RGBlink 4K vue PTZ camera

User Manual

RGBlink®

Content

Thank you for choosing our product!

This User Manual is designed to show you how to use this PTZ quickly and make use of all the features. Please read all directions and instructions carefully before using this product.

Declarations

FCC/Warranty

Federal Communications Commission (FCC) Statement

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. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be responsible for correcting any interference.

Guarantee and Compensation

RGBlink provides a guarantee relating to perfect manufacturing as part of the legally stipulated terms of guarantee. On receipt, the purchaser must immediately inspect all delivered goods for damage incurred during transport, as well as for material and manufacturing faults. RGBlink must be informed immediately in writing of any complains.

The period of guarantee begins on the date of transfer of risks, in the case of special systems and software on the date of commissioning, at latest 30 days after the transfer of risks. In the event of justified notice of compliant, RGBlink can repair the fault or provide a replacement at its own discretion within an appropriate period. If this measure proves to be impossible or unsuccessful, the purchaser can demand a reduction in the purchase price or cancellation of the contract. All other claims, in particular those relating to compensation for direct or indirect damage, and also damage attributed to the operation of software as well as to other service provided by RGBlink, being a component of the system or independent service, will be deemed invalid provided the damage is not proven to be attributed to the absence of properties guaranteed in writing or due to the intent or gross negligence or part of RGBlink.

If the purchaser or a third party carries out modifications or repairs on goods delivered by RGBlink, or if the goods are handled incorrectly, in particular if the systems are commissioned operated incorrectly or if, after the transfer of risks, the goods are subject to influences not agreed upon in the contract, all guarantee claims of the purchaser will be rendered invalid. Not included in the guarantee coverage are system failures which are attributed to programs or special electronic circuitry provided by the purchaser, e.g. interfaces. Normal wear as well as normal maintenance are not subject to the guarantee provided by RGBlink either.

The environmental conditions as well as the servicing and maintenance regulations specified in this manual must be complied with by the customer.

Operators Safety Summary

The general safety information in this summary is for operating personnel.

Do Not Remove Covers or Panels

There are no user-serviceable parts within the unit. Removal of the top cover will expose dangerous voltages. To avoid personal injury, do not remove the top cover. Do not operate the unit without the cover installed.

Power Source

This product is intended to operate from a power source that will not apply more than 230 volts rms between the supply conductors or between both supply conductor and ground. A protective ground connection by way of grounding conductor in the power cord is essential for safe operation.

Grounding the Product

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the product input or output terminals. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Use the Proper Power Cord

Use only the power cord and connector specified for your product. Use only a power cord that is in good condition. Refer cord and connector changes to qualified service personnel.

Use the Proper Fuse

To avoid fire hazard, use only the fuse having identical type, voltage rating, and current rating characteristics. Refer fuse replacement to qualified service personnel.

Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate this product in an explosive atmosphere.

Installation Safety Summary

Safety Precautions

For all PTZ installation procedures, please observe the following important safety and handling rules to avoid damage to yourself and the equipment.
To protect users from electric shock, ensure that the chassis connects to earth via the ground wire provided in the AC power Cord.
The AC Socket-outlet should be installed near the equipment and be easily accessible.

Unpacking and Inspection

Before opening PTZ shipping box, inspect it for damage. If you find any damage, notify the shipping carrier immediately for all claims adjustments. As you open the box, compare its contents against the packing slip. If you

find any shortages, contact your sales representative.
Once you have removed all the components from their packaging and checked that all the listed components are present, visually inspect the system to ensure there was no damage during shipping. If there is damage, notify the shipping carrier immediately for all claims adjustments.

Site Preparation

The environment in which you install your PTZ should be clean, properly lit, free from static, and have adequate power, ventilation, and space for all components.

Electric Safety

Installation and operation must accord with electric safety standard

Polarity of power supply

The power supply of the product is ±12V, the max electrical current is 2A .Polarity of the power supply drawing.

Careful of installation

Never move the camera by seizing the camera head. Don't rotate camera head by hand; otherwise, mechanical trouble will occur.
This series item must be put on the smooth desk or platform, and it can not be installed slant ways;
If the camera is installed on TV or computer, the base can be fixed by four double-sided adhesive trays.
Don't apply in corrosive liquid, as or solid environment to avoid the cover which is made up of organic material.
To make sure no obstacle in rotation range.
Never power on before installation is completed.

Don't disassemble discretionarily.

We are not responsible for any unauthorized modification or dismantling.

Chapter 1 Your Product

1.1 In the Box

Name	Qty.
Camera	1
International Power Adapter (cable included）	1
RS232 Cable	1
Remote Control	1
User Manual	1

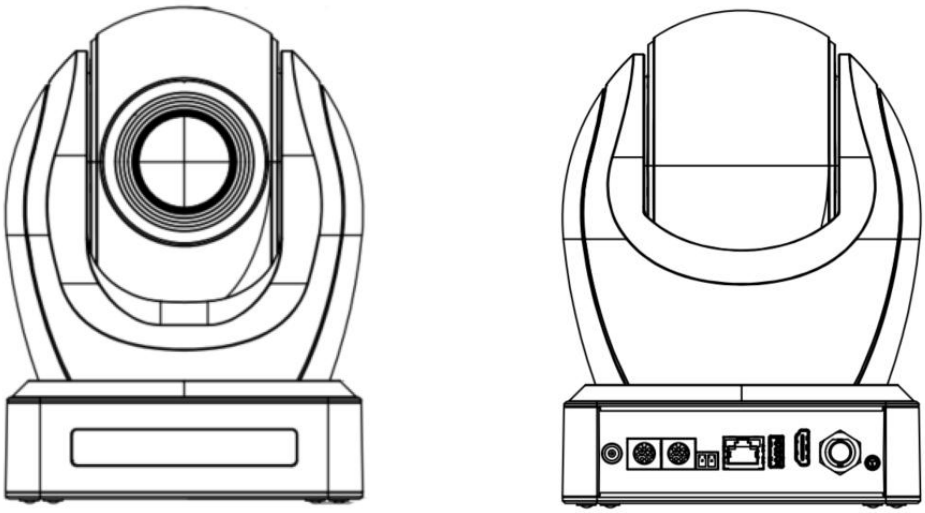
1.2 Product Overview

1.2.1 Product Model

This User Manual is applicable to:

RGB12X-PAI-OL	4K30 12X POE Tracking Camera
RGB12X-NAI-OL	4K30 12X POE NDI Tracking Camera
RGB20X-PAI-OL	4K30 20X POE Tracking Camera
RGB20X-NAI-OL	4K30 20X POE NDI Tracking Camera
RGB30X-PAI-OL	4K30 30X POE Tracking Camera
RGB30X-NAI-OL	4K30 30X POE NDI Tracking Camera
RGB12X-UPAI-OL	4K60 12X POE Tracking Camera
RGB12X-UNAI-OL	4K60 12X POE NDI Tracking Camera
RGB20X-UPAI-OL	4K60 20X POE Tracking Camera
RGB20X-UNAI-OL	4K60 20X POE NDI Tracking Camera
RGB30X-UPAI-OL	4K60 30X POE Tracking Camera
RGB30X-UNAI-OL	4K60 30X POE NDI Tracking Camera

1.2.2 Dimension



167mm(Length) × 152mm(Width) × 210mm(Height)

1.2.3 Main Features

- HD image with 1/2.8-inch 8.42MP sensor
- 12X/20X/30X optical zoom lenses available
- Advanced autofocus for fast, accurate, and stable focusing
- Low-noise CMOS with 2D/3D noise reduction for high SNR and clarity
- HDMI/SDI/USB/LAN outputs, SDI supports 1080P60 at 100m
- H.265/H.264 video and AAC/G.711A audio compression
- AAC audio input (16k-48kHz) and G.711A (8kHz) support
- ONVIF/RTSP/RTMP protocols with RTMP push and VISCA control
- AI tracking with face/human recognition for classrooms and meetings
- RS485/RS232 control (RS232 supports cascading)
- VISCA/PELCO-D/P protocols with auto-detection
- Silent gimbal with precision stepper motor for smooth, quiet operation
- Low-power sleep mode under 400mW
- 255 presets (10 accessible via remote)
- Infrared remote controller (anti-interference, signal passthrough)
- Ideal for education, conferences, medical, court, and command systems

1.2.4 Technical Specification

Parameters	
Image sensor	1/2.8-inch high-quality CMOS sensor
Effective pixels	8.42 megapixels, 16:9 aspect ratio
Video signal format and resolution RGB12X-PAI-OL RGB12X-NAI-OL RGB20X-PAI-OL RGB20X-NAI-OL RGB30X-PAI-OL RGB30X-NAI-OL	**HDMI：** 3840 × 2160P@30/29.97/25 | 1920 × 1080P@60/59.94/50/30/29.97/25 1280 × 720P@60/59.94/50 **SDI：** 1920 × 1080P@60/59.94/50/30/29.97/25 | 1920 × 1080i@60/50/59.94 1280 × 720P60/59.94/50 **USB：** **YUY2/NV12:** 1920 × 1080 | 1280 × 720 | 1024 × 576 | 800 × 600 | 800 × 448 | 640 × 480 640 × 360 | 480 × 270 | 320 × 180P30/25/20/15/10/5fps **H264/H265/MJPG:** 3840 × 2160@30/29.97/25 1920 × 1080 | 1600 × 896 | 1280 × 720 | 1024 × 576 | 960 × 540 | 800 × 600 800 × 448 | 720 × 576 | 720 × 480 | 640 × 480 | 640 × 360 | 480 × 270 352 × 288 | 320 × 240@60/30/25/20/15/10/5fps **LAN：** **H264/H265:** Main Code Stream： 3840 × 2160 | 2592 × 1944 | 2304 × 1296@30/29.97/25 1920 × 1080 | 1280 × 720@60/30/25/20/15/10/5fps Subcode Stream： 1920 × 1080 | 1280 × 720 | 640 × 360 | 640 × 480 | 320 × 240 320 × 180@30/25/20/15/10/5fps
Video signal format and resolution RGB12X-UPAI-OL RGB12X-UNAI-OL RGB20X-UPAI-OL RGB20X-UNAI-OL RGB30X-UPAI-OL RGB30X-UNAI-OL	**HDMI：** 3840 × 2160P@60/59.94/50/30/29.97/25 | 1920 × 1080P@60/59.94/50/30/29.97/25 | 1280 × 720P60/59.94/50 **SDI：** 1920 × 1080P@60/59.94/50/30/29.97/25 | 1920 × 1080i@60/50/59.94 | 1280 × 720P@60/59.94/50 **USB：** **YUY2/NV12:** 1920 × 1080 | 1280 × 720 | 1024 × 576 | 800 × 600 | 800 × 448 | 640 × 480 | 640 × 360 | 480 × 270 | 320 × 180P30/25/20/15/10/5fps **H264/H265/MJPG:** 3840 × 2160 | 1920 × 1080 | 1600 × 896 | 1280 × 720 | 1024 × 576 | 960 × 540 | 800 × 600 | 800 × 448 | 720 × 576 | 720 × 480 | 640 × 480 | 640 × 360 | 480 × 270 | 352 × 288 | 320 × 240@60/30/25/20/15/10/5fps **LAN：** **H264/H265:** Main Code Stream： 3840 × 2160 | 2592 × 1944 | 2304 × 1296@60/30/25/20/15/10/5fps 1920 × 1080 | 1280 × 720@60/30/25/20/15/10/5fps Subcode Stream： 1920 × 1080 | 1280 × 720 | 640 × 360 | 640 × 480 | 320 × 240 |

	320 × 180@30/25/20/15/10/5fps		
Lens Optical Zoom	12x	20x	30x
Digital Zoom	16x	16x	16x
Focal Length Range	f = 4.1 ~ 49.2mm	f = 4.8 ~ 96mm	f = 5.2 ~ 148.4mm
H FOV°	70.4° ~ 6.72°	60.04° ~ 3.81°	58.1° ~ 2.14°
F-Number (F/No.)	F1.8 ~ F2.68	F1.8 ~ F2.9	F1.3 ~ F4.8
Minimum Illumination	0.5Lux(F1.8, AGC ON)		
Digital Noise Reduction	2D & 3D digital noise reduction		
White Balance	Auto/manual/one-click white balance/specified color temperature (2400K-7100K, 100K step)		
Focus	Auto/manual/one-press focus		
Aperture	Auto/manual		
Electronic Shutter	Auto/manual		
Backlight Compensation	On/off		
Wide Dynamic Range	Off/dynamic level adjustment		
Video Adjustment	Brightness, sharpness, saturation, contrast, white balance, anti-flicker, low-light compensation adjustable		
Signal-to-Noise Ratio	>50dB		

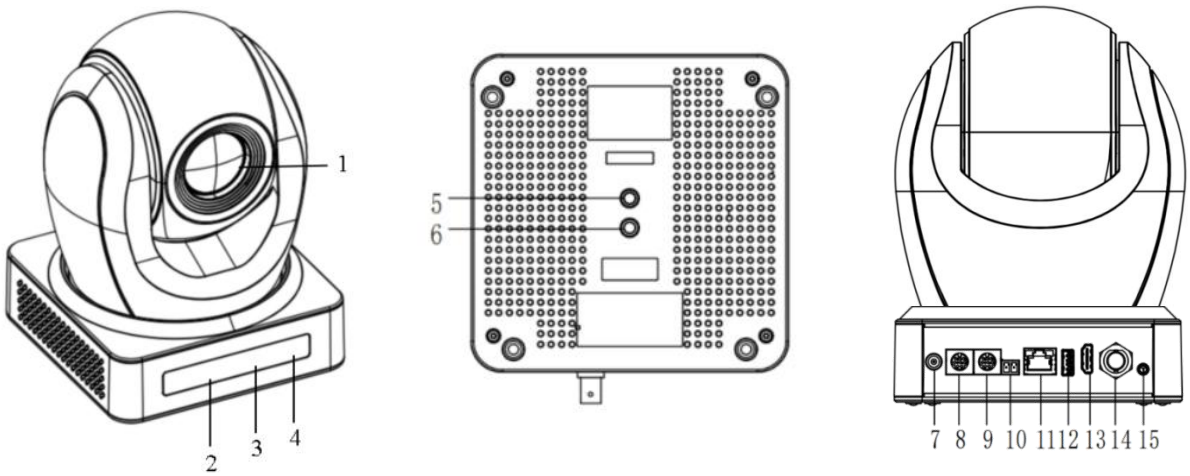
Connectors and Standard Protocols	
Video Connectors	HDMI/ 3G-SDI/LAN(POE+)/USB3.0
Image bitstream	Dual stream output capability
Video compression format	LAN：H.264/H.265 USB 3.0：MJPG/H.264/H.265/YUY2/NV12
Control Connectors	RS-232（RS232 output loop-through）/RS-485
Control protocol	VISCA/Pelco-D/Pelco-P; Baud rate：115200/9600/4800/2400bps
Audio input	Dual-channel 3.5mm audio jack
Audio compression format	AAC, G.711A
LAN	1000M Ethernet port with optional POE+ power supply, supports audio/video output and network VISCA control protocol
Audio output	HDMI/ 3G-SDI/LAN/USB3.0
Network protocol	Support RTSP, RTMP, ONVIF, SRT, NDI (optional); IP VISCA control protocol supported. Remote firmware upgrade, reboot and reset supported
USB communication protocol	UVC (USB Video Class) and UAC (USB Audio Class) compliant

Pan-Tilt Parameters	
Pan Rotation	-170° ~ +170°
Tilt Rotation	-30° ~ +90°
Pan Control Speed	0.1°/s ~ 60°/s
Tilt Control Speed	0.1°/s ~ 30°/s
Preset Speed	Pan: 60°/s, Tilt: 30°/s
Number of Presets	Users can set up to 255 preset positions (10 via remote control)

Other Parameters	
Power adapter	Input: AC110V-AC220V
Input voltage	Output: DC12V/2.5A
Input current	DC12V±10%
Power consumption	1.5A (Max)
Storage temperature	18W (Max)
Storage humidity	-10℃ ~ +60℃
Operating temperature	20% ~ 95%
Operating humidity	-10℃ ~ +50℃
Dimensions	20% ~ 80%
Approx. weight	167×152×210 mm
Operating environment	1.9kg (4.2lb)
Remote maintenance (network interface)	Indoor
Optional accessories	Firmware upgrade, reboot, reset

Chapter 2 Install Your Product

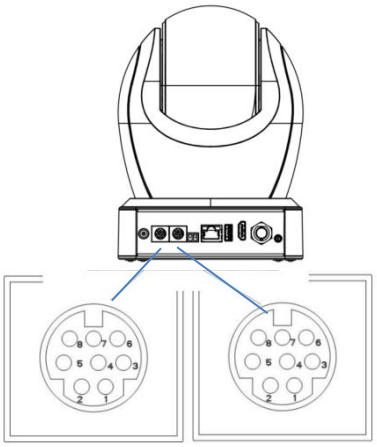
2.1 Interface and Switch



Item	Name
1	Lens
2	Infrared Receiver
3	LED Display
4	POWER LED
5	Positioning Hole
6	1/4-20UNC Threaded Mounting Hole
7	DC12V Power Input Socket
8	RS232 IN Interface
9	RS232 OUT Interface
10	RS485 Interface
11	RJ45(PoE+/Streaming) Interface
12	USB3.0 Output Interface
13	HDMI Output Interface
14	3G-SDI
15	LINE IN Interface

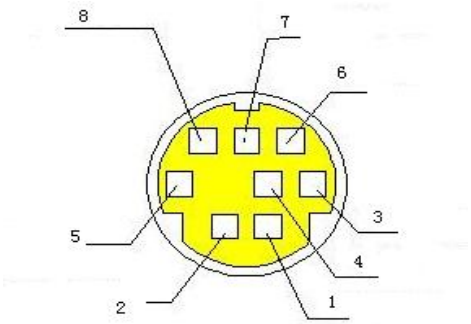
2.2 RS232 Interface

1. RS-232



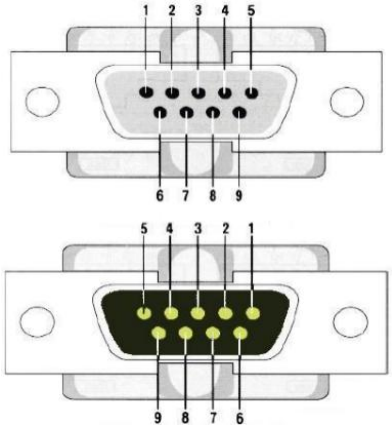
Connection method for PC and controller	
Device	WindowsDB-9
1.DTR	1.DCD
2.DSR	2.RXD
3.TXD	3.TXD
4.GND	4.DTR
5.RXD	5.GND
6.GND	6.DSR
7.IR OUT	7.RTS
8.NC	8.CTS
	9.RI

2. RS-232 Mini-DIN 8-pin Definition



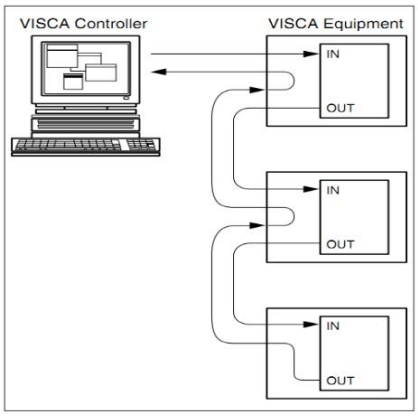
NO.	Port	Definition
1	DTR	Data Terminal Ready
2	DSR	Data Set Ready
3	TXD	Transmit Data
4	GND	System Ground
5	RXD	Receive Data
6	GND	System Ground
7	IR OUT	IR Commander Signal
8	NC	No Connection

3. RS232 (DB9) Port Definition



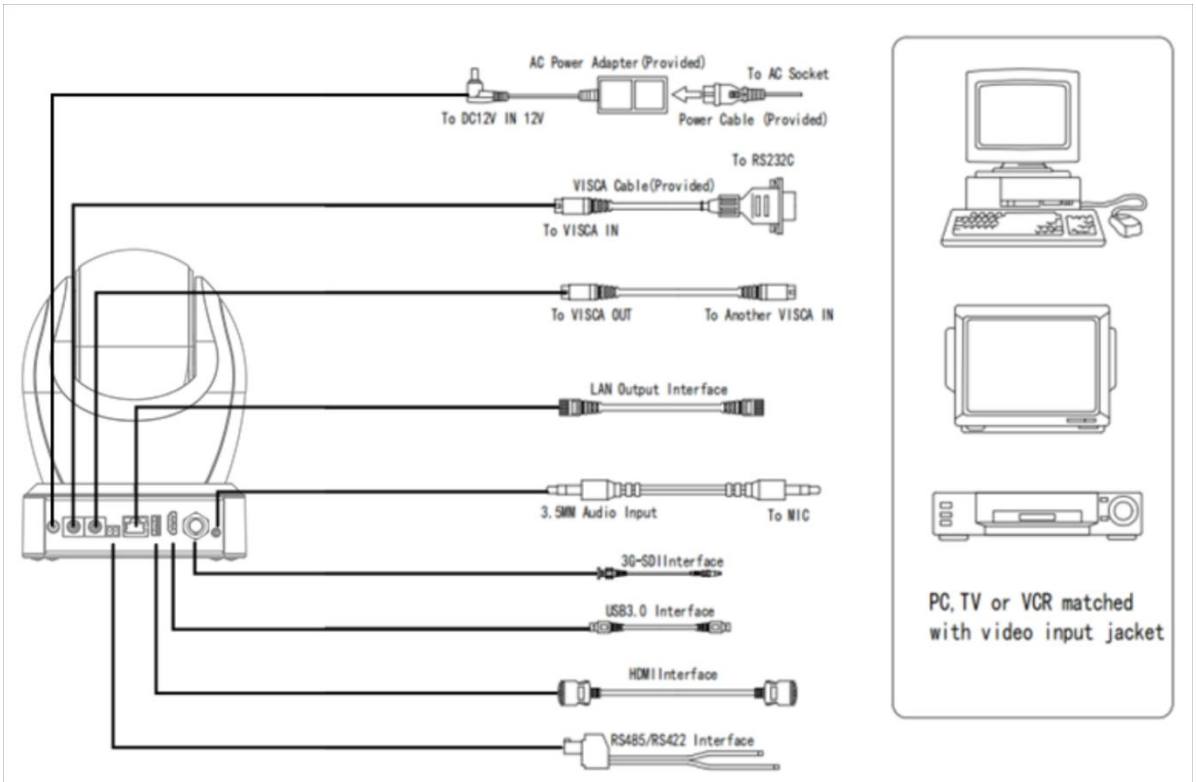
NO.	Port	Definition
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	System Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

4. VISCA networking shown as below:



Camera cascade connection method	
Device 1	Device 2
1.DTR	1.DTR
2.DSR	2.DSR
3.TXD	3.TXD
4.GND	4.GND
5.RXD	5.RXD
6.GND	6.GND
7.IR OUT	7.OPEN
8. NC	8.OPEN

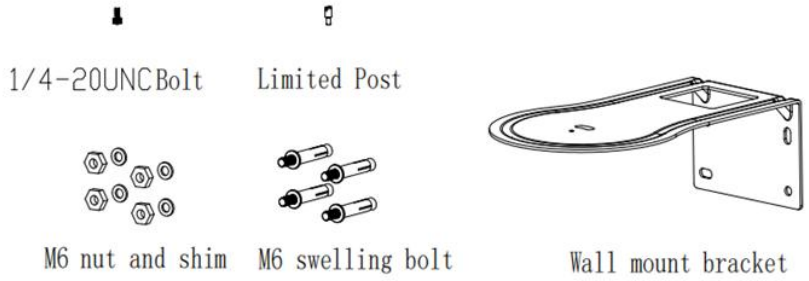
2.3 Quick Start

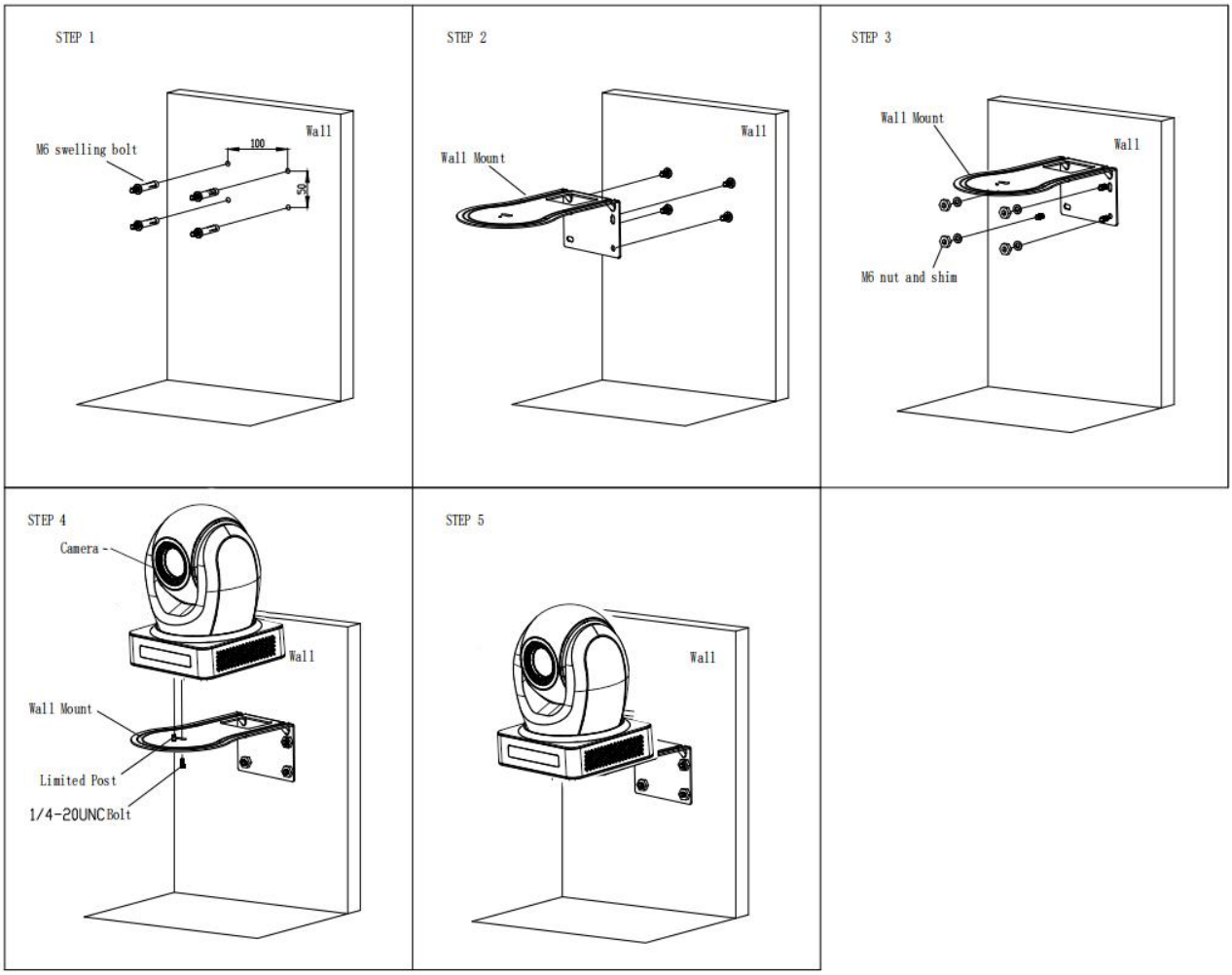


1. Please check connections are correct before starting.
2. Connect the power adapter to the power connector on the rear panel of the camera. The power indicator on the front panel of the camera is on.
3. After the camera is powered on, it starts to initialize, right up to the limit position, and then both horizontal and vertical go to the middle position, the motor stops running, and the initialization is completed. (Note: If preset 0 is saved, PTZ will be move to preset 0)

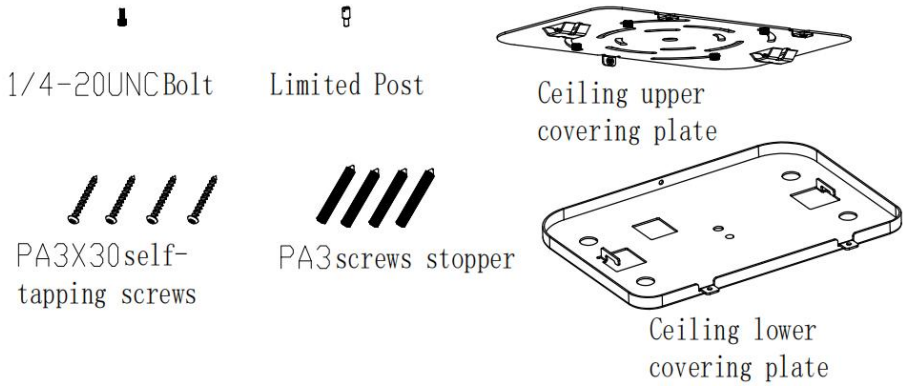
2.4 Installation

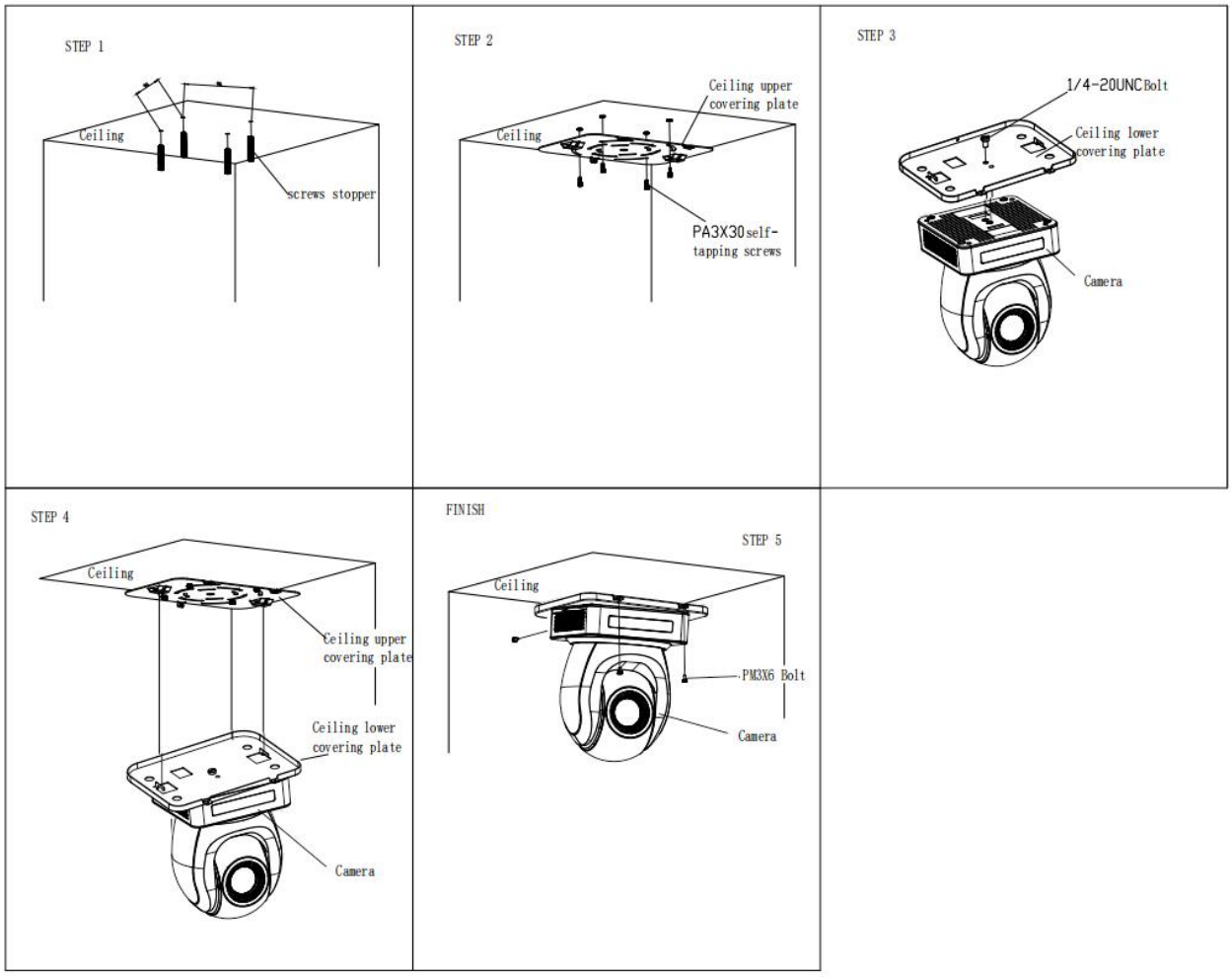
2.4.1 Wall Mount





2.4.2 Ceiling Mount



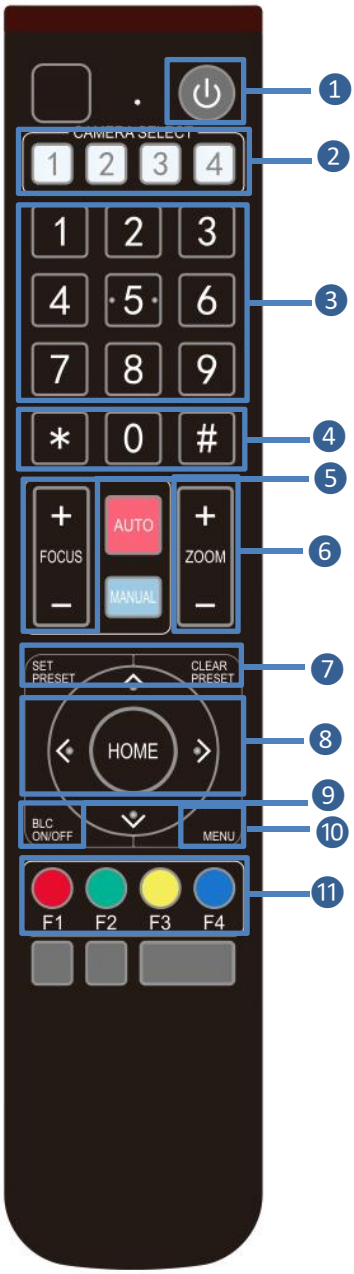


Note: The installation diagram is for reference only. The brackets and screws are not standard. For packing accessories, please refer to the actual product.

Chapter 3 Use Your Product

3.1 Remote Controller

3.1.1 Button Functions



1. Standby Key

After 3S long press, the camera will step into standby mode. Long press 3S again, the camera will self-test again and back to HOME position. (Note: If power-on mode is turned on and Preset 0 is set, and there is no operation within 12s, it will automatically point to the specified preset position.

2. Camera Address Selection

Select the camera address which wants to be controlled

3. Number Key

Set or run 0-9 presets

4, *, # Key

Key combination use

5. Focus Control Key

Auto Focus: Enter into auto focus mode.

Manual Focus: The camera focus mode is manual

Switch the camera focus mode to manual focus by pressing [focus +] or [focus -] to adjust.

6. Zoom Control Key

Zoom＋:Lens near

Zoom－:Lens far

7. Set or Clear Preset key:

Set Preset: Set preset key + 0-9 number key:

Clear Preset key: Clear preset key + 0-9 number key

8. Pan/Tilt Control Key

Press ▲Key :Up

Press ▼Key :Down

Press ◄ Key :Left

Press ► Key: Right

“HOME” Key: Return to the middle position or enter into the next level menu

9. BLC Control Key

Back Light ON / OFF: Turn on or off the back light

10. Menu Setting

Open or close the OSD menu

Enter / exit the OSD menu or return to the previous menu.

11. Camera IR Remote Control Address Setting

【*】+【＃】+【F1】:Camera Address No.1

【*】+【＃】+【F2】:Camera Address No. 2

【*】+【＃】+【F3】:Camera Address No. 3

【*】+【＃】+【F4】:Camera Address No. 4

12. Key Combination Functions

【#】+【#】+【#】	Clear all presets
【*】+【#】+【6】	Restore factory defaults
【*】+【#】+【9】	Flip switch
【*】+【#】+Auto	Enter into the aging mode
【#】+【*】+Auto	Stop the aging mode
【*】+【#】+【3】	Menu set to Chinese
【*】+【#】+【4】	Menu set to English
【*】+【#】+Manual	Restore the default user name, password, and IP address
【#】+【#】+【0】	Switch video format 4KP60
【#】+【#】+【1】	Switch video format 4KP50
【#】+【#】+【2】	Switch video format 4KP30
【#】+【#】+【3】	Switch video format 4KP25
【#】+【#】+【4】	Switch video format 1080P60
【#】+【#】+【5】	Switch video format 1080P50
【#】+【#】+【6】	Switch video format 1080P30
【#】+【#】+【7】	Switch video format 1080P30
【#】+【#】+【8】	Switch video format 1080P25

3.1.2 Remote Control Usage

Finishing initialization, it can receive and execute the IR commands. Press the remote controller button, the indicator light is flashing; release the button, the indicator light stops flashing. Users can control the pan/tilt/zoom, setting and running preset positions via the IR remote controller.

Key Instruction:

1. In this instruction, “press the key” means a click rather than a long-press, and a special note will be given if a long-press for more than one second is required.

2. When a key-combination is required, do it in sequence. For example, “【 *】+【#】+【F1】”means press“【*】”first and then press“【#】” and last press“【F1】”.

1）Camera Selection

Select the camera address to control.

2) Pan/Tilt Control

Up: press ▲ Down: press ▼

Left: press ◄ Right: press ►

Back to middle position: press“【HOME】”

Press and hold the up/down/left/right key, the pan/tilt will keep running, from slow to fast, until it runs to the endpoint; the pan/tilt running stops as soon as the key is released.

3）Preset Position Setting, Cancellation, and Recall

1. Save a Preset Position: Press the [Set Preset] button, then press a number key from 0 to 9 to assign a preset position corresponding to the selected number key.

Note: A maximum of 10 preset positions can be saved using the remote control.

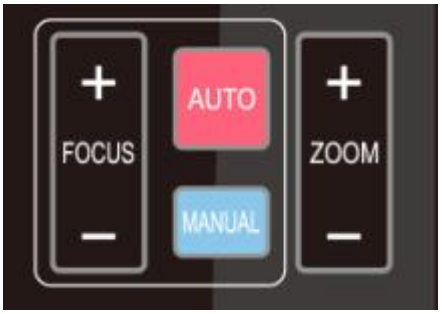
2. Recall a Preset Position: Simply press the number key (0 to 9) to recall a previously saved preset position.

Note: If no preset has been saved for the selected number key, the action will have no effect.

3. Clear a Preset Position: Press the [Clear Preset] button, then press a number key from 0 to 9 to cancel the corresponding preset position.

Note: Pressing the [#] key three times consecutively will clear all preset positions.

4）Zoom Control

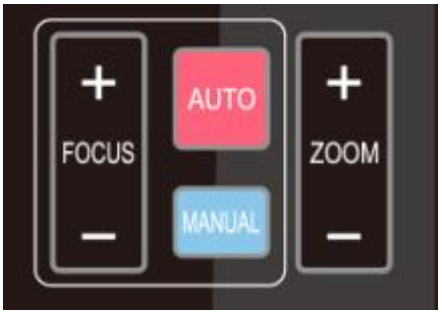


ZOOM IN: press 【Zoom + 】 key

ZOOM OUT: press 【Zoom -】key

Press and hold the key, the camera will keep zooming in or zooming out and stops as soon as the key is released.

5) Focus Control



Focus (near):Press “【focus+】” key (Valid only in manual focus mode)

Focus (far): Press “【focus-】”key (Valid only in manual focus mode)

Auto Focus: Support

Manual Focus: Support

Press and hold the key, the action of focus will keep continue and stops as soon as the key is released.

6）Camera Remote Controller Address Setting

【*】+【＃】+【F1】:Camera Address No.1
【*】+【＃】+【F2】:Camera Address No. 2
【*】+【＃】+【F3】:Camera Address No. 3
【*】+【＃】+【F4】:Camera Address No. 4

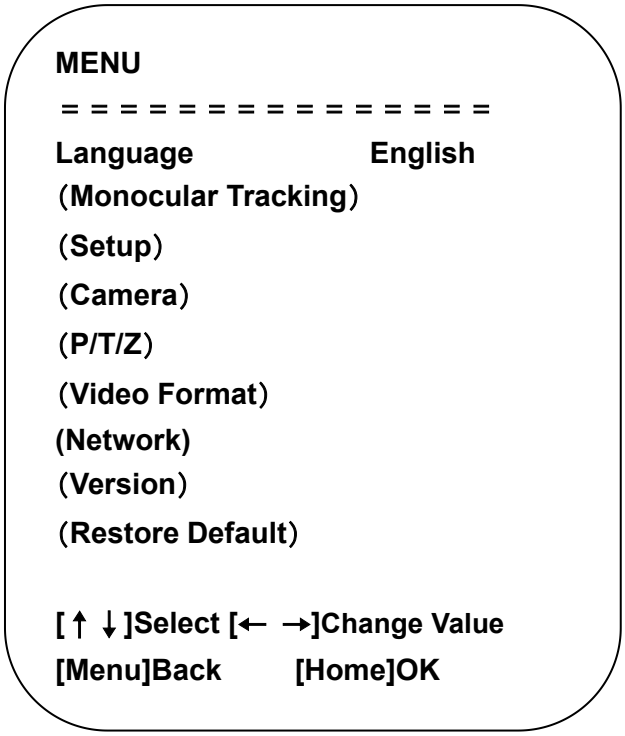
7）Tracking Setting

F1: Turn off tracking
F2: Real-time tracking
F3: PTZ speed-
F4: PTZ speed+

3.2 GUI Settings

3.2.1 MENU

In normal working mode, press【MENU】key to display the menu, using scroll arrow to point at or highlight the selected items.



Language Settings / Language: Select the menu language (Chinese/English).

Monocular Tracking: Enter the monocular tracking settings menu.

Settings: Enter the system parameter settings submenu.

Camera Parameters: Enter the camera parameter settings submenu.

P/T/Z: Enter the pan/tilt/zoom parameter settings submenu.

Version: Enter the version submenu.

Restore Factory Defaults: Enter the restore factory defaults menu, then select "Yes" or "No" to restore factory settings.

[↑↓] Select: Use the up and down arrow keys to choose a menu item.

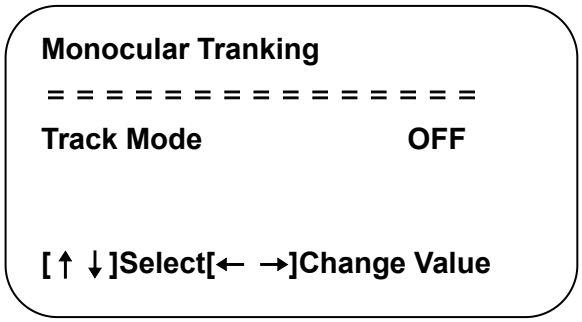
[← →] Modify: Use the left and right arrow keys to modify parameters.

[Menu] Return: Press the [Menu] button to return.

[Home] Confirm: Press the [Home] button to confirm.

3.2.2 Monocular Tracking

In the main menu, move the cursor to "Monocular Tracking" and press the [HOME] button to enter the settings page, as shown in the image below.



Tracking Switch: Available options: OFF/ Real-Time Tracking / Stage Tracking / Area Tracking / Smart Framing

Person Size: Available options: Close-Up, Half Body, Full Body, Custom

Custom Level: Available options: 0-5 (Only effective in Custom mode)

Person Position: Available options: Left, Right, Center

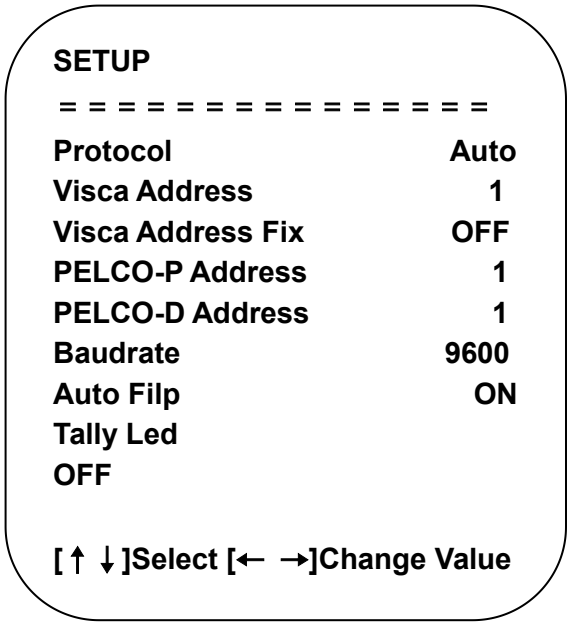
Sensitivity: Available options: High, Medium, Low

Target Loss Action: Available options: Home, Preset 0, Last Lost Position

Target Loss Time: Available options: 0-60 seconds

3.2.3 System Setting

Move the pointer to the (Setup) in the Main Menu, click the【HOME】key and enter into the (System Setting) as shown below,



PROTOCOL: VISCA/Pelco-P/Pelco-D/Auto

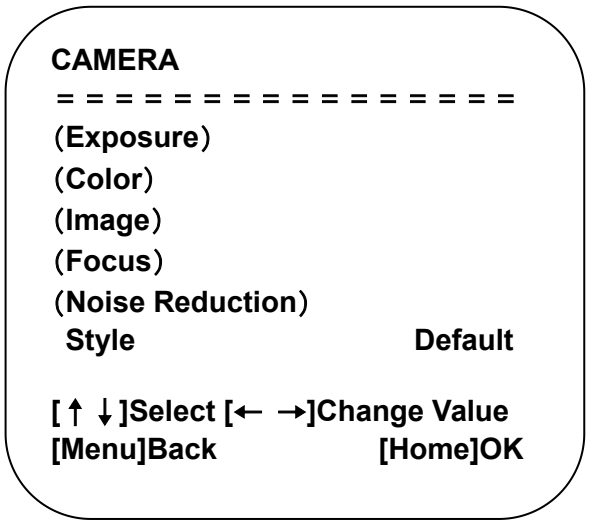
Visca ADDR: VISCA=1~7 Pelco-P=1~255 Pelco-D = 1~255

Baud rate: 2400/4800/9600/38100/115200

Visca Address Fix: On/Off

3.2.4 Camera Parameter Setting

Move the pointer to the (CAMERA) in the Main Menu, click the 【HOME】 key and enter the (CAMERA) as follow:



Exposure: Enter into Exposure setting

Image: Enter the Image submenu

Color: Enter into color setting

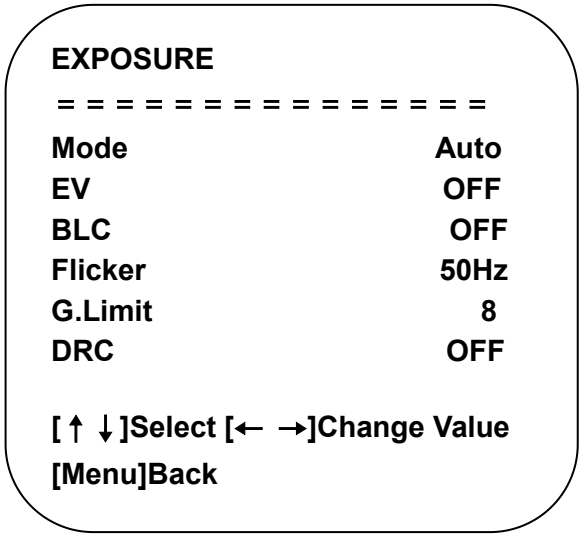
Focus: Enter into focus setting

Noise Reduction: Enter the Noise Reduction submenu

Style: Default, Conference, Clear, Vivid, Soft

1）Exposure

Move the pointer to the (EXPOSURE) in the Main Menu, click the【HOME】and enter the (EXPOSURE SET) as follow:



Mode : Auto, Manual, Shutter priority, Iris priority and Brightness priority.

EV : On/Off (only available in auto mode)

Compensation Level: -7~7 (only available in auto mode when EV is ON)

BLC: ON/OFF for options (only available in auto mode)

Anti-Flicker: OFF/50Hz/60Hz for options (only available in Auto/Iris **priority**/Brightness **priority** modes)

Gain Limit: 0~15 (only available in Auto/Shutter priority/Aperture priority/Brightness **priority** mode)

WDR: Off, 1~8

Shutter priority: 1/25, 1/30, 1/50, 1/60, 1/90, 1/100, 1/120, 1/200, 1/250, 1/350, 1/500, 1/1000, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000(only available in Manual and Shutter priority mode)

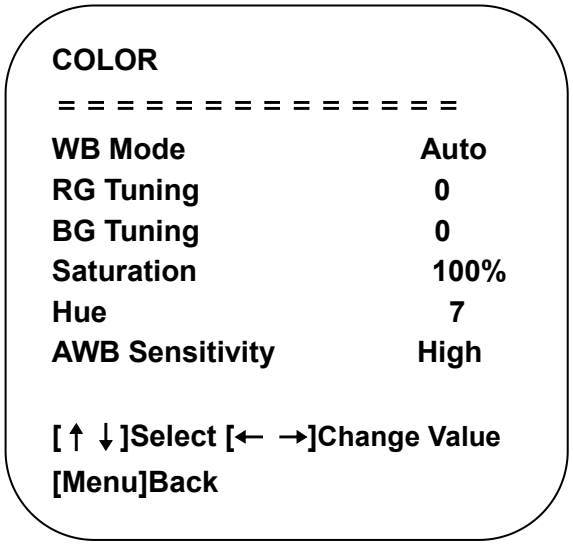
Aperture priority: OFF, F11.0, F9.6, F8.0, F6.8, F5.6, F4.8, F4.0, F3.4, F2.8, F2.4, F2.0, F1.8 (only available in Manual and Aperture priority mode)

Brightness: 0~23 (only available in Brightness **priority** mode)

Gain: Set the gain level. Available options: 0-20 (Effective only in Manual mode)

2）Color

Move the pointer to the (COLOR) in the Main Menu, click the【HOME】and enter the (COLOR SET) as follow



WB Mode: Available options: Auto, Manual, One-Touch White Balance, Specified Color Temperature

Red Tuning: -10~10(only available in Manual mode)

Blue Tuning: -10~10(only available in Manual mode)

Red Gain: 0~255(only available in Manual mode)

Blue Gain: 0~255(only available in Manual mode)

Saturation: 60%, 70%, 80%, 90%, 100%, 110%, 120%, 130%, 140%, 150%, 160%, 170%, 180%, 190%, 200%

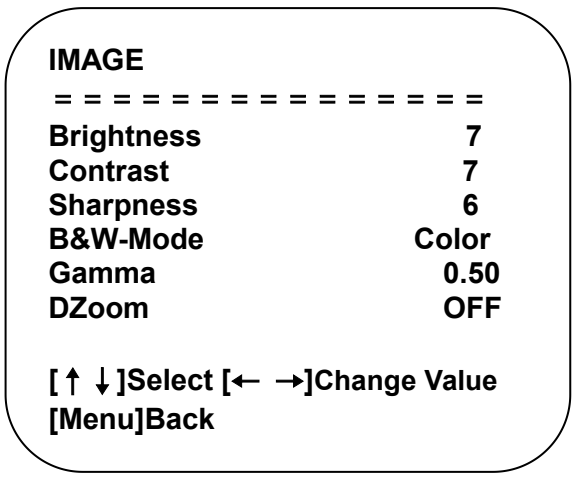
Hue: 0~14

AWB Sensitivity: high/middle/low(only available in Auto mode)

Specified Color Temperature: 2400K-7100K, adjustable in 100K steps

3）Image

Move the pointer to the (IMAGE) in the Menu, click the【HOME】and enter the (IMAGE) as follow



Brightness: 0~14

Contrast: 0~14

Sharpness: auto, 0~14

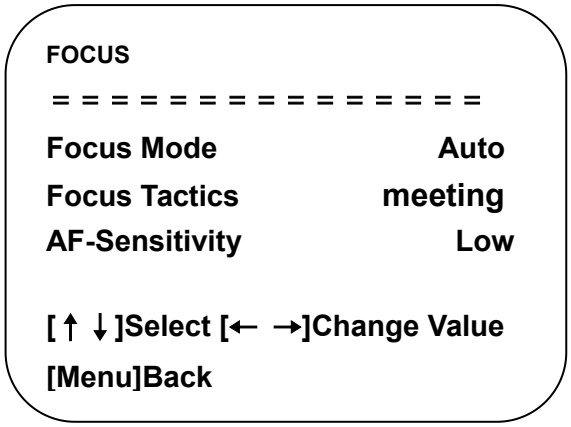
B&W Mode: color, black/white

Gamma: default, 0.45,0.48,0.50,0.55,0.63

DZoom: digital zoom options: On/Off

4）Focus

Move the pointer to the (FOCUS) in the Menu, click the【HOME】and enter the (FOCUS) as follow

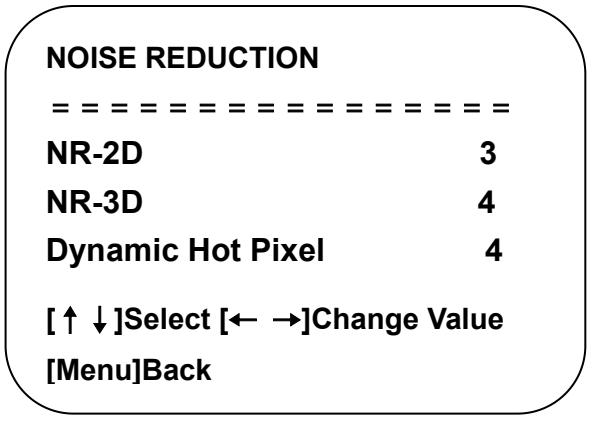


Focus Mode: Available options: Auto, Manual, One-Touch Focus

Focus Strategy: Pre-Focus, Post-Focus, Normal Conference, Education Tracking, Moving Object Focus, Center FocusAF-**Sensitivity:** High, middle, low

5）Noise Reduction

Move the pointer to the (NOISE REDUCTION) in the Menu, click the【HOME】and enter the (NOISE REDUCTION) as follow



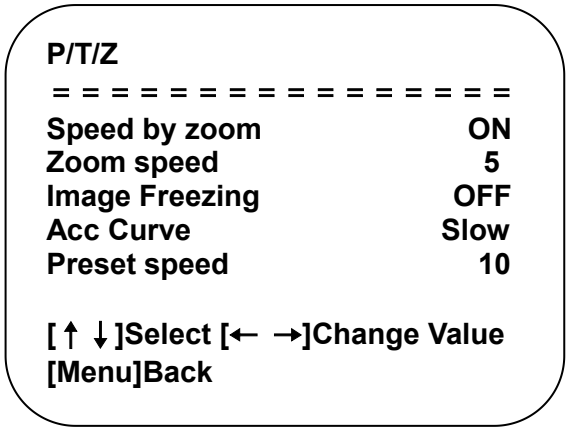
2D Noise Reduction: Auto, close,1~7

3D Noise Reduction: Close, 1~7

Dynamic Hot Pixel: Off; 1~5

3.2.5 P/T/Z

Move the pointer to the (P/T/Z) in the Main Menu, click the 【HOME】 and enter the (P/T/Z) as follow



Depth of Field: Only effective for remote controller, On/ Off;

When zoom in, the Pan/Tilt control speed by remoter will become slow

Zoom Speed: Set the zoom speed for remote controller, 1~8

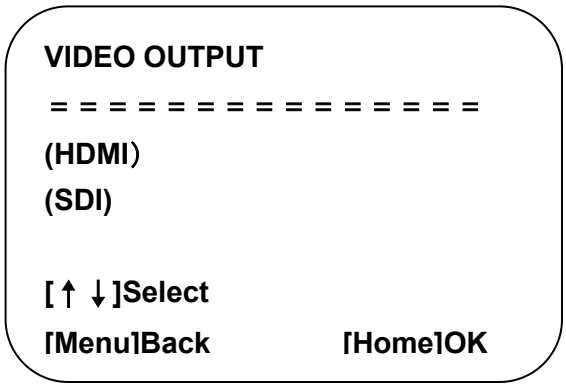
Image Freezing: On/Off

Accelerating Curve: Fast/slow

Preset Speed: 1-10

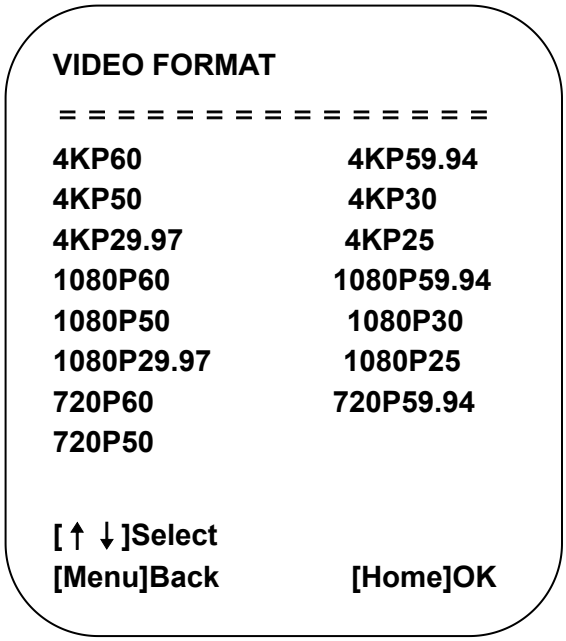
3.2.6 Video Format

Move the pointer to the (Video Format) in the Menu, click the 【HOME】 and enter the (Video Format) as follow



1) HDMI output

Camera parameter menu move the cursor to (HDMI), press the [HOME] button to enter HDMI, as shown below.



Caution

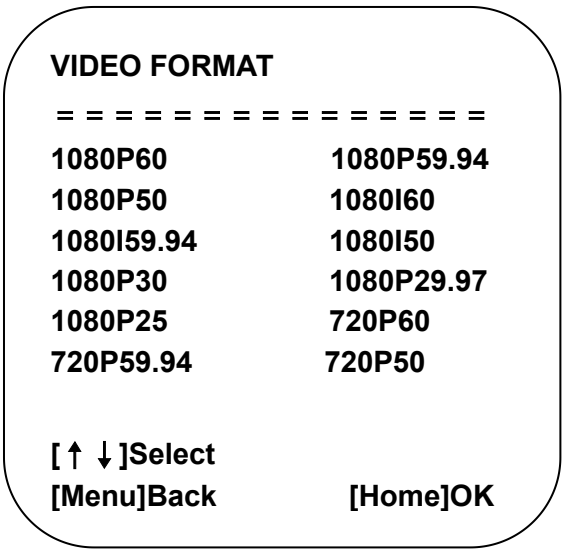
- Note: 4KP60/59.94/50 are only available for models:

RGB12X-UPAI-OL, RGB12X-UNAI-OL, RGB20X-UPAI-OL, RGB20X-UNAI-OL

RGB30X-UPAI-OL, RGB30X-UNAI-OL

2) SDI output

Camera parameter menu move the cursor to (SDI), press the [HOME] button to enter SDI, as shown below.

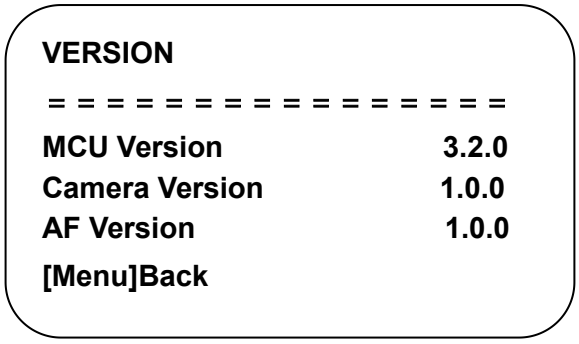


Caution

- Note: Exit menu after modifying parameter to save it

3.2.7 Version

Move the pointer to the (VERSION) in the Main Menu, click the 【HOME】 and enter the (VERSION) as follow



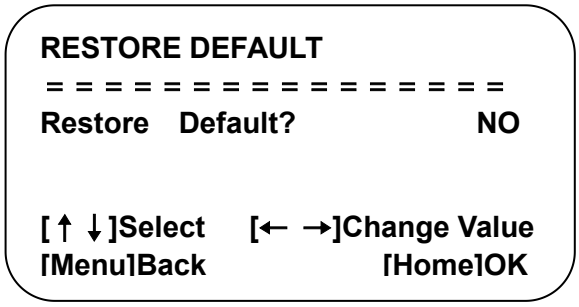
MCU Version: Display MCU version information

Camera Version: Display camera version information

AF Version: Display the focus version information

3.2.8 Restore Default

Move the pointer to the (VERSION) in the Main Menu, click the 【HOME】 and enter the (VERSION) as follow



Restore default: Yes/no ; (after restoring default, the language and video format won't be restored.

●Note: If the address of former remoter is not 1 but another one from 2, 3, 4, the corresponding camera address will restore to 1 when all parameters or system parameters are restored. User should change the remoter address to be 1 (press No.1 according to the camera so to get normal operation)

Chapter 4 Web Settings

4.1 Connection Method

Direct Connection: Directly connect the device to the computer using a network cable.
Connection to LAN: Connect the device to the Internet network, which can be done via a router or switch. The user can log in to the device through a browser.

Caution

- Note: Do not place power cables and network cables in areas that are easily accessible to people, as poor contact could cause unstable signal transmission and affect video quality.

The computer must have the IP subnet of the device. If the subnet is not added, login issues and other errors may occur. For example, if the device's default IP address is 192.168.5.163, the computer needs to add the subnet 5.
The process is as follows: First, open the computer's Local Area Connection properties window, select "Internet Protocol Version 4 (TCP/IPv4)", double-click or click "Properties" to enter the properties window for Internet Protocol Version 4 (TCP/IPv4). Select "Advanced", click "Advanced" to open the advanced TCP/IP settings. In the IP address section, add the IP and subnet mask. After adding, click "OK" to complete the subnet addition. Users can add the corresponding subnet according to the IP address they modified for the device.

Notes: The added IP address must not conflict with other computers or device IPs. Before adding, verify whether this IP already exists.

To verify if the subnet has been added successfully, open the "Start" menu on the computer, select "Run", type "cmd", and click "OK" to open the DOS command window. Type "ping 192.168.5.26" and press Enter. If information like Figure 4-1 appears, it indicates that the subnet has been added successfully.

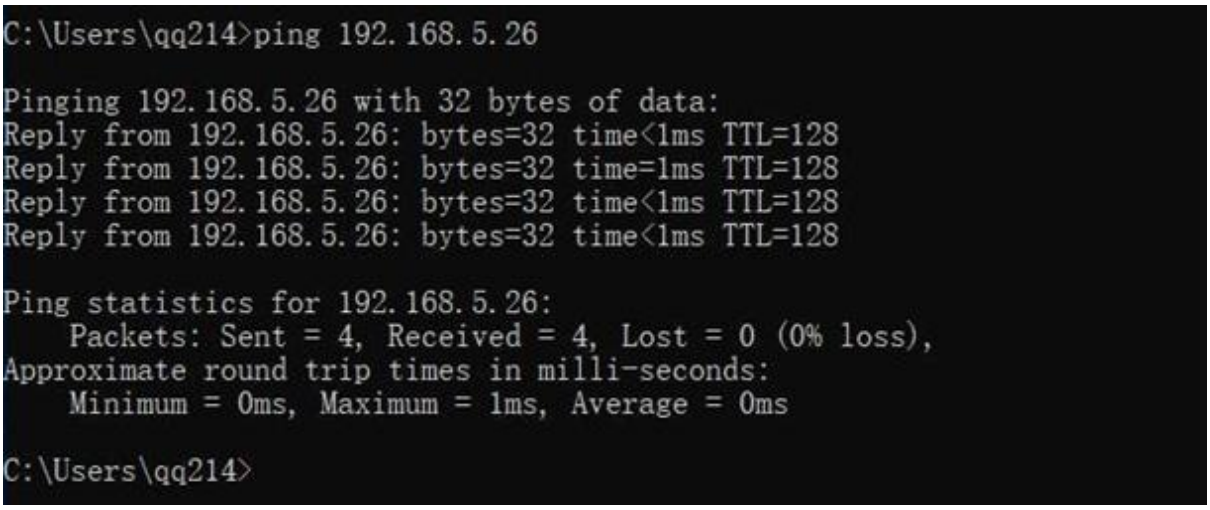


Figure 4-1: Subnet Addition Successful Illustration

User can also to verify network connection as steps above mentioned after the finish of camera self-check. If IP is

default, open DOS command window and input 192.168.5.163, then press Enter key. It will show message as below: which means network connection is normal.

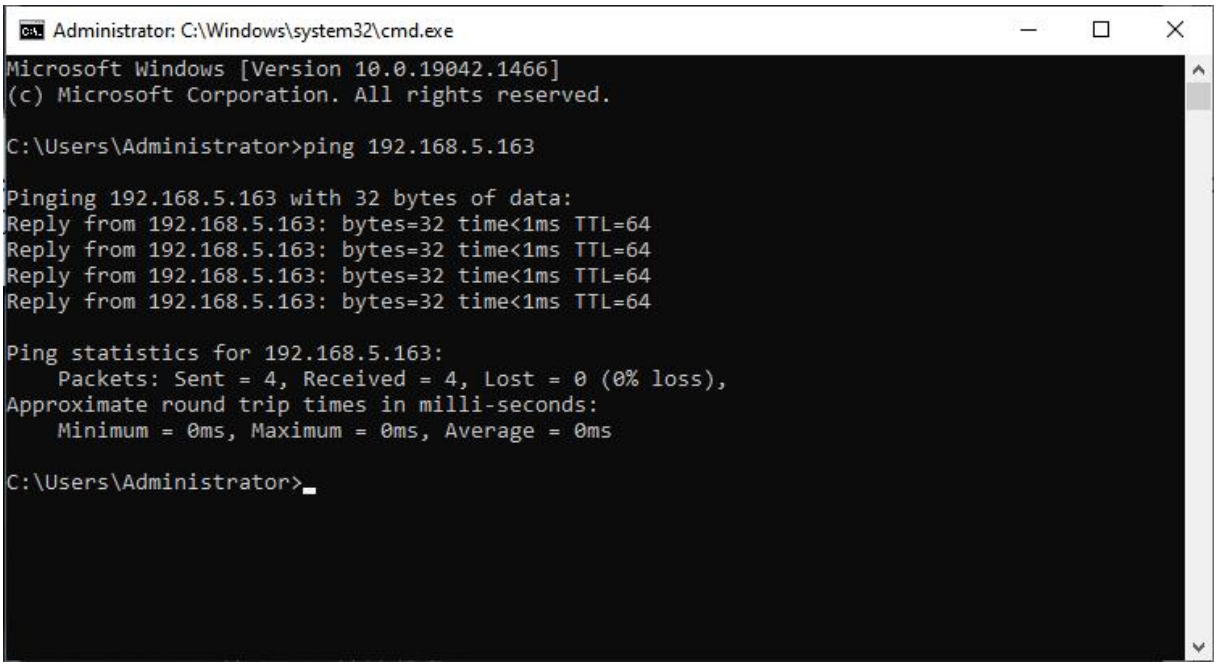


Figure 4-2: Network Connection Normal Illustration

4.2 Camera Web Interface

4.2.1 Web Login

1）Client Login

Enter the device IP address (default is 192.168.5.163) in the browser's address bar and press Enter to access the Web client login page. There are two login methods: administrator and general user. By logging in as an administrator (default username and password: admin), you can perform operations such as preview, configuration, and logout. By logging in as a general user (default username and password: user1 or user2), you can only perform operations like preview and logout, with no configuration options available.

Note: The Web access feature is supported by browsers such as Google Chrome (supports preview), Internet Explorer (IE), 360 browser, and other common browsers.

Language Selection: In the top right corner of the login page, you will see "中文|English". Click to select the desired language for the webpage interface.

4.2.2 Preview

After successful login into the management interface, it enters the video preview interface. In the preview screen, users can control PTZ, zoom, focus, video capture, sound, focus, full screen and set the preset position, run, delete and other operations.

1) Administrator Login

Username and password default to admin.

The administrator can perform operations such as pan-tilt control, zooming, focusing, sound control, magnification, full screen, and setting, running, or deleting preset positions. The administrator also has the ability to preview, configure, and log out.

2) General User Login

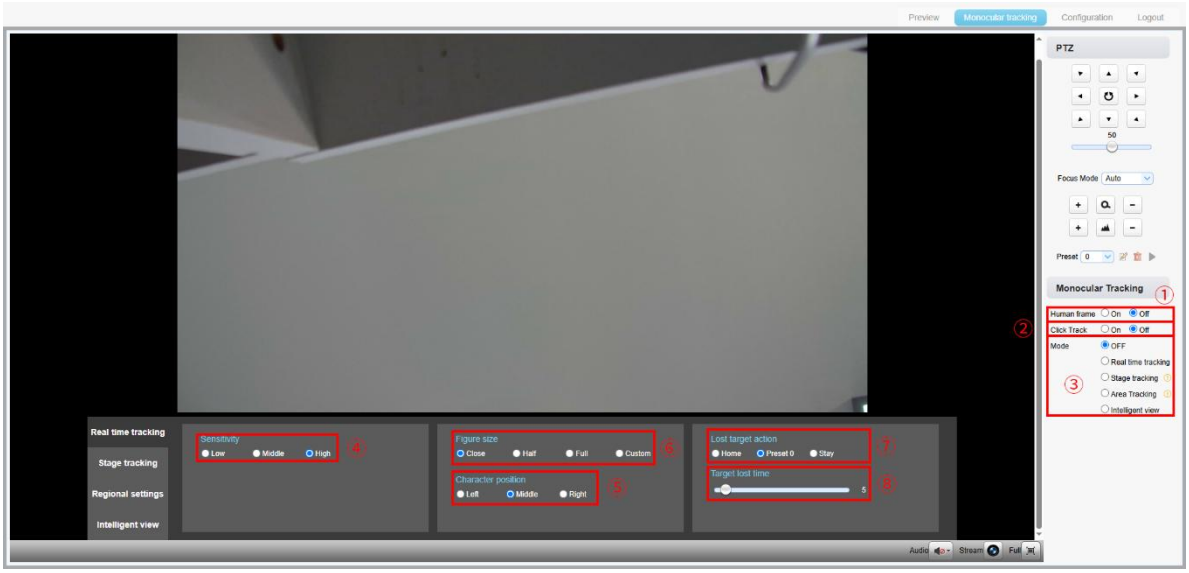
Username and password default to user1 or user2.

General users can perform operations such as pan-tilt control, zooming, focusing, sound control, magnification, full screen, and setting, running, or deleting preset positions. General users can preview and log out, but cannot access configuration settings.

Caution

- Note: There is no configuration right if you login as user

4.2.3 Monocular Tracking



① Enable/Disable Human Detection Box – Default is disabled. When enabled, the tracked target will be surrounded by a yellow box, while other objects will be in green boxes.

② Enable/Disable Object Selection–Default is disabled. When enabled, left-clicking on a person with the mouse will make that person the tracking target.

③ Select Tracking Mode: Disable Tracking, Real-time Tracking, Stage Tracking, Area Tracking, and Intelligent Framing–Default is disabled.

④ Set Sensitivity: High, Medium, or Low–Default is Medium.

⑤ Set Person Size: Close-up, Half-body, Full-body, or Custom (0–5)–Default is Half-body.

⑥ Set Position of the Person in the Frame: Left, Center, or Right–Default is Center.

⑦ Set Action When Target is Lost: Return to Origin, Preset Position 0, or Last Known Position–Default is Return to Origin.

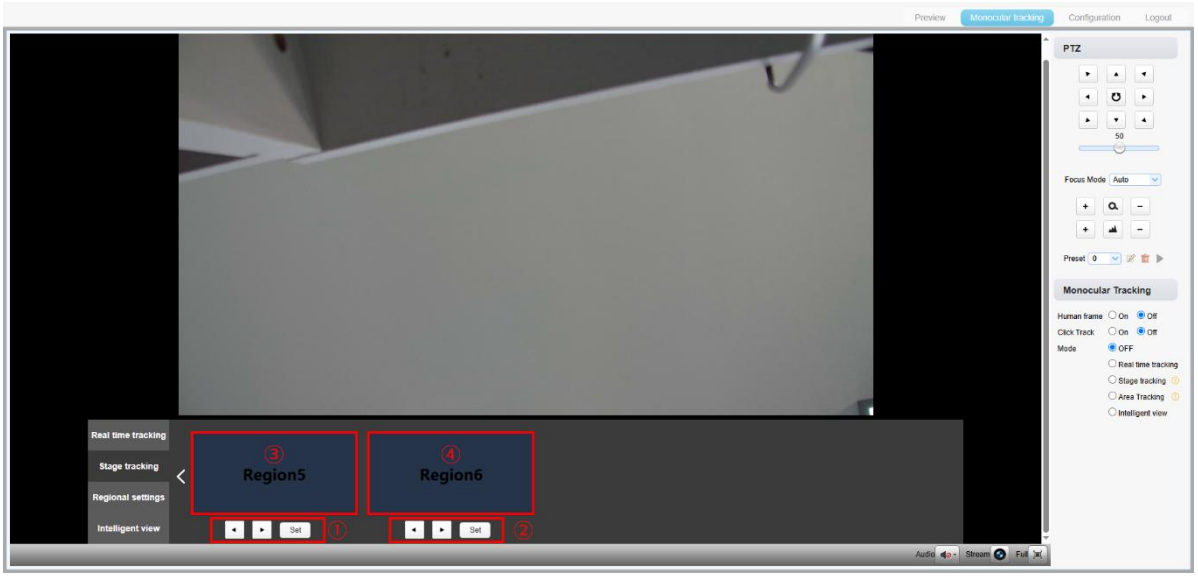
⑧ Target Loss Duration: Can be set from 0 to 10 seconds, default is 3 seconds.

	Sensitivity	Person Size	Person Position	Target Loss Action	Target Loss Duration
Real-time Tracking	◎	◎	◎	◎	◎
Stage Tracking	◎	×	◎	◎	◎
Area Tracking	◎	×	×	◎	◎
Intelligent Framing	◎	×	×	◎	◎

Notes:

1.◎: Configurable in this tracking mode.

2.×: Not configurable in this tracking mode.



①: Click to set the left boundary of the tracking area, then click [Set] to complete.

②: Click to set the right boundary of the tracking area, then click [Set] to complete.

③: Click to adjust the window to the left boundary position.

④: Click to adjust the window to the right boundary position.

Note: Area setting is only possible when tracking is disabled.

①: Taking Area 1 as an example: Adjust the pan-tilt to set the tracking area, then click [Set] to finalize the setup, and the image will be saved and displayed in Window 1.

②: Click [Recall] to adjust the camera to the preset area.

③: Click the window view to adjust the camera to the preset area.

④: Select the areas to track, with a minimum of 2 areas required.

Notes:

1. Area setting is only possible when tracking is disabled.
2. Each preset view must be continuous from left to right and overlap during setup.

4.2.4 Configuration

Click **Configuration** to enter into the device parameters setting page
There are the following options: Audio configuration, video configuration, network configuration, internet access configuration, system configuration, detailed description see the following table.

Menu	Explanation
Audio configure	Including audio compressing format, sampling frequency, sampling precision, compressing code rate settings etc.
Video configure	Including video encoding, video parameters, character-overlapping, character size, video output setting etc.
Network configure	Including basic parameters, Ethernet, DNS, wireless network setting, GB28181 etc.
System configure	Including equipment property, system time, user management, version update, Reset, Reboot device settings etc.

4.2.5 Audio Configuration

Switch: Set whether to enable audio.
Compression Format: Set the audio compression format. After changing, the device requires a manual restart (default: G.711A, AAC optional).
Sampling Frequency: Set the audio sampling frequency. After changing, the device requires a manual restart (default: 16000, 32000, 44100, 48000 optional, G.711A defaults to 8000).
Sampling Precision: Set the audio sampling precision (default: 16 bits).
Compression Bitrate: Set the audio compression bitrate (default: 64 Kbps, 32, 48, 96, 128 optional).
Channel Type: Set the channel type (default: mono, stereo optional).
Input Volume: Set the input volume level (default 2; range: 1-10 optional).
Click the "Save" button to display the "Save Successful! The settings will take effect after restarting the device" message. Restart the device for the changes to take effect.

4.2.6 Video configuration

1) Video Encoding
Code Stream: Stream: Different video output mode setting, use different streams. (Main stream, secondary stream)
Compression Format: Set the video compression format, save to take it effect (primary / secondary stream default: H.264, H.265 optional)
Profile: Profile Mode Setting (Default HP, BP,MP Optional)
Video Size: Set the image resolution. Changes will take effect after saving. (Main stream default: 3840*2160, 1280*720, 1920*1080, 2304*1296, 2590*1944 optional)
Sub stream default: 1920*1080, 320*240, 640*360, 640*480, 1280*720, 1920*1080 optional)
Stream Rate Control: Set rate control mode, save to take it effect (Primary / secondary stream default variable bit rate).
Image Quality: Set the image quality, image quality can be changed only when rate control is variable bit rate, (main stream defaulted is better, secondary stream default is not good, there are best, better, good, bad, worse,

worst for options).

Rate (Kb / s): Set the video bit rate (main stream default 4096Kb/s,64-40960Kb/s optional; secondary stream default 512Kb/s,64-20480Kb/s optional)

Frame Rate (F / S): Set the video frame rate (primary / secondary stream default 25F / S, primary stream 5-60F/S optional, secondary stream 5-30F / S optional).

Key Frame Interval: Set the key frame interval (primary / secondary stream default 100F; Primary stream 1-300 optional. Secondary stream 1-150F optional).

Minimum QP of Key Frame Interval: Set minimum QP of key frame interval (Default 20, 10-51 for optional)

Stream Name: When streaming via rtsp or rtmp, user can modify stream name. Main Stream(live/av0), sub stream(live/av1)

Click the "Save" button to display the "Parameter saved successfully" message, then settings take effect.

2) Stream Release

Switch: To turn on/off the main / secondary stream.

Protocol: primary / secondary stream applies RTMP protocol. RTSP, SRT

Host Port: server port number (default 1935, 0-65535 optional)

Host Address: server IP addresses (default 192.168.5.11)

Stream Name: choose a different stream name (live / av0, live / av1 optional).

User: Set the user name.

Password: Set the password.

Click on the "Save" button to display the "Save successful" message, then settings take effect.

Method of obtaining RTSP: rtsp: // device IP address: 554 / live / av0 (av0 main stream; av1 secondary stream)

3）RTP Broadcasting

Main/Sub Stream: On/off;

Protocol:（Default RTP, TS optional）

Address: Default 224.1.2.3. It can be edited.

Port: The main stream defaults to 4000, the secondary stream defaults to 4002, and the main/secondary stream is optional from 0 to 65535.

Visit: Address comes up after setting. Eg; rtp://224.1.2.3:4000;udp://@224.1.2.3:4000;tcp://@224.1.2.3:4002;

4) Video Parameters

a. Focus: Focus mode, focus range, focus sensitivity can be set.

Focus Mode: set the focus mode (Default automatic, manual optional, one-key focus)

Focus range: set the focus range (the default middle, the upper, lower and all optional)

Focus Sensitivity: Set the focus sensitivity (default is low, high, medium optional)

b. Exposure: can set exposure mode, exposure compensation, backlight compensation, anti-flicker, gain limit, dynamic range, shutter, aperture, brightness, gain

Exposure Mode: Set the exposure mode (the default automatic, manual, shutter priority, aperture priority, Brightness priority optional)

Exposure compensation: Exposure compensation setting is active when it is auto status (default is off).

Exposure compensation value: Set the exposure compensation value, valid when it is set for auto(default 0, -7 to 7 optional).

BLC: Set back light compensation, valid when it is auto status (default is off).

Anti-flicker: Set up anti-flicker mode, valid when status of automatic, aperture or brightness priority (default 50Hz, closed, 60Hz optional).

Gain limit: set the gain limits, auto, active when it is status of aperture or brightness priority

(default 8, 0-15 optional)

Gain: Set the gain. This setting is only effective when the exposure mode is set to manual. (Default 0, Range: 0-20 optional).

Dynamic range: set the dynamic range (default off, 1-8 optional).

Shutter speed: active when it is status of manual or shutter-priority (default 1/100,1/25,1/30,1/50,1/60,1/90,1/100,1/120,1/200,1/250,1/350,1/500,1/1000,1/2000,1/3000,1/4000,1/6000,1/10000 optional).

Aperture value: Set the aperture value, active when it is status of manual or aperture-priority(default F1.8, closed, F11, F9.6, F8.0, F6.8, F5.6, F4.8, F4.0, F3.4, F2.8, F2.4, F2.0, F1.8 optional).

Brightness: Set the brightness value, active when it is a state of brightness priority (default 11,0~23 optional).

c. Color: White balance, saturation, color, white balance, sensitivity, color temperature, gain red and blue gain can be set.

White balance modes: Set the white balance mode (Default automatic, manual, one-key white balance, specified color temperature optional).

Note: Click the “Correction” button when selected the One-push white balance mode.

Red Tint Adjustment: Set the red tint adjustment. This setting is only effective when the white balance mode is set to automatic. (Default: 0, range: -10 to 10 optional).

Blue Tint Adjustment: Set the blue tint adjustment. This setting is only effective when the white balance mode is set to automatic. (Default: 0, range: -10 to 10 optional).

Saturation: Set the saturation (default 100%,60%,70%,80%,90%,100%,110%,120%,130%,140%,150%,160%,170%,180%,190%,200%optional).

Chroma: Set the chrome (default 7, 0-14 optional).

Auto white balance sensitivity: Sensitivity Auto white balance settings (default is low, high, medium optional).

Red gain: Set the red gain, effective when it is manual (default 56,0~255 optional).

Blue gain: Sets the Blue gain, effective when it is manual (default 158, 0~255optional).

Specified Color Temperature: Set the color temperature, only effective in white balance mode, default 2400K-7100K optional, adjustable in 100 steps.

d. Image: You can set Brightness, Contrast, Sharpness, Gamma Curve, Black & White Mode, Horizontal Flip, Vertical Flip, Auto Flip, Electronic Zoom, Ultra-Low Light Mode

Brightness: Set the brightness (default 7, 0-14 optional).

Contrast: set the contrast (default 7, 0-14 optional).

Sharpness: Set the sharpness value (default 6, 0-15 optional).

Gamma Curve: Set the gamma curve value (Default: 0.50, 0.45, 0.48, 0.50, 0.55, 0.63 options).

Lens correction: Set lens correction (default off, on optional)

Black and white mode: Set black and white mode (default color, black/white optional).

Flip Horizontal: Set Flip Horizontal (default Off, On optional).

Flip Vertical: Set vertical flip (default Off, On optional).

Electronic Zoom: Set the electronic zoom (Default: Off, On/Off options).

Auto Flip: Set the image flip (Default: On, On/Off options).

Low-Light Mode: Set Low-light mode (default off/on optional)

e. Noise Reduction: 2D noise reduction, 3D noise reduction and dynamic dead pixel correction available.

2D Noise Reduction: Set 2D noise reduction level (default 3,1-7and auto optional).

3D Noise Reduction: Set 3D noise reduction level (default 4,1-7and auto optional).
Dynamic dead pixel correction: Set Dynamic dead pixel correction (default 4, 1-5, off optional).

f. Style: Select the picture style (Options: Default, Conference, Clear, Vivid, Soft).

Caution

- Note: Refresh the page after changing above parameters in a, b, c, d, e, f to take effect.

5) Character Overlay
Display Date and Time: Set whether to display the date and time (can be checked).
Display Title: Set whether to display the title (can be checked).
Time Font Color: Set the font color for the time (Default: White, options: Black, Yellow, Red, Blue).
Title Font Color: Set the font color for the title (Default: White, options: Black, Yellow, Red, Blue).
Move Characters: Set the display position for the time and title. Click the "Up, Down, Left, Right" buttons to move the corresponding character position.
Title Display Content: Set the title content for the device (Default: CAMERA1).
Time Display Content: Set the system time (Default: 1970/01/01 05:36:00).
Click the "Save" button to display the "Parameter Save Successful" message, and the settings will take effect.

6) Character Size
Auto-Scale Size Based on Resolution: Can be checked.
Main Stream Character Size: Set the character size for the main stream display. Changes will take effect after restarting the device (Default: 48, options: 8-200).
Sub Stream Character Size: Set the character size for the sub stream display. Changes will take effect after restarting the device (Default: 48, options: 8-200).
Click the "Save" button to display the "Parameter Save Successful" message, and the settings will take effect.

7) Video Output
Output Format: Set the video output format. Options include:
SDI Output Format： 1080P60, 1080P59.94, 1080P50, 1080I60, 1080I59.94, 1080I50, 1080P30, 1080P29.97, 1080P25, 720P60, 720P59.94, 720P50 optional
HDMI Output Format： 3840*2160P60, 3840*2160P59.94, 3840*2160P50, 3840*2160P30, 3840*2160P29.97, 3840*2160P25, 1080P60, 1080P59.94, 1080P50, 1080P30, 1080P29.97, 1080P25, 720P60, 720P59.94, 720P50 optional
Click the "Save" button to display the "Parameters saved successfully" message, and the settings will take effect.

4.2.7 Network configuration

1) Network port
Data port: set the data port, the device will restart automatically after changed(default 3000, 0-65535 optional).
Web Port: Set Web port, the device will restart automatically after changed (default is 80, 0-65535 is optional).
Onvif Port: Set Onvif port, the device will restart automatically after changed(default 2000, 0-65535 optional).
Soap Port: Set Soap port (default 1936, 0-65535 optional).
RTMP Port: Set RTMP port (default 1935, 0-65535 optional).

RTSP Port: Set RTSP port, the device will restart automatically after changed (default 554, 0-65535 optional).
Visca Port: Set Visca port, the device will restart automatically after changed (default 1259,0-65535 optional).
Click on the "Save" button, it will be valid when display "Save successful".
RTSP Access: rtsp://Device IP Address:554/live/av0 (av0 main stream; av1 sub stream)
RTMP Access: rtmp://Device IP Address:1935/live/av0 (av0 main stream; av1 sub stream)

2) Ethernet parameters
DHCP: Enable or disable obtain IP automatically can be set. Save changes and reboot the device to takes effect (Default:OFF)
IP Address: Set the IP address, save changes and reboot the device to takes effect (default 192.168.5.163).Note: This IP address is the same with the one used to login Web page.
Subnet Mask: Set the subnet mask (default 255.255.255.0).
Default Gateway: Set the default gateway (default 0.0.0.0).
Physical Address: Set the physical address (the parameter is read-only but can not be modified).
Click on the "Save" button, it will be valid when display "Save successful". (Note: To prevent IP conflicts while modifying).

3) DNS parameters
Preferred DNS server: set the preferred DNS server. (Default 0.0.0.0).
Alternate DNS server: Alternate DNS server settings. (Default 0.0.0.0).
Click on the "Save" button, it will be valid when display "Save successful".

4) GB28181
Switch: set whether open GB28181, can check
Time Synchronization: whether synchronization time is set, you can check
Stream Type: stream type setting (the default main stream, secondary stream optional)
Sign effective time (in seconds): 3600 Range 5-65535
Heartbeat time (seconds): 60 Range 1-65535
Register ID: 34020000001320000001
Register User name: IPC
Register Password: 12345678
Equipment ownership: Users can add their own
Administrative regions: Users can add their own
Alarm Zone: Users can add their own
Equipment installation address: Users can add their own
Local SIP Port: 5060 Range 0-65535
GB28181 Server Address: IP address of the computer
Server SIP Port: 5060 Range 0-65535
Server ID: 34020000002000000001
Click on the "Save" button, it will be valid when display "Save successful".

5) SRT
SRT port: Set the SRT port (default 9000, 0-65535 optional)
SRT password: Set SRT password
SRT password length: Set the SRT password length (default 0, 16, 24, 32 optional)

Click the "Save" button, and the prompt message "Parameters saved successfully! It will take effect after restarting!" will be displayed. After setting, restart the camera to take effect.

4.2.8 System Configuration

1) Device Properties

Device Name: Set the device name (the default Camera-1, user can add their own).

Device ID: Set the device ID (default 1, Read-Only).

System Language: Set the system language (default Simplified Chinese, English optional).Need to re-login after modify and save the setting.

Click on the "Save" button, it will be valid when display "Save successful".

2) System Time

Date Format: Set the date format (YYYY-MM-DD default that year - month - day, MM-DD-YYYY namely Month - Day - Year, DD-MM-YYYY date - month - year Optional).

Date separator: set the date separator (default '/', '.', '-' Optional).

Time Zone: Set the time zone (default is GMT+8, other time zones are available).

Time Type: Set the time types (default 24 hours, optional 12 hours).

NTP Enable: You can check this option to enable NTP time synchronization.

Update Interval: Set the interval for the NTP server to update automatically (effective only when NTP is enabled; default is 1 day, other options include 2-10 days)**.**

NTP Server Address or Domain: Set the NTP server address or domain (effective only when NTP is enabled; default is time.nits.gov, users can modify it).

NTP Server Port: Set the NTP server port (effective only when NTP is enabled; default is port 123, users can modify it).

Click the "Save" button to display the message "Parameters saved successfully," and the settings will take effect.

Time setting: Set time mode (to choose the computer time synchronization, NTP server time synchronization, or set manually).

Computer Time: Display the computer time (only valid if syncing with computer time). Click the "Sync" button to sync.

Manual Time Setting: Click the calendar icon on the right to manually set the time (only valid if manually setting the time).

3) User Management

Select users: Set the user type (the default administrator, Common User 1, Common User 2 optional)

User name: set the user name (Select User Administrator default admin; select a common user1 default user1; to select a common user 2 default user2; user can modify their own)

Password: Set a password (Select User Administrator default admin; select a common user1 default user1; to select a common user 2 default user2; user can modify their own).

Password confirmation: Confirm the input passwords are the same or not.

Click the "Save" button to display the message "Parameters saved successfully," and the settings will take effect.

Caution

- Note: Please note that usernames and passwords are case-sensitive.
- Important Notes: If logged in as a regular user, you will not have configuration permissions and will only be able to preview or log out.

4) Version Upgrade

The page displays version information, which is read-only and cannot be modified. The version information shown will match the one in the menu, and it may differ depending on the device model.

Upgrade File: Click "Browse..." to select the upgrade file from the window that appears. Click the "Upgrade" button, and a dialog box will appear. After a successful upgrade, the device will automatically restart (Note: Ensure that the device's power and network connections are stable during the upgrade process to avoid failure).

You can use any of the three methods, where method (a) will also restore the IP address and password to their defaults.

Caution

- Note: Make sure the power and network is keeping connected during the process. or the upgrade will fail.
- Note: After the version upgrade is complete, you need to restore factory defaults; a, through web to restore the factory default configuration; b, through the recovery menu; c, remote control shortcut * # 6.
- Note: Choose one of the above three ways. If chose a, the IP accounts, passwords also need to be restored to the default.

5) Restore Factory Setting

Click on pop-up "Restore Factory Defaults" button and choose “yes” or “no”, then the device will restart automatically and restore factory setting.

6) Reboot

Click on the pop-up "Reboot" button and choose “yes” or “no”, then the device will restart automatically

4.2.9 Logout

Point "Logout" pop-up "Confirmation" dialog; select "Yes" or "No", choose “Yes” to exit the current page and return to the user login interface.

Chapter 5 Ordering Codes

5.1 Product Code

Product Code	Model	Product Name
981-1100-01-0	RGB12X-PAI-OL	4K30 12X POE Tracking Camera
981-1100-02-0	RGB12X-NAI-OL	4K30 12X POE NDI Tracking Camera
981-1100-03-0	RGB20X-PAI-OL	4K30 20X POE Tracking Camera
981-1100-04-0	RGB20X-NAI-OL	4K30 20X POE NDI Tracking Camera
981-1100-05-0	RGB30X-PAI-OL	4K30 30X POE Tracking Camera
981-1100-06-0	RGB30X-NAI-OL	4K30 30X POE NDI Tracking Camera
981-1100-07-0	RGB12X-UPAI-OL	4K60 12X POE Tracking Camera
981-1100-08-0	RGB12X-UNAI-OL	4K60 12X POE NDI Tracking Camera
981-1100-09-0	RGB20X-UPAI-OL	4K60 20X POE Tracking Camera
981-1100-10-0	RGB20X-UNAI-OL	4K60 20X POE NDI Tracking Camera
981-1100-11-0	RGB30X-UPAI-OL	4K60 30X POE Tracking Camera
981-1100-12-0	RGB30X-UNAI-OL	4K60 30X POE NDI Tracking Camera

Chapter 6 Support

6.1 Contact Us

RGBlink Headquarters
Xiamen · China

Room 601A, No. 37-3 Banshang community. Building 3, Xinke Plaza, Torch Hi-Tech industrialDevelopment Zone, Xiamen,China

+86 0592 577 1197

China Regional **Sale & Support**
Shenzhen · China

705, 7th Floor, South District, Building 2B, Skyworth Innovation Valley, No. 1 Tangtou Road, Shiyan Street, Baoan District, Shenzhen City, Guangdong Province

+86 0755 2153 5149

Beijing Region Office
Beijing · China

Room 33, 2nd Floor, Building 1, National Defense Science and Technology Park, Zhongguancun Campus, Beljing institute of Technology, Haidian

+010 8577 7286

6.2 Troubleshooting

1. No image displayed by video output

Solution:

a. Check camera power for connection, and check if power indicator is lit.

b. Power off, restart the device and check if it performs self inspection normally.

c. Check if connection line of video output and video display functions.

2. Image is unstable

Solution: a:Check if connection line of video output and video display functions.

3. Lens zoom image dithering

Solution:

a. Check if camera is installed securely.

b. :Check if there is vibrating machine or object nearby the camera.

4. Remote control is out of service

Solution:

a. Set remote control address to be 1, and check if it works (if the device restores to default, remote control address will be restored to 1）

b. Check if remote control battery is installed or battery is low

c. Check if menu exits. It only works when menu exits; if webpage outputs image, it will not display menu or perform any operation. Menu exits in 30s automatically. Remote control works.

5. Serial port is out of control

Solution:

a. Check if it is standard control line provided by our company.

b. Check if serial port protocol, baud rate and address are consistent with camera.

c. Check if control line connects correctly.

6. Failure to log in webpage

Solution:

a. Use display to check if camera outputs image normally

b. Check if network cable connects correctly (flicker of yellow indicator at internet access means network cable connection is correct）

c. Check if computer adds network segment and if network segment is consistent with camera IP address.

d. Click “start” in computer, select “operate”, and enter cmd; click “confirm”, DOS command window appears; Input ping 192.168.5.163, press Enter, information below means network connection functions well.

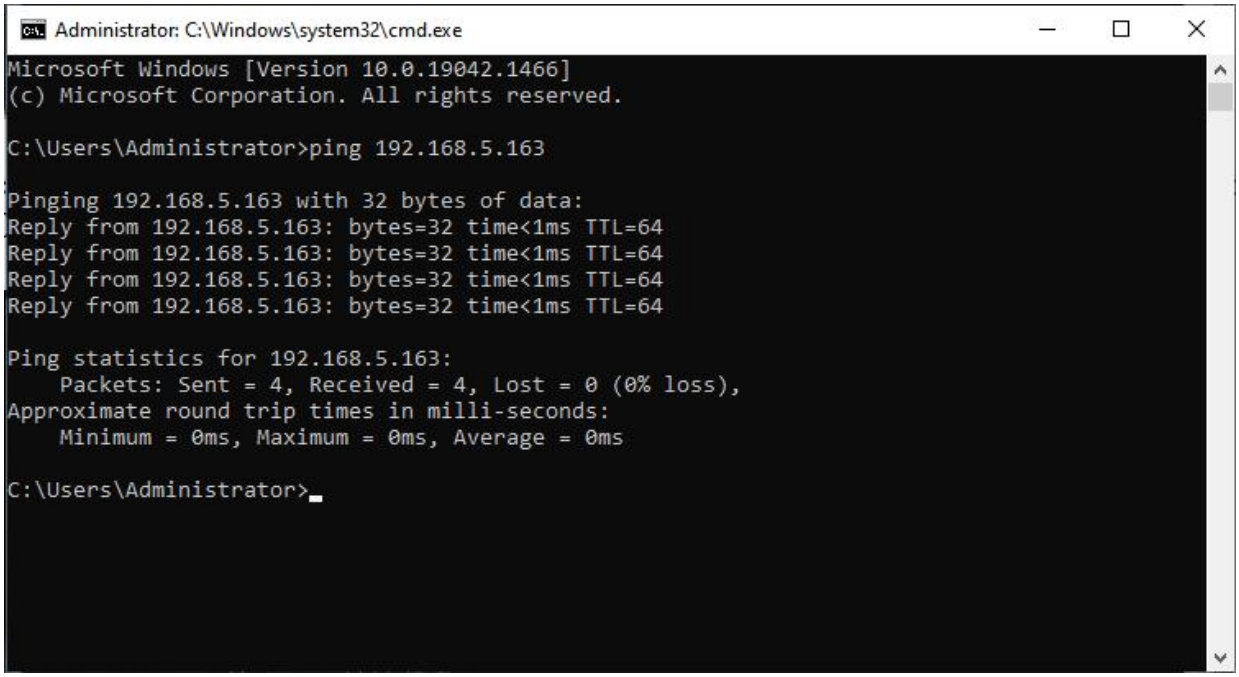


Figure 6-1 Network Connection Schematic

Chapter 7 Appendix

7.1 Serial Communication Control

Under normal working condition, the camera could be controlled through RS232/RS485 interface (VISCA), RS232C serial parameter are as follows:

Baud rate: 2400/4800/9600/115200 bits / sec; Start bit: 1; data bits: 8; Stop bit: 1; Parity: None.

After power on, the camera first go left, then back to the middle position. Self-test is finished after the zoom moved to the farthest and then back to the nearest position. If the camera saved 0 preset before, it will be back to that position after initialization. At this point, the user can control the camera by the serial commands.

7.2 VISCA protocol list

7.2.1 Tracking VISCA Serial Commands

Main Function	**Function Description(Input and Query)**	**VISCA Protocol Command**	**Command Description**
Ttacking Mode	Direct	8x 0A 01 32 00 00 02 0p FF	0p: 0: Off 1: Real-time Tracking 2: Stage Tracking 3: Area Tracking 4: Intelligent Framing
	Ttacking Mode Inq	8x 09 01 32 FF	y0 50 0p FF 0p:0-4
Ttacking Sensitivity	Direct	8x 01 0B 00 02 0p FF	0p: 0: High 1: Medium 2:Low
	Ttacking Sensitivity Inq	8x 09 0B 00 02 FF	y0 50 0p FF 0p:0-2
Ttacking Figure size	Direct	8x 01 0B 02 01 0p FF	0p: 0: Half-body 1: Close-up 2: Full-body 3: Custom
	Ttacking Figure size	8x 09 0B 02 01 FF	y0 50 0p FF 0p:0-3
Ttacking_Figure size Custom level	Direct	8x 01 0B 02 02 0p FF	0p: 0: Left 1: Center 2: Right
	Ttacking Figure size Custom level Inq	8x 09 0B 02 02 FF	y0 50 0p FF 0p:0-2
Ttacking Lost target action	Direct	8x 01 0B 00 04 0p FF	0p: 0: home 1: Preset Position0 2: Final Lost Position
	Ttacking Lost target action Inq	8x 09 0B 00 04 FF	y0 50 0p FF 0p:0-2
Ttacking Target lost time	Direct	8x 01 0B 00 03 0p FF	0p: 0-3C
	Ttacking Target lost time Inq	8x 09 0B 00 03 FF	y0 50 0p FF 0p:0-3C

7.2.2 Device Return Commands

Ack/Completion Message		
	Command packet	**Note**
ACK	z0 41 FF	Returned when the command is accepted.
Completion	z0 51 FF	Returned when the command has been executed.

z = device address + 8

Error Messages	**Command packet**	**Note**
Syntax Error	z0 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted.
Command Buffer Full	z0 60 03 FF	Indicates that two sockets are already being used(executing two commands) and the command could not be accepted when received.
Command Canceled	z0 6y 04 FF (y: Socket No.)	Returned when a command which is being executed in a socket specified by the cancel command is canceled. The completion message for the command is not returned.
No Socket	z0 6y 05 FF (y: Socket No.)	Returned when no command is executed in a socket specified by the cancel command, or when an invalid socket number is specified.
Command Not Executable	z0 6y 41 FF (y: Execution command Socket No. Inquiry command: 0)	Returned when a command cannot be executed due to current conditions. For example, when commands controlling the focus manually are received during auto focus.

7.2.3 Camera control command

Command	**Function**	**Command packet**	**Note**
AddressSet	Broadcast	88 30 0p FF	P:Address setting
CAM_Power	On	8x 01 04 00 02 FF	Power ON/OFF
	Off	8x 01 04 00 03 FF	
CAM_Zoom	Stop	8x 01 04 07 00 FF	
	Tele(Standard)	8x 01 04 07 02 FF	
	Wide(Standard)	8x 01 04 07 03 FF	
	Tele(Variable)	8x 01 04 07 2p FF	p = 0(low) - F(high)
	Wide(Variable)	8x 01 04 07 3p FF	p = 0(low) - 7(high)
	Direct	8x 01 04 47 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM _Focus	Stop	8x 01 04 08 00 FF	
	Far(Standard)	8x 01 04 08 02 FF	
	Near(Standard)	8x 01 04 08 03 FF	
	Far(Variable)	8x 01 04 08 2p FF	p = 0(low) - F(high)
	Near (Variable)	8x 01 04 08 3p FF	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	pqrs: Focus Position
	Auto Focus	8x 01 04 38 02 FF	

Command	Function	Command packet	Note
	Manual Focus	8x 01 04 38 03 FF	
	One Push	8x 01 04 38 04 FF	
CAM _Zoom Focus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position tuvw: Focus Position
CAM_AF Sensitivity	High	8x 01 04 58 01 FF	Focus sensitivity Setting
	Normal	8x 01 04 58 02 FF	
	Low	8x 01 04 58 03 FF	
CAM_AF Zone	Front	8x 01 04 AA 00 FF	Focus Region Setting
	Beting	8x 01 04 AA 01 FF	
	Meeting	8x 01 04 AA 02 FF	
	Education	8x 01 04 AA 03 FF	
	Moving	8x 01 04 AA 04 FF	
	Middle	8x 01 04 AA 05 FF	
CAM_WB	Auto	8x 01 04 35 00 FF	
	Manual	8x 01 04 35 05 FF	
	One Push mode	8x 01 04 35 03 FF	
	One Push Trigger	8x 01 04 10 05 FF	One Push WB Trigger(Enabled during One Push WB mode)
	2400K	8x 01 04 35 0C FF	
	2500K	8x 01 04 35 0D FF	
	2600K	8x 01 04 35 0E FF	
	2700K	8x 01 04 35 0F FF	
	2800K	8x 01 04 35 10 FF	
	2900K	8x 01 04 35 11 FF	
	3000K	8x 01 04 35 01 FF	
	3100K	8x 01 04 35 12 FF	
	3200K	8x 01 04 35 13 FF	
	3300K	8x 01 04 35 14 FF	
	3400K	8x 01 04 35 15 FF	
	3500K	8x 01 04 35 07 FF	
	3600K	8x 01 04 35 16 FF	
	3700K	8x 01 04 35 17 FF	
	3800K	8x 01 04 35 18 FF	
	3900K	8x 01 04 35 19 FF	
	4000K	8x 01 04 35 02 FF	
	4100K	8x 01 04 35 1A FF	
	4200K	8x 01 04 35 1B FF	
	4300K	8x 01 04 35 1C FF	
	4400K	8x 01 04 35 1D FF	
	4500K	8x 01 04 35 08 FF	
	4600K	8x 01 04 35 1E FF	
	4700K	8x 01 04 35 1F FF	
	4800K	8x 01 04 35 21 FF	

Command	Function	Command packet	Note
	4900K	8x 01 04 35 22 FF	
	5000K	8x 01 04 35 04 FF	
	5100K	8x 01 04 35 23 FF	
	5200K	8x 01 04 35 24 FF	
	5300K	8x 01 04 35 25 FF	
	5400K	8x 01 04 35 26 FF	
	5500K	8x 01 04 35 09 FF	
	5600K	8x 01 04 35 27 FF	
	5700K	8x 01 04 35 28 FF	
	5800K	8x 01 04 35 29 FF	
	5900K	8x 01 04 35 2A FF	
	6000K	8x 01 04 35 0A FF	
	6100K	8x 01 04 35 2B FF	
	6200K	8x 01 04 35 2C FF	
	6300K	8x 01 04 35 2D FF	
	6400K	8x 01 04 35 2E FF	
	6500K	8x 01 04 35 06 FF	
	6600K	8x 01 04 35 2F FF	
	6700K	8x 01 04 35 30 FF	
	6800K	8x 01 04 35 31 FF	
	6900K	8x 01 04 35 32 FF	
	7000K	8x 01 04 35 0B FF	
	7100K	8x 01 04 35 33 FF	
CAM_AWB Sensitivity	Low	8x 01 04 A9 00 FF	WB Sensitivity Setting
	Normal	8x 01 04 A9 01 FF	
	High	8x 01 04 A9 02 FF	
CAM _RGain	Reset	8x 01 04 03 00 FF	Manual Control of R Gain
	Up	8x 01 04 03 02 FF	
	Down	8x 01 04 03 03 FF	
	Direct	8x 01 04 43 00 00 0p 0q FF	pq: R Gain
CAM_ Bgain	Reset	8x 01 04 04 00 FF	Manual Control of B Gain
	Up	8x 01 04 04 02 FF	
	Down	8x 01 04 04 03 FF	
	Direct	8x 01 04 44 00 00 0p 0q FF	pq: B Gain
CAM_AE	Full Auto	8x 01 04 39 00 FF	Automatic Exposure mode
	Manual	8x 01 04 39 03 FF	Manual Control mode
	Shutter priority	8x 01 04 39 0A FF	Shutter Priority Automatic Exposure mode
	Iris priority	8x 01 04 39 0B FF	Iris Priority Automatic Exposure mode
	Bright	8x 01 04 39 0D FF	Bright mode
CAM_Shutter	Reset	8x 01 04 0A 00 FF	Shutter Setting
	Up	8x 01 04 0A 02 FF	
	Down	8x 01 04 0A 03 FF	

Command	Function	Command packet	Note
	Direct	8x 01 04 4A 00 00 0p 0q FF	pq: Shutter Position
CAM_Iris	Reset	8x 01 04 0B 00 FF	Iris Setting
	Up	8x 01 04 0B 02 FF	
	Down	8x 01 04 0B 03 FF	
	Direct	8x 01 04 4B 00 00 0p 0q FF	pq: Iris Position
CAM_Gain Limit	Reset	8x 01 04 0C 00 FF	Gain Limit Setting
	Up	8x 01 04 0C 02 FF	
	Down	8x 01 04 0C 03 FF	
	Gain Limit	8x 01 04 2C 0p FF	p: Gain Positon
CAM_Bright	Reset	8x 01 04 0D 00 FF	Bright Setting
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
	Direct	8x 01 04 4D 00 00 0p 0q FF	pq: Bright Positon
CAM_ExpComp	On	8x 01 04 3E 02 FF	Exposure Compensation ON/OFF
	Off	8x 01 04 3E 03 FF	
	Reset	8x 01 04 0E 00 FF	Exposure Compensation Amount Setting
	Up	8x 01 04 0E 02 FF	
	Down	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 00 00 0p 0q FF	pq: ExpComp Position
CAM_Back Light	On	8x 01 04 33 02 FF	Back Light Compensation
	Off	8x 01 04 33 03 FF	
CAM_WDRStrength	Reset	8x 01 04 21 00 FF	WDR Level Setting
	Up	8x 01 04 21 02 FF	
	Down	8x 01 04 21 03 FF	
	Direct	8x 01 04 51 00 00 00 0p FF	p: WDR Level Positon
CAM_NR	2D	8x 01 04 53 0p FF	P=0-8 0:OFF 8: Auto
	3D	8x 01 04 54 0p FF	P=0-8 0:OFF 8: Auto
CAM_Gamma		8x 01 04 5B 0p FF	p=0-4 0:0.45 1:0.48 2:0.50 3:0.55 4:0.63
CAM_Low-Light Mode	ON	8x 01 04 2D 01 FF	Low-Light Mode Setting
	OFF	8x 01 04 2D 00 FF	
CAM_Gain		8x 01 04 4C 00 00 0p 0q FF	Pq:0-14
CAM PresetSpeed		8x 01 01 0p FF	P:1-A
CAM_Flicker	OFF	8x 01 04 23 00 FF	OFF
	50HZ	8x 01 04 23 01 FF	50HZ
	60HZ	8x 01 04 23 02 FF	60HZ
CAM_Aperture	Reset	8x 01 04 02 00 FF	Aperture Control
	Up	8x 01 04 02 02 FF	
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain
CAM_Picture effect	B&W-Mode	8x 01 04 63 04 FF	Picture effect Setting
	OFF	8x 01 04 63 00 FF	

Command	Function	Command packet	Note
CAM_Memory	Reset	8x 01 04 3F 00 pq FF	pq: Memory Number(=0 to 254) Corresponds to 0 to 9 on the Remote Commander
	Set	8x 01 04 3F 01 pq FF	
	Recall	8x 01 04 3F 02 pq FF	
CAM_LR_Reverse	On	8x 01 04 61 02 FF	Image Flip Horizontal ON/OFF
	Off	8x 01 04 61 03 FF	
CAM_PictureFlip	On	8x 01 04 66 02 FF	Image Flip Vertical ON/OFF
	Off	8x 01 04 66 03 FF	
CAM_ColorSaturation	Direct	8x 01 04 49 00 00 00 0p FF	P=0-E 0:60% 1:70% 2:80% 3:90% 4:100% 5:110% 6:120% 7:130% 8:140% 9:150% A:160% B:160% C:180% D:190% E:200%
CAM_IDWrite		8x 01 04 22 0p 0q 0r 0s FF	pqrs: Camera ID (=0000 to FFFF)
IR_Receive	ON	8x 01 06 08 02 FF	IR(remote commander)receive On/Off
	OFF	8x 01 06 08 03 FF	
CAM_Setting Reset	Reset	8x 01 04 A0 10 FF	Reset Factory Setting
CAM_Brightness	Direct	8x 01 04 A1 00 00 0p 0q FF	pq: Brightness Position
CAM_Contrast	Direct	8x 01 04 A2 00 00 0p 0q FF	pq: Contrast Position
CAM_Flip	OFF	8x 01 04 A4 00 FF	Single Command For Video Flip
	Flip-H	8x 01 04 A4 01 FF	
	Flip-V	8x 01 04 A4 02 FF	
	Flip-HV	8x 01 04 A4 03 FF	
CAM_Video System	Set camera video system	8x 01 06 35 00 0p FF	1C:4KP60 1D:4KP59.94 1B:4KP50 19:4KP30 1E:4KP29.97 1A:4KP25 00:1080P60 0A:1080P59.94 01:1080P50 06:1080P30 0D:1080P29.97 07:1080P25 04:720P60 0C:720P59.94 05:720P50
Pan_tiltDrive	Up	8x 01 06 01 VV WW 03 01 FF	VV: Pan speed 0x01 (low speed) to 0x18 (high speed) WW: Tilt speed 0x01 (low speed) to 0x14 (high speed) YYYY: Pan Position ZZZZ: Tilt Position
	Down	8x 01 06 01 VV WW 03 02 FF	
	Left	8x 01 06 01 VV WW 01 03 FF	

Command	Function	Command packet	Note
	Right	8x 01 06 01 VV WW 02 03 FF	
	Upleft	8x 01 06 01 VV WW 01 01 FF	
	Upright	8x 01 06 01 VV WW 02 01 FF	
	DownLeft	8x 01 06 01 VV WW 01 02 FF	
	DownRight	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	Absolute Position	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	Relative Position	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	Home	8x 01 06 04 FF	
	Reset	8x 01 06 05 FF	
Pan-tiltLimitSet	Set	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W:1 UpRight 0:DownLeft YYYY: Pan Limit Position(TBD) ZZZZ: Tilt Limit Position(TBD)
	Clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	

7.2.4 Inquiry Command

Command	Function	Command packet	Note
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF	Off(Standby)
CAM_ZoomPosInq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_FocusAFModeInq	8x 09 04 38 FF	y0 50 02 FF	Auto Focus
		y0 50 03 FF	Manual Focus
		y0 50 04 FF	One Push mode
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_AFSensitivityInq	8x 09 04 58 FF	y0 50 01 FF	High
		y0 50 02 FF	Normal
		y0 50 03 FF	Low
CAM_AFZoneInq	8x 09 04 AA FF	y0 50 00 FF	Front
		y0 50 01 FF	Beting
		y0 50 02 FF	Meeting
		y0 50 03 FF	Education
		y0 50 04 FF	Moving
		y0 50 05 FF	Middle
CAM_WBModeInq	8x 09 04 35 FF	y0 50 00 FF	Auto
		y0 50 00 FF	Auto

Command	Function	Command packet	Note
		y0 50 05 FF	Manual
		y0 50 03 FF	One Push mode
		y0 50 05 FF	One Push Trigger
		y0 50 0C FF	2400K
		y0 50 0D FF	2500K
		y0 50 0E FF	2600K
		y0 50 0F FF	2700K
		y0 50 10 FF	2800K
		y0 50 11 FF	2900K
		y0 50 01 FF	3000K
		y0 50 12 FF	3100K
		y0 50 13 FF	3200K
		y0 50 14 FF	3300K
		y0 50 15 FF	3400K
		y0 50 07 FF	3500K
		y0 50 16 FF	3600K
		y0 50 17 FF	3700K
		y0 50 18 FF	3800K
		y0 50 19 FF	3900K
		y0 50 02 FF	4000K
		y0 50 1A FF	4100K
		y0 50 1B FF	4200K
		y0 50 1C FF	4300K
		y0 50 1D FF	4400K
		y0 50 08 FF	4500K
		y0 50 1E FF	4600K
		y0 50 1F FF	4700K
		y0 50 21 FF	4800K
		y0 50 22 FF	4900K
		y0 50 04 FF	5000K
		y0 50 23 FF	5100K
		y0 50 24 FF	5200K
		y0 50 25 FF	5300K
		y0 50 26 FF	5400K
		y0 50 09 FF	5500K
		y0 50 27 FF	5600K
		y0 50 28 FF	5700K
		y0 50 29 FF	5800K
		y0 50 2A FF	5900K
		y0 50 0A FF	6000K
		y0 50 2B FF	6100K
		y0 50 2C FF	6200K
		y0 50 2D FF	6300K

Command	Function	Command packet	Note
		y0 50 2E FF	6400K
		y0 50 06 FF	6500K
		y0 50 2F FF	6600K
		y0 50 30 FF	6700K
		y0 5031 FF	6800K
		y0 50 32 FF	6900K
		y0 50 0B FF	7000K
		y0 50 33 FF	7100K
CAM_AWBSensitivityInq	8x 09 04 A9 FF	y0 50 00 FF	Low
		y0 50 01 FF	Normal
		y0 50 02 FF	High
CAM_RGainInq	8x 09 04 43 FF	y0 50 00 00 0p 0q FF	pq: R Gain
CAM_BGainInq	8x 09 04 44 FF	y0 50 00 00 0p 0q FF	pq: B Gain
CAM_AEModeInq	8x 09 04 39 FF	y0 50 00 FF	Full Auto
		y0 50 03 FF	Manual
		y0 50 0A FF	Shutter priority
		y0 50 0B FF	Iris priority
		y0 50 0D FF	Bright
CAM_ShutterPosInq	8x 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: Shutter Position
CAM_IrisPosInq	8x 09 04 4B FF	y0 50 00 00 0p 0q FF	pq: Iris Position
CAM_Gain LimitInq	8x 09 04 2C FF	y0 50 0p FF	p: Gain Positon
CAM_ BrightPosiInq	8x 09 04 4D FF	y0 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompModeInq	8x 09 04 3E FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ExpCompPosInq	8x 09 04 4E FF	y0 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_BacklightModeInq	8x 09 04 33 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_WDRStrengthInq	8x 09 04 51 FF	y0 50 00 00 00 0p FF	p: WDR Strength
CAM_NRLevel(2D) Inq	8x 09 04 53 FF	y0 50 0p FF	P: 2DNRLevel
CAM_NRLevel(3D) Inq	8x 09 04 54 FF	y0 50 0p FF	P:3D NRLevel
CAM_FlickerModeInq	8x 09 04 55 FF	y0 50 0p FF	p: Flicker Settings(0: OFF, 1: 50Hz, 2:60Hz)
CAM_ApertureInq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffectModeInq	8x 09 04 63 FF	y0 50 00 FF	Off
		y0 50 04 FF	B&W
CAM_MemoryInq	8x 09 04 3F FF	y0 50 0p FF	p: Memory number last operated.
SYS_MenuModeInq	8x 09 06 06 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_LR_ReverseInq	8x 09 04 61 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_PictureFlipInq	8x 09 04 66 FF	y0 50 02 FF	On
		y0 50 03 FF	Off

Command	Function	Command packet	Note
CAM_ColorSaturationInq	8x 09 04 49 FF	y0 50 00 00 00 0p FF	p: Color Gain setting 0h (60%) to Eh (200%)
CAM_IDInq	8x 09 04 22 FF	y0 50 0p FF	Camera ID
IR_ReceiveInq	8x 09 06 08 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_BrightnessInq	8x 09 04 A1 FF	y0 50 00 00 0p 0q FF	pq: Brightness Position
CAM_ContrastInq	8x 09 04 A2 FF	y0 50 00 00 0p 0q FF	pq: Contrast Position
CAM_FlipInq	8x 09 04 A4 FF	y0 50 00 FF	Off
		y0 50 01 FF	Flip-H
		y0 50 02 FF	Flip-V
		y0 50 03 FF	Flip-HV
CAM_GammaInq	8x 09 04 5B FF	y0 50 0p FF	p: Gamma setting
CAM_VersionInq	8x 09 00 02 FF	y0 50 ab cd mn pq rs tu vw FF	ab cd : vender ID (0220) mn pq : model ID rs tu :ARM Version vw :reserve
VideoSystemInq	8x 09 06 23 FF	y0 50 0p FF	1C:4KP60 1D:4KP59.94 1B:4KP50 19:4KP30 1E:4KP29.97 1A:4KP25 00:1080P60 0A:1080P59.94 01:1080P50 06:1080P30 0D:1080P29.97 07:1080P25 04:720P60 0C:720P59.94 05:720P50
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	y0 50 ww zz FF	ww: Pan Max Speed zz: Tilt Max Speed
Pan-tiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	wwww: Pan Position zzzz: Tilt Position

Note:【x】in this chart means the device address to be operated, 【y】=【x + 8】

7.3 Pelco-P Protocol Command List

Function	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Up	0xA0	Address	0x00	0x08	Pan Speed	Tilt Speed	0xAF	XOR
Down	0xA0	Address	0x00	0x10	Pan Speed	Tilt Speed	0xAF	XOR
Left	0xA0	Address	0x00	0x04	Pan Speed	Tilt Speed	0xAF	XOR
Right	0xA0	Address	0x00	0x02	Pan Speed	Tilt Speed	0xAF	XOR

Upleft	0xA0	Address	0x00	0x0C	Pan Speed	Tilt Speed	0xAF	XOR
Upright	0xA0	Address	0x00	0x0A	Pan Speed	Tilt Speed	0xAF	XOR
DownLeft	0xA0	Address	0x00	0x14	Pan Speed	Tilt Speed	0xAF	XOR
DownRight	0xA0	Address	0x00	0x12	Pan Speed	Tilt Speed	0xAF	XOR
Zoom In	0xA0	Address	0x00	0x20	0x00	0x00	0xAF	XOR
Zoom Out	0xA0	Address	0x00	0x40	0x00	0x00	0xAF	XOR
Stop	0xA0	Address	0x00	0x00	0x00	0x00	0xAF	XOR
Focus Far	0xA0	Address	0x01	0x00	0x00	0x00	0xAF	XOR
Focus Near	0xA0	Address	0x02	0x00	0x00	0x00	0xAF	XOR
Set Preset	0xA0	Address	0x00	0x03	0x00	Preset ID	0xAF	XOR
Clear Preset	0xA0	Address	0x00	0x05	0x00	Preset ID	0xAF	XOR
Call Preset	0xA0	Address	0x00	0x07	0x00	Preset ID	0xAF	XOR
Query Pan Position	0xA0	Address	0x00	0x51	0x00	0x00	0xAF	XOR
Query Pan Position Response	0xA0	Address	0x00	0x59	Value High Byte	Value Low Byte	0xAF	XOR
Query Tilt Position	0xA0	Address	0x00	0x53	0x00	0x00	0xAF	XOR
Query Tilt Position Response	0xA0	Address	0x00	0x5B	Value High Byte	Value Low Byte	0xAF	XOR
Query Zoom Position	0xA0	Address	0x00	0x55	0x00	0x00	0xAF	XOR
Query Zoom Position Response	0xA0	Address	0x00	0x5D	Value High Byte	Value Low Byte	0xAF	XOR

7.4 Pelco-D Protocol Command List

Function	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Up	0xFF	Address	0x00	0x08	Pan Speed	Tilt Speed	SUM
Down	0xFF	Address	0x00	0x10	Pan Speed	Tilt Speed	SUM
Left	0xFF	Address	0x00	0x04	Pan Speed	Tilt Speed	SUM
Right	0xFF	Address	0x00	0x02	Pan Speed	Tilt Speed	SUM
Upleft	0xFF	Address	0x00	0x0C	Pan Speed	Tilt Speed	SUM
Upright	0xFF	Address	0x00	0x0A	Pan Speed	Tilt Speed	SUM
DownLeft	0xFF	Address	0x00	0x14	Pan Speed	Tilt Speed	SUM
DownRight	0xFF	Address	0x00	0x12	Pan Speed	Tilt Speed	SUM
Zoom In	0xFF	Address	0x00	0x20	0x00	0x00	SUM
Zoom Out	0xFF	Address	0x00	0x40	0x00	0x00	SUM
Focus Far	0xFF	Address	0x00	0x80	0x00	0x00	SUM
Focus Near	0xFF	Address	0x01	0x00	0x00	0x00	SUM
Stop	0xFF	Address	0x00	0x00	0x00	0x00	SUM
Set Preset	0xFF	Address	0x00	0x03	0x00	Preset ID	SUM
Clear Preset	0xFF	Address	0x00	0x05	0x00	Preset ID	SUM
Call Preset	0xFF	Address	0x00	0x07	0x00	Preset ID	SUM
Query Pan Position	0xFF	Address	0x00	0x51	0x00	0x00	SUM
Query Pan Position Response	0xFF	Address	0x00	0x59	Value High Byte	Value Low Byte	SUM
Query Tilt Position	0xFF	Address	0x00	0x53	0x00	0x00	SUM
Query Tilt Position Response	0xFF	Address	0x00	0x5B	Value High Byte	Value Low Byte	SUM
Query Zoom Position	0xFF	Address	0x00	0x55	0x00	0x00	SUM
Query Zoom Position Response	0xFF	Address	0x00	0x5D	Value High Byte	Value Low Byte	SUM

7.5 Terms & Definitions

●**RCA:** Connector used primarily in consumer AV equipment for both audio and video. The RCA connector was developed by the Radio Corporation of America.

●**BNC:** Stands for Bayonet Neill-Concelman. A cable connector used extensively in television (named for its inventors). A cylindrical bayonet connector that operates with a twist-locking motion.

●**CVBS:** CVBS or Composite video, is an analog video signal without audio. Most commonly CVBS is used for transmission of standard definition signals. In consumer applications the connector is typically RCA type, while in professional applications the connector is BNC type.

●**YPbPr:** Used to describe the colour space for progressive-scan. Otherwise known as component video.

●**VGA:** Video Graphics Array. VGA is an analog signal typically used on earlier computers. The signal is non-interlaced in

modes 1, 2, and 3 and interlaced when using in mode.

●**DVI:** Digital Visual Interface. The digital video connectivity standard that was developed by DDWG (Digital Display Work Group). This connection standard offers two different connectors: one with 24 pins that handles digital video signals only, and one with 29 pins that handles both digital and analog video.

●**SDI:** Serial Digital Interface. Standard definition video is carried on this 270 Mbps data transfer rate. Video pixels are characterized with a 10-bit depth and 4:2:2 color quantization. Ancillary data is included on this interface and typically includes audio or other metadata. Up to sixteen audio channels can be transmitted. Audio is organised into blocks of 4 stereo pairs. Connector is BNC.

●**HD-SDI:** High-definition serial digital interface (HD-SDI), is standardized in SMPTE 292M this provides a nominal data rate of 1.485 Gbit/s.

● **12G-SDI:** Standardized in SMPTE 424M, consists of a single 2.970 Gbit/s serial link that allows replacing dual link HD-SDI.

●**6G-SDI:** Standardized in SMPTE ST-2081 released in 2015, 6Gbit/s bitrate and able to support 2160p@30.

●**12G-SDI:** Standardized in SMPTE ST-2082 released in 2015, 12Gbit/s bitrate and able to support 2160p@60.

●**U-SDI:** Technology for transmitting large-volume 8K signals over a single cable. a signal interface called the ultra high definition signal/data interface (U-SDI) for transmitting 4K and 8K signals using a single optical cable. The interface was standardized as the SMPTE ST 2036-4.

●**HDMI:** High Definition Multimedia Interface: An interface used for the transmission of uncompressed high definition video, up to 8 channels of audio, and control signals, over a single cable.

●**HDMI 1.3:** released on June 22 2006, and increased the maximum TMDS clock to 340 MHz (10.2 Gbit/s). Support resolution 1920 × 1080 at 120 Hz or 2560 × 1440 at 60 Hz). It added support for 10 bpc, 12 bpc, and 16 bpc color depth (30, 36, and 48 bit/px), called deep color.

●**HDMI 1.4 :** released on June 5, 2009, added support for 4096 × 2160 at 24 Hz, 3840 × 2160 at 24, 25, and 30 Hz, and 1920 × 1080 at 120 Hz. Compared to HDMI 1.3, 3 more features added which are HDMI Ethernet Channel (HEC) , audio return channel (ARC),3D Over HDMI, a new Micro HDMI Connector, an expanded set of color spaces.

●**HDMI 2.0:** Released on September 4, 2013 increases the maximum bandwidth to 18.0 Gbit/s. Other features of HDMI 2.0 include up to 32 audio channels, up to 1536 kHz audio sample frequency, the HE-AAC and DRA audio standards, improved 3D capability, and additional CEC functions.

●**HDMI 2.0a:** Was released on April 8, 2015, and added support for High Dynamic Range (HDR) video with static metadata.

●**HDMI 2.0b:** Was released March, 2016, support for HDR Video transport and extends the static metadata signaling to include Hybrid Log-Gamma (HLG).

●**HDMI 2.1:** Released on November 28, 2017. It adds support for higher resolutions and higher refresh rates, Dynamic HDR including 4K 120 Hz and 8K 120 Hz.

●**DisplayPort:** A VESA standard interface primarily for video, but also for audio, USB and other data. DisplayPort (orDP) is backwards compatible with HDMI, DVI and VGA.

●**DP 1.1:** Was ratified on 2 April 2007, and version 1.1a was ratified on 11 January 2008. DisplayPort 1.1 allow a maximum bandwidth of 10.8 Gbit/s (8.64 Gbit/s data rate) over a standard 4-lane main link, enough to support 1920x1080@60Hz.

●**DP 1.2:** Introduced on 7 January 2010, effective bandwidth to 17.28 Gbit/s support increased resolutions, higher refresh rates, and greater color depth, maximum resolution 3840 × 2160@60Hz.

●**DP 1.4:** Publish on 1 Mar, 2016.overall transmission bandwidth 32.4 Gbit/s ,DisplayPort 1.4 adds support for Display Stream Compression 1.2 (DSC), DSC is a "visually lossless" encoding technique with up to a 3:1 compression ratio. Using DSC with HBR3 transmission rates, DisplayPort 1.4 can support 8K UHD (7680 × 4320) at 60 Hz or 4K UHD (3840 × 2160) at 120 Hz with 30 bit/px RGB color and HDR. 4K at 60 Hz 30 bit/px RGB/HDR can be achieved without the need for DSC.

●**Multi-mode Fiber:** Fibers that support many propagation paths or transverse modes are called multi-mode fibers, generally have a wider core diameter and are used for short-distance communication links and for applications where high power must be transmitted.

●**Single-mode Fiber:** Fiber that support a single mode are called single-mode fibers. Single-mode fibers are used for most communication links longer than 1,000 meters (3,300 ft).

●**SFP:** Small form-factor pluggable, is a compact, hot-pluggable network interface module used for both telecommunication and data communications applications.

●**Optical Fiber Connector:** Terminates the end of an optical fiber, and enables quicker connection and disconnection than splicing. The connectors mechanically couple and align the cores of fibers so light can pass. 4 most common types of optical fiber connectors are SC, FC, LC,ST.

●**SC:** (Subscriber Connector), also known as the square connector was also created by the Japanese company – Nippon Telegraph and Telephone. SC is a push-pull coupling type of connector and has a 2.5mm diameter. Nowadays, it is used mostly in single mode fiber optic patch cords, analog, GBIC, and CATV. SC is one of the most popular options, as its simplicity in design comes along with great durability and affordable prices.

●**LC：** (Lucent Connector) is a small factor connector (uses only a 1.25mm ferrule diameter) that has a snap coupling mechanism. Because of its small dimensions, it is the perfect fit for high-density connections, XFP, SFP, and SFP+ transceivers.

●**FC:** (Ferrule Connector) is a screw type connector with a 2.5mm ferrule. FC is a round shaped threaded fiber optic connector,mostly used on Datacom, telecom, measurement equipment, single-mode laser.

●**ST:** (Straight Tip) was invented by AT&T and uses a bayonet mount along with a long spring-loaded ferrule to support the fiber.

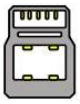
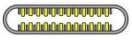
●**USB:** Universal Serial Bus is a standard that was developed in the mid-1990s that defines cables, connectors and communication protocols. This technology is designed to allow a connection, communication and power supply for peripheral devices and computers.

●**USB 1.1:** Full–Bandwidth USB, specification was the first release to be widely adopted by the consumer market. This specification allowed for a maximum bandwidth of 12Mbps.

●**USB 2.0:** Or Hi–Speed USB, specification made many improvements over USB 1.1. The main improvement was an increase in bandwidth to a maximum of 480Mbps.

●**USB 3.2:** Super Speed USB with 3 varieties of 3.2 Gen 1(original name USB 3.0), 3.2Gen 2(original name USB 3.1), 3.2 Gen 2x2 (original name USB 3.2) with speed up to 5Gbps,10Gbps,20Gbps respectively.

USB version and connectors figure:

	Type A	Type B	Mini A	Mini B	Micro-A	Micro-B	Type C
USB 2.0							
USB 3.0							
USB 3.1&3.2							

●**NTSC:** The colour video standard used in North America and some other parts of the world created by the National Television Standards Committee in the 1950s. NTSC utilizes an interlaced video signals.

●**PAL:** Phase Alternate Line. A television standard in which the phase of the colour carrier is alternated from line to line. It takes four full images (8 fields) for the colour-to-horizontalimages (8 fields) for the colour-to-horizontal phase relationship to return to the reference point. This alternation helps cancel out phase errors. For this reason, the hue control is not needed on a PAL TV set. PAL, is widely used in needed on a PAL TV set. PAL, is widely used in Western Europe, Australia, Africa, the Middle East, and Micronesia. PAL uses 625-line, 50-field (25 fps) composite colour transmission system.

●**SMPTE:** Society of Motion image and Television Engineers. A global organization, based in the United States, that sets standards for baseband visual communications. This includes film as well as video and television standards.

●**VESA:** Video Electronics Standards Association. An organization facilitating computer graphics through standards.

●**HDCP:** High-bandwidth Digital Content Protection (HDCP) was developed by Intel Corporation an is in wide use for

protection of video during transmission between devices.

●**HDBaseT:** A video standard for the transmission of uncompressed video (HDMI signals) and related features using Cat 5e/Cat6 cabling infrastructure.

●**ST2110:** A SMPTE developed standard, ST2110 describes how to send digital video over and IP networks. Video is transmitted uncompressed with audio and other data in a separate streams. SMPTE2110 is intended principally for broadcast production and distribution facilities where quality and flexibility are more important.

●SDVoE**:** Software Defined Video over Ethernet (SDVoE) is a method for transmission, distribution and management AV signals using a TCP/IP Ethernet infrastructure for transport with low latency. SDVoE is commonly used in integration applications.

●**Dante AV:** The Dante protocol was developed for and widely adopted in audio systems for the transmission of uncompressed digital audio on IP based networks. The more recent Dante AV specification includes support for digital video.

●**NDI:** Network Device interface (NDI) is a software standard developed by NewTek to enable video-compatible products to communicate, deliver, and receive broadcast quality video in a high quality, low latency manner that is frame-accurate and suitable for switching in a live production environment over TCP (UDP) Ethernet based networks. NDI is commonly found in broadcast applications.

●**RTMP:** Real-Time Messaging Protocol (RTMP) was initially a proprietary protocol developed by Macromedia (now Adobe) for streaming audio, video and data over the Internet, between a Flash player and a server.

●**RTSP:** The Real Time Streaming Protocol (RTSP) is a network control protocol designed for use in entertainment and communications systems to control streaming media servers. The protocol is used for establishing and controlling media sessions between end points.

●**MPEG:** Moving Picture Experts Group is a working group formed from ISO and IEC developing standards that allow audio/video digital compression and Transmission.

●**H.264:** Also known as AVC (Advanced Video Coding) or MPEG-4i is a common video compression standard. H.264 was standardized by the ITU-T Video Coding Experts Group (VCEG) together with the ISO/IEC JTC1 Moving Picture Experts Group (MPEG).

●**H.265:** Also known as **HEVC** (High Efficiency Video Coding)H.265 is the successor to the widely used H.264/AVC digital video coding standard. Developed under the auspices of ITU, resolutions up to 8192x4320 may be compressed.

●**API:** An Application Programming Interface (API) provides a predefined function which allows access capabilities and features or routines via a software or hardware, without accessing source code or understanding the details of inner working mechanism. An API call may execute a function and/or provide data feedback/report.

●**DMX512:** The communication standard developed by USITT for entertainment and digital lighting systems.The wide

adoption of the Digital Multiplex (DMX) protocol has seen the protocol used for a wide range of other devices including video controllers. DMX512 is delivered over cable of 2 twisted pairs with 5pin XLR cables for connection.

●**ArtNet:** An ethernet protocol based on TCP/IP protocol stack, mainly used in entertainment/events applications. Built on the DMX512 data format, ArtNet enables multiple “universes” of DMX512 to be transmitted using ethernet networks for transport.

●**MIDI:** MIDI is the abbreviation of Musical Instrument Digital Interface. As the name indicates the protocol was developed for communication between electronical musical instruments and latterly computers. MIDI instructions are triggers or commands sent over twisted pair cables, typically using 5pin DIN connectors.

●**OSC:** The principle of Open Sound Control (OSC) protocol is for networking sound synthesizers, computers, and multimedia devices for musical performance or show control. As with XML and JSON, the OSC protocol allows sharing data. OSC is transported via UDP packets between devices connected on an Ethernet.

●**Brightness:** Usually refers to the amount or intensity of video light produced on a screen without regard to colour. Sometimes called black level.

●**Contrast Ratio:** The ratio of the high light output level divided by the low light output level. In theory, the contrast ratio of the television system should be at least 100:1, if not 300:1. In reality, there are several limitations. Well-controlled viewing conditions should yield a practical contrast ratio of 30:1 to 50:1.

●**Colour Temperature:** The colour quality, expressed in degrees Kelvin (K), of a light source. The higher the colour temperature, the bluer the light. The lower the temperature, the redder the light. Benchmark colour temperature for the A/V industry include 5000°K, 6500°K, and 9000°K.

●**Saturation:** Chroma, Chroma gain. The intensity of the colour, or the extent to which a given colour in any image is free from white. The less white in a colour, the truer the colour or the greater its saturation. Saturation is the amount of pigment in a colour, and not the intensity.

●**Gamma:** The light output of a CRT is not linear with respect to the voltage input. The difference between what you should have and what is actually output is known as gamma.

●**Frame:** In interlaced video, a frame is one complete image.A video frame is made up of two fields, or two sets of interlaced lines. In a film, a frame is one still image of a series that makes up a motion image.

●**Genlock:** Allows synchronisation of otherwise video devices. A signal generator provides a signal pulses which connected devices can reference. Also see Black Burst and Color Burst.

●**Blackburst:** The video waveform without the video elements.It includes the vertical sync, horizontal sync, and the Chroma burst information. Blackburst is used to synchronize video equipment to align the video output.

●**Colour Burst:** In colour TV systems, a burst of subcarrier frequency located on the back part of the composite video signal. This serves as a colour synchronizing signal to establish a frequency and phase reference for the Chroma signal.

Colour burst is 3.58 MHz for NTSC and 4.43 MHz for PAL.

●**Colour Bars：** A standard test pattern of several basic colours (white, yellow, cyan, green, magenta, red, blue, and black) as a reference for system alignment and testing. In NTSC video, the most commonly used colour bars are the SMPTE standard colour bars. In PAL video, the most commonly used colour bars are eight full field bars. On computer monitors the most commonly used colour bars are two rows of reversed colour bars

●**Seamless Switching:** A feature found on many video switchers. This feature causes the switcher to wait until the vertical interval to switch. This avoids a glitch (temporary scrambling) which often is seen when switching between sources.

●**Scaling:** A conversion of a video or computer graphic signal from a starting resolution to a new resolution. Scaling from one resolution to another is typically done to optimize the signal for input to an image processor, transmission path or to improve its quality when presented on a particular display.

●**PIP:** Picture-In-Picture. A small image within a larger image created by scaling down one of image to make it smaller. Other forms of PIP displays include Picture-By-Picture (PBP) and Picture- With-Picture (PWP), which are commonly used with 16:9 aspect display devices. PBP and PWP image formats require a separate scaler for each video window.

●**HDR:** is a high dynamic range (HDR) technique used in imaging and photography to reproduce a greater dynamic range of luminosity than what is possible with standard digital imaging or photographic techniques. The aim is to present a similar range of luminance to that experienced through the human visual system.

●**UHD:** Standing for Ultra High Definition and comprising 4K and 8K television standards with a 16:9 ratio, UHD follows the 2K HDTV standard. A UHD 4K display has a physical resolution of 3840x2160 which is four times the area and twice both the width and height of a HDTV/FullHD (1920x1080) video signal.

●**EDID:** Extended Display Identification Data. EDID is a data structure used to communicate video display information, including native resolution and vertical interval refresh rate requirements, to a source device. The source device will then output the provided EDID data, ensuring proper video image quality.

7.6 Revision History

The table below lists the changes to the User Manual.

Version	Date	ECO#	Description	Editor
V1.0	2025-06-10	0000#	First release	Alyssa