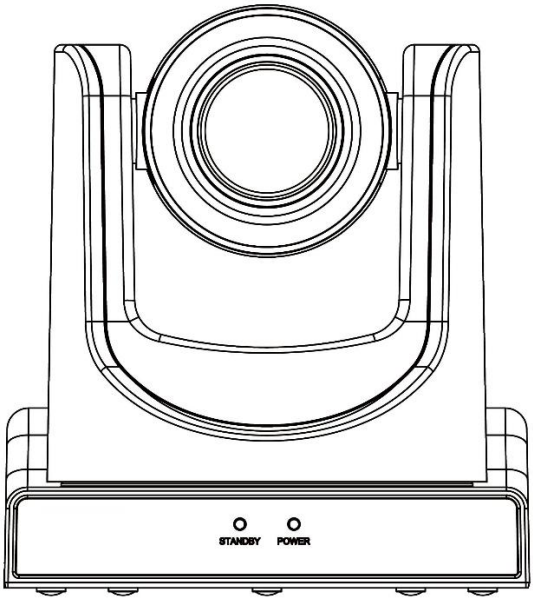
CAVE-TEK

P12i/P20i/P30i Tracking Camera



User Guide
English (V1)

Table of content

1 Packing List 1
2 Quick Start 1
3 About CAVE Camera 2
3.1 Interfaces 2
3.2 Dimension 2
3.3 Remote Control 3
3.4 RS-232 Interface 4
3.5 Serial Communication Control 4
4 GUI Settings 5
4.1 MENU 5
4.2 EXPOSURE 5
4.3 COLOR 6
4.4 IMAGE 6
4.5 DISPLAY 7
4.6 P/T/Z 7
4.7 COMMUNICATION SETUP 7
4.8 AI SETUP 8
4.9 Language 8
4.10 RESTORE DEFAULT 9
5 Network Function 10
5.1 Operating Environment 10
5.2 Equipment Installation 10
5.3 Internet Connection 10
5.4 Camera controlled by LAN 10
5.4.1 Setup IP address 10
5.4.2 Login IP Camera admin 11
5.4.3 Open Network stream with VLC player 12
5.5 Camera Setup 13
5.5.1 Homepage Introduction 13
5.5.2 Video Settings 15
5.5.3 Image Settings 16
5.5.4 Audio Settings 17
5.5.5 System Settings 18
5.5.6 Network Settings 18
5.5.7 Device Information 19

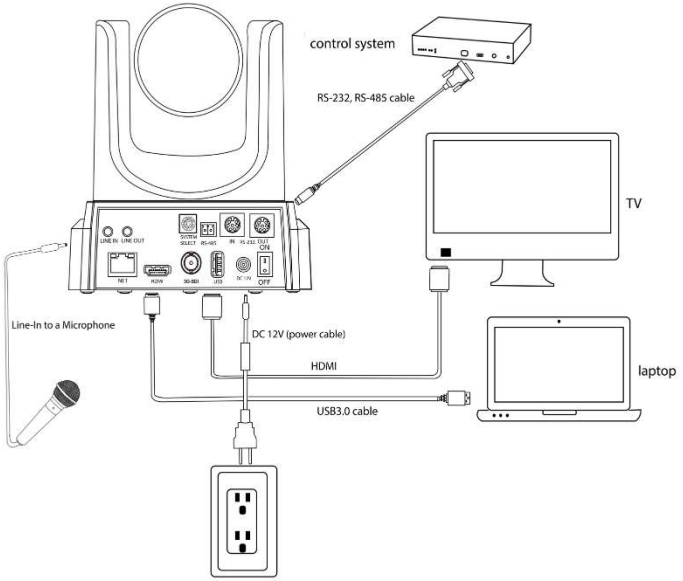
1 Packing List

Open the box, you will find below items:

Name	Quantity
CAVE-TEK Camera	1
AC Power Adaptor	1
Power Cable	1
USB Cable	1
Remote Control	1
Quick Installation Guide	1

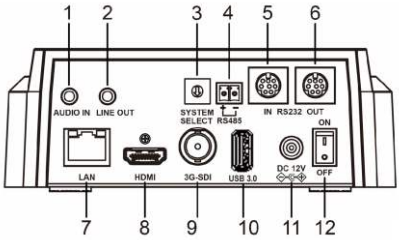
2 Quick Start

1) Please check below connection diagram first.
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 boot up to the initialization position. 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, Camera will be moved to preset 0)



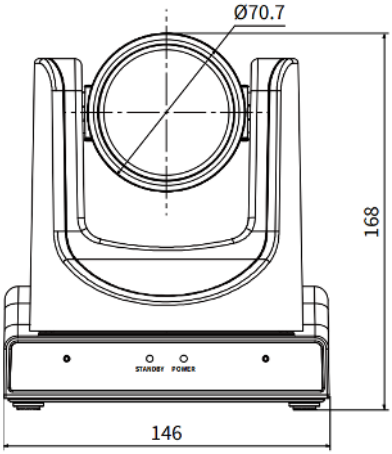
3 About CAVE Camera

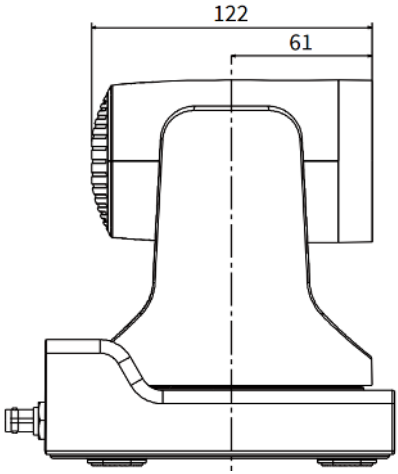
3.1 Interfaces



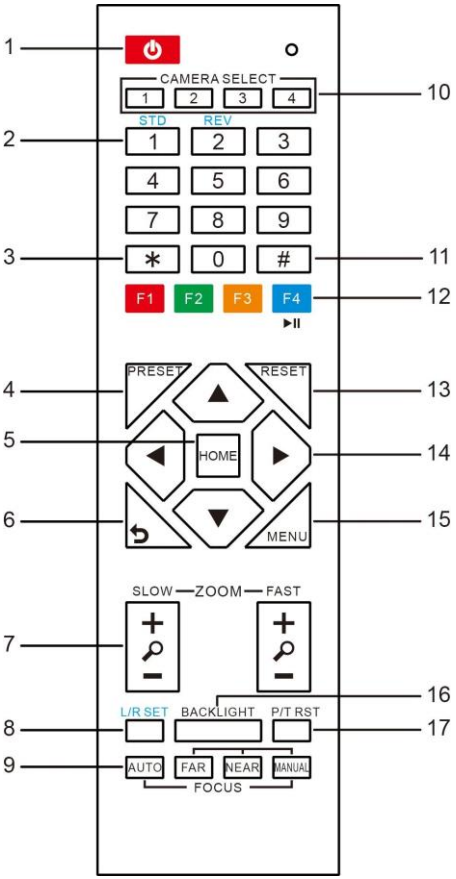
Item	Name
1	AUDIO IN Interface
2	LINE OUT Interface
3	SYSTEM SELECT
4	RS-485 Interface
5	RS232 IN Interface
6	RS232 OUT Interface
7	Network Interface
8	HDMI Interface
9	3G SDI Interface
10	USB 3.0 Interface
11	DC12V Interface
12	POWER SWITCH

3.2 Dimension





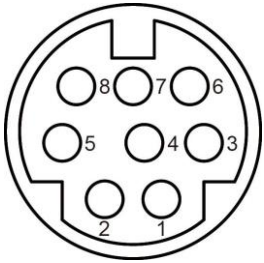
3.3 Remote Control



Key Description
1. Standby Key
Press this button to enter standby mode. Press it again to enter normal mode.
2. Number Key
To set preset or call preset.
3. *Key
To configure the special function key.
4. Preset Key
Set preset: Store a preset position. [SET PRESET] + Numeric button (0-9): Setting a corresponding numeric key preset position.
5. HOME Key
Confirm the selection, or move the camera back to the middle position
6. Return Key
Return to the previous menu

7. Zoom Key
Slow Zoom: Zoom In [+] or Zoom Out [-] slowly Fast Zoom: Zoom In [+] or Zoom Out [-] fast
8. Left/Right Setting Key
Press with 1 button and 2 buttons setting the direction of the Pan-Tilt. ● Simultaneously press L/R Set +1[STD]: set the Pan-Tilt to turn the same direction as the L/R Set. ● Simultaneously press L/R Set +2[REV]: set the Pan-Tilt to turn the opposite direction as the L/R Set.
9. Focus Key
To adjust the focus. Press [AUTO] adjust the focuses on the center of the object automatically. Or to adjust the focus manually. Press [MANUAL] adjusts the focus on the center of the object manual.
10. Selection Key
Press the button corresponding to the camera you want to operate with the remote controller.
11. #Key
To configure the special function key.
12. IR Remote Control Key
[F3]: Start AI Tracking [F4]: Stop AI Tracking [*]+[＃]+[F1] [F2] [F3] [F4]: Assign Cam 1,2,3,4
13. Reset Key
Clear preset: Erase a preset position. [CLEAR PRESET] + Numeric button (0-9) Or: [*]+[#]+[CLEAR PRESET]: Erase all the preset individually.
14. PTZ Control Key
Press arrow buttons to perform panning and tilting. Press [HOME] button to face the camera back to front.
15. Menu Key
MENU: enter or exit OSD MENU.
16. Backlight Key
BLC ON/OFF: Press this button to enable the backlight compensation. Press it again to disable the backlight compensation.
17. PTZ Reset Key
Preset Pan/Tilt self-test.
18. Special Function Key
[*]+[＃]+[1]: Change OSD menu to English [*]+[＃]+[4]: Display current IP address [*]+[＃]+[6]: Reset to system defaults [*]+[＃]+[8]: Display camera firmware Info. [*]+[＃]+[9]: set mounting mode (normal / vertical flip) [＃]+[*]+[4]: Set Network configuration to DHCP [*]+[＃]+[Manual]: Reset network to default. [*]+[＃]+[F1]: Assign Camera to IR Address 1 [*]+[＃]+[F2]: Assign Camera to IR Address 2 [*]+[＃]+[F3]: Assign Camera to IR Address 3 [*]+[＃]+[F4]: Assign Camera to IR Address 4

3.4 RS-232 Interface



No.	Function
1	DTR
2	DSR
3	TXD
4	GND
5	RXD
6	GND
7	IR OUT
8	NC

The correspondence between the camera and Windows DB-9 pin:

Camera	Windows DB-9
1.DTR	1.CD
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

The correspondence between the camera and the Mini DIN pin:

Camera	Mini DIN
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.NC
8.NC	8.NC

3.5 Serial Communication Control

- **RS232 Communication Control**

The camera is controlled via RS232. The RS232 serial port parameters are as follows:
Baud rate: 2400/4800/9600/38400 bit/s;
Starting Position: 1 bit
Data bit: 8 bits
Stop bit: 1 bit
Check digit: None

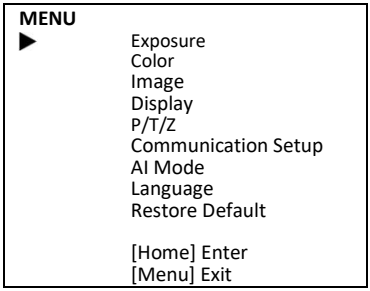
- **List of protocols**

For a detailed list of VISCA/Pelco-D/Pelco-P protocols, please check www.cave-tek.com.

4 GUI Settings

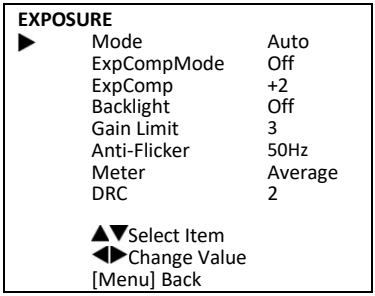
4.1 MENU

Press the [MENU] button to display the main menu on the display, using the arrow button to move the cursor to the item. Press the [HOME] button to enter the corresponding sub-menu.



4.2 EXPOSURE

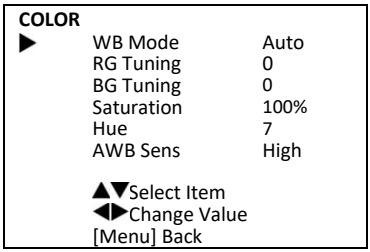
Move the main menu cursor to [EXPOSURE], and press [HOME] key enter the exposure page, as shown in the following figure.



Mode: Exposure mode, Auto, Manual, SAE, AAE, Bright.
ExpCompMode: Exposure the compensation mode, On, Off (Effective only in Auto mode).
ExpComp: Exposure the compensation value. Value: -7~7 (Effective only in ExpCompMode item to On).
Backlight: Set the backlight compensation, On, Off (Effective only in Auto mode).
Bright: Intensity control, 0~17 (Effective only in Bright mode).
Gain Limit: Maximum gain limit, 0 ~ 15 (Effective only in Auto, SAE, AAE, Bright mode).
Anti-Flicker: Anti-flicker, Off, 50Hz, 60Hz (Effective only in Auto, AAE, Bright mode).
Meter: Average, Center, Smart, Top.
Gain: 0 ~ 7 (Effective only in Manual mode).
DRC: DRC strength, optional items: 0 ~ 8.

4.3 COLOR

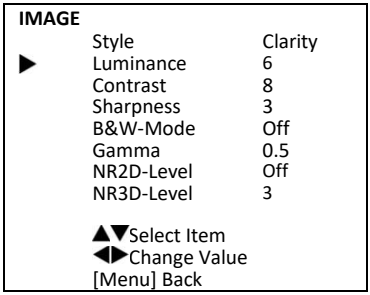
Move the main menu cursor to [COLOR], and press [HOME] key enter the color page, as shown in the following figure.



WB-Mode: White balance mode: Auto, Indoor, Outdoor, One Push, Manual, VAR.
RG Tuning: Red gain fine-tuning: -10 ~ +10 (Effective only in Auto, One Push, VAR mode).
BG Tuning: Blue gain fine-tuning: -10 ~ +10 (Effective only in Auto, One Push, VAR mode).
Saturation: 60% ~ 200%.
Hue: 0 ~ 14.
AWB Sens: The white balance sensitivity: Low, Middle, High.
RG: Red gain: 0~255 (Effective only in Manual mode).
BG: Blue gain: 0~255 (Effective only in Manual mode).
Colortemp: 2500K ~ 8000K (Effective only in VAR mode).

4.4 IMAGE

Move the main menu cursor to [IMAGE], and press [HOME] key enter the image page, as shown in the following figure.



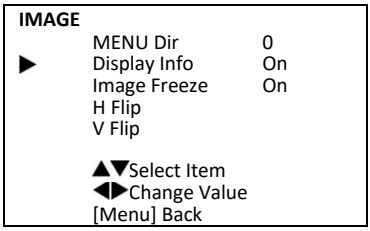
Style: Default.

Luminance: 0 ~ 14.
Contrast: 0 ~ 14.
Sharpness: Auto, 0 ~ 15.
B&W-Mode: On, Off.
Gamma: Default, 0.45, 0.5, 0.56, 0.63.

NR2D Level: 2D noise reduction: Off, Auto, 1 ~ 5.
NR3D Level: 3D noise reduction: Off, 1 ~ 8.

4.5 DISPLAY

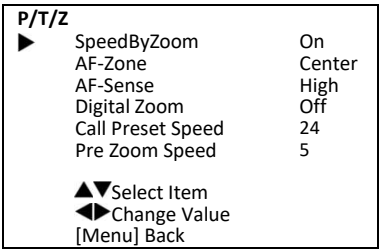
Move the main menu cursor to [DISPLAY], and press [HOME] key enter the image page, as shown in the following figure.



Menu Dir: 0,90, 180, 270.
Display Info: On, Off.
Image Freeze: On, Off.
Flip-H: On, Off.
Flip-V: On, Off.

4.6 P/T/Z

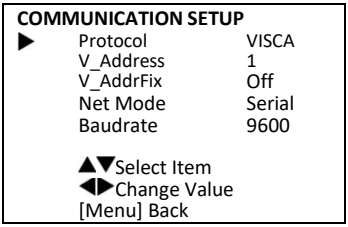
Move the main menu cursor to [P/T/Z], and press [HOME] key enter the P/T/Z page, as shown in the following figure.



SpeedByZoom: The depth of field scale switch: On, Off.
AF-Zone: Interested in focusing area: Top, Center, Bottom.
AF-Sense: Automatic focusing sensitivity options: Low, Normal, High.
Digital Zoom: Off, 2x, 4x, 8x, 16x.
Call Preset Speed: 1 ~ 24.
Pre Zoom Speed: 0 ~ 7.

4.7 COMMUNICATION SETUP

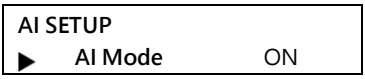
Move the main menu cursor to [COMMUNICATION SETUP], and press [HOME] key enter the communication setup page, as shown in the following figure.



Protocol: Control protocol type: Auto, VISCA, PELCO-D, PELCO-P.
V_Address: 1 ~ 7. (Effective only in Auto, VISCA protocol).
V_AddrFix: On, Off (When set to On, useless in 88 30 01 FF Command).
P_D_Address: 0 ~ 254. (Effective only in PELCO-D protocol).
P_P_Address: 0 ~ 31. (Effective only in PELCO-P protocol).
Net Mode: Set the serial port network control: Serial, Paral.
Baudrate: Serial port baud rate: 2400, 4800, 9600, 38400.

4.8 AI SETUP

Move the main menu cursor to [AI SETUP], and press [HOME] key enter the setup page, as below.



AI Mode: Off, Single Tracking, Auto Framing, Demo.

Single Tracking Mode: Camera will analyze the person object from the camera image based on the AI technology then follow the target object automatically.

Auto Framing Mode: Camera will analyze the person object from the camera image based on the AI technology then framing the attendees automatically.

Demo Moe: Camera will analyze the person object from the camera image based on the AI technology then list all available object automatically.

INSTALL and SETUP:

A. **Install** Install the camera in the back of the room (Recommendation: Distance from the object 4 meters and the above · Height 200-250 cm)

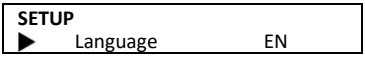
B. **Setup** Turn on the [Tracking Mode] from the menu.

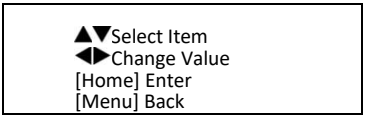
C. **Start Tracking** Press [F3] button to start the tracking feature, it will show a red rectangle on the available person, move the left/right arrow to select the target object, then press[Home] again to start the tracking. When the target object leave the room, the camera will switch to another object automatically or return to the standby area (Preset 0)

D. **Stop Tracking** Press [F4] button to stop the tracking feature.

4.9 Language

Move the main menu cursor to [Language], and press [HOME] key enter the setup page, as below.

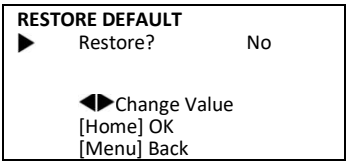




Language: EN, Chinese, Russian.

4.10 RESTORE DEFAULT

Move the main menu cursor to [RESTORE DEFAULT], and press [HOME] key enter the restore default page, as shown in the following figure.



Restore: Confirm restore factory settings: Yes, No.
Note: Press [HOME] button to confirm, all parameter restore default, include IR Remote address and VISICA address.

5 Network Function

5.1 Operating Environment

Operating System: Windows 7/8/10, Mac OS X, Linux, Android
Network Protocol: TCP/IP
System Requirement: Intel Duo Core /256M RAM/40G HDD/ Graphics card support DirectX 9.0 or later version.

5.2 Equipment Installation

1) Connect internet camera to your internet or to your PC directly via network cable.
2) Turn on DC 5V power.
3) If the network connection is normal, the connection light (green) at the network interface will light up within 5 seconds. The data indicator (orange) will flash, indicating that the camera's physical connection has been completed.

5.3 Internet Connection

There are two main ways to connect network camera.

Connect by Network Cable

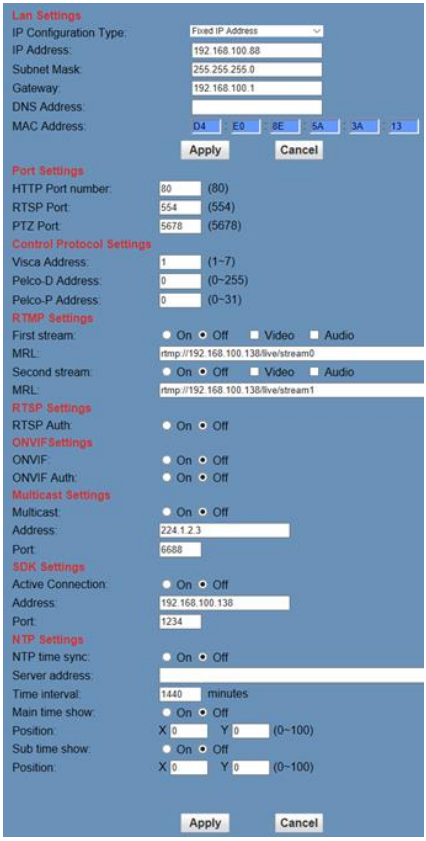
Connect by Switch/Router

5.4 Camera controlled by LAN

5.4.1 Setup IP address

If you don't know the camera IP, view as below:
Method 1: Press * and # and 4 on the remote controller one by one; the camera IP address will be shown on screen.

Change IP address, two methods as below:
Method 1: Login to the web page, select "Network > Lan Settings," change IP address. Click "Apply" then restart the camera.
Method 2: Press * and # and Manual on the remote controller one by one; the camera IP address will restore to the default IP address (192.168.100.88).



Note: IP camera default IP address "192.168.100.88", the username is "admin", password is "admin".

5.4.2 Login IP Camera admin

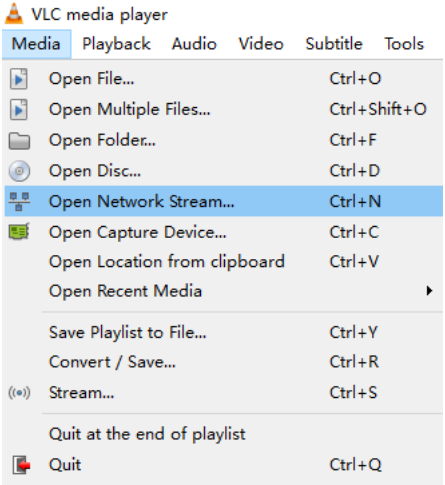
Enter 192.168.100.88 on browser, a login window pop up, input login name: admin, password: admin, shown as below:

After login, shown as below:

5.4.3 Open Network stream with VLC player

Step 1 Open VLC media player.

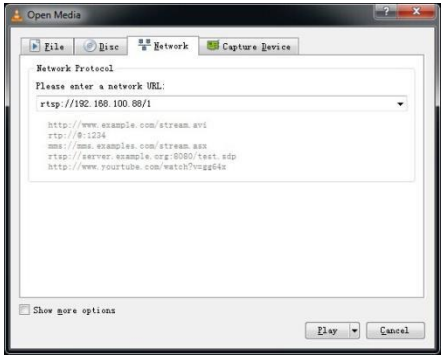
Step 2 Click "Media > Open Network Stream", or click "Ctrl + N"; as below:



Step 3 Input URL address:
rtsp://ip: port number/1 (First stream);
rtsp://ip: port number/2 (Second stream).

Step 4 Finish.

Note: RTSP default port number 554.



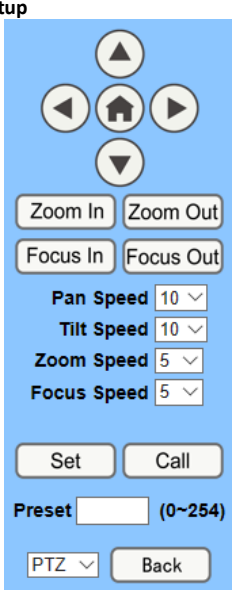
5.5 Camera Setup

5.5.1 Homepage Introduction

A. Preview window

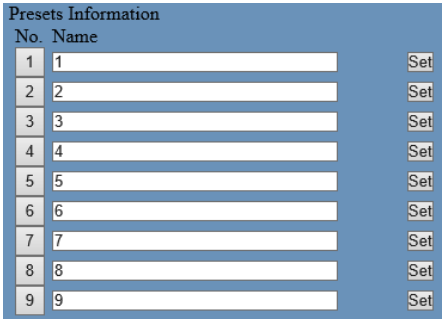
1) Video playback pause button: control real-time video pause, stop the last picture, click recoverable video again.
2) Audio control buttons: can set silent mode.
3) Full-screen switch button.

B. PTZ Setup



PTZ direction control box: Up, down, left, right, home button as above.
Rate: Pan Speed can be chosen as 1 ~ 24, Tilt Speed can be chosen as 1 ~ 20.
Select the corresponding speed and click the direction button to realize PTZ speed up or speed down.
Zoom In/Zoom out: For zooming in or zooming out. Focus In/Focus Out: Focusing on distant the objects or focusing on close the objects.
Set/Call: When PTZ turns to the expected position, set up the preset that the user wants as below.
Method 1: Type a number into the Preset box.

Method 2: Type the name into the Presets Information.

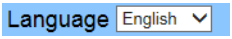


Click "Set" button, when PTZ turn to other position, click "Call" button or click "No." of the Presets Information, PTZ will turn back to preset position.

PTZ / MENU: When system in menu mode, OSD menu display in the upper corner of the image page. PTZ direction control box: Up/down button select menu, and the home button enter the submenu, the left/right button modify the submenu. After the menu to be modified, select PTZ. If in the main menu, save the setting and exit automatically. Otherwise, return to the previous menu.

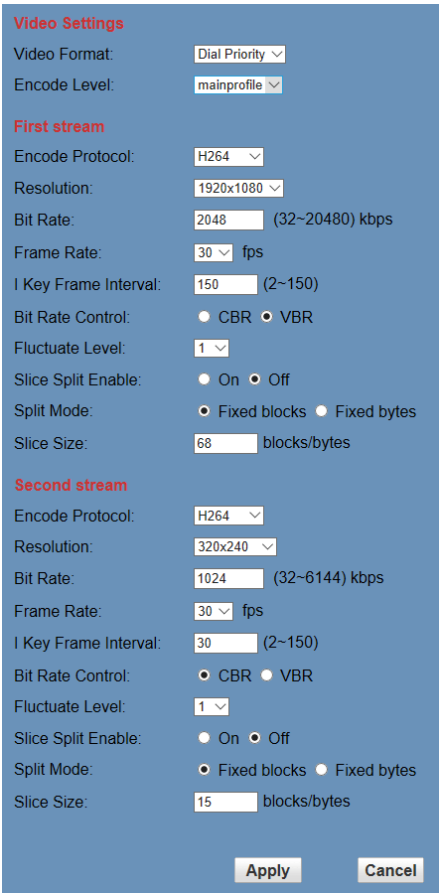
PTZ: system in PTZ mode.

C. Language selection



Change Language: Chinese/English/Russian

5.5.2 Video Settings



1) Video Format

Support 50Hz (PAL) and 60Hz (NTSC), and Dial Priority three formats.

2) Encode Level

Support baseline, mainprofile, highprofile and svc-t four levels.

3) Encode Protocol

Support H.264, H.265 and MJPEG three formats.

4) Resolution

First stream support 1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360. Second stream support 1280x720, 1024x576, 720x576 (50Hz support), 720x480 (60Hz support), 720x408, 640x360, 480x270, 320x240, 320x180; The bigger resolution is, the clearer the image will be, more network bandwidth will be taken.

5) Bit Rate

The user can specify the bit rate. Generally speaking, the larger the bit rate, the better image quality. However, the configuration of the bit rate needs to be adjusted according to the actual network condition. When the network bandwidth is low, if you configure the bit rate in a large value, the video stream cannot

be transmitted smoothly and the visual effect become very poor.

6) Frame Rate

User can specify the frame rate's size, generally speaking, the bigger frame rate value, the image more smooth; Frame rate is smaller, the video might be leggy.

7) I Key Frame Interval

Set interval between 2 I frame, the bigger interval is the response will be lower from viewing window.

8) Bit Rate Control

Constant Bit Rate: Video encoder will be encoding according to preset speed.

Variable Bit Rate: Video encoder will adjust the speed based on preset speed to gain the best image quality.

9) Fluctuate Level

Restrain the fluctuation magnitude of variable rate, grade 1 ~ 6.

10) Slice Split Enable

Enable or disable slice split function.

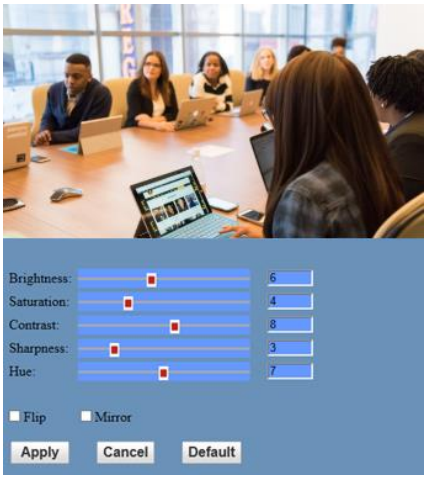
11) Split Mode

Select split mode, optional items: Fixed blocks, Fixed bytes.

12) Slice Size

Set the size of slice.

5.5.3 Image Settings



1) Brightness

Image bright 0~14, slider control, on the right shows the corresponding numerical.

Default value is 6.

2) Saturation

Saturation 0~14, slider control, on the right shows the corresponding numerical.

Default value is 4.

3) Contrast

Contrast 0~14, slider control, on the right shows the corresponding numerical.

Default value is 8.

4) Sharpness

Sharpness 0~15, slider control, on the right shows the corresponding numerical.

Default value is 3.

5) Hue

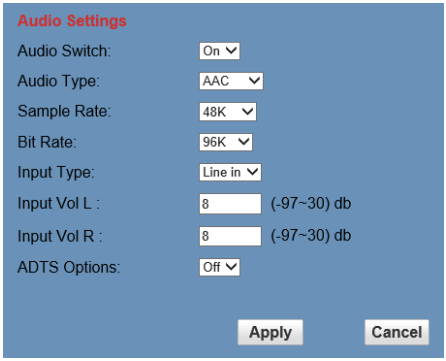
Hue 0~14, slider control, on the right shows the corresponding numerical.

Default value is 7.

6) Flip & Mirror

Tick Flip to realize image upside down, tick mirror to realize image around the mirror. Default value is not tick.

5.5.4 Audio Settings



1) Audio Switch

Enable or disable audio switch.

2) Audio Type

Audio type AAC.

3) Sample Rate

Sample rate 44.1K and 48K selectable.

4) Bit Rate

Bit rate 96K, 128K, 256K selectable.

5) Input Type

Input type line in.

6) Input Vol L

The volume of the left channel.

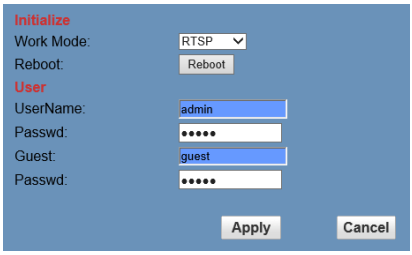
7) Input Vol R

The volume of the right channel.

8) ADTS Options

Optional items: On, Off.

5.5.5 System Settings



1) Work Mode

The default work mode is RTSP.

Optional items: RTSP, SDK, Multicast.

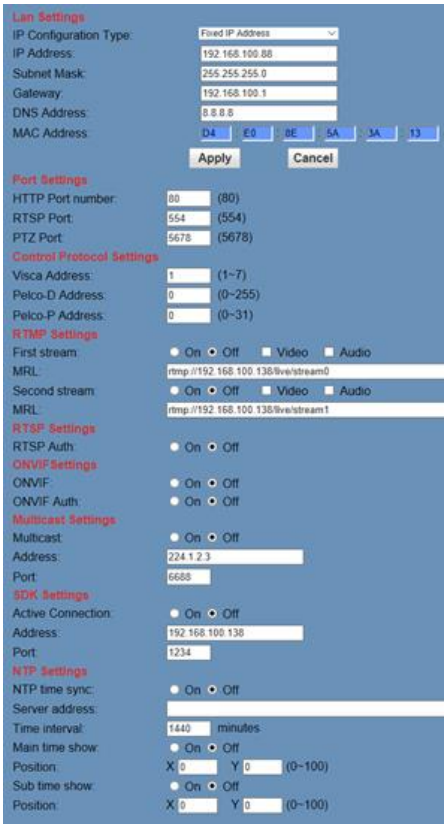
2) Reboot

Click the "Reboot" button, system restart.

3) Username and password

The user can modify the password (letters and numbers only).

5.5.6 Network Settings



1) LAN Settings

Default the IP address is 192.168.100.88, the MAC address can not be modified.

2) Port Settings

A. HTTP Port

The port setting is to set up a web server program using which port to transmit. When port mapping, need to be consistent with the port number (default port: 80).

B. RTSP Port

Network camera support RTSP protocol, use the VLC tools broadcast.

C. PTZ Port

Support PTZ protocol, default port: 5678.

3) Control Protocol Settings

Setting the camera control communication protocol, include Visca address, Pelco-D address, and Pelco-P address.

4) RTMP Settings

Setting the MRL of RTMP, select enable or disable video and audio. You can select the control code stream of "On", "Off", "Video", "Audio" between in the two streams.

5) RTSP Settings

Turn On/Off RTSP auth.

6) ONVIF Settings

Turn On/Off ONVIF and ONVIF auth.

7) Multicast Settings

Turn On/Off multicast. Setting the multicast address (default value is 224.1.2.3) and port (default value is 6688, then 6688 is the multicast port of the first stream; 6690 is the multicast port of the second stream).

8) SDK Settings

Turn On/Off active connection. Setting SDK address (default value is 192.168.100.138) and port (default value is 1234).

9) NTP Settings

Turn On/Off NTP time sync, main time show and sub time show. Setting NTP server address, time interval, primary stream position and sub stream part.

5.5.7 Device Information

Display the current device information, as shown below.

V1.1_20230407