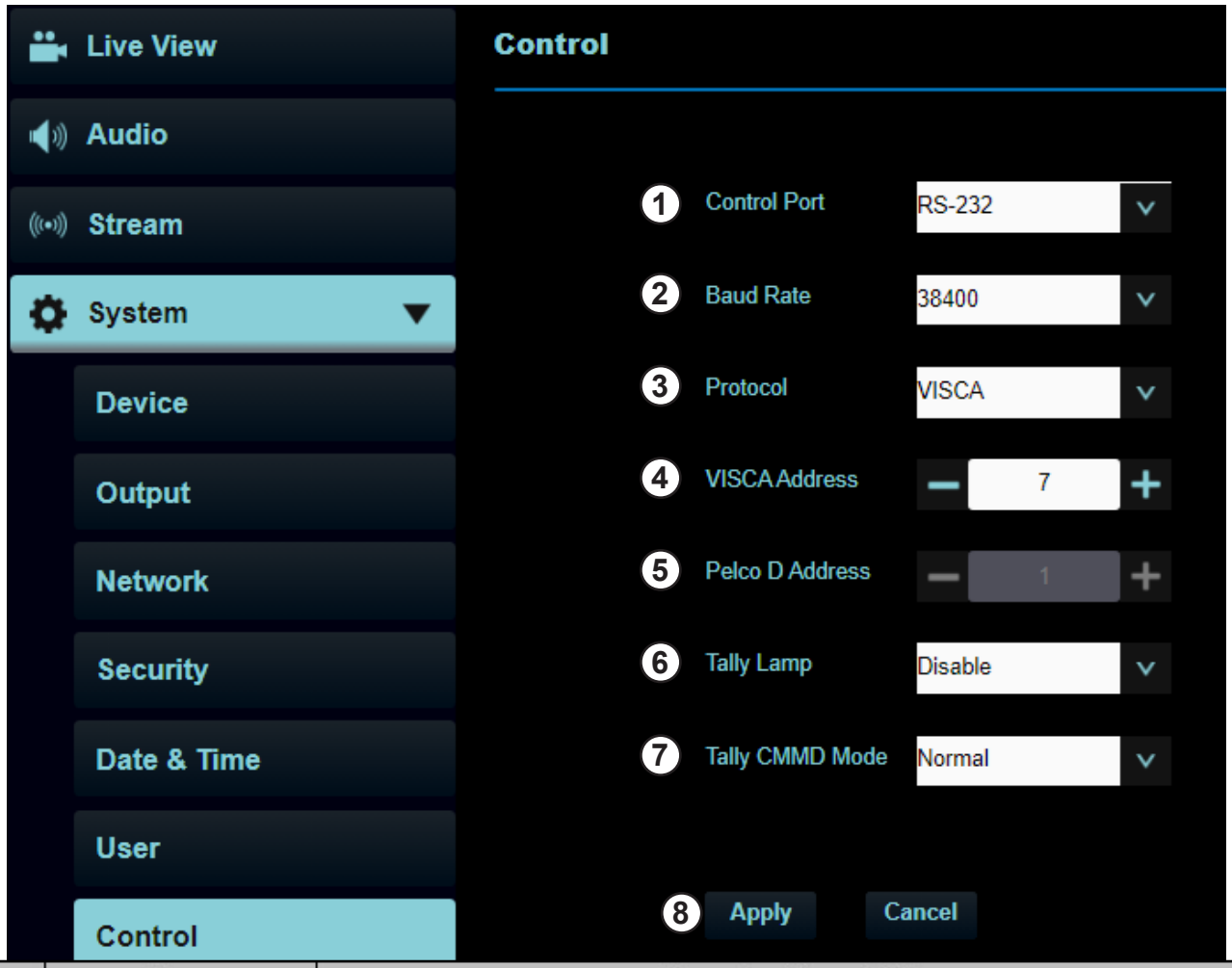
• Supporting 4 ~ 32 characters for user name and password

• Please mix uppercase and lowercase letters or numbers for characters. Special symbols or the underlined cannot be used

• Authentication Mode: Set the new account management permissions

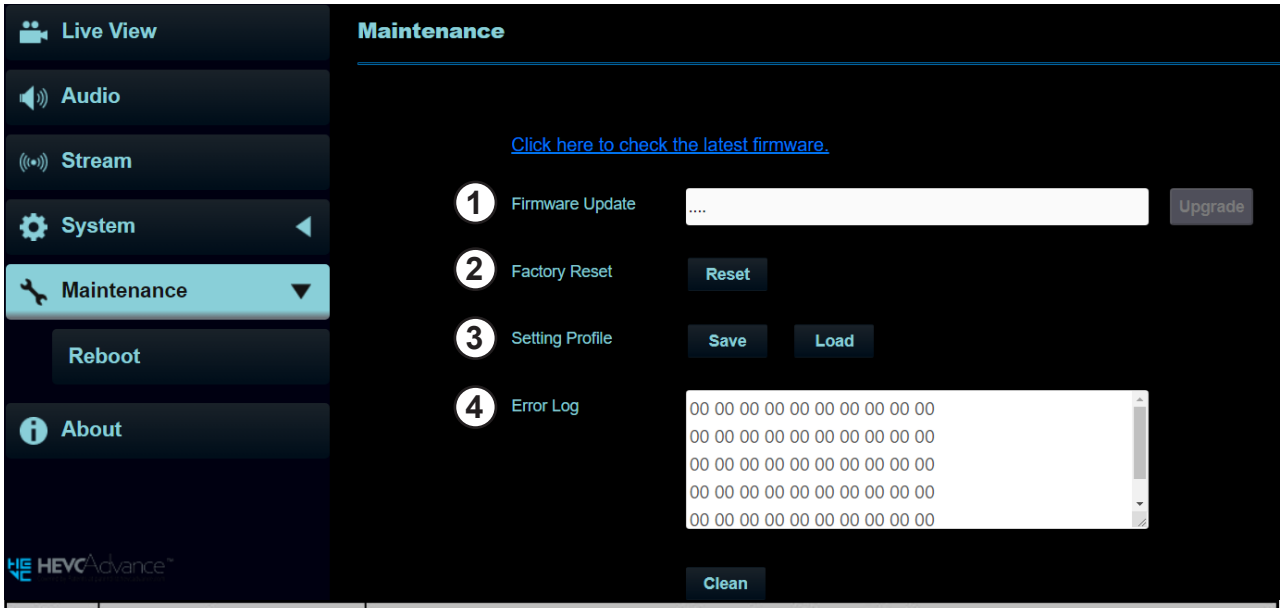
User Type	Admin	Operator	Viewer
View images	V	V	V
Settings	V	V	X
Account management	V	X	X

5.2.13 Settings – Control Port Number



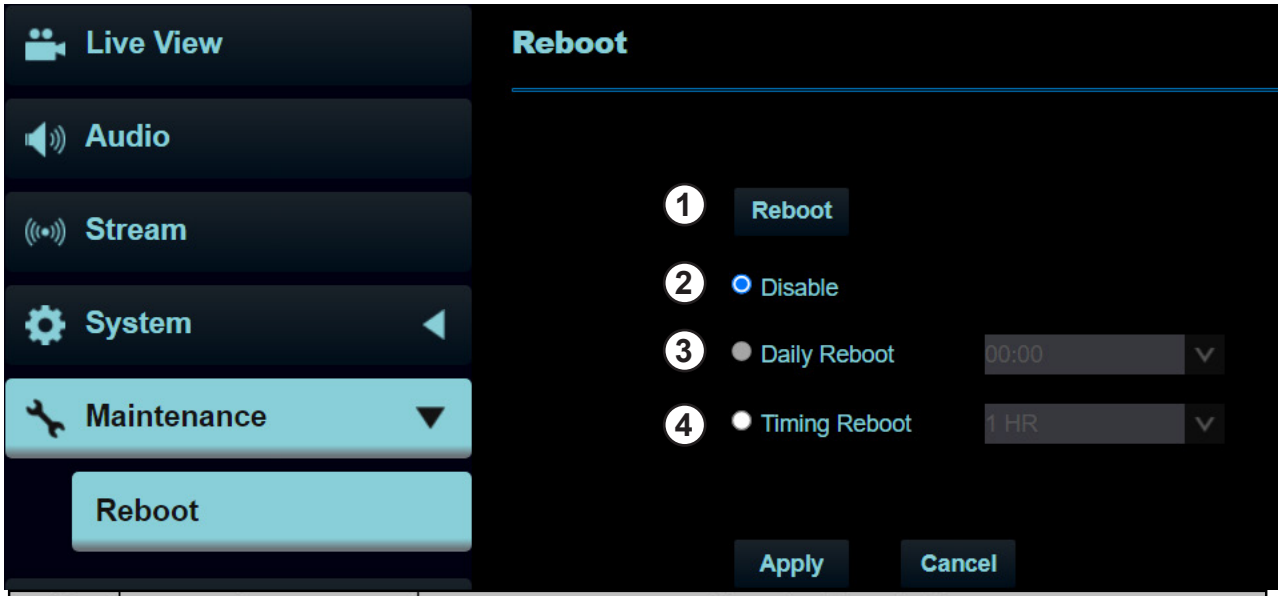
No	Item	Function Descriptions
1	Control Port	RS-232 / RS-422
2	Baud Rate	Choose the transmission speed of the control signal as 9600/38400
3	Protocol	VISCA/Pelco D protocol is supported
4	VISCA address	The camera ID address 0 ~ 7 can be assigned.
5	Pelco D address	The camera ID address 1 ~ 255 can be assigned.
6	Tally Lamp	Enable/Disable Tally Lamp
7	Tally CMMD Mode	Set whether the indicator light is linked with RS232 command ➢ General (Not linked): The indicator light switch and mode shall be set separately. - When the indicator light is on and the default mode is off, additional command is required to set the indicator light mode - Setting the indicator light mode when the indicator light is off will not trigger the indicator light ➢ Link: - When the indicator light is on, the default mode is red light - Setting the indicator light mode when the indicator light is off will turn on the indicator light
8	Apply/ Cancel	Apply/ Cancel Setting

5.2.14 Maintenance



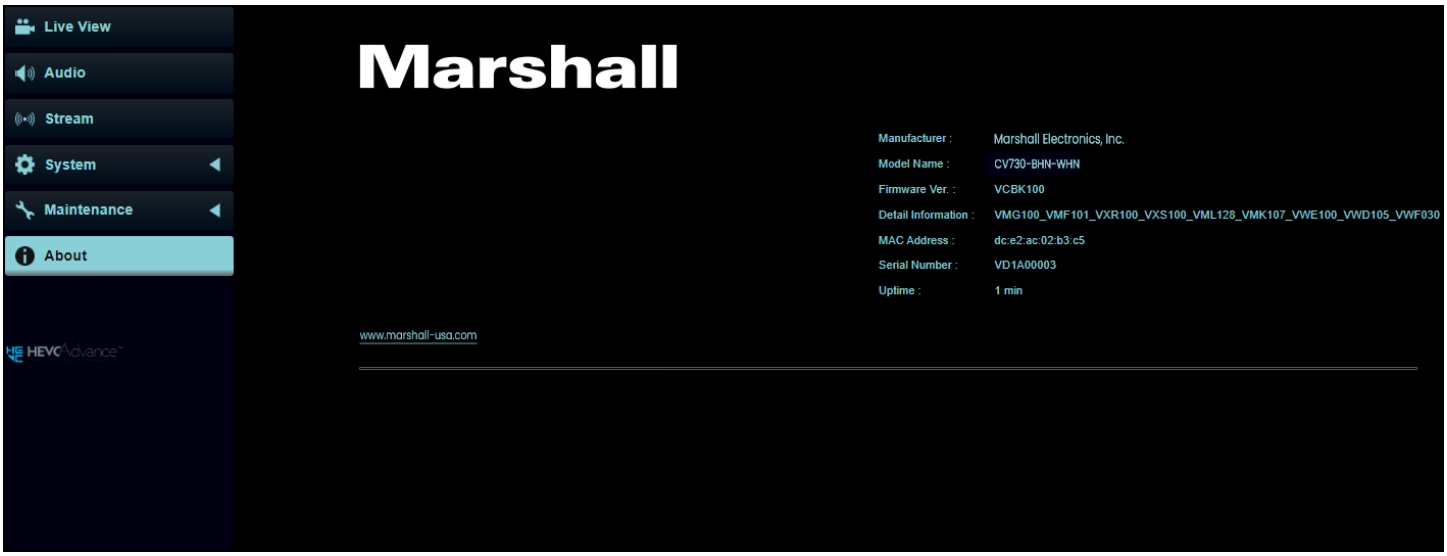
No	Item	Function Descriptions
1	Firmware Update	▪ Click the link to check the lastest firmware. ▪ Click [….] to select the firmware file, and click [Upgrade] to update the firmware <NOTE> Update takes about 2 - 3 minutes <NOTE> Please do not operate or turn off the power of the device during the update to avoid firmware update failure
2	Factory Reset	Restore the factory default setting
3	System Settings	Save setup parameters, and users can download and upload camera setup parameters
4	Event Logs	If the camera encounters errors, an error code log will be established <NOTE> When an error code appears, please try to click Clean to make sure whether the issue has occurred repetitively

5.2.15 Maintenance Reboot



No	Item	Function Descriptions
1	Reboot	Reboot immediately
2	Disable	Disable the reboot settings
3	Daily reboot	Set the daily reboot time <NOTE> Please go to **Settings** - **Time** to complete the SNTP server synchronization to set daily reboot
4	Timing Reboot	Set the timing reboot time

5.2.16 About



Function Descriptions

Display the firmware version, serial number, running time and other related information of the camera

For technical support, please scan the QRcode at the bottom right

Chapter 6: DIP Switch Setting

6.1 DIP SWITCH

6.1.1 OUTPUT Switch (Switch to different output resolutions and framerates)

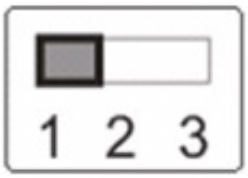
To switch via the OSD/ Web Page/RS-232 Command is also available based on the last executed action

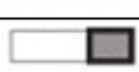


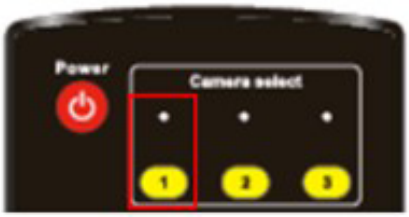
ID	Output Resolution	Frame Rate	Note
0	3840x2160p	59.94	<NOTE> For 3G-SDI, 1080P output will be automatically adjusted <NOTE> USB only supports resolutions lower than 3840 x 2160p 29.97
1		50	
2		29.97	
3		25	
4	1920x1080p	59.94	
5		50	
6		29.97	
7		25	
8	1280x720p	59.94	
9		50	
A		Reserved	
B		Reserved	
C	1920x1080i	59.94	
D		50	
E	Reserved	Reserved	
F			

6.1.2 IR SELECT (Selected by Remote control)

When using the remote control, please make sure the settings of IR SELECT and the Camera Select of the remote control are consistent



ID	Setting
1	
2	
3	



Chapter 7: Troubleshooting

This chapter describes problems you may encounter while using CV730-BHN. If you have questions, please refer to related chapters and follow all the suggested solutions. If the problem still occurred, please contact your distributor or the service center.

No.	Problems	Solutions
1.	Boot without power signal	1. Make sure you have plugged in the power cord. 2. When using a PoE connection, ensure that the power supply supports PoE++ (IEEE802.3bt) hubs
2.	There is no image output from CV730-BHN	1. Check the power supply or PoE supply functions. 2. Check the correct output source is selected by [System Setting] > [Output Setting] on the web page ▪ Streaming: HDMI + Streaming ▪ NDI: HDMI+NDI ▪ USB Output: HDMI + UVC 3. Confirm whether the camera resolution can be used together with the monitor equipment ▪ If 4k output, confirm the monitor equipment supports 4K output 4. Replace the cables and make sure they are not faulty.
3.	RS-232 cannot be controlled	1. Confirm the connection is correct (RS-232 In/ Out) 2. Please make sure the Baud rate setting is the same as the control equipment
4.	Whether the Internet can be used for operation	Please refer to ***5.2.9 Settings- Network*** for the Internet usage
5.	The ONVIF software cannot find the machine	1. Please make sure that [Setting]> [Video]> [Camera Location] on the web page uses only English letters or numbers. The ONVIF software cannot find the machine if you use special characters and space. 2. Either NDI or ONVIF can be used. Please go to the [Setting] > [Video] > [NDI|HX] on the web page to check if it is [Off].
6.	Tally lamp is not working when applying RS232 setting	Please make sure if the Tally lamp function is enabled from the setting menu or web page. ■ Setting Menu: [System] > [Tally Lamp] ■ Web page: [Setting] > [Camera] > [Tally Lamp]
7.	The camera does not save the relevant parameters (PTZ, AWB …) after reboot	Please make sure if the Initial Position is set to Last Operated Position from the setting menu or web page ■ Setting Menu: [System] > [Initial Position] ■ Web page: [Setting] > [Camera] > [Pan Tilt Zoom]
8.	Tracking Data Output is delayed or not updated	Please confirm that the camera is not in the following status The following function settings may cause data output to be delayed or not updated: - Modify output resolution - Modify camera mode - Modify HDMI format - Turn on the setting menu - Streaming Setting - Audio Source Setting
9.	With LC100N device, CV730-BHN cannot be found by NDI	LC100N only supports the cameras the NDI|HX2-source camera. Please go to [Streaming] > [NDI] > [NDI|HX] on the web page to check the HX2 output is set

Safety Precautions

Always follow these safety instructions when setting up and using the CV730-BHN PTZ Camera:

1 ..... Operation

1.1 Please use the product in the recommended operating environments, away from water and source of heat

1.2 Do not place the product on a tilted or unstable trolley, stand or table.

1.3 Please clean the dust on the power plug prior to usage. Do not insert the product's power plug into a multiplug to prevent sparks or a fire.

1.4 Do not block the slots and openings in the case of the product. They provide ventilation and prevent the product from overheating.

1.5 Do not open or remove covers, otherwise it may expose you to dangerous voltages and other hazards. Refer all servicing to licensed service personnel.

1.6 Unplug the product from the wall outlet and refer servicing to licensed service personnel when the following situations happen:

- If the power cords are damaged or frayed.
- If liquid is spilled into the product or the product has been exposed to rain or water.

2 ..... Installation

2.1 For security considerations, please make sure the standard mount you use is in line with UL or CE safety approbations and installed by technician personnel approved by agents.

3 ..... Storage

3.1 Do not place the product where the cord can be stepped on as this may result in fraying or damage to the lead or the plug.

3.2 Unplug this product during thunderstorms or if it is not going to be used for an extended period.

3.3 Do not place this product or accessories on top of vibrating equipment or heated objects.

4 ..... Cleaning

4.1 Disconnect all the cables prior to cleaning and wipe the surface with a dry cloth. Do not use alcohol or volatile solvents for cleaning.

5 ..... Batteries (for products or accessories with batteries)

5.1 When replacing batteries, please only use similar or the same type of batteries

5.2 When disposing of batteries or products, please adhere to the relevant instructions in your country or region for disposing of batteries or products

Precautions

	This symbol indicates that this equipment may contain dangerous voltage which could cause electric shock. Do not remove the cover (or back). No user-serviceable parts inside. Refer servicing to licensed service personnel.		This symbol indicates that there are important operating and maintenance instructions in this User Manual with this unit.

FCC Warning

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 when the equipment is operated in a commercial environment.

Notice :

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC Warning

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of Industry Canada.

Cet appareil numerique respecte les limites de bruits radioelectriques applicables aux appareils numeriques de Classe A prescrites dans la norme sur le material brouilleur: "Appareils Numeriques," NMB-003 edictee par l'Industrie.

EN55032 CE Warning Operation of this equipment in a residential environment could cause radio interference.

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

Manufacturer: Marshall Electronics, Inc.

Product Name: CV730-BHN/WHN

Model Number: PTZ Camera

Responsible Party – U.S. Contact Information

Supplier: Marshall Electronics, Inc.

20608 Madrona Ave, Torrance, CA. 90503

e-mail: support@marshall-usa.com

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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