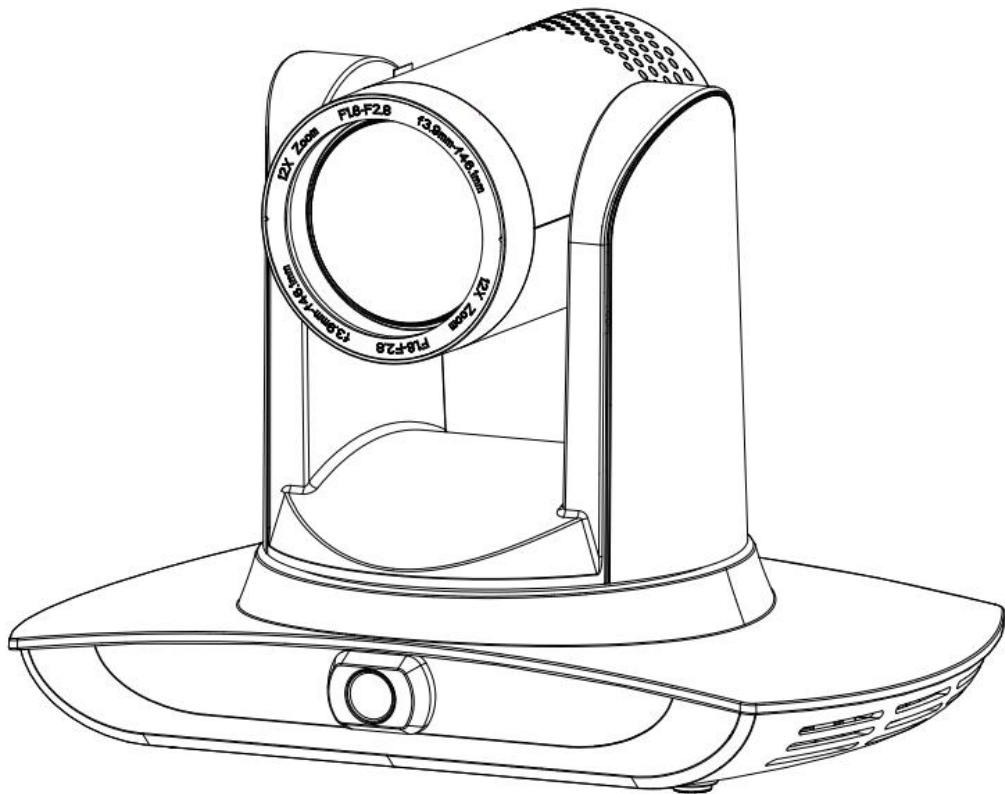




Prestel HD-LTC2xxHSU3

Intelligent Binocular Tracking
Camera - Teacher's Edition



USER MANUAL

Preface




This manual is to ensure that the user can use the product properly and avoid danger while operating. Before using this product, please read the user manual carefully and keep it properly for future reference.

Overview

This manual is about Educational Intelligent Binocular Tracking Camera operation.

Graphic Symbols

Description of graphic symbols used in this manual:

Symbols	Description
 Illustration	This symbol indicates that the words are clarification or supplement to this article.
 Caution	This symbol indicates that negligence of the instructions may lead to mishandling that may cause injury or property damage.
 Danger	This symbol indicates a risk that may result in damage to this machine or documents. Follow the instructions to avoid property damage.

Attention

This manual details functions, installation, operation principles and methods of Educational Intelligent Binocular Tracking Camera. Please read this manual carefully before installation and use.

Precautions

This product can only be used in the specified conditions in order to avoid any damage to the camera

- 1) Do not expose the product to rain or moisture ;
- 2) To prevent the risk of electric shock, do not open the case. Installation and maintenance should only be carried out by qualified technicians ;
- 3) Do not use the product beyond the specified temperature, humidity or power supply specifications ;
- 4) Please use a soft dry cloth to clean the camera. If the camera is very dirty, clean it with diluted neutral detergent; do not use any type of solvents, which may damage the surface ;

Electrical Safety

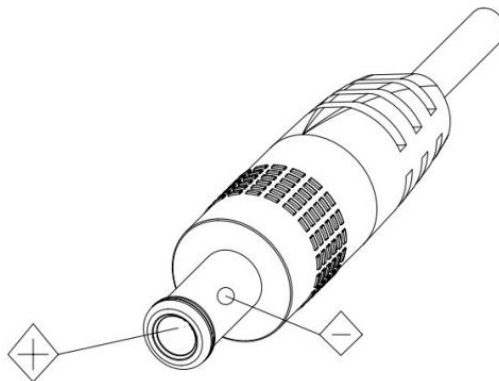
Installation and use of this product must strictly comply with local electrical safety standards.

Transportation

Avoid any stress, vibration, or moisture during transportation, storage, installation and operation.

Power supply polarity

This product applies DC 12V power supply. Power plug polarity is shown as follows :



Install with caution

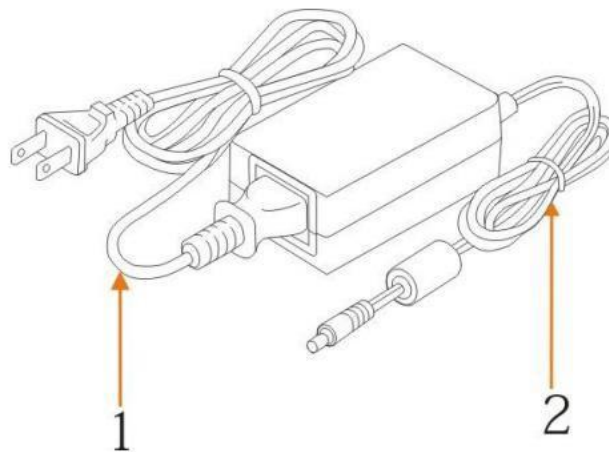
- 1) Do not rotate the camera head violently, otherwise it may cause mechanical malfunction ;
- 2) This product should be placed on a stable desktop or other horizontal surfaces. Do not install the product obliquely, otherwise it may display inclined image ;
- 3) When installing the camera on TV or personal computer, use four double faced adhesive pads at the bottom for fixing ;
- 4) This product shell is made of organic materials. Do not expose it to any liquid, gas or solids which may corrode the shell ;
- 5) During installation, ensure that there are no obstacles within rotation range of the holder ;
- 6) Do not power on before finishing installation ;

Do Not Dismantle Camera

We are not responsible for any unauthorized modification or dismantling.

Magnetic Interference

Electromagnetic fields at specific frequencies may affect the video image. This product is Class A. It may cause radio interference in household application. Appropriate measure is required.



If it is needed to extend power line of the camera, extend it from terminal 1 (220V/110V) rather than terminal 2 (DC12V), otherwise it will prevent the device from functioning!

Contents

1.	System overview	6
	1.1 System introduction	6
	1.2 Product Features	6
	1.3 Technical Specification	8
2.	Interface	12
3.	Dimensions	13
4.	System connection	14
	4.1 Installation layout	14
	4.2 System wiring	15
5.	IE Login and Tracking Setup Procedure	16
	5.1 Connection mode	16
	5.2 IE Login	18
	5.3 IE Preview	18
	5.4 IE Configuration	18
	5.4.1 Audio Configuration	19
	5.4.2 Video Configuration	19
	5.4.3 Network Configuration	25
	5.4.4 System Configuration	27
	5.5 Logout	29
	5.6 Configure Tracking Parameters	30
	5.6.1 Teacher's Edition Tracking Configuration	30
	5.6.2 Student's Edition Tracking Configuration	36
6	Recording Host Connection Instructions	40
	6.1 Teacher's Tracking Camera Setup	40
	6.1.1 Auto tracking control	40
	6.1.2 Action Code Docking	40
	6.1.3 Internal Live Streaming Integration	42
	6.2 Student's Tracking Camera Setup	44
	6.2.1 Auto tracking control	44

6.2.2	Action Code Docking	45
6.2.3	Internal Live Streaming Integration	46
7	Description of remote control	48
7.1	Remote Control Key Introduction	48
7.2	Use of remote control	49
8	Menu Setting	51
8.1	Main Menu	51
8.2	System parameter settings	52
8.3	Camera parameter settings	52
8.4	P/T/Z	56
8.5	Video format	56
8.6	Version	57
8.7	Restore default	57
9	VISCA protocol command list	58
10	Pelco-D protocol command list	63
11	Pelco-P protocol command list	64
12	Maintenance and troubleshooting	65
12.1	Maintenance	65
12.2	Troubleshooting	65

1. System overview

1.1 System introduction

Teaching tracking camera system solution is a dedicated smart camera solution leading in international education information industry.

Teaching tracking camera products feature built-in high speed processor and advanced image processing and analytical algorithm, which allows it to track and detect teachers, students and blackboard-writing accurately and quickly. It fully satisfies all scenario demand by recorded broadcasting of teaching and remote interactive teaching.

Teaching tracking camera products adopt advanced ISP processing technique and algorithm, producing vivid images which feature balanced brightness, distinct layering, high definition and color reducibility.

Teaching tracking camera products are characterized by improved function, high performance, reliable operation, simple use and easy maintenance.

1.2 Product Features

- **Integrated Design:** Built-in panoramic camera, achieving the integration of panoramic camera and tracking camera;
- **Intelligent Teaching Tracking:** Built-in advanced image recognition and tracking algorithms, achieving fast, stable, and accurate tracking of targets without the need for any additional positioning cameras or tracking hosts;
- **Full-frame Image Recognition:** Image detection is performed on every frame, with high sensitivity in image recognition. In complex environments, it can accurately differentiate between people and backgrounds, ensuring accurate tracking and excluding interference caused by background changes. Even when multiple moving targets are present, it can still accurately track the correct target with an extremely low target loss rate;
- **High immunity from interference:** More diversified and flexible recognition shield settings ensure that once tracking target is locked, it will not be affected by other moving object or projector;
- **Stable tracking:** Movement sensitivity is adjustable. When tracking slight movement of target or hand movement, it will not cause wrong operation of the camera;
- **Self-adaptive image:** The tracking camera zooms depending on distance to target so that the visual image maintains proper size and scale;

- **High environmental suitability:** Tracking result will not be affected by classroom size, shape or seat arrangement;
- **Super wide dynamic exposure:** It solves the issue that tracking object dims in strong light such as projector;
- **Multiple Tracking Modes:** Supports real-time tracking, movie tracking, and area tracking. Switch between multiple tracking modes;
- **Full HD Image:** Uses a high-quality 1/2.8-inch image sensor with a maximum resolution of up to 1920x1080 and a high output frame rate of up to 60 frames per second;
- **Undistorted Lens:** The teacher's camera uses a 12X optical zoom lens, and the student's camera uses a 20X optical zoom lens, providing a wide undistorted viewing angle;
- **Low Noise and High SNR:** Super high SNR image is achieved with low noise CMOS, maintaining clean and clear images even in extremely low light conditions;
- **Multiple Audio/Video Compression Standards:** Support for H.264/H.265 Video compression, and AAC、MP3、G.711A audio compression;
- **Multiple Video Output Interfaces:** Support HDMI、SDI、USB3.0 and LAN ((100 Mbit/s) Multiple interface modes to output video;
- **Multiple Network Protocol:** Support ONVIF、GB/T28181、RTSP、RTMP protocols; Support RTMP push mode, easy to be connected to streaming server (Wowza、FMS); Support RTP multicast mode; Support network full command VISCA control protocol.
- **Multiple Control Protocols:** Support VISCA、PELCO-D、PELCO-P protocols, Support automatic identification protocols;
- **Support PoE:** The use of a single Ethernet cable enables simultaneous transmission of power, control, and video signals, simplifying wiring and installation;
- **Quiet Pan / Tilt Movement:** With high accuracy step driving motor, camera can pan / tilt extremely quiet and smooth;
- **Flexible Installation:** Various installation options are available. The teacher's camera supports both Wall mount and ceiling mount, while the student's camera must be Wall mount;
- **Wide Application:** Suitable for teaching recording, remote interactive teaching, and other applications.

1.3 Technical Specification

Table1-3 Technical Parameter

Parameter/Model	Teacher Tracking Camera	Student Tracking Camera
Tracking Camera Lens Parameters		
Image Sensor	1/2.8 inch high quality HD CMOS sensor	
Effective Pixels	2.07 megapixel、16: 9	
Video format	SDI、HDMI: 1080P60/50/30/25/59.94/29.97 720P60/50 /59.94 U3: YUY2/NV12 : 1920×1080/1280×720/1024×576/800×600/800×448/640×360/ 640×480/480×270/320×180@ 30/25/20/15/10/5fps; MJPEG/H.264 : 1920×1080/1600×896/1280×720/1024×576/960×540/800×600 /800×448/720×576/720×480/640×360/640×480/480×270/352× 288/320×240@30/25/20/15/10/5fps; LAN: H264:1920*1080P@30/25/20/15/10/5fps; 1280*720P@30/25/20/15/10/5fps; 640*480@30/25/20/15/10/5fps;	
Optical Zoom	12X f = 4.1~49.2mm	20X f = 5~91.5mm
Viewing Angle	7.5° (N) ~78.4° (W)	3.9° (N) ~67.4° (W)
Iris	F1.8~F2.68	F1.8 ~ F2.9
Digital Zoom	X10	
Minimum Illumination	0.5Lux(F1.8, AGC ON)	

DNR	2D & 3D
White Balance	Auto/Manual/One-push /3000K/3500K/4000K/4500K/5000K/5500K/6000K/6500K/7000K
Focus	Auto/Manual/One-push
Iris Mode	Auto/Manual
Electronic Shutter	Auto/Manual
BLC	On/off
Dynamic Range	Off, Dynamic Level Adjustment
Video Adjustment	Brightness, Chromaticity, Saturation, Contrast, Sharpness, Gamma Curve
SNR	>55dB
Video Compression Format	H.264、H.265、MJPEG、YUY2、NV12
Audio Compression Format	AAC、MP3、G.711A
Network Protocols	RTSP、RTMP、ONVIF、GB/T28181 and IP VISCA
Control protocol	Protocol: VISCA/Pelco-D/Pelco-P; Baudrate: 115200/38400/9600/4800/2400
Panoramic camera lens parameters	
Image Sensor	1/2.8 inch high quality HD CMOS sensor
Effective Pixel	2.07 megapixel
lens	Fixed focus
Focus Distance	3.24mm
Aperture	F=2.2

Field Angle (D/H/V)	88°\80°\51°
PTZ Parameter	
Pan Move	-170°~+170°
Tilt Move	-30°~+90°
Pan Speed	0.1 ~100°/s
Tilt Speed	0.1~45°/s
Preset Speed	Pan 100°/s, Tilt: : 45°/s
Preset Quantity	Up to 255 preset (10 via remote control)

Interface	
Video Output	1X HDMI2.0 interface; 1X 3G-SDI interface; 1X USB3.0 interface; 1X LAN interface:100 Mbps Ethernet port 10/100M BASE-TX) , supports POE (802.af) ;
Audio Input	Dual channel 3.5mm linear input;
Control Jacks	1X RS485/RS232: 5pin Phoenix Head;
Power Interface	Input AC110V-AC220V Output DC12V/2.5A
Power Switch	Support

Other Parameter	
Storage Temperature	-10℃~+70℃
Storage Humidity	20%~95%
Working Temperature	-10℃~+50℃
Working Humidity	20%~80%
Dimension	253.9mmX179mmX144.7mm

Weight	1.50kg
Environment	Indoors
Supplied Accessory	12V/2.5A Power Adapter、RS232 Control Cable、USB Cable、Remote Control、User Manual
Optional Accessory	Mounting Bracket

2.Interface

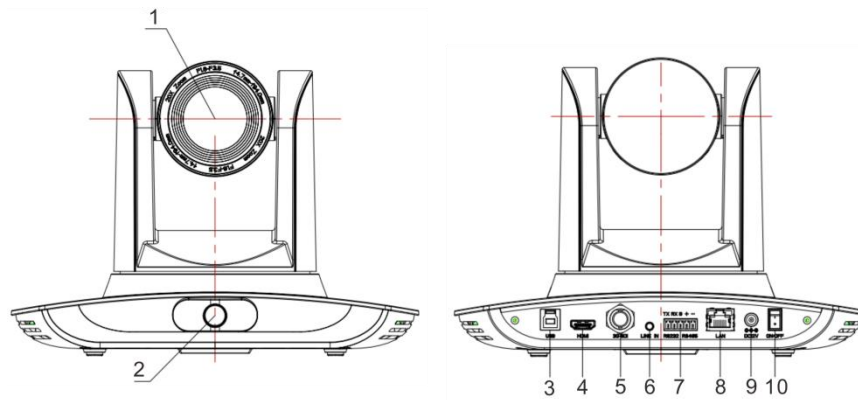


Figure1.1 Interface Diagram

Interface:

- | | | |
|--------------------------|------------------|--------------------|
| 1、 Close-up Lens | 5、 SDI Output | 9、 Power interface |
| 2、 panoramic Lens | 6、 A-IN | 10、 Power Switch |
| 3、 USB3.0 Output | 7、 RS232/ RS485 | |
| 4、 HDMI Output Interface | 8、 LAN Interface | |

3. Dimensions

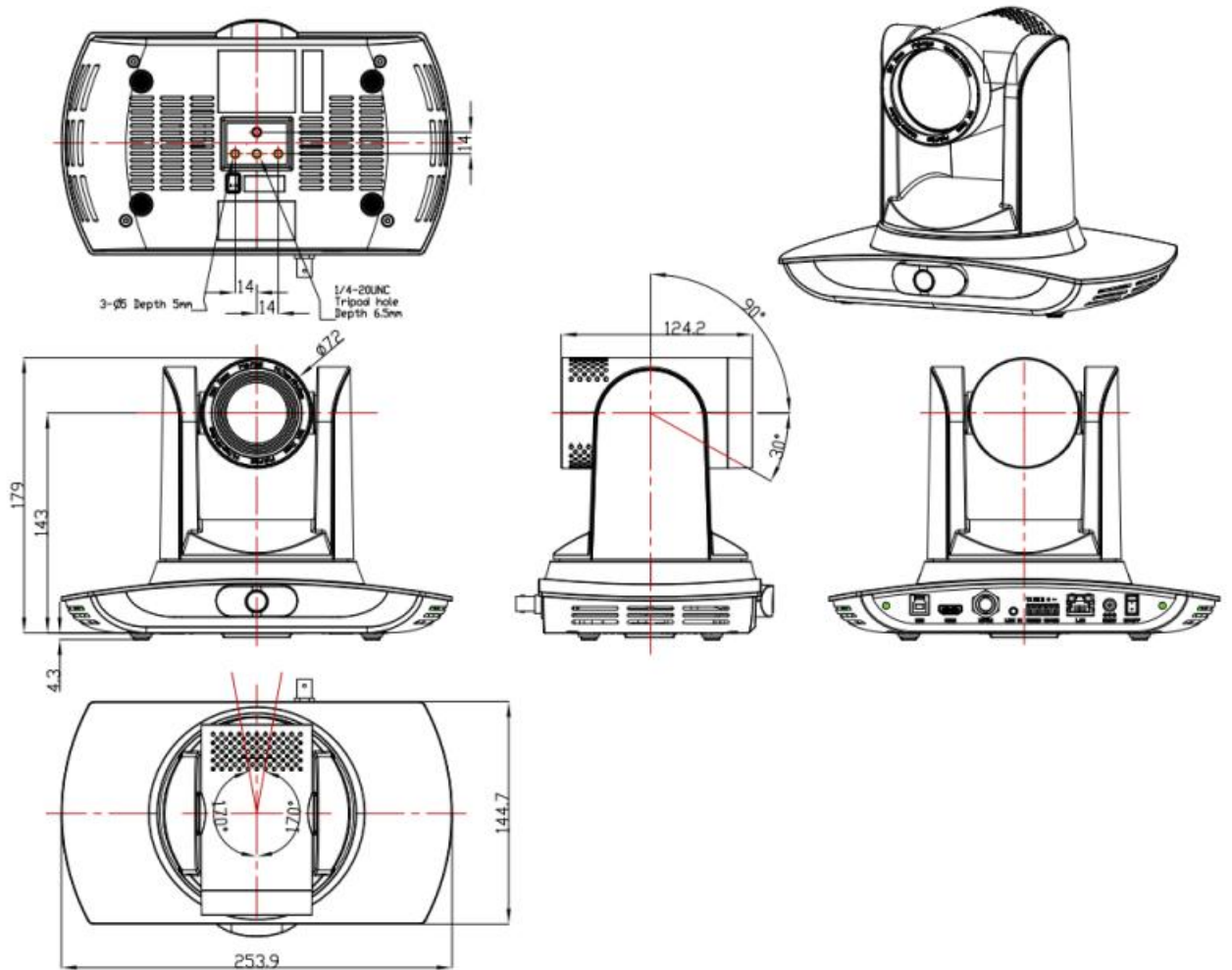
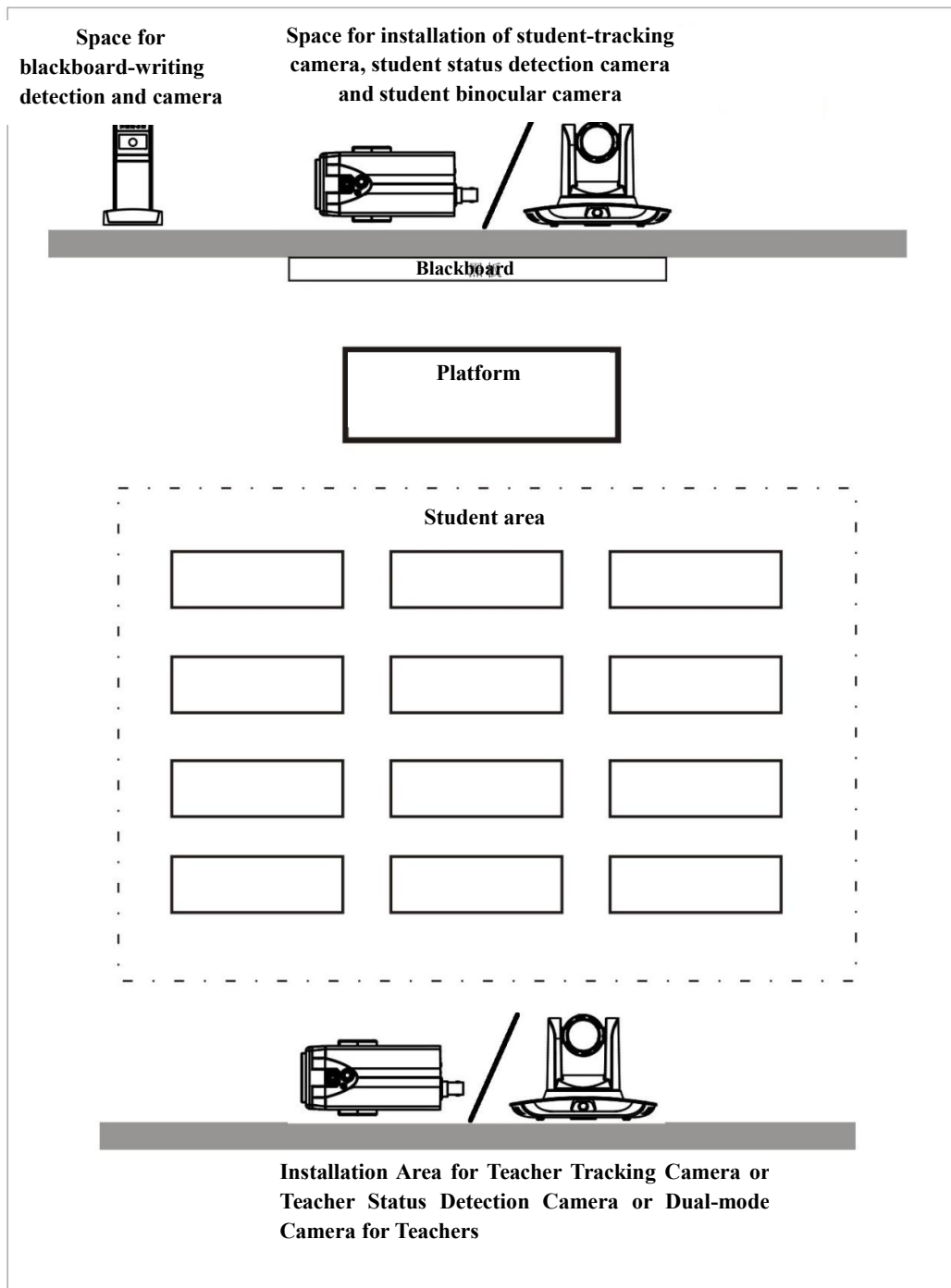


Figure3-1 Dimension

4. System connection

4.1 Installation layout

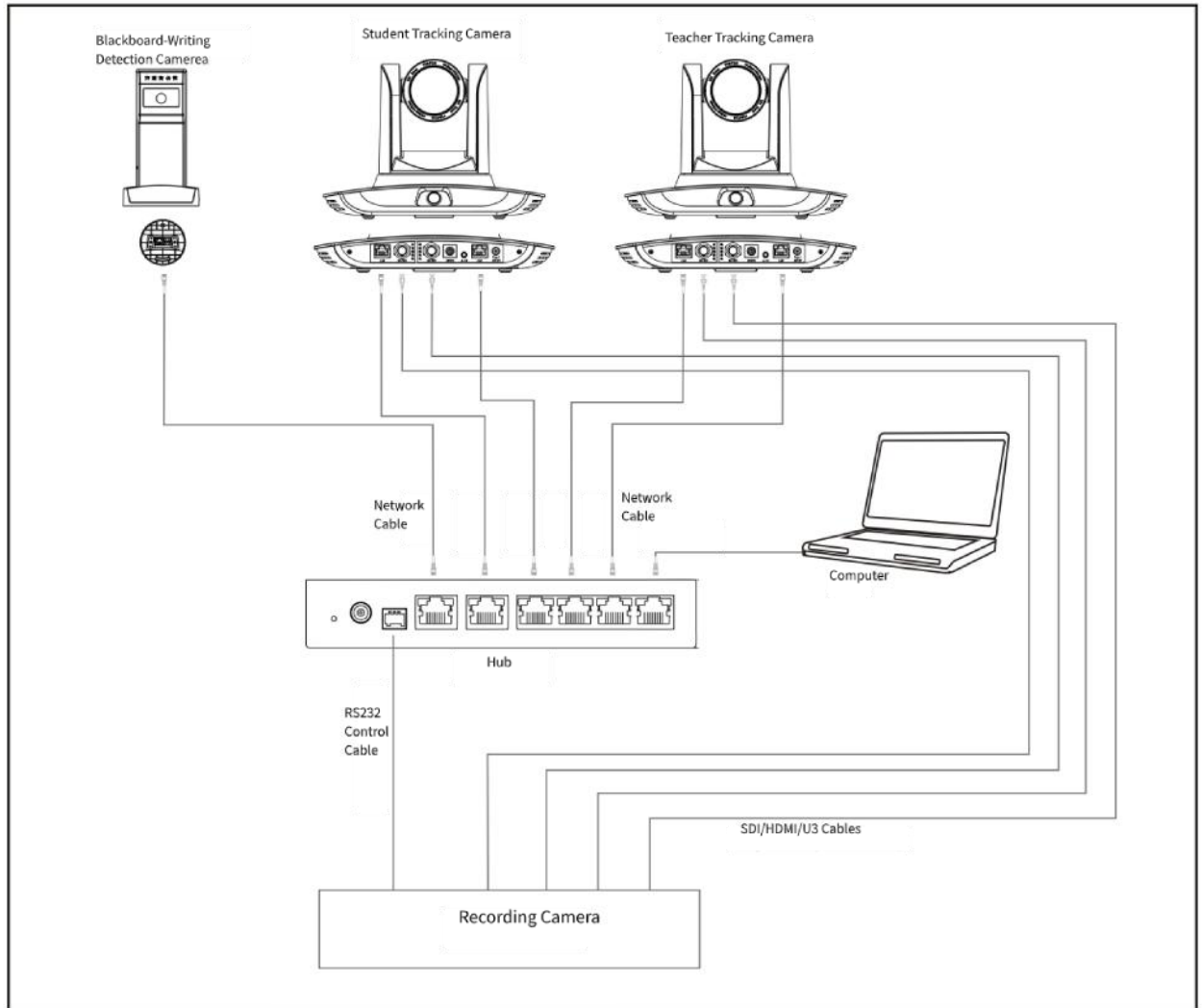


The recommended installation height for the tracking camera is 1.8-2.5 meters (distance from the panoramic lens to the ground), and the distance from the blackboard should be 5-9 meters. The tracking camera should be installed as

close as possible to the central axis of the classroom to achieve the best tracking effect.

4.2 System wiring

The teaching tracking camera products provide a smart camera solution for education information field, and customers can select all or some products as needed. Different combinations of products meet demand of customers' application scenarios.



If the recording and broadcasting host supports LAN network control port, the Hub can be replaced by LAN network switch.

5. IE Login and Tracking Setup Procedure

5.1 Connection mode

Direct connection: Connect the camera and computer by network connecting cable.

Internet connection mode: Connect the device to the Internet network by using a router or switch to access the network. Users can log in to the device through a web browser.

Caution

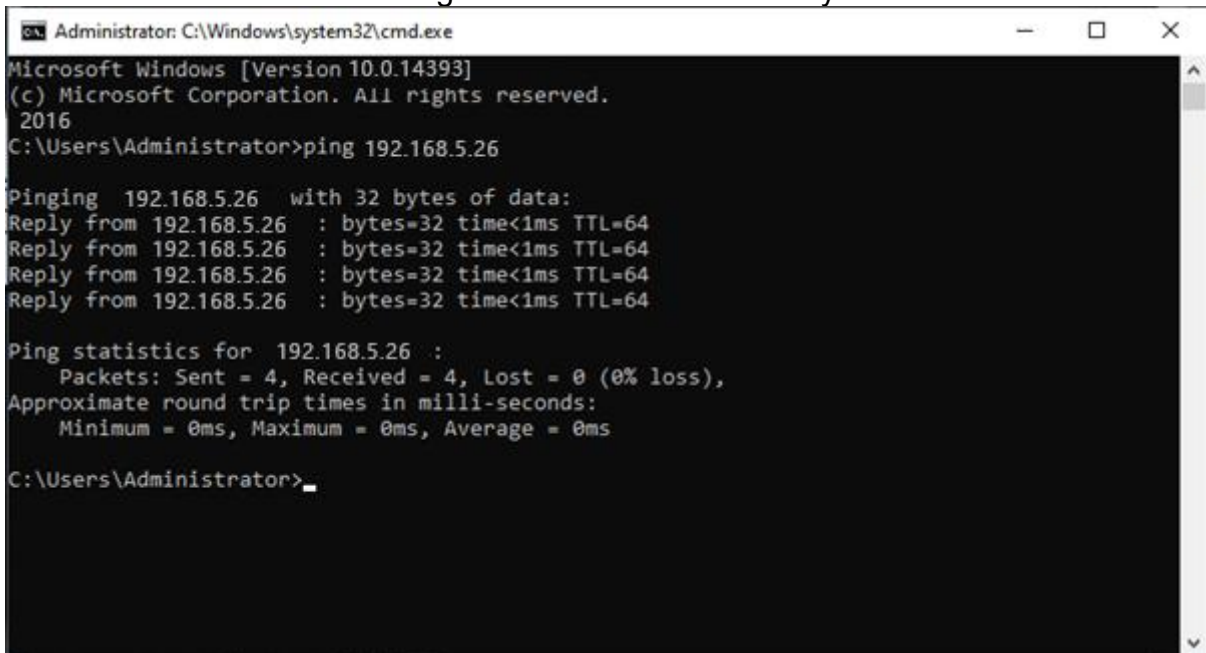
- Please do not put the power cable and network cable in places where can be easily touched, to prevent video unstable signal transmission due to poor contact of cables.
- The computer must have the network segment where the camera IP address belongs to. The device will not be accessible if without the segment. The camera default IP address is 192.168.5.163, segment 5 must be added in the computer.
- Firstly open the window of Local Area Connection Properties on computer, select the "Internet protocol version 4(TCP/IPv4)". Double click or click the property "Internet" protocol version 4 (TCP/IPv4) to enter into the Internet Protocol Version 4(TCP/IPv4) Properties window; select "Advanced" to enter into the Advanced TCP/IP Setting and add IP and subnet mask. Click the "Confirm" to finish the adding of IP segment. User can add the corresponding network segment according to the revised IP address of the camera.

Caution

- **The IP address to be added cannot be same with that of other computers or devices.**
- **The existence of this IP address needs to be verified before adding.**

To verify whether the network segment is added successfully, open "Start" on the computer, select "Run", enter cmd, and click "OK" to open the DOS command window of the computer, enter ping 192.168.5.26 (IP address configured for the local connection of the computer), and press Enter. The following information is displayed:

it indicates that the network segment is added successfully



```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.14393]
(c) Microsoft Corporation. All rights reserved.
2016
C:\Users\Administrator>ping 192.168.5.26

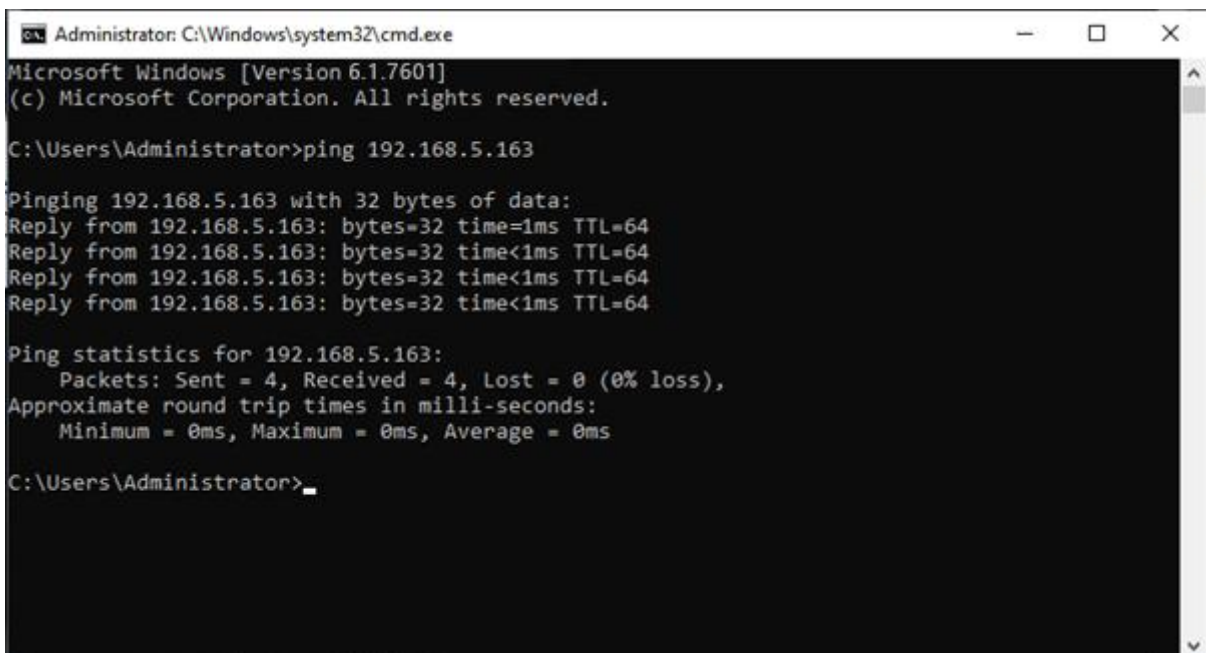
Pinging 192.168.5.26 with 32 bytes of data:
Reply from 192.168.5.26 : bytes=32 time<1ms TTL=64
Reply from 192.168.5.26 : bytes=32 time<1ms TTL=64
Reply from 192.168.5.26 : bytes=32 time<1ms TTL=64
Reply from 192.168.5.26 : bytes=32 time<1ms TTL=64

Ping statistics for 192.168.5.26 :
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Administrator>
```

Figure5-1 Network segment successfully added illustration

After camera power on and self-check, follow the steps above to verify network connection. Open DOS command window, ping 192.168.5.163 and press Enter key.



```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
(c) Microsoft Corporation. All rights reserved.
C:\Users\Administrator>ping 192.168.5.163

Pinging 192.168.5.163 with 32 bytes of data:
Reply from 192.168.5.163: bytes=32 time=1ms TTL=64
Reply from 192.168.5.163: bytes=32 time<1ms TTL=64
Reply from 192.168.5.163: bytes=32 time<1ms TTL=64
Reply from 192.168.5.163: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.5.163:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Administrator>
```

Figure5-2 Network Connection Screenshot

5.2 IE Login

1) Web Client Platform

Enter the device's IP address into the browser's address bar. For the teacher machine, the default IP address is 192.168.5.163, and for the student machine, it is 192.168.5.164. Press Enter to access the Web client login interface. There are two login modes available: administrator and regular user. Logging in as an administrator (username and password are both "admin" by default) allows you to perform operations such as previewing, configuring, and logging out, whereas logging in as a regular user (username and password are either "user1" or "user2" by default) only allows you to preview and log out, without access to configuration options. Note that the Web access function is supported by common browsers such as Microsoft Edge, Opera, Google Chrome, and Sogou.

2) Language Selection: On the right top of the interface display “中文|English”, click “English”.

5.3 IE Preview

After successfully logging in, enter the management interface, and the default entry is the video preview interface. In the preview interface, you can perform operations such as PTZ control, zoom, Code stream, 3D positioning, preset settings, operation, and deletion.

1) Login as administrator

User name and password default admin

you can perform operations such as PTZ control, zoom, Code stream, 3D positioning, preset settings, operation, and deletion. preview, configuration, and logout can be performed.

2) Log in as a normal user

User name and password default user1 or user2

you can perform operations such as PTZ control, zoom, Code stream, 3D positioning, preset settings, operation, and deletion. preview, configuration, and logout can be performed.

Caution

- There is no configuration authority to log in as a normal user.
-

5.4 IE Configuration

Click "Configuration" to enter the Camera parameter configuration page.

There are mainly the following options: audio configuration, video configuration, network configuration, system configuration, etc. Please refer to the table below for specific descriptions.

Table5-4 Camera parameter configuration

Menu	Explanation
Audio Configuration	Including audio switch, compression format, sampling frequency, sampling accuracy, compression bitrate, channels, input volume, etc.
Video Configuration	Including video encoding, stream publishing, multicast/unicast, close-up video parameters, panoramic video parameters, character overlay, video output, etc.
Network Configuration	Including network port, Ethernet parameters, DNS parameters, GB28181, SRT, RTSP, etc.
System Configuration	Including device properties, system time, user management, firmware upgrade, restore factory defaults, restart device, parameter import/export, etc.

5.4.1 Audio Configuration

Switch: Set whether to enable audio

Compression format: set the audio compression format, the device will automatically restart after the change (default: AAC, MP3、G.711A optional)

Sampling frequency: set the audio sampling frequency, the device will automatically restart after changing (default: 48000, 16000、32000 optional)

Sampling precision: set the audio sampling precision (default: 16bits)

Compression code rate: set audio compression code rate (default: 64kbps, 32、48、96、128kbps optional)

Channel type: set the channel type (default mono, stereo optional)

Input volume: set the input volume (default 2, 1~10 optional)

Click "SAVE", it will display "Successfully saved. Restart the device to take effect".

5.4.2 Video Configuration

1) Video Encoding

Code Stream: Different video output mode setting, use different streams. (Close-up main stream, panorama main stream, guide stream)

Compression Format: Set the video compression format, save to take it effect (default: H.264, H.265 optional)

Profile: Profile Mode Setting (default: HP, BP、MP optional)

Video Size: Set image resolution, changes take effect after saving and restarting the device. (Close-up main stream default: 1920*1080, 1280*720、640*480 optional;

Panoramic main stream default: 1920*1080; play-guide stream default: 1920*1080, 1280*720、640*480 optional)

Stream Rate Control: Set rate control mode, save to take it effect (The close-up main stream, panoramic main stream, and play-guide stream have the default bit rate, and the variable bit rate is optional)

Image Quality: Set the image quality, image quality can be changed only when rate control is variable bit rate (default: best, better, good, bad, worse, worst for options)

Rate (Kb/s) : Set the video bit rate (close-up main stream default: 4096Kb/s, 64~40960Kb/s options; panoramic main stream default: 512Kb/s, 64~40960Kb/s options; play-guide stream default: 4096Kb/s, 64~40960Kb/s options)

Frame rate (F/S) : Set the video frame rate (close-up main stream、panoramic main stream、play-guide stream default: 30F/S, Code stream 5~30 F/S options)

Key frame interval: Set the key frame interval (close-up main stream、panoramic main stream、play-guide stream default: 30, 1~150 options)

Minimum QP of key frame interval: Set minimum QP of key frame interval (default: 20, 10~51 options)

Stream Name: When streaming via rtsp or rtmp, user can modify stream name; close-up main stream (default: live/av0) 、panoramic main stream (default: live/av2) 、play-guide stream (default: live/av4)

Click "SAVE", it will display "Successfully saved. Restart the device to take effect".

2) Stream Release

Code stream: you can set up any stream release including close-up main stream、panoramic main stream、play-guide stream

Switch: Set stream publishing to turn on or off

Protocol: Set the protocol for stream publishing (default: RTMP Protocol, RTSP、SRT options)

Host Port: server port number (default: 1935, 0~65535 options)

Host Address: server IP address (default: 192.168.5.11)

Stream name: You can set different stream names (live/av0、live/av2、live/av4 options)

Username: Set username

Password: Set user password

SRT Password: Set SRT stream password

SRT Password Length: set the length of SRT stream password

Click "SAVE", it will display "Successfully saved. Restart the device to take effect".

3) Multicast/unicast

Code stream: you can set up any Multicast/unicast including close-up main stream、panoramic main stream、play-guide stream

Switch: Turn on/off multicast or unicast

Protocol: Set multicast protocol (default RTP multicast, TS multicast, UDP unicast, TCP unicast optional)

Address: default 224.1.2.3 It can be edited.

Port: Main Stream Default Port (close-up main stream default 4000, panoramic main stream default 4004, broadcast code stream default 4008.)

Visit: Address comes up after setting. Eg:

RTP multicast rtp://224.1.2.3:4000;

TS multicast udp://@224.1.2.3:4000;

UDP unicast udp://@224.1.2.3:4000;

TCP unicast tcp://@224.1.2.3:4000;

4) Close-up video parameters

a、 **Focus: Focus mode, focus area, focus sensitivity** (This parameter is only for reference of close-up video parameters)

Focus Mode: Set the focus Mode (Default: Automatic, manual, one-click focus optional)

Focus area: Set the focus area (Default: All, middle, up, and down are optional)

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

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

Exposure Mode: Set the exposure mode (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 Exposure Compensation is on (default 0,-7 to 7 optional)

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

Anti-flicker: Set Anti-Scintillation mode, only valid in auto exposure mode and Aperture/brightness is preferred (default 50Hz, close、 60Hz optional)

Gain Limit: Set the gain limit, which is only valid when the exposure mode is automatic and the brightness priority (default 5, 0~15 optional)

Shutter speed: Set the shutter value, only valid when the exposure mode is manual and shutter priority (default: 1/100, 1/25、 1/30、 1/50、 1/60、 1/90、 1/120、 1/180、 1/250、 1/350、 1/500、 1/1000、 1/2000、 1/3000、 1/4000、 1/6000、 1/10000 optional)

Brightness: Set the brightness value, only valid when the exposure mode has priority on brightness (default: 10, 0~23 optional)

Gain: Set the gain value, Only effective in manual and shutter priority exposure modes (default: 1, 0~15 optional)

c、 **Color:** white balance mode, saturation, chroma, white balance sensitivity, red fine-tuning, blue fine-tuning, red gain, blue gain can be set

White balance mode: Set the white balance mode (default automatic, manual, one-push white balance. Specify color temperature optional) Note: When selecting the One-touch White Balance mode, press the "Correction" button on the right-hand side.

Red fine-tuning: Set the red fine-tuning, which is only effective when the white balance mode is automatic (default: 0, -10~10 optional)

Blue fine-tuning: Set blue fine-tuning, only valid when the white balance mode is automatic (default: 0, -10~10 optional)

Saturation: Set the saturation (default: 38, 0~127 optional)

Chroma: Set the chroma (default: 4, 0~8 optional)

White balance sensitivity: set the white balance sensitivity (default: low, high, medium optional)

Red gain: Set the red gain, which is only valid when the white balance mode is manual (default: 36, 0~100 optional)

Blue gain: Set the blue gain, only valid in white balance mode manual (default: 36, 0~100 optional)

d. Image: You can set brightness, contrast, sharpness, gamma curve, black and white mode, Automatic flip, horizontal flip, vertical flip, Ultra low illumination

Brightness: set the brightness (default: 50, 0~100 optional)

Contrast: set the contrast (default: 50, 0~100 optional)

Sharpness: Set the sharpness value (default: 4, 0~15 optional)

Gamma curve: set the gamma curve value (default, 0.45, 0.50, 0.55, 0.63 optional)

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

Automatic flip: set the video flip effect (default: ON, OFF optional)

Horizontal flip: set the video flip effect, it can only be configured after turning off the auto flip (default: off and on are optional)

Vertical flip: set the video flip effect, it can only be configured after turning off the auto flip (default: off and on are optional)

Ultra low illumination: Set whether to turn on/off ultra-low light mode. (default: off and on are optional)

e. NOISE REDUCTION: You can be set to 2D noise reduction, 3D noise reduction, and dynamic bad pixel correction.

2D Noise Reduction: set the level of 2D noise reduction (default: off, auto, 1~8 optional)

3D Noise Reduction: set the level of 3D noise reduction (default: 8, 1~8, off optional)

Dynamic Bad Pixel Correction: set bad pixel correction (default: off, 1~5 optional)

f. Picture Style: choose the picture style (default: standard, clear, vivid, soft optional)

5) Panoramic video parameters

a、 Focus: Focus mode, focus area, focus sensitivity (This parameter is only for reference of Panoramic video parameters)

Focus Mode: Set the focus Mode (Default: Automatic, manual, one-click focus optional)

Focus area: Set the focus area (Default: All, middle, up, and down are optional)

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

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

Exposure Mode: Set the exposure mode (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 Exposure Compensation is on (default: 0, -7~7 optional)

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

Anti-flicker: Set Anti-Scintillation mode, only valid in auto exposure mode and Aperture/brightness is preferred (default: 50Hz, close, 60Hz optional)

Gain Limit: Set the gain limit, which is only valid when the exposure mode is automatic and the brightness priority (default: 4, 0~15 optional)

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

Shutter speed: Set the shutter value, only valid when the exposure mode is manual and shutter priority (default: 1/100, 1/25, 1/30, 1/50, 1/60, 1/90, 1/120, 1/180, 1/250, 1/350, 1/500, 1/1000, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000 optional)

Brightness: Set the brightness value, only valid when the exposure mode has priority on brightness (default: 10, 0~23 optional)

Gain: Set the gain value, Only effective in manual and shutter priority exposure modes (default: 0, 0~20 optional)

c、 Color: white balance mode, saturation, chroma, white balance sensitivity, red fine-tuning, blue fine-tuning, red gain, blue gain can be set

White balance mode: Set the white balance mode (default automatic, manual, one-push white balance, Specify color temperature optional) Note: When selecting the One-touch White Balance mode, press the "Correction" button on the right-hand side.

Red fine-tuning: Set the red fine-tuning, which is only effective when the white balance mode is automatic (default: 0, -10~10 optional)

Blue fine-tuning: Set blue fine-tuning, only valid when the white balance mode is automatic (default: 0, -10~10 optional)

Saturation: Set the saturation (default: 38, 0~127 optional)

Chroma: Set the chroma (default: 4, 0~8 optional)

White balance sensitivity: set the white balance sensitivity (default: high, medium, low optiona)

Red gain: Set the red gain, which is only valid when the white balance mode is manual (default: 36, 0~100 optiona)

Blue gain: Set the blue gain, only valid in white balance mode manual (default: 36, 0~100 optiona)

d、Image: You can set brightness, contrast, sharpness, gamma curve, black and white mode, Automatic flip, horizontal flip, vertical flip, Ultra low illumination

Brightness: set the brightness (default: 50, 0~100 optional)

Contrast: set the contrast (default: 50, 0~100 optional)

Sharpness: Set the sharpness value (default: 4, 0~15 optional)

Gamma curve: set the gamma curve value (default: 0.45, 0.50, 0.55, 0.63 optional)

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

Automatic flip: set the video flip effect (default: off, on optional)

Horizontal flip: set the video flip effect, it can only be configured after turning off the auto flip (default: off and on are optional)

Vertical flip: set the video flip effect, it can only be configured after turning off the auto flip (default: off and on are optional)

Ultra low illumination: Set whether to turn on/off ultra-low light mode. (default: off and on are optional)

e、NOISE REDUCTION: You can be set to 2D noise reduction, 3D noise reduction, and dynamic bad pixel correction.

2D Noise Reduction: set the level of 2D noise reduction (default: off, auto, 1~8 optional)

3D Noise Reduction: set the level of 3D noise reduction (default: 8, 1~8, off optional)

Dynamic Bad Pixel Correction: set bad pixel correction (default: off, 1~5 optional)

f、Picture Style: choose the picture style (default: standard, clear, vivid, soft optional)

 **Caution**

- Note: Change the value of the video parameters in the above items a, b, c, d, e and click refresh to take effect.

6) Character Overlapping

a、Close-up/panoramic character overlay

Display time and date: Set whether to display the time and date can be checked

Display title: Set whether to display the title or not can be checked

Time font color: set the time font color (default white, black, yellow, red, blue optional)

Title font color: set the title font color (default white, black, yellow, red, blue optional)

Move character: set the moving time and the display position of the title, click the "up, down, left, right" button to move the corresponding character position

Title display content: device attribute setting title content (default: CAMERA-1)

Time display content: system time setting time (default 1970/01/10 05:36:00)

Click the "Save" button, the prompt message "Parameters saved successfully" is displayed, and the settings can take effect.

b、Character Size

Automatically scale the size according to the resolution: selectable

Close-up character size: Set the displayed character size, change and save it and restart the device to take effect (default: 48, 8~200 optional)

Panorama character size: Set the displayed character size, change and save it and restart the device to take effect (default: 48, 8~200 optional)

Click the "Save" button, the prompt message "Parameters saved successfully" is displayed, and the settings can take effect.

7) Video output

Switch: ON/OFF, can be checked (Default: Off)

Output video: close-up video, panoramic video, guide video (default guide video)

Output format: Set the video output format (default: 1080P60, 1080P50、1080P30、1080P25、720P60、720P50、1080P59.94、1080P29.97、720P59.94 optional)

Click the "Save" button, the prompt message "Parameters saved successfully" is displayed, and the settings can take effect.

5.4.3 Network Configuration

1) Network port

Data port: Set the data port, change and save it and restart the device to take effect (default: 3000, 0~65535 optional)

Web Port: Set the Web port, change and save it and restart the device to take effect (default: 80, 0~65535 optional)

Onvif Port: Set the Onvif port, change and save and restart the device to take effect (default: 2000, 0~65535 optional)

Soap Port: Set the Soap port (default: 1936, 0~65535 optional)

Rtmp Port: Set the Rtmp port (default: 1935, 0~65535 optional)

Rtsp Port: Set the Rtsp port, change and save and restart the device to take effect (default: 554, 0~65535 optional)

Visca Port: Set the Visca port, change and save and restart the device to take effect (default: 1259, 0~65535 optional)

Https Port: Set the Https port, change and save and restart the device to take effect (default: 443, 0~65535 optional)

WebSocket Port: Set the WebSocket port, change and save and restart the device to take effect (default: 8088, 0~65535 optional)

Click the "Save" button, the prompt message "Parameters saved successfully" is displayed, and the settings can take effect.

RTSP acquisition method: rtsp:// device IP address:554/live/av0 (av0 Close-up main stream; av2 panoramic main stream; av4 pilot stream)

RTMP acquisition method: rtmp:// device IP address:1935/live/av0 (av0 Close-up main stream; av2 panoramic main stream; av4 pilot stream)

2) Ethernet parameters

DHCP: Set whether to enable automatic IP acquisition. After changing and saving, restart the device to take effect (default closed)

IP address: set the IP address, change and save it and restart the device to take effect (default IP: 192.168.5.163)



● **The IP address here is the address of the 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 ((this parameter is read-only and cannot be modified)

Click the "Save" button to display the "Parameters saved successfully" prompt message, and the settings will take effect (Note: When changing the IP, prevent IP conflicts)

3) DNS Parameters

Preferred DNS server: Set the preferred DNS server (default 0.0.0.0)

Alternative DNS server: Set alternative DNS server (default 0.0.0.0)

Click the "Save" button, the prompt message "Parameters saved successfully" is displayed, and the settings can take effect

4) GB28181

Switch: Set whether to turn on GB28181, can be checked

Time synchronization: set whether to synchronize the time, you can check it

Stream type: stream type setting (default primary stream)

Signing Time (in seconds): default: 3600 range 5~65535

Heartbeat time (seconds): default: 60, range 1~65535

Registration ID:34020000001320000001

Registered user name: IPC

Registration password: 12345678

Server domain: users can add by themselves

Administrative area: users can add by themselves

Alarm area: users can add by themselves

Device installation address: users can add by themselves

Local SIP port: default: 5060, range 0~65535

GB28181 server domain: computer IP address

Server SIP port: default: 5060, range 0~65535

Server ID: 34020000002000000001

Click the "Save" button, the prompt message "Parameters saved successfully" is displayed, and the settings can take effect

5) SRT

SRT Port: Set the SRT Port, change and save and restart the device to take effect (default 9000, 0~65535 optional)

SRT password: Set the SRT password, change and save and restart the device to take effect (The default is empty, and the password must be between 10 and 80 characters.)

SRT Password length: Set the SRT password length, change and save and restart the device to take effect (default 0, 16、24、32 optional)

7) RTSP

RTSPAuthentication: Set whether to enable RTSP authentication, change and save and restart the device to take effect (default off)

5.4.4 System Configuration

1) Device attributes

Device name: set the device name (default: CAMERA-1, users can modify by themselves)

Device ID: Set the device ID number (default: 1, read-only)

System language: set the page language type (default simplified Chinese, English optional) after modification and saving, you need to log in again
Click the "Save" button, the prompt message "Parameters saved successfully" is displayed, and the settings can take effect

2) System time

Date format: set the date format (default: YYYY-MM-DD means year-month-day, MM-DD-YYYY means month-day-year、DD-MM-YYYY day-month-year optional)

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

Time zone: set the time zone (default Dongba District, other time zones are optional)

Time type: set the time type (default 24 hours, 12 hours optional)

Enable NTP: can be checked, NTP time can be set after checking (default: off)

Update interval: Set the time interval for the NTP server to automatically update (valid after NTP is enabled; 1 day by default, 2-10 days optional)

NTP server address or domain name: Set the NTP server address or domain name (valid after NTP is enabled; the default is time.nits.gov, which can be modified by the user)

NTP server port: Set the NTP server port (valid after NTP is enabled; the default is 123, which can be modified by the user)

Click the "Save" button, the prompt message "Parameters saved successfully" is displayed, and the settings can take effect.

Time setting: setting time mode (optionally synchronized with computer time, synchronized with NTP server, manual setting)

Computer time: display the computer time (only the time setting method is valid for synchronization with the computer time) click the "synchronize" button

Manually set the time: Click the calendar icon on the right to manually set the time (only the time setting method is effective for manual setting)

3) User management

Select User: Set the login user type (default administrator, ordinary user 1, ordinary user 2 are optional)

User name: set the user name (select user administrator default admin; select user common user 1 default user1; select user common user 2 default user2; users can modify by themselves)

Password: Set password (select user administrator default admin; select user common user 1 default user1; select user common user 2 default user2; users can modify by themselves)

Password confirmation: confirm whether the input passwords are consistent
Click the "Save" button, the prompt message "Parameters saved successfully" is displayed, and the settings can take effect

Please note that the username and password are case-sensitive.

Caution

- If you log in to the web page with the user name and password of a normal user, you will not have the configuration authority and can only perform preview, playback, and logout operations.
-

4) Version upgrade

The page displays the version information, which can only be read by the user and cannot be modified. It is consistent with the version information in the menu.

The version information is different for different device models.

Upgrade file: Click "Select document" and select the upgrade file in the pop-up window; click the "Upgrade" button to pop up the upgrade dialog box; after the upgrade is successful, the device will automatically restart (Note: Ensure the power and network of the device during the upgrade process Connect normally, otherwise the upgrade will fail)



Version upgrade interface

! Caution

- After the version upgrade is completed, the factory default values need to be restored.

5) Restore the factory

Restore factory defaults: Click the "Restore Factory Defaults" button, a confirmation dialog box pops up, select "Yes" or "No", and the device will automatically restart after selecting "Yes" to take effect.

6) Restart the device

Restart the device: Click the "Restart Device" button, a confirmation dialog box pops up, select "Yes" or "No", and the device automatically restarts after selecting "Yes"

7) Parameter Import/Export

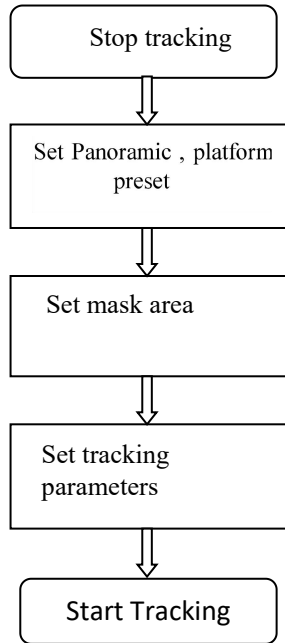
- Import:** Click "Select File" in the pop-up window, choose the import file "ConfCam"; click the "Import" button to open the import dialog; after successful import, restart the device. (Note: Ensure that the device's power and network are properly connected during the import process, otherwise the import will fail)
- Export:** Right-click and select "Save link as" to export the "ConfCam" file in the pop-up dialog box.

5.5 Logout

Click "Logout" to pop up the "Confirm" dialog box; select "Yes" or "No", select Yes to log out of the current user, as shown in the figure below, and return to the user login interface.

5.6 Configure Tracking Parameters

Set the process



5.6.1 Teacher's Edition Tracking Configuration

The following will provide setting explanations in accordance with the setup flowchart. The main interface for teacher tracking configuration is shown in Figure 5-4.

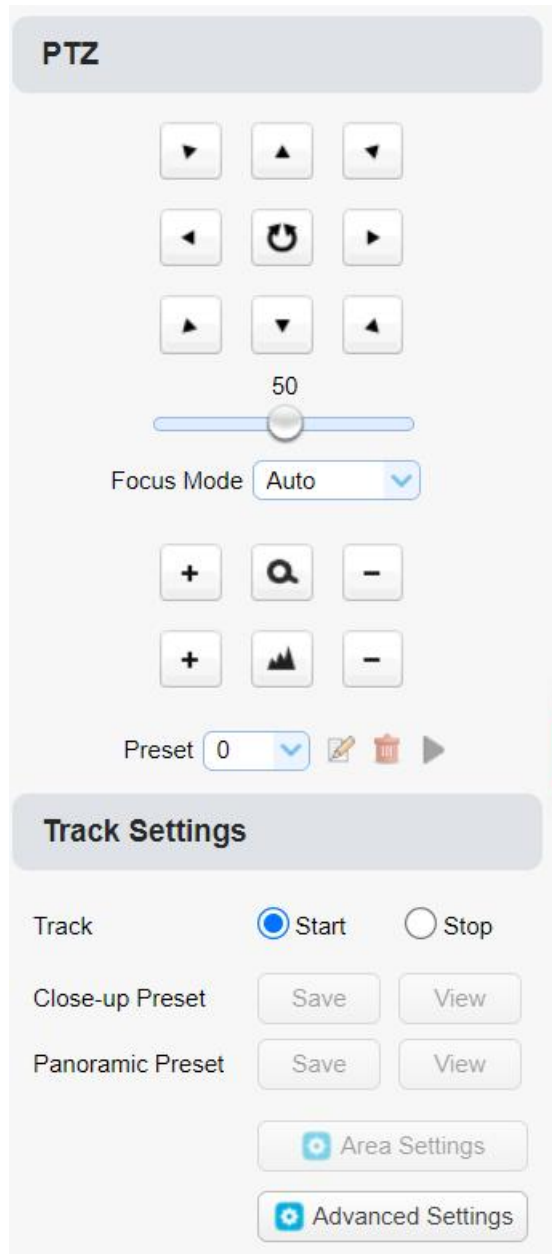


Figure 5-4 Operating interface

1. Click to stop tracking
2. Close-up preset bit Settings

The operation interface for setting the preset position is shown in Figure 5-5. By controlling the PTZ position and zoom value, adjust the camera's perspective and position to the preset position and save it. The specific instructions for setting the close-up preset position are as follows.

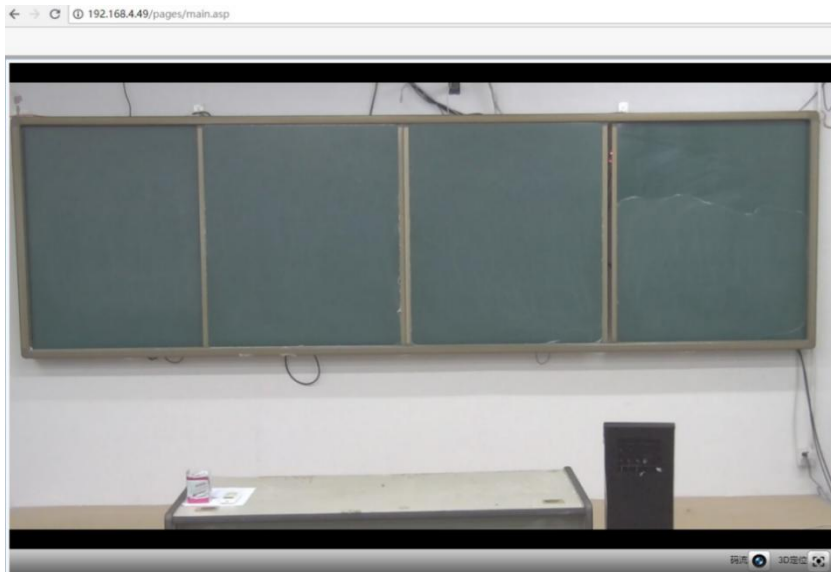


Figure 5-5 Operating interface

Close-up preset position: Control the teacher tracking camera to ensure that the podium (if there's a teacher, it's recommended for the teacher to stand in the middle of the podium) has the desired visual effect in the tracking camera's view, then click to save the close-up preset position. During normal tracking, the size of the teacher in the image is based on the close-up preset position. After the tracking target disappears, you can also choose to return the close-up lens to the close-up preset position.

3. Panoramic Preset Position Setting

The operation interface for setting the preset position is as shown in Figure 5-6. By controlling the position of the PTZ (Pan-Tilt-Zoom) and adjusting the zoom value, the camera's perspective and position are adjusted to the preset position and saved. The panoramic preset position setup is explained as follows:

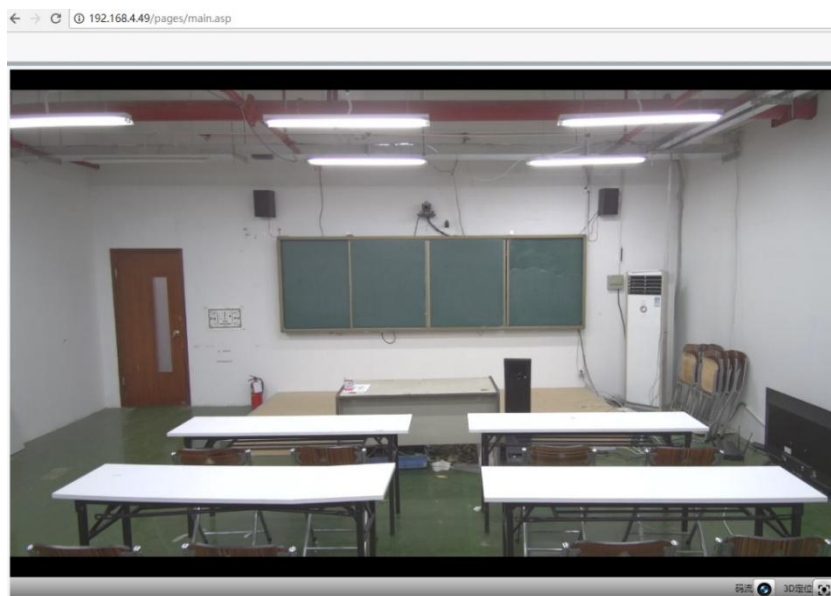


Figure 5-6 Operating interface

Panoramic Preset Position: Control the teacher tracking camera to enable the camera to view most of the classroom scenery (or any desired location). After the target tracking is lost, you can choose to return the camera to the panoramic position.

4. Area Setting: (can set the podium area and the masking area)

4.1: Podium Area: The podium area is the region where the close-up lens initiates tracking. Typically, the blackboard position on the classroom podium is selected to ensure that the teacher's upper body is within the set area when standing at the podium, and the lower boundary of the podium area is not exceeded when the first row of students is seated, Refer to Figure 5-7.

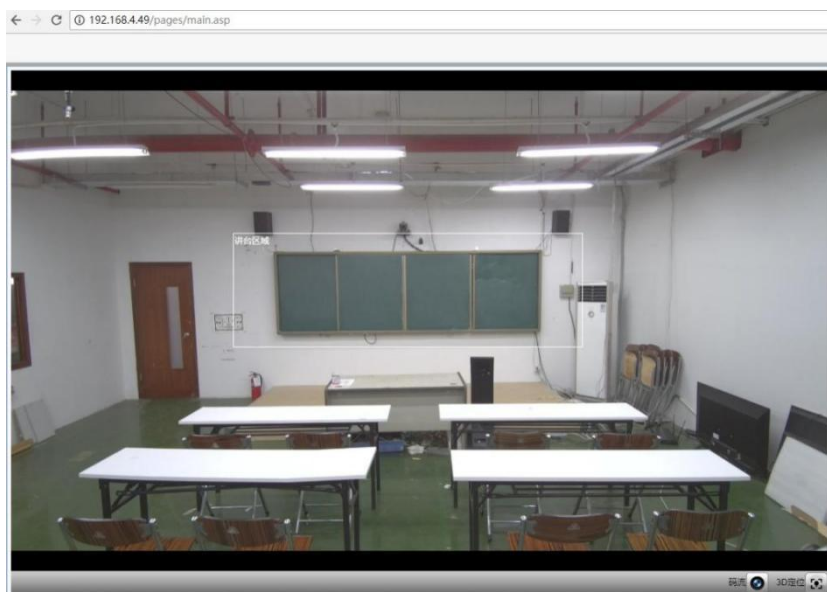


Figure 5-7 Operating interface

4.2: Masking Area: The masking area is typically set in regions that may affect the tracking effect of the teacher, such as areas with dynamic changes like television sets, projectors, doors, and windows. Refer to Figure 5-8:

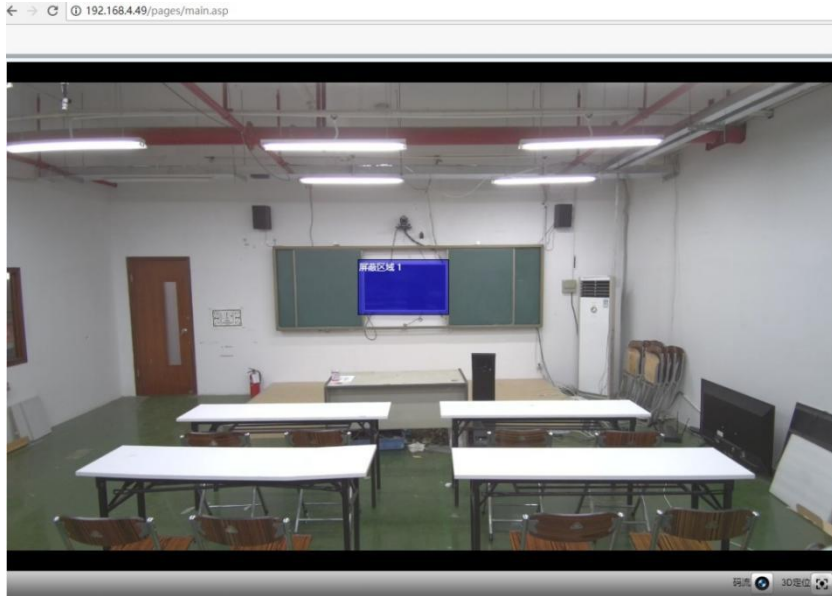


Figure 5-8 Operating interface

5. Advanced parameter

Target Lost Action: When the target is lost, the lens will return to the specified preset position that can be selected from panoramic preset position or close-up preset position.

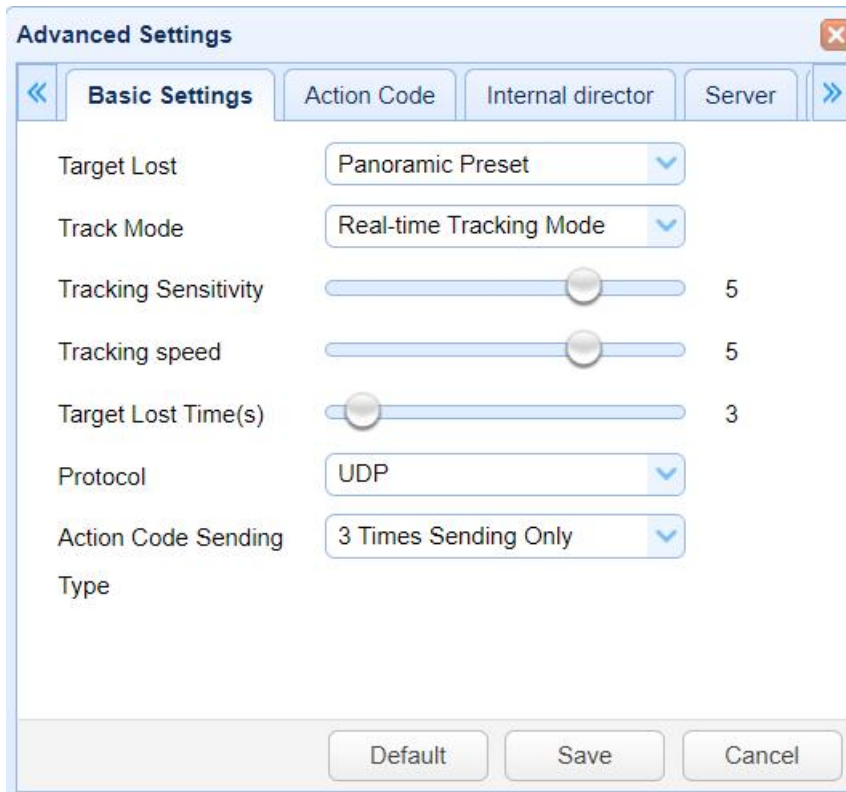


Figure 5-9 Operating interface

Tracking Modes (Three types) : Real-time tracking mode, Movie mode, Area tracking mode:

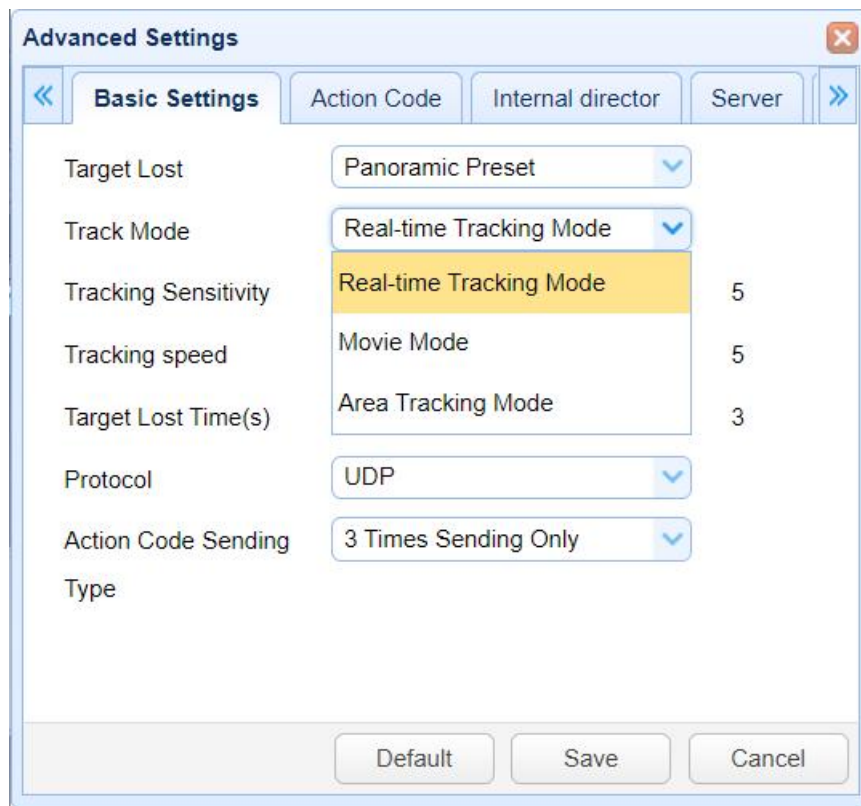


Figure 5-10 Operating interface

Tracking Sensitivity: Under teacher tracking mode, it refers to the degree of movement needed to trigger the tracking action when the tracked target transitions from a still state to a moving state. A higher sensitivity setting means that even small movements of the tracked target will trigger the camera's tracking action.

Tracking Speed: Refers to the horizontal tracking speed of the tracking camera.

Target Lost Time: Refers to the duration the tracking camera waits after the target is lost((default: 2 seconds)) before executing the target lost action (default: return to panoramic preset position).

Communication Protocol: Can be set to UDP, TCP, or serial port protocol.

Action Code Transmission Type: Can be set to transmit only 3 times, continuous transmission, or transmit only once.

For the settings of action codes, refer to the "6. Integration with Recording Host" section.

For the settings of internal live broadcasting, refer to the "6. Integration with Recording Host" section.

For the settings of the server, refer to the "6. Integration with Recording Host" section.

After the relevant settings are completed, click "Save". Depending on the specific scenario and customer requirements, you can enter the advanced parameter section multiple times to modify the configuration values for optimal performance.

5.6.2 Student's Edition Tracking Configuration

The following will be explained in accordance with the setting flow chart. Please refer to Figure 5-11 for the main interface of student tracking configuration.

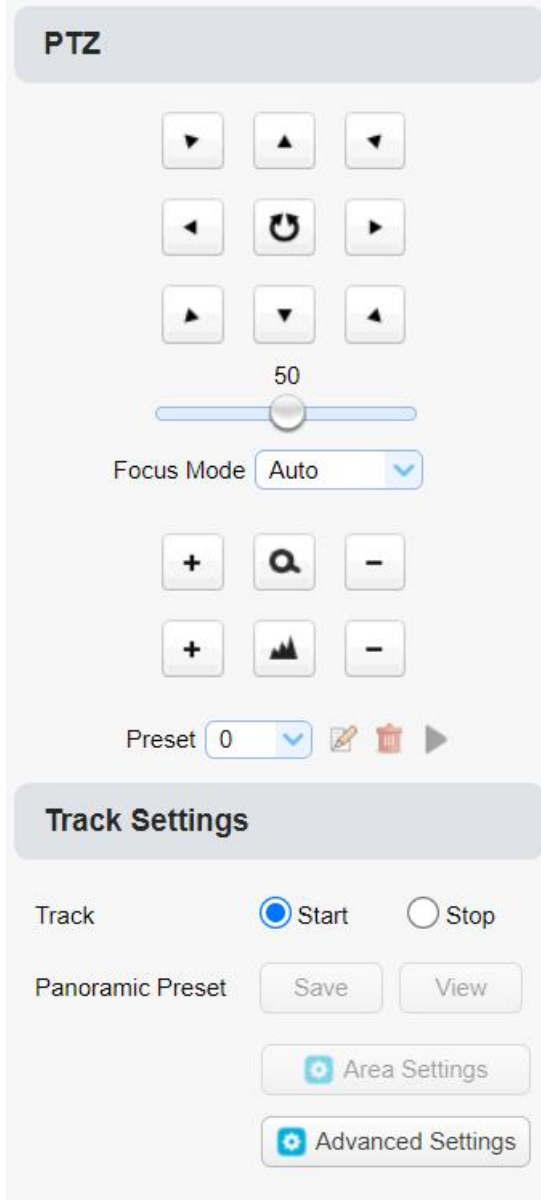


Figure 5-11 Operating interface

Note: Student tracking only requires configuring the blocking area. Simply point the camera at the student and click "Start Tracking", no further action is needed.

1. Click to stop tracking

2. Panoramic Preset Position Setting

The interface for setting preset positions is shown in Figure 5-12. By controlling the position and zoom value of the PTZ, adjust the camera's field of view and position to the preset position, then save. The explanation for setting panoramic preset positions is as follows:

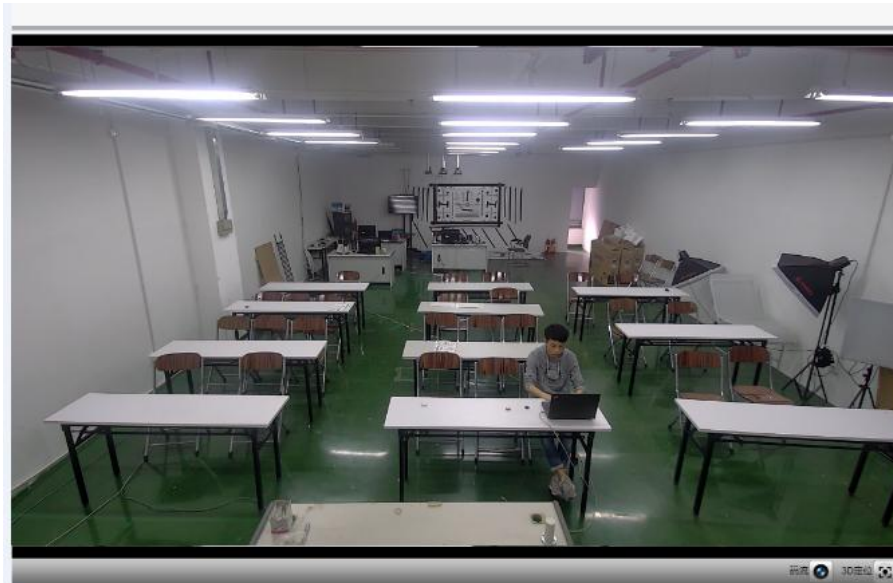


Figure 5-12 Operating interface

Panoramic Preset Position: Control the student tracking camera to view most of the classroom scene (or any other location). After the target tracking is lost, the camera can be set to return to the panoramic position.

3. Area Setting (Setting the Masking Are)

4. Masking Area: The masking area is generally set in areas that may affect the effectiveness of student tracking, such as areas with potentially dynamic changes like televisions, projectors, doors, and windows. Refer to Figure 5-13:

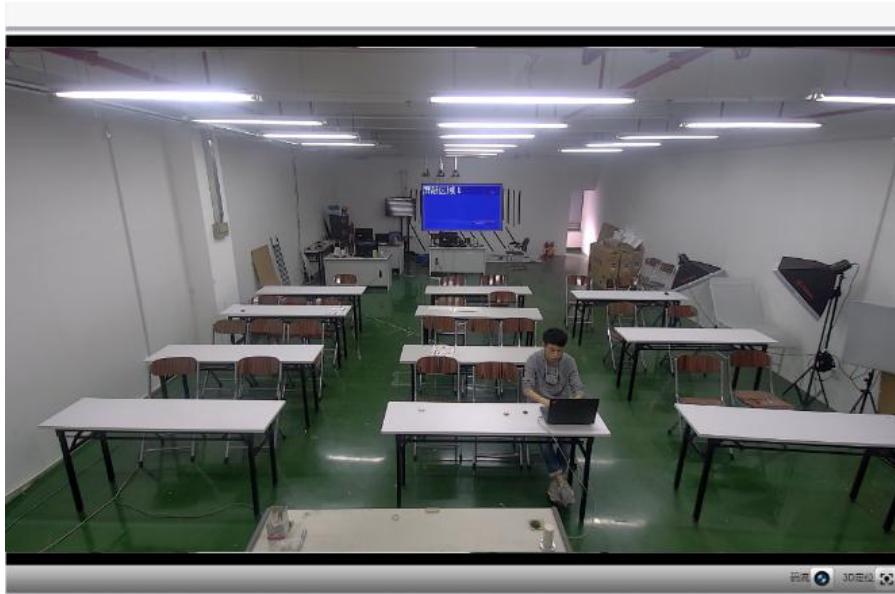


Figure 5-13 Operating interface

5. Advanced Parameters

Target Lost Action: When the target is lost, the camera will return to the specified preset position. This preset position can be set to either maintain its current position or return to the panoramic preset position.

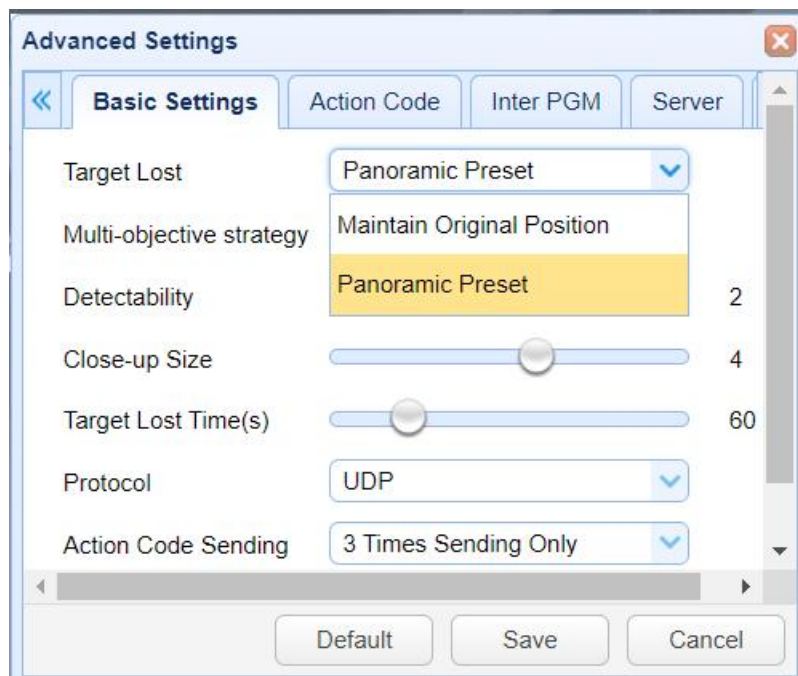


Figure 5-14 Operating interface

Multi-target Strategy: When multiple targets are detected, the tracking mode can be set to either close-up or panoramic.

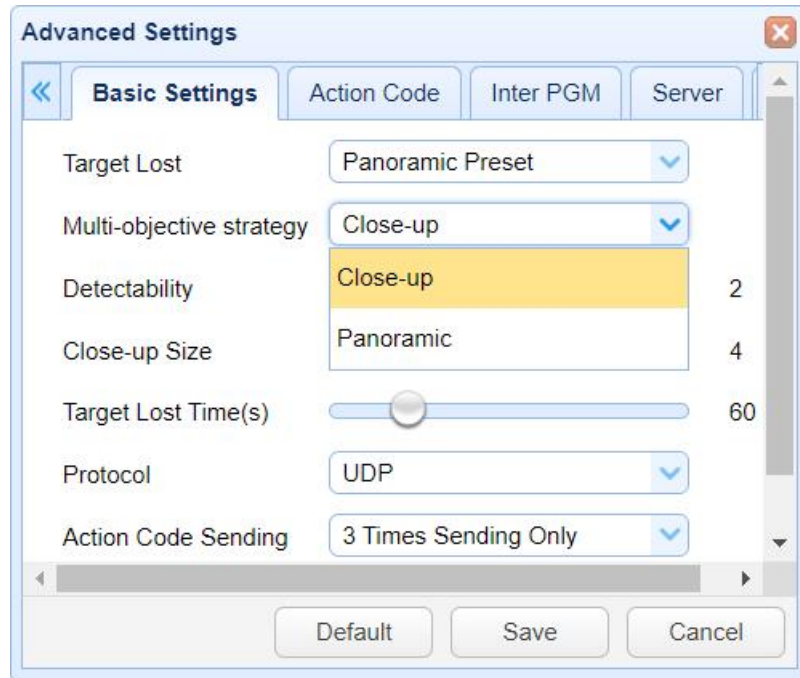


Figure 5-15 Operating interface

Detection Sensitivity: In student tracking mode, the size of the motion triggered by the tracked target, from sitting to standing, will activate the camera tracking. The higher the sensitivity setting, the smaller the motion required to trigger the camera tracking action.

Student Close-up Size: Sets the image size ratio for student camera tracking close-ups.

Target Lost Timeout: Sets the time to wait (default is 60 seconds) after target loss before the tracking camera executes the target lost action (default: return to panoramic preset position).

Communication Protocol: Can be set to UDP, TCP, or serial port protocol.

Action Code Transmission Type: Can be set to transmit only 3 times, continuous transmission, or transmit only once.

For the settings of action codes, refer to the "6. Integration with Recording Host" section.

For the settings of the server, refer to the "6. Integration with Recording Host" section.

After the relevant settings are completed, click "Save". Depending on the specific scenario and customer requirements, you can enter the advanced parameter section multiple times to modify the configuration values for optimal performance.

6 Recording Host Connection Instructions

6.1 Teacher's Tracking Camera Setup

6.1.1 Auto tracking control

The recording and broadcasting host sends commands through the LAN network interface to control the automatic tracking of the teacher-tracking camera. While in automatic tracking mode, the pan-tilt movement and zoom of the camera cannot be controlled via the browser interface or remote control. When not in automatic tracking mode, the pan-tilt movement and zoom can be controlled via the browser interface or remote control..

1. Network receiving address: IP address for teacher tracking camera

2.Command

Type	Command
Start teacher tracking	AA 40 01 00
Stop teacher tracking	AA 40 01 01

6.1.2 Action Code Docking

Tracking status of teacher tracking camera will be feed back to recording host via network (UDP/TCP/serial port transmission) in the form of action code.

1. Configure recording host address

If recording host uses LAN to receive action code, then it needs to configure host address by browser interface configuration tool. Click **Advanced parameters** ->**Server**, as shown below:

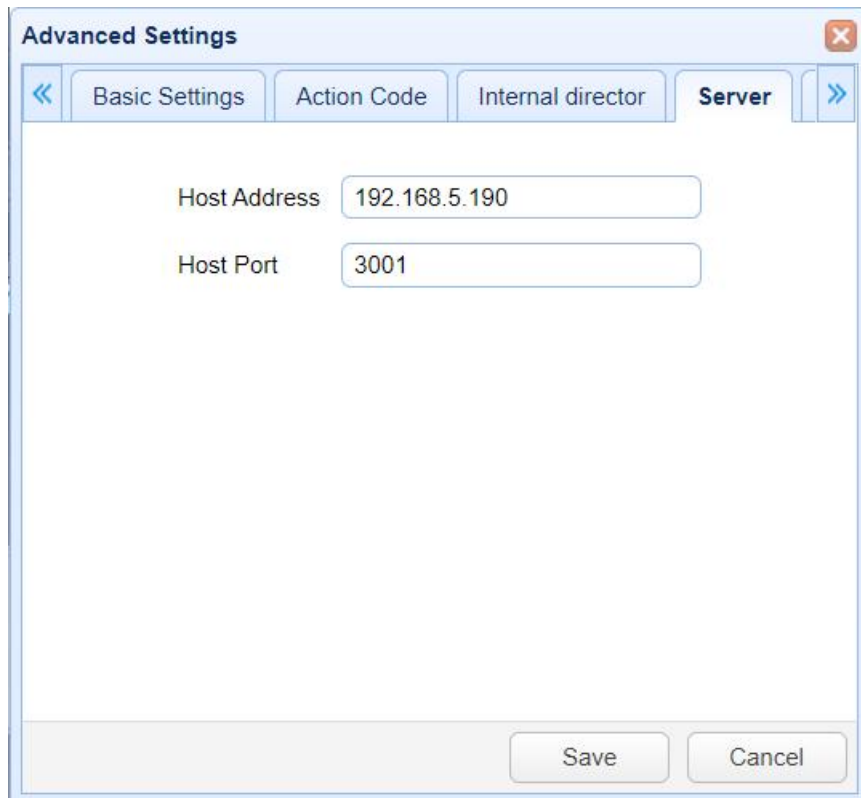


Figure 6-1 Operating interface

2. Configure action code

Through the advanced parameters in the browser interface, action codes can be edited as needed. Click Advanced parameters ->action codes,

After modification, click "Save", as shown below:

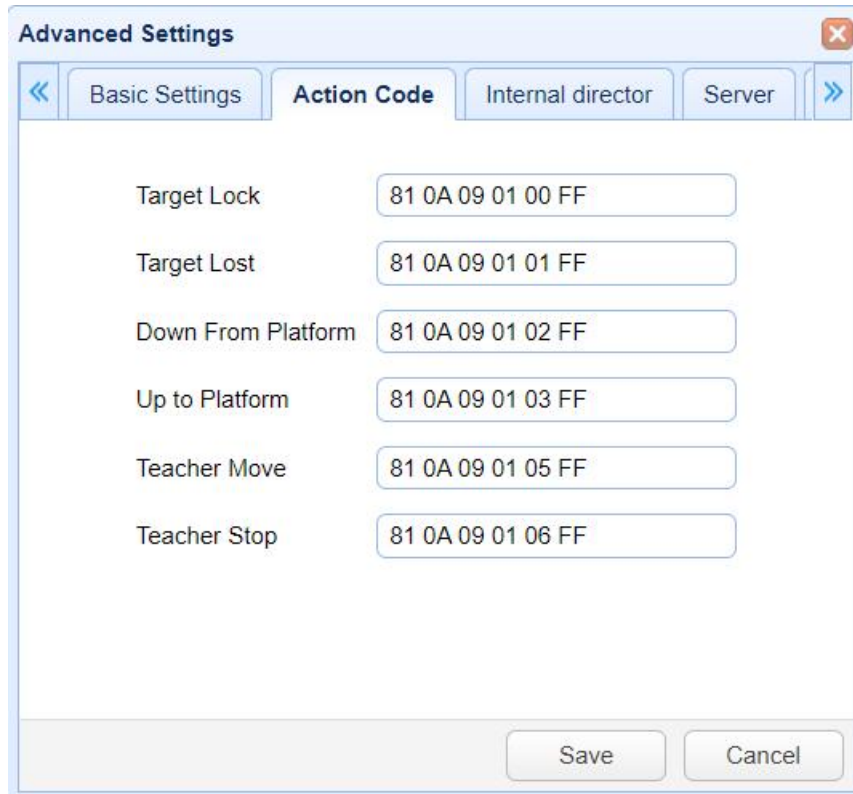


Figure 6-2 Operating interface

6.1.3 Internal Live Streaming Integration

The broadcasting status of the teacher tracking camera will be fed back to the lecture host in real time via network (UDP/TCP/serial port transmission) in the form of internal broadcast codes.

1. Configure recording host address

If recording host uses LAN to receive action code, then it needs to configure host address by browser interface configuration tool. Click Advanced parameters ->Server, as shown below:

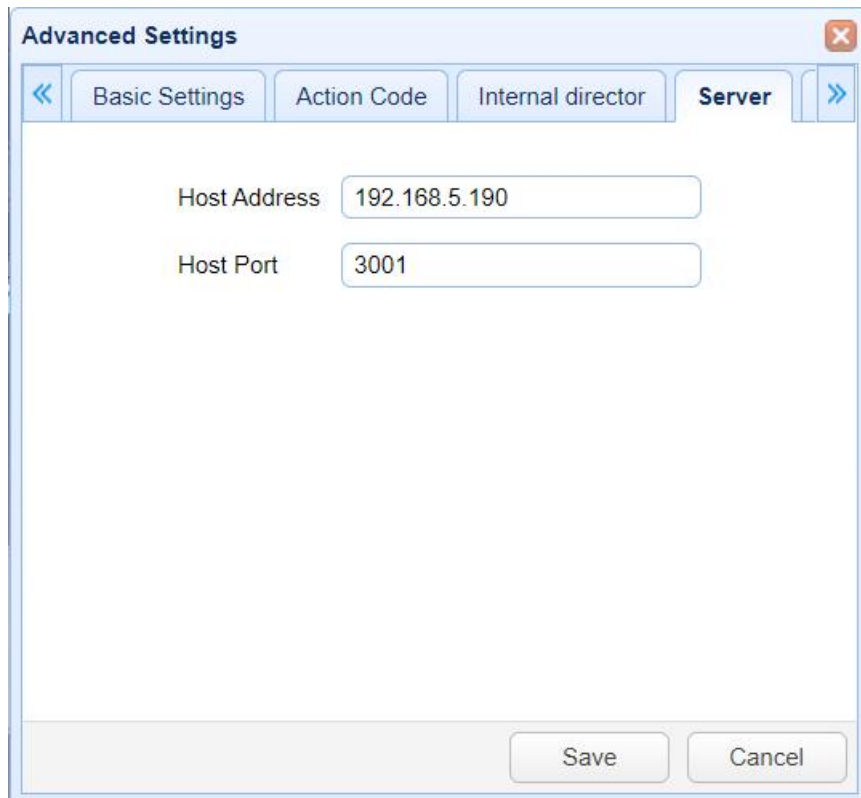


Figure 6-3 Operating interface

2. Internal Broadcasting Configuration

Through the advanced parameters in the browser interface, internal broadcast codes can be edited as needed. Navigate to Advanced Parameters -> Internal Broadcasting;

Student IP Address: Enter the IP address of the student tracking camera here. When obtaining the broadcast stream, it enables the switching between the close-up view of the teacher tracking camera and the close-up/panoramic view of the student tracking camera.

After making the modifications, click "Save", as shown below:

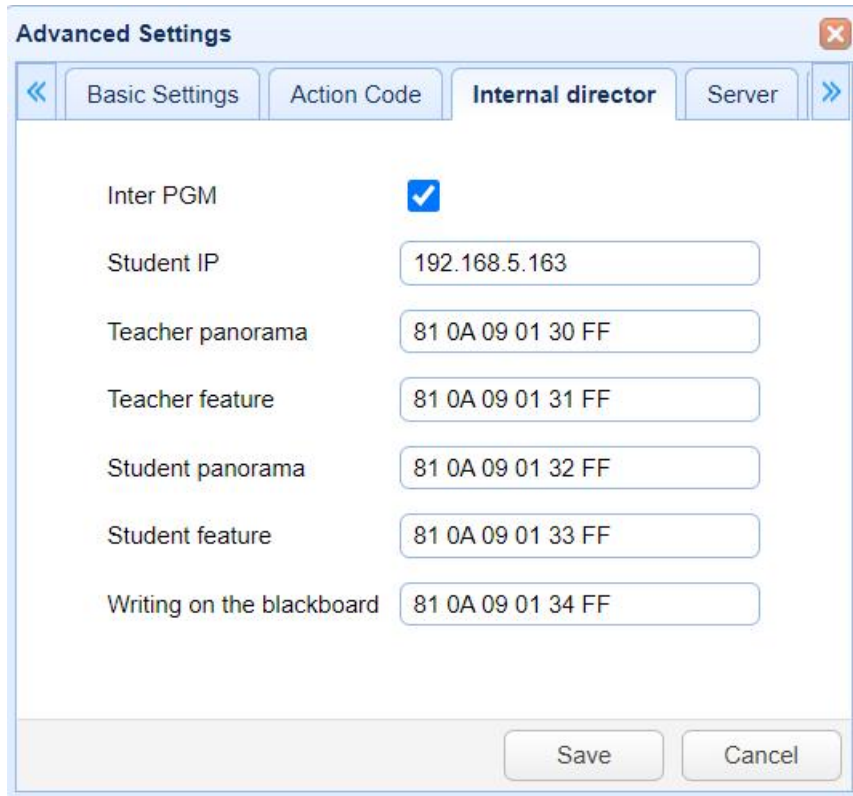


Figure 6-3 Operating interface

Note: When the broadcast code is selected, action codes will not be sent.
If action codes need to be sent, the broadcast code selection must be canceled.

6.2 Student's Tracking Camera Setup

6.2.1 Auto tracking control

The recording and broadcasting host sends commands through the LAN network interface to control the student tracking cameras to automatically track movements. In the automatic tracking state, the camera PTZ rotation and zoom cannot be controlled through the PTZ control on the browser interface or the remote control; when the automatic tracking is stopped, the PTZ can be controlled through the PTZ control on the browser interface or the remote control Rotate and zoom.

1. Network receiving address: IP address for student tracking camera

2.Command

Type	Command
Start student tracking	AA 40 01 00
Stop student tracking	AA 40 01 01

6.2.2 Action Code Docking

The tracking status of the student tracking camera will be continuously fed back to the lecture host in real-time via network (UDP/TCP/serial port transmission) in the form of action codes.

1. Configure recording host address

If recording host uses LAN to receive action code, then it needs to configure host address by browser interface configuration tool. Click Advanced parameters ->Server, as shown below:

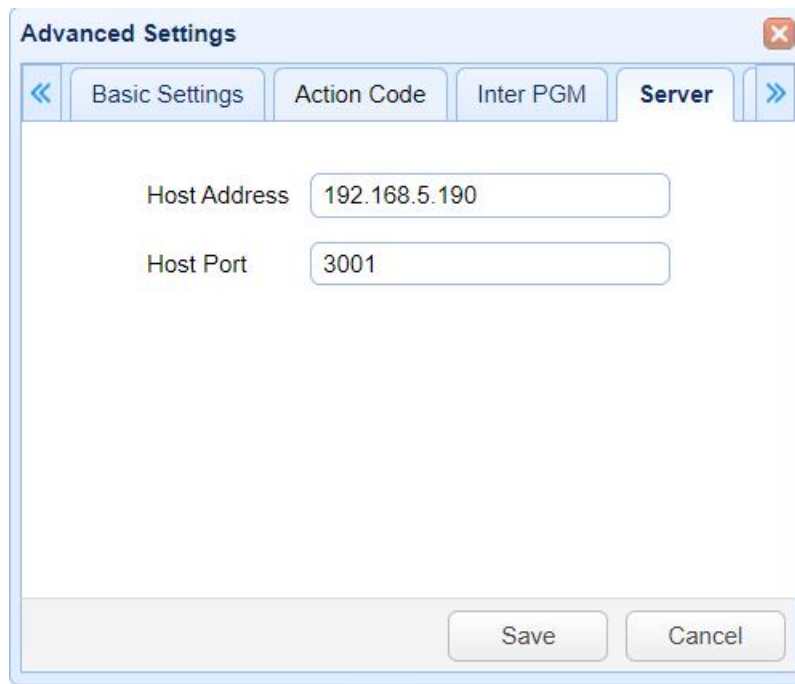


Figure 6-4 Operating interface

2. Configure action code

Through the advanced parameters in the browser interface, action codes can be edited as needed. Click Advanced parameters ->action codes,

After modification, click "Save", as shown below:

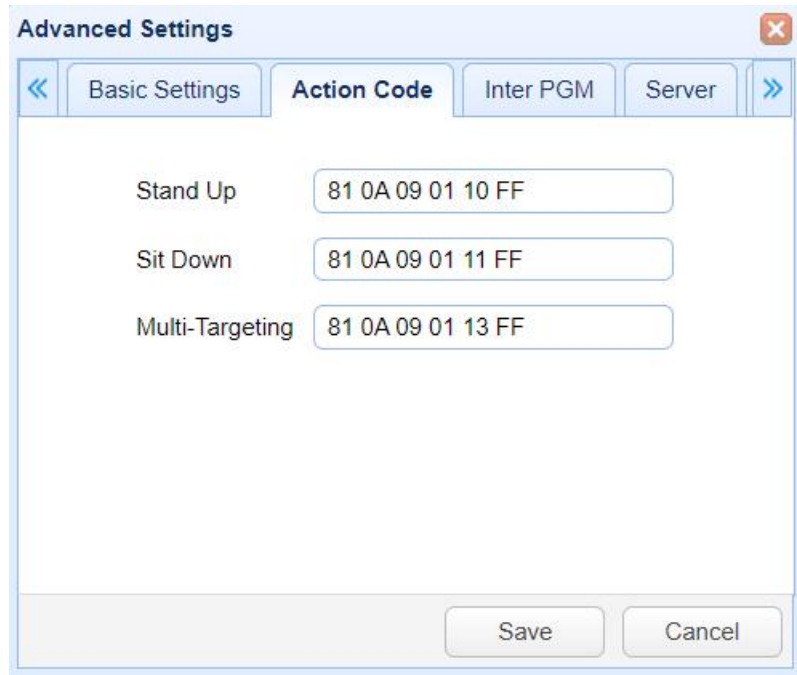


Figure 6-5 Operating interface

6.2.3 Internal Live Streaming Integration

The broadcast status of the student tracking camera will be fed back to the teacher tracking camera in real-time via the network.

1. Server Address Configuration for Teacher Tracking Camera IP

Configure the IP address of the teacher tracking camera through the browser interface. Click on Advanced Parameters -> Server, as shown below:

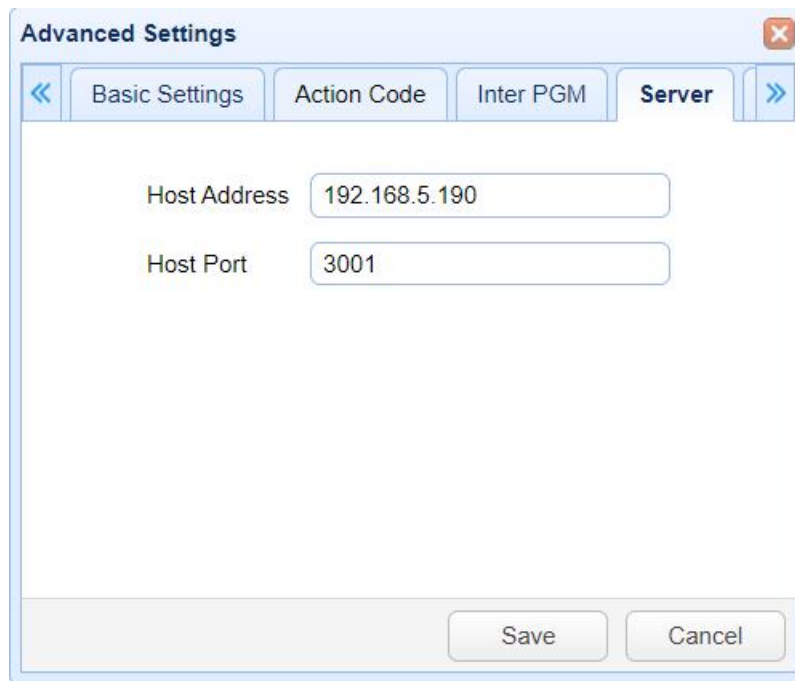


Figure 6-6 Operating interface

2. Internal Broadcasting Configuration

You can enable the internal broadcast function as per your needs by configuring it in the browser interface under Advanced Parameters. Follow the steps: Advanced Parameters -> Internal Broadcast;

Internal Broadcast: select checked.(Not checked by default)

After modification, click “Save”, as shown below:

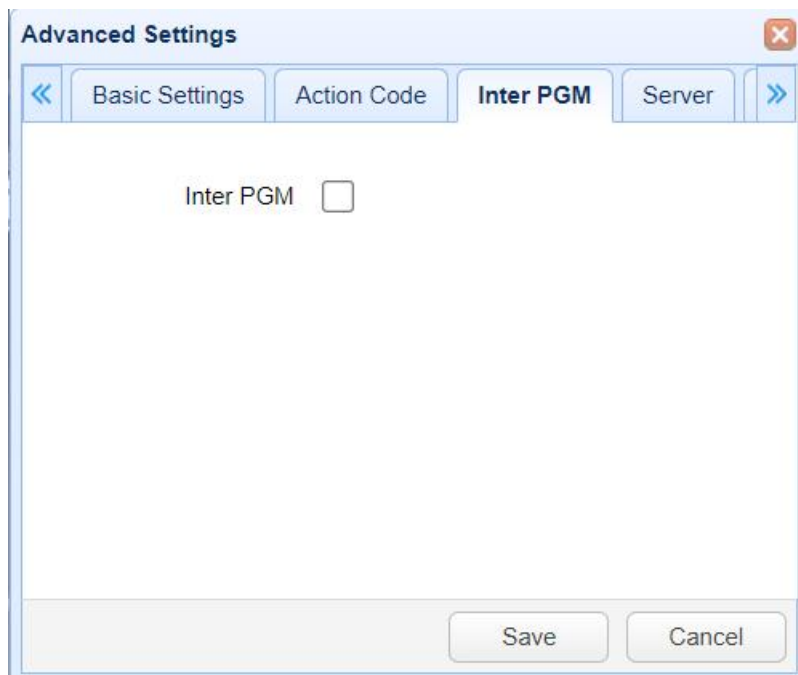


Figure 6-7 Operating interface

Note: When the broadcast code is selected, action codes will not be sent.
If action codes need to be sent, the broadcast code selection must be canceled.

7 Description of remote control

7.1 Remote Control Key Introduction



1、 Standby key

Long press standby key for 3s, camera enters standby mode, long press, this key again for 3s, camera will perform self-inspection again and return to HOME position. When setting #0 as preset, when there is no action within 12s, the holder will return to #0 preset.

2、 Select camera

Select address number of camera to be controlled.

3、 Number key

Set or call #0-9 preset.

4、 *key and #key

5、 Focusing control key: adjust focusing.

[Auto focusing]: Enter auto focusing mode

[Manual focusing]: shift camera focusing mode to manual; adjust focusing via [Focusing +] or [Focusing -]

6、 Zoom key

[Zoom +]: zoom out lens; [Zoom -]: zoom in lens

7、 Set and clear preset key

Set preset : Save a preset, set preset + number key (0-9), that is set preset of corresponding number key;

Cancel preset: Cancel a preset, cancel preset + number key (0-9), that is cancel preset of corresponding number key;

8、 PTZ control buttons

(Up, Down, Left, Right) arrow: control the pan/tilt to rotate up, down, left, and right.

【HOME】 key: Holder returns to center position or enters the next level menu.

9、 Backlight compensation control key

Backlight on/off: Turn on or off backlight.

10、 Menu key: Enter/exit OSD menu or return to previous level menu.

11、 Set infrared remote control address of camera

【*】 + 【#】 + 【F1】 : 1 address 【*】 + 【#】 + 【F2】 : 2 address

【*】 + 【#】 + 【F3】 : 3 address 【*】 + 【#】 + 【F4】 : 4 address

12、Combination key functions

- | | |
|---|--|
| 1) 【#】 + 【#】 + 【#】 : Cancel all presets | 2) 【*】+【#】+【6】 : Restore factory settings |
| 3) 【*】 + 【#】 + 【9】 : Shift between front and upside down installation | 4) 【*】 + 【#】 + auto: Enter aging mode |
| 5) 【*】 + 【#】 + 【3】 : Set menu into Chinese | 6) 【*】 + 【#】 + 【4】 : Set menu into English |
| 7) 【*】+【#】+ manual: Restore default IP, user name, password | 8) 【#】 + 【#】 + 【0】 : Shift video format 1080P60 |
| 9) 【#】+【#】+【1】 : Shift video format 1080P50 | 10) 【#】 + 【#】 + 【2】 : Shift video format 1080P30 |
| 11) 【#】+【#】+【3】 : Shift video format 1080P25 | 12) 【#】 + 【#】 + 【4】 : Shift video format 720P60 |
| 13) 【#】 + 【#】 + 【5】 : Shift video format 720P50 | 14) 【#】 + 【#】 + 【6】 : Shift video format 1080I60 |
| 15) 【#】+【#】+【7】 : Shift video format 1080I25 | 16) 【#】 + 【#】 + 【8】 : Shift video format 720P60 |
| 17) 【#】 + 【#】 + 【9】 : No video format output | |

7.2 Use of remote control

After normal start of the camera, it receives infrared command and execute. Press down remote control key, receiving indicator of remote control flashes, release the key, the indicator stops flashing. User can set preset, read position, horizontal and vertical motion by infrared remote control.

Description of keys :

1、 Key press mentioned in this manual means press and release the key on remote control. For example, “press [HOME] key” means press down [HOME] key and release. If long press is needed, it will be specified specially.

2、 Operation of combination keys mentioned in this manual means operating such keys in order. For example, “press [*] + [#] + [F1]” means press [*] first, then [#], and [F1] at last.

1) Select camera



Select address number of camera to be controlled.

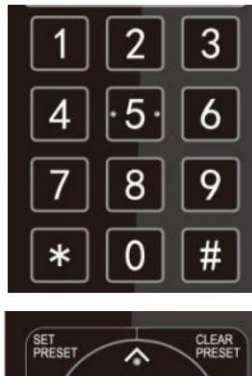
2) PTZ Control



Rotate upward: Press 【▲】 rotate downward: Press 【▼】 Rotate to left: Press 【◀】 rotate to right: Press 【▶】 Center position:

Press **【HOME】** Long press UDLR key, it will rotate from low speed to high speed continuously, until it reaches the destination; release in the middle of the journey, it will stop movement.

3) Set, cancel, call preset



1. Save preset: Press [Set preset], then press any number key from 0 to 9, it will reset a preset corresponding to the number key.

Note: with remote control, it can set 10 presets at most.

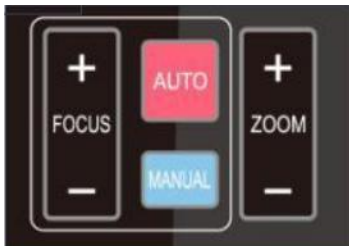
2. Call preset: Press number key 0~9 directly, it will call preset which has been saved.

Note: If this key has no preset, this operation is invalid.

3. Cancel preset: Press [cancel preset], then press any number from 0 to 9, it will cancel preset corresponding to the number.

Note: Press [#] three times in a row, it will cancel all presets.

4) Zoom Control



ZOOM+:press **【ZOOM+】** key to zoom in

ZOOM-:press **【ZOOM-】** key to zoom out

Press and hold the keys,the action will stop as soon as the key is released.

5) Focus Control



Auto:autofocus mode

Manual>manual focus mode

Focus+(near):Press **【FOCUS+】** key(Valid only in

Manual focus mode)

Focus-(far):Press **【FOCUS-】** key(Valid only in Manual focus mode)

Press and hold the keys,the action of focus will keep

Continue and stop as soon as the key is released.

7) Camera Remote Control Address Setting



【F1】 : Turn off Tracking

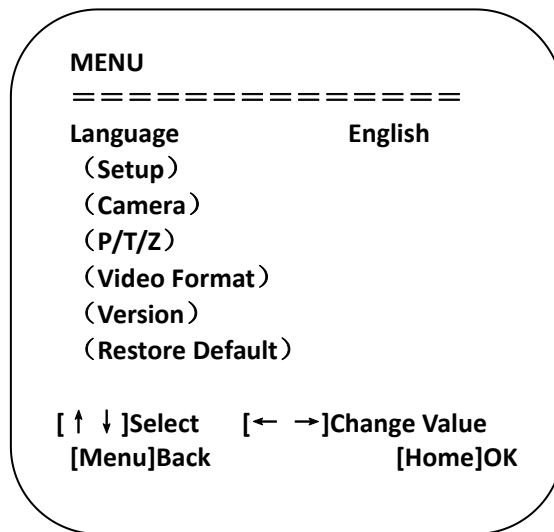
【F2】 : Turn on Tracking

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

8 Menu Setting

8. 1 Main Menu

In normal image, press [MENU] key, the screen displays the menu content, use the arrow to point to the desired item.



Language settings /Language: Select menu language, Chinese/English **Settings :** Enter submenu of system parameter settings

Camera parameters: Enter submenu of camera parameter settings

P/T/Z : Enter the PTZ parameter setting submenu

Version: Enter submenu of Version

Restore default: Enter restore default, select “yes” or “no” restore default

[↑↓] Select: Press [↑↓] to select menu item

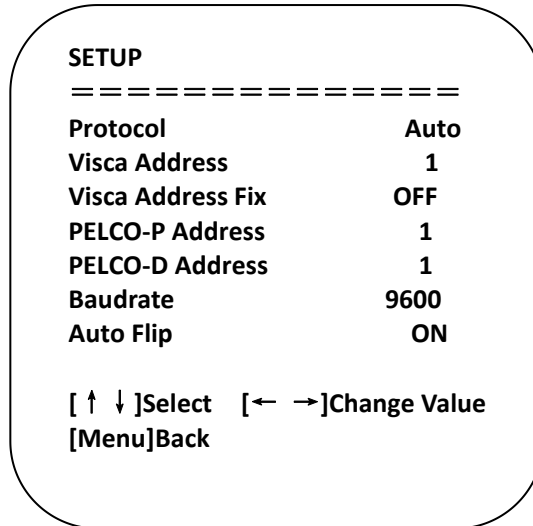
[← →] Change value: Press [←→] to change value

[Menu] return: Press menu key to return

[Home] confirm: Press [Home] key to confirm

8.2 System parameter settings

On the main menu, move the cursor to (Settings), press [HOME] key to enter Settings page, as shown below.



Protocol: Protocol Type
 VISCA/PELCO-P/PELCO-D/Auto

Baudrate:
 2400/4800/9600/38400/115200

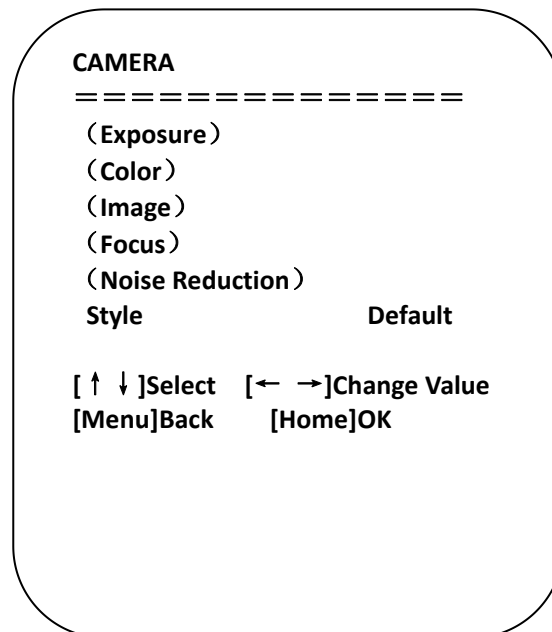
Automatic turnover: On/Off

Communication Address: VISCA=1~7; PELCO-P
 = 1~255; PELCO-D =1~255

VISCA Fixed Address: On/Off

8.3 Camera parameter settings

On the main menu, move the cursor to (CAMERA), press [HOME] key to enter CAMERA page, as shown below.



Exposure: Enter Exposure sub-menu

Image: Enter Image sub-menu

Color: Enter Color sub-menu

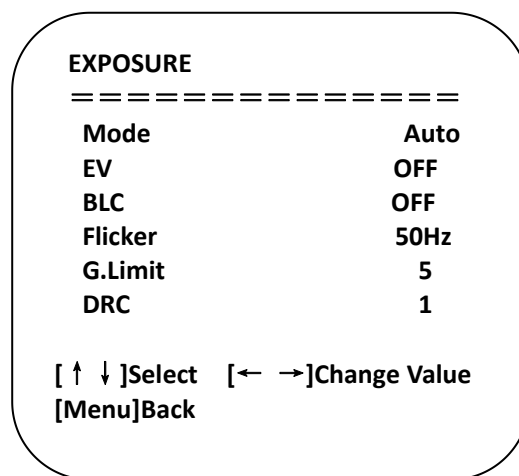
Focus: Enter Focus sub-menu

Noise Reduction: Enter Noise Reduction sub-menu

Style: Default, Standard, Bright, Clear, Soft

1) Exposure

On CAMERA menu, move the cursor to (EXPOSURE), press [HOME] key to enter exposure page, as shown below.



Mode: Auto, manual, shutter priority, aperture priority, brightness priority

EV: On/off (only valid in auto mode)

Compensation grade: -7~7 (only valid in auto mode when “EV” is on)

BLC: On/off (only valid in auto mode) **DRC:** 1~8, off

Anti-flicker: Off, 50Hz, 60Hz (valid in auto, aperture priority and brightness priority modes)

Gain Limit: 0~15 (valid in auto, aperture priority and brightness priority modes)

Gain: : 0~15 (valid in manual and shutter priority modes)

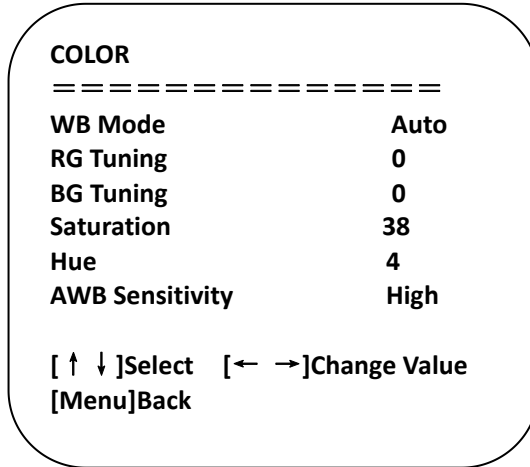
Shutter priority: 1/25、1/30、1/50、1/60、1/90、1/100、1/120、1/180、1/250、1/350、1/500、1/1000、1/2000、1/3000、1/4000、1/6000、1/10000 (valid in manual and shutter priority modes)

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 (valid in manual and aperture priority modes)

Brightness: 0~23 (only valid in brightness priority mode)

2) Color

On CAMERA menu, move the cursor to (COLOR), press [HOME] key to enter COLOR page, as shown below.



WB Mode: auto, manual, one-key white balance, specified color temperature

RG Tuning : -10~10 (only valid in auto mode) **BG Tuning :** -10~10(only valid in auto mode)

Red gain: 0~100 ((only valid in manual mode) **Blue gain:** 0~100 ((only valid in manual mode)

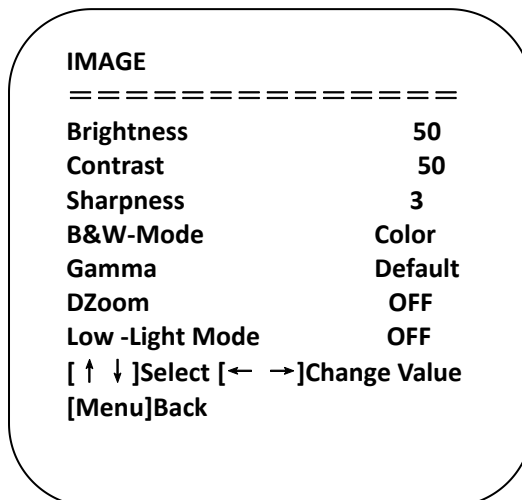
Saturation: 0~100 **Hue:**0~8

AWB Sensitivity: high, medium, low (only valid in auto mode)

Color Temperature: 2400K~7100K (Effective only in specified color temperature mode)

3) Image

On CAMERA menu, move the cursor to (IMAGE), press [HOME] to enter IMAGE page, as shown below.



Brightness: 0~100

Contrast: 0~100

Sharpness: 0~15

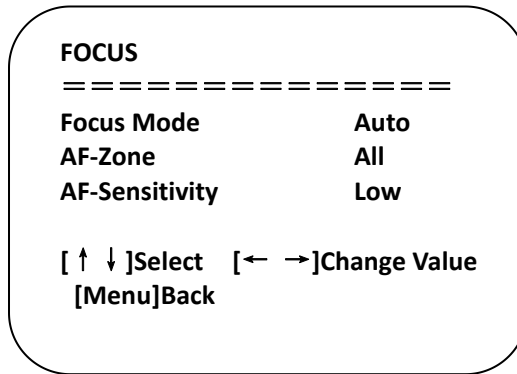
B&W-Mode: color, black

&white

Gamma: default、 0.45、 0.50、 0.55、 0.63 **DZoom:** On/Off

4) Focus

On CAMER menu, move the cursor to (FOCUS), press [HOME] key to enter FOCUS page, as shown below.



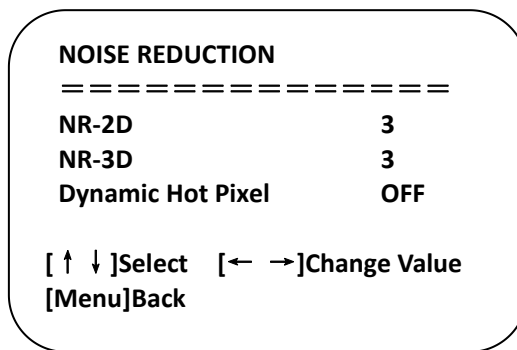
Focus mode : auto/manual/ One-click focusing

AF-Zone: up/center/low

AF-Sensitivity: high/medium/low

5) NOISE REDUCTION

On CAMERA menu, move the cursor to (Noise reduction), press [HOME] key to enter Noise reduction page, as shown below.



NR-2D: auto, off, 1~7

NR-3D: off, 1~8

Dynamic hot pixel:off、 1~5

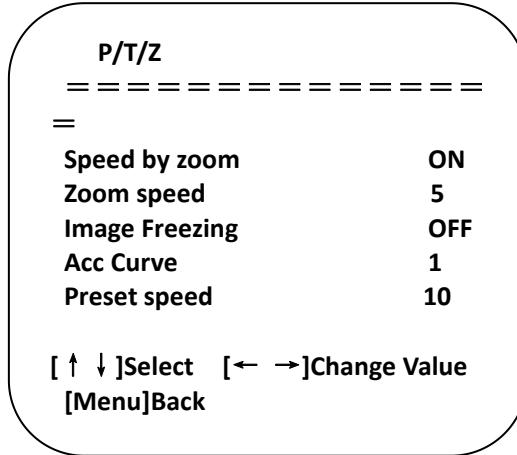
6) Style

Move the camera parameter menu pointer to "Style" and press the [← →] key to switch styles.

Style: Default/Standard/Clear/Bright/Soft

8. 4 P/T/Z

On the main menu, move the cursor to (P/T/Z), press [HOME] key to enter P/T/Z page, as shown below.



Speed by zoom : It only works on remote control, on, off; when camera zooms in, remote control will make holder rotate at lower speed.

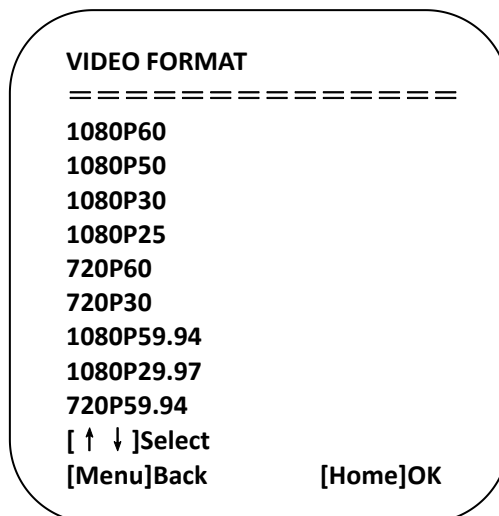
Zoom speed: Set speed for remote control camera zoom, 1~8 **Image freezing**: On/off

Acc Curve: Quick/slow

Preset speed: 1-10

8. 5 Video format

On the main menu, move the cursor to (VIDEO FORMAT), press [HOME] key to enter VIDEO FORMAT page, as shown below.



Note: only when rotation dial-up is at F will ST model menu show this item.
S version: 1080P60 downward compatibility; M version: 1080P30 downward compatibility
Change parameter value in the menu. To save value when power off, exit menu.

8. 6 Version

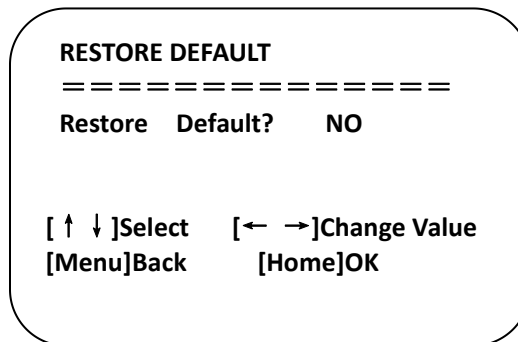
On the main menu, move the cursor to **(Version)**, press **[HOME]** key to enter Version page, version information varies from product model and date of production. Version information contains version number and version upgrade time.

MCU version: It displays MCU version information. **Camera version:** It displays camera version information. **Focus version:** It displays focus version information.

Note: The HDMI model also has a USB version (USB version-CAM1: Displays the USB version information of USB3.0 output 1, USB version-CAM2: Displays the USB version information of USB3.0 output 2)

8. 7 Restore default

- 1 On the main menu, move the cursor to (restore), press **[HOME]** key to enter Restore page, as shown below.



Restore default: Yes/no (color style and video format can't be restored default)

Note: If remote address used before is not 1, but any one from 2, 3 and 4, after restoring all parameters or system parameters, device address corresponding to the remote control will be reset to 1. At this moment, it is needed to change remote control address to 1, that is, press Camera and select [1], control will function.

9 VISCA protocol command list

When the camera is operated normally, we can control it via RS232C/RS485 port (VISCA IN). Parameters of RS232C serial port are as follows:

Baud rate: 2400/4800/9600/38400/115200 bit/s; start bit: 1 bit; digit bit: 8 bits; stop bit: 1 bit; verification bit: none

After powering on, camera rotates to left bottom first, and then returns to middle. Zoom lens zooms out to the furthest and zooms in to the nearest, and finishes self-inspection. If the camera saves #0 preset, after initialization, camera will go to #0 preset. Now user can use a serial port command to control the camera.

Return Command

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

z = Camera address +8

Error Messages		
	Command package	Notes
Syntax Error	z0 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted
Command Not Executable	z0 61 41 FF	Returned when a command cannot be executed due to current conditions. For example, when commands controlling the focus manually are received during auto focus.

Camera control command

Command	Function	Command package	Notes
AddressSet	Broadcast	88 30 01 FF	Address setting
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear
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	p = 0(low) - 7(high) pqrs: Zoom Position
	Tele(Standard)	8x 01 04 07 02 FF	
	Wide(Standard)	8x 01 04 07 03 FF	
	Tele(Variable)	8x 01 04 07 2p FF	
	Wide(Variable)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 0p 0q 0r 0s FF	
CAM_Focus	Stop	8x 01 04 08 00 FF	p = 0(low) - 7(high) pqrs: Focus Position
	Far(Standard)	8x 01 04 08 02 FF	
	Near(Standard)	8x 01 04 08 03 FF	
	Far(Variable)	8x 01 04 08 2p FF	
	Near (Variable)	8x 01 04 08 3p FF	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	
	Auto Focus	8x 01 04 38 02 FF	
Manual Focus	8x 01 04 38 03 FF		

Command	Function	Command package	Notes
CAM_ZoomFocus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position tuvw: Focus Position
CAM_WB	Auto	8x 01 04 35 00 FF	
	3000K	8x 01 04 35 01 FF	
	4000k	8x 01 04 35 02 FF	
	One Push mode	8x 01 04 35 03 FF	
	5000k	8x 01 04 35 04 FF	
	Manual	8x 01 04 35 05 FF	
	6500k	8x 01 04 35 06 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	
	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	Reset	8x 01 04 0C 00 FF	Gain Setting
	Up	8x 01 04 0C 02 FF	
	Down	8x 01 04 0C 03 FF	
	Direct	8x 01 04 0C 00 00 0p 0q FF	pq: 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

Command	Function	Command package	Notes
	Up	8x 01 04 0E 02 FF	Compensation Amount Setting
	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_NR (2D)		8x 01 04 53 0p FF	P=0-7 0:OFF
CAM_NR (3D)		8x 01 04 54 0p FF	P=0-8 0:OFF
CAM_Gamma		8x 01 04 5B 0p FF	p = 0 – 4 0: Default 1: 0.45 2: 0.50 3: 0.55 4: 0.63
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_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 4900 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% 10:160% 11:160% 12:180% 13:190% 14:200%
CAM_IDWrite		8x 01 04 22 0p 0q 0r 0s FF	pqrs: Camera ID (=0000 to FFFF)
SYS_Menu	ON	8x 01 04 06 06 02 FF	Turn on the menu screen
	OFF	8x 01 04 06 06 03 FF	Turn off the menu screen
IR_Receive	ON	8x 01 0608 02 FF	IR(remote commander)receive On/Off
	OFF	8x 01 0608 03 FF	
IR_ReceiveReturn	On	8x 01 7D 01 03 00 00 FF	IR(remote commander)receive message via the VISCA communication ON/OFF
	Off	8x 01 7D 01 13 00 00 FF	
CAM_SettingReset	Reset	8x 01 04 A0 10 FF	Reset Factory Setting

Command	Function	Command package	Notes
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_VideoSystem	Set camera video system	8x 01 06 35 00 0p FF	P: 0~E Video format 0:1080P60 8:720P30 1:1080P50 9:720P25 2:1080i60 A: 1080P59.94 3:1080i50 B: 1080i59.94 4:720P60 C: 720P59.94 5:720P50 D: 1080P29.97 6:1080P30 E: 720P29.97 7:1080P25
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	
	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	
	AbsolutePosition	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	RelativePosition	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 07000W 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 07010W 07 0F 0F 0F 07 0F 0F 0F FF	

Search Command

Command	Command package	Return package	Notes
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_FocusAFModelInq	8x 09 04 38 FF	y0 50 02 FF	Auto Focus
		y0 50 03 FF	Manual Focus
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_WBModelInq	8x 09 04 35 FF	y0 50 00 FF	Auto
		y0 50 01 FF	3000K

		y0 50 02 FF	4000K
		y0 50 03 FF	One Push Mode
		y0 50 04 FF	5000K
		y0 50 05 FF	Manual
		y0 50 00 FF	6500K
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_BrightPosInq	8x 09 04 4D FF	y0 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompModelInq	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_BacklightModelInq	8x 09 04 33 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_NRLevel(2D) Inq	8x 09 04 53 FF	y0 50 0p FF	P: 2DNRLLevel
CAM_NRLevel(3D) Inq	8x 09 04 54 FF	y0 50 0p FF	P:3D NRLevel
CAM_FlickerModelInq	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_PictureEffectModelInq	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_MenuModelInq	8x 09 0606 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
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	p: Gamma ID
IR_ReceiveInq	8x 09 0608 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_BrightnessInq	8x 09 04A1 FF	y0 50 00 00 0p 0q FF	pq: Brightness Position
CAM_ContrastInq	8x 09 04A2 FF	y0 50 00 00 0p 0q FF	pq: Contrast Position
CAM_FlipInq	8x 09 04A4 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 ST (0951) U3 (3950) rs tu : ARM Version vw : reserve
VideoSystemInq	8x 09 06 23 FF	y0 50 0p FF	P: 0~E Video format 0:1080P60 8:720P30 1:1080P50 9:720P25 2:1080i60 A: 1080P59.94 3:1080i50 B: 1080i59.94 4:720P60 C: 720P59.94 5:720P50 D: 1080P29.97 6:1080P30 E: 720P29.97 7:1080P25
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	y0 50 ww zz FF	ww: Pan Max Speedzz: Tilt Max Speed
Pan-tiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	www: Pan Positionzzzz: Tilt Position

Note: [x] on table above means address of camera to be operated, [y] = [x+8].

10 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

11 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

12 Maintenance and troubleshooting

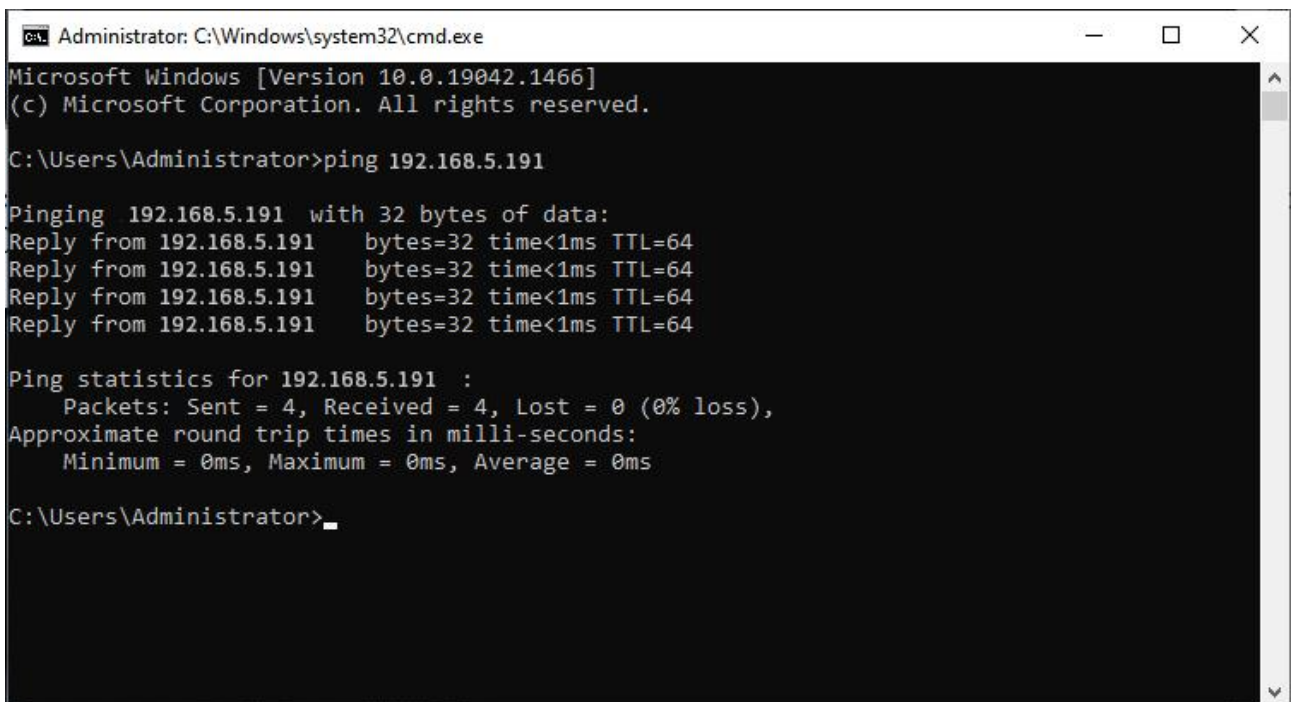
12.1 Maintenance

- 1) Please disconnect power of camera if it is not in long-term use. Meanwhile, disconnect AC power adapter from AC socket.
- 2) To avoid scratch, use soft cloth or cotton to wipe off dust on camera case.
- 3) Please clean camera lens with dry soft cloth. If stain persists, use mild detergent to wipe gently. Do not use strong or corrosive detergent which may scratch the lens and affect image result.

12.2 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 dial switch at the bottom is in normal operating mode (refer to Table 2.2 and Table 2.3)
d、 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 camera is in normal operating mode (refer to table 2.2 and table 2.3)
d、 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.

- d. Check if camera is in normal operating mode (refer to table 2.2 and table 2.3)
- 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 192.168.5.191, press Enter, information below means network connection functions well.



```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.19042.1466]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Administrator>ping 192.168.5.191

Pinging 192.168.5.191 with 32 bytes of data:
Reply from 192.168.5.191    bytes=32 time<1ms TTL=64
Reply from 192.168.5.191    bytes=32 time<1ms TTL=64
Reply from 192.168.5.191    bytes=32 time<1ms TTL=64
Reply from 192.168.5.191    bytes=32 time<1ms TTL=64

Ping statistics for 192.168.5.191  :
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Administrator>
```