NDI Camera

User Manual

RGBlink®

Content

Thank you for choosing our product!

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

Declarations

FCC/Warranty

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be responsible for correcting any interference.

Guarantee and Compensation

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

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

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

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

Operators Safety Summary

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

Do Not Remove Covers or Panels

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

Power Source

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

Grounding the Product

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

Use the Proper Power Cord

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

Use the Proper Fuse

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

Do Not Operate in Explosive Atmospheres

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

Installation Safety Summary

Safety Precautions

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

Unpacking and Inspection

Before opening NDI processor shipping box, inspect it for damage. If you find any damage, notify the shipping carrier immediately for all claims adjustments. As you open the box, compare its contents against the packing slip. If you find any shortages, contact your sales representative.

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

Site Preparation

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

Electric Safety

Installation and operation must accord with electric safety standard

Polarity of power supply

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

Careful of installation

Never move the camera by seizing the camera head. Don't rotate camera head by hand; otherwise, mechanical trouble will occur.

This series item must be put on the smooth desk or platform, and it can not be installed slant ways;

If the camera is installed on TV or computer, the base can be fixed by four double－sided adhesive trays.

Don't apply in corrosive liquid, as or solid environment to avoid the cover which is made up of organic material.

To make sure no obstacle in rotation range.

Never power on before installation is completed.

Don't disassemble discretionarily.

We are not responsible for any unauthorized modification or dismantling.

Chapter 1 Your Product

1.1 In the Box

Power Adapter × 1

RS232 serial port line × 1

Remote control × 1

1.2 Product Overview

1.2.1 Product Model

The User Manual is applicable to: 12X NDI Camera: RGB12X-NDI-WH

20X NDI Camera: RGB20X-NDI-WH
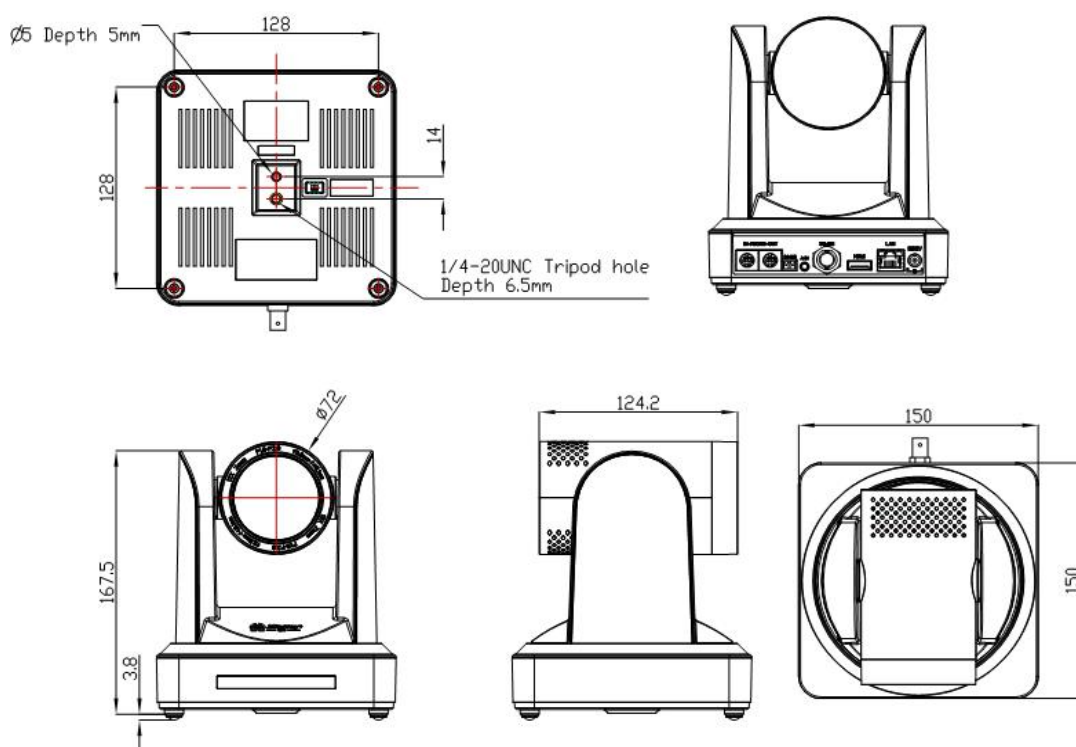
1.2.2 Dimension

Figure 1.1 NDI Camera dimension

1.2.3 Main Features

Camera Performance

NDI camera offers perfect functions, superior performance and rich interfaces. The features include advanced ISP processing algorithms to provide vivid images with a strong sense of depth, high resolution and fantastic color rendition. It supports H.265/H.264 encoding which makes motion video fluent and clear even with less than ideal bandwidth conditions.

1) **Superb High-definition Image:** It employs 1/2.8 inch high quality CMOS sensor. Resolution is up to 1920×1080 with frame rate up to 60 fps.

2) **Various Optical Zoom Lens:** It has 12X/20X optical zoom lens for options.

3) **Leading Auto Focus Technology:** Leading auto focus algorithm makes lens a fast, accurate and stable auto-focusing.

4) **Low Noise and High SNR:** Low Noise CMOS effectively ensure high SNR of camera video.Advanced 2D/3D noise reduction technology is also used to further reduce the noise, while ensuring image sharpness.

5) **Quiet PTZ:** By adopting high accuracy step driving motor mechanism, it works extremely quiet and moves smoothly and very quickly to designated position.

6) **Multi-Format Video Outputs:** support HDMI,3G-SDI,NDI and IP stream.The 3G-SDI is available for 100m transmission at 1080p60 format.

7) **Low-power Sleep Function:** Support low-power sleep/wake up, the consumption is lower than 500mW under sleep mode.

8) **Support Multiple Control Protocol:** Support VISCA, PELCO-D, PELCO-P protocols which can also be automatically recognized.Support VISCA control protocol through IP port.

9) **RS-232 Cascade Function:** Support RS-232 cascade function which is convenient for installing.

10) **255 Presets Positions:** Up to 255 presets (10 presets by remoter).

11) **Wide Application:** Tele-education, Lecture capture, Webcasting, Videoconferencing, Tele-training, Tele-medicine, Interrogation and Emergency command systems.

Network performance

1) **Audio Input Interface:** 3.5mm Stereo Jack.
2) **Multiple Audio/Video Compression:** Support H.264/H.265 video compression; AAC,MP3 and G.711A audio compression; Support compression of resolution up to 1920×1080 with frame up to 60 fps and 2 channel 1920×1080p with 30 fps compression.
3) **Multiple network protocol:** Support ONVIF,RTSP,RTMP,NDI protocols and RTMP push mode, easy to link streaming media server.

Technical Specification

Model	12X	20X
Camera Parameter		
Sensor	1/2.8 inch high quality HD CMOS sensor	
Effective Pixels	207megapixel、16：9	
Output Resolutions	720p25/29.97/30/50/59.94/60；1080i50/59.94/60；1080p25/30/29.97/30/50/59.94/60	
Optical Zoom	12X f＝3.9～46.8mm	20X f＝5.5～110mm
View Angle	6.3°（tele） 72.5°（wide）	3.3°（tele） 54.7°（wide）
AV	F1.8 – F2.4	F1.6 ～ F3.5
Digital Zoom	10X	
Minimum Illumination	0.5Lux(F1.8, AGC ON)	
DNR	2D & 3D DNR	
White Balance	Auto/Manual/One Push/3000K/3500K/4000K/4500K/5000K/5500K/6000K/6500K/7000K	
Focus	Auto/Manual	
Aperture	Auto/Manual	
Electronic Shutter	Auto/Manual	
BLC	ON/OFF	
WDR	OFF/Dynamic level adjustment	
Video Adjustment	Brightness/Color/Saturation/Contrast/Sharpness/B/W mode/Gamma curve	
SNR	>55dB	

Input/Output Interface	
Video Interface	HDMI、3G-SDI、NDI
Image Code Stream	Double streams outputs simultaneously
Video Compression forma	H.265、H.264
Control Signal Interface	RS-232 Ring through RS232 output, RS-485
Control Protocol	Protocol：VISCA/Pelco-D/Pelco-P；
Audio Input Interface	Double track 3.5mm linear input;
Audio Compression Format	AAC、MP3、G.711A
HD IP Interface	100M IP port（10/100BASE-TX） Support IP VISCA control protocol
Network Protocol	RTSP、RTMP、ONVIF、GB/T28181、NDI
Power Interface	HEC3800 outlet (DC12V)

PTZ Parameter	
Pan Rotation	-170°～+170°
Tilt Rotation	-30°～+90°
Pan Control Speed	0.1 ～60°/sec
Tilt Control Speed	0.1～30°/sec
Preset Speed	Pan: 60°/sec, Tilt: 30°/sec
Preset Number	255 presets (10 presets by remote controller)

Other Parameter	
Supply Adapter	AC110V-AC220V to DC12V/1.5A
Input Voltage	DC12V±10%
Input Current	1A （Max）
Consumption	12W(Max)
Store Temperature	-10℃～+60℃
Store Humidity	20%～95%
Working Temperature	-10℃～+50℃
Working Humidity	20%～80%
Dimension	150mm×150mm×167.5mm
Weight	1.4kg
Working Environment	Indoor
Remote Operation (IP)	Remote Upgrade, Reboot and Reset

Accessory	Power Supply、RS232 Control Cable、Remoter
Optional Accessory	Bracket

Chapter 2　Install Your Product

2.1 Camera Interface Explanation
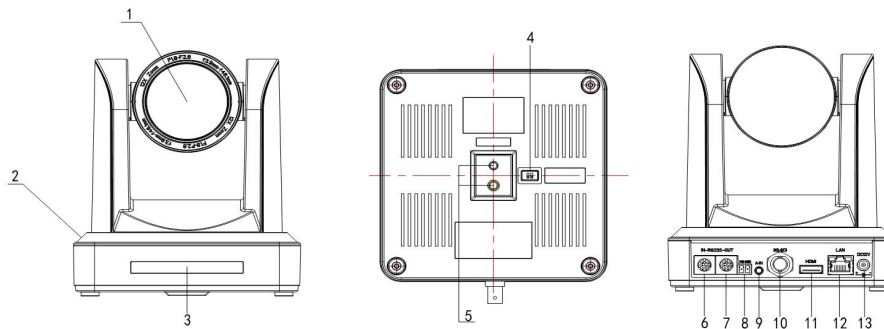
Figure 2.1　Camera Interface

Interface explanation

1、Camera Lens	6、RS232 Control Interface (input)	11、HDMI Interface
2、Camera Base	7、RS232 Control Interface (output）	12、10/100M Network Interface
3、 Remote Controller Receiver Light	8、RS485 Input (left +,right-)	13、DC12V Input Power Supply Socket
4、Bottom Dial Switch	9、Audio Input Interface	
5、Tripod Screw Hole	10、3G-SDI interface	

2.1.1　External Interface

External interface: RS232 Input /Output, RS485 Input, Audio Input,3G-SDI Output, HDMI Output, DNI Network Output Interface, DC12V Power Interface.
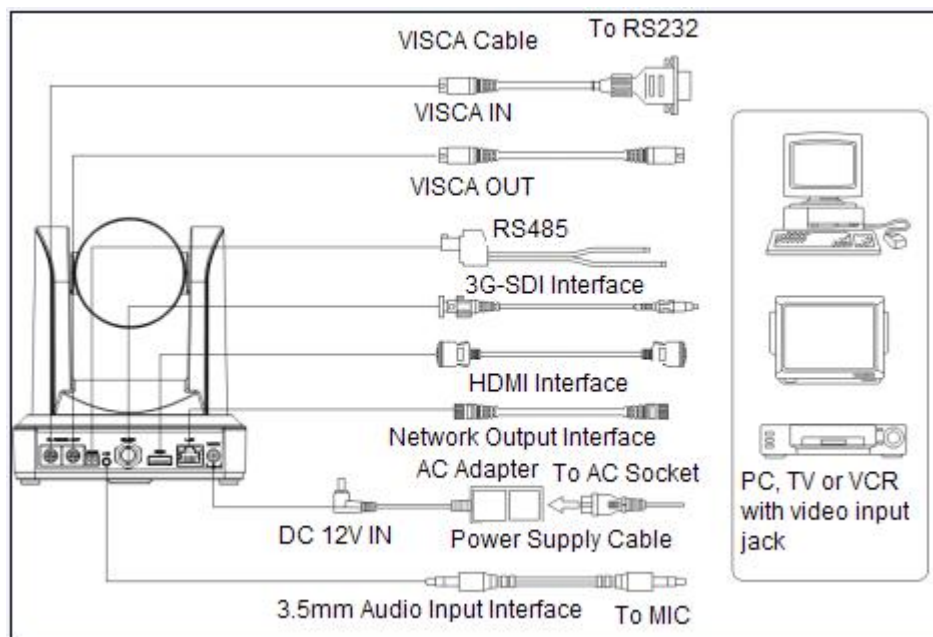
Figure 2.2 External Interface diagram

2.1.2 Bottom Dial Switch

NDI Camera Bottom Dial Switch diagram shown in Figure 2.3
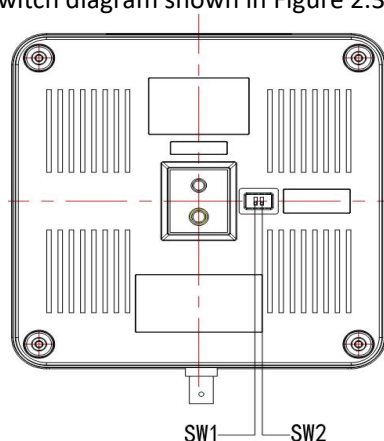
Figure 2.3 Bottom Dial Switch diagram

two DIP switches are set to ON or OFF to select different modes of operation as shown in Table 2.1

Table 2.1 Dial Switch setting

NO.	SW2	SW1	Explanation
1	OFF	OFF	Updating mode
2	ON	ON	Working mode

2.1.3 RS-232 Interface

1）**RS-232 interface**
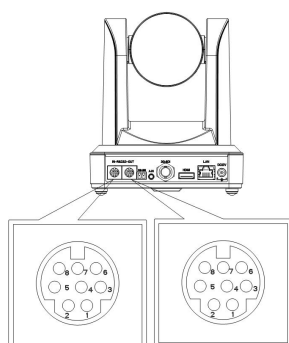
Computer or keyboard and camera connection method

Camera	WindowsDB-9
1.DTR	1.DCD
2.DSR	2.RXD
3.TXD	3.TXD
4.GND	4.DTR
5.RXD	5.GND
6.GND	6.DSR
7.IR OUT	7.RTS
8.NC	8.CTS
	9.RI

2）RS-232 Mini-DIN 8-pin Port Definition
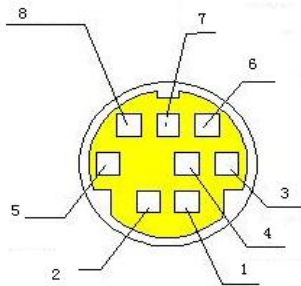
NO.	Port	Definition
1	DTR	Data Terminal Ready
2	DSR	Data Set Ready
3	TXD	Transmit Data
4	GND	System Ground
5	RXD	Receive Data
6	GND	System Ground
7	IR OUT	IR Commander Signal IR
8	NC	No Connection

3）RS232(DB9) Port Definition
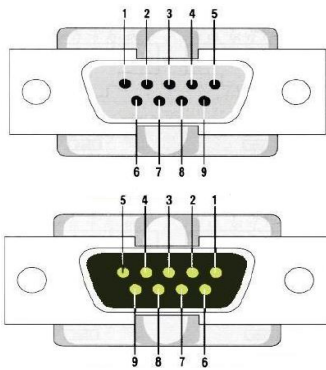
NO.	Port	Definition
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	System Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

4）VISCA networking as shown below
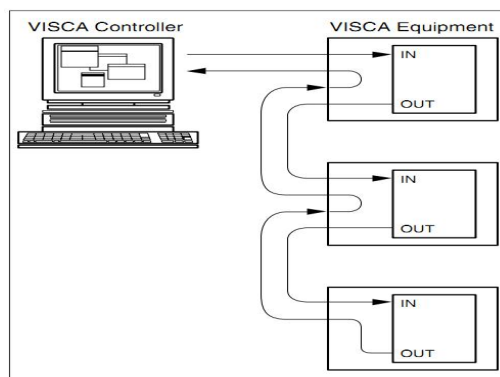
Camera cascade connection method

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

Note: PTZ Camera has RS232 input and output interface, so you can cascade as the above way.

2.2 Bracket Mount

Note: Bracket can only be wall mounted or upside down mounted on template and concrete wall, but can not be installed on plasterboard.

1）Wall mount step

M6 nut and shim   M6 swelling bolt   Wall mount bracket   Camera

Step 1

Step2

Step3

Step4

Camera

Wall mount bracket

1/4-20UNC bolt

Finish

Wall

Wall

2）Upside down mount step

PA3X30 self-tapping screws

PM3X6 screws

Ceiling upper covering plate

Screw stopper

1/4-20UNC screw

Ceiling lower covering plate

Camera

Step1

Ceiling

Screw stopper

Step2

Ceiling upper covering plate

Ceiling

PA3X30 self-tapping screws

Step3

1/4-20UNC screw

Ceiling lower covering plate

Camera

Step4

Ceiling upper
covering plate

Ceiling
lower
covering
plate

Camera

Step5

Ceiling

PM3X6 bolt

Camera

Note:The bracket mount is the optional accessory.

Chapter 3 Use Your Product

3.1 Video Output

3.1.1 Power on initial configuration

1) Power on: Connect DC12V power supply adapter with power supply socket.

2) Initial configuration: Power on with power indicator light on and remote control receiver light blinking, camera head moves from bottom left to the bottom, and then goes to the HOME position (intermediate position of both horizontal and vertical),while the camera module stretches. When remote control receiver light stops blinking, the self-checking is finished.

> Note: If you set preset 0, when Power on self-test is completed, the camera automatically moves to the preset 0 position

3.1.2 Video Output

PTZ Camera has a variety of video output: LAN, HDMI and 3G‑SDI.

1) Video Output from LAN

    a. Network Cable Connection Port: refer to No.12 in Figure2.1

    b. Webpage Login: Open your browser and enter 192.168.5.163 in the address bar (factory default); press Enter to enter into the login page; click on the "player is not installed, please download and install!" and follow the installation steps for installation.Then enter the user name admin and password admin (factory default); press Enter to enter into the preview page, users can carry out PTZ control, configuration and other operations.

2) HDMI Video Output

    a. HDMI Video Cable Connection: refer to No.11 in Figure2.1.

    b. Connect the camera and the monitor via HDMII video cable; video output is available after camera self-test.

3) 3G-SDI Video Output

    a. 3G-SDI video cable connection: refer to No.10 in Figure2.1

    b. Connect the camera and the monitor via 3G-SDI video cable; video output is available after camera self-test.

> Note: When the device is first powered on, the current IP address of the camera is displayed in the upper left corner of the screen.
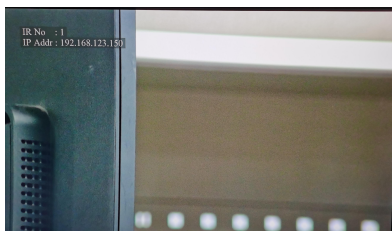
3.2 Remote Controller

3.2.1 Keys Instruction
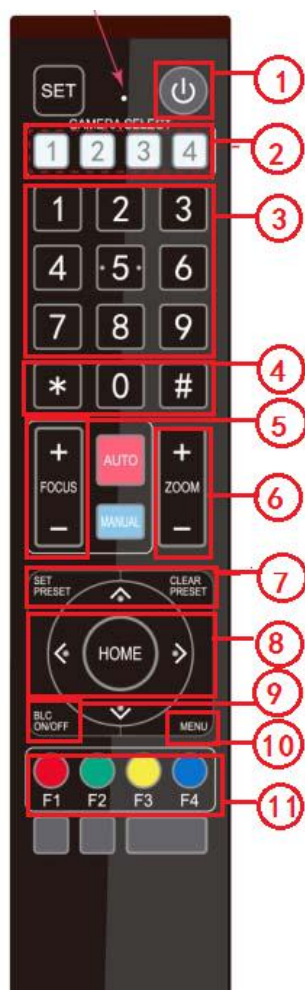
1. Standby Key

After 3S long press, the camera will step into standby mode. Long press 3S again, the camera will

self-test again and back to HOME position. (Note: If power-on mode is turned on and Preset 0 is

set, and there is no operation within 12s, it will automatically point to the specified preset position.

2. Camera Selection

   Select the camera address which wants to be controlled

3. Number Key

Set or run 0-9 presets

4. *,# Key

Key combination use

5. Focus Control Key

Auto Focus: Enter into auto focus mode.
Manual Focus: The camera focus mode is manual
Switch the camera focus mode to manual focus by pressing [focus +] or [focus -] to adjust

6. Zoom Control Key

Zoom＋:Lens near
Zoom－:Lens far

7. Set or Clear Preset key

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

8. Pan/Tilt Control Key

Press Key :Up
Press Key :Down
Press Key :Left
Press Key: Right
"HOME" Key: Return to the middle position or enter into the next level menu

9. BLC Control Key

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

10. Menu Setting

Open or close the OSD menu
Enter / exit the OSD menu or return to the previous menu

11. Camera IR Remote Control Address Setting

   【*】+【＃】+【F1】:Camera Address No.1
   【*】+【＃】+【F2】:Camera Address No. 2

【＊】＋【＃】＋【F3】:Camera Address No. 3
【＊】＋【＃】＋【F4】:Camera Address No. 4

12. Key Combination Functions

1）【#】＋【#】＋【#】：Clear all presets
2）【＊】＋【#】＋【6】：Restore factory defaults
3）【＊】＋【#】＋【9】：Flip switch
4）【＊】＋【#】+Auto： Enter into the aging mode
5）【＊】＋【#】＋【3】：Menu set to Chinese
6）【＊】＋【#】＋【4】：Menu set to English
7）【＊】＋【#】+Manual: Restore the default user name, password and IP address
8）【#】＋【#】＋【0】：Switch the video format to 1080P60
9）【#】＋【#】＋【1】：Switch the video format to 1080P50
10）【#】＋【#】＋【2】：Switch the video format to 1080I60
11）【#】＋【#】＋【3】：Switch the video format to 1080I50
12）【#】＋【#】＋【4】：Switch the video format to720P60
13）【#】＋【#】＋【5】：Switch the video format to 720P50
14）【#】＋【#】＋【6】：Switch the video format to 1080P30
15）【#】＋【#】＋【7】：Switch the video format to 1080P25
16）【#】＋【#】＋【8】：Switch the video format to 720P30
17）【#】＋【#】＋【9】：Switch the video format to 720P25

3.2.2 Applications

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

Key Instruction:

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

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

1）**Camera Selection**

Select the camera address to control.

2）**Pan/Tilt Control**

Up：press【▲】　　　　Down：press【▼】
left：press【◄】　　　　Right：press【►】
Back to middle position：press【HOME】
Press and hold the up/down/left/right key, the pan/tilt will keep running, from slow to fast, until it runs to the endpoint; the pan/tilt running stops as soon as the key is released.

3) Zoom Control

ZOOM IN: press "ZOOM 【▲】" key
ZOOM OUT: press "ZOOM 【▼】" key
Press and hold the key, the camera will keep zooming in or zooming out and stops as soon as the key is released.

4) Focus Control

Focus (near):Press "【focus+】" key (Valid only in manual focus
mode)
Focus (far): Press "【focus-】"key (Valid only in manual focus
mode)
Auto Focus: Support
Manual Focus: Support
Press and hold the key, the action of focus will keep continue and stops as soon as the key is released.

5) BLC Setting

BLC ON / OFF: support

6) Presets Setting, Running, Clearing
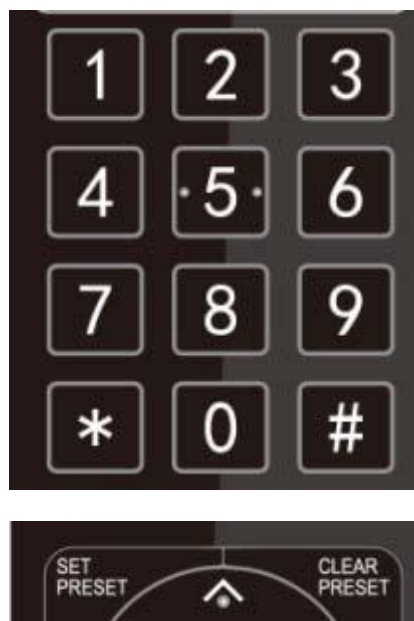
1. Preset setting: to set a preset position, the users should press the "【SET PRESET】" key first and then press the number key 0-9 to set a relative preset,
Note: 10 preset positions in total are available by remote controller.
2. Preset Running: Press a number key 0-9 directly to run a relative preset.
Note: Action in vain if a relative preset position is not existed.
3. Preset clearing : to clear a preset position, the user can press the "【CLEAR PRESET】" key first and then press the number key 0-9 to clear the relative preset;
Note : press the" 【#】" key three times continually to cancel all the presets.

7) Camera Remote Controller Address Setting

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

3.3 Menu Setting

3.3.1 Main Menu

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

```
  MENU
 ================
 Language            English
（Setup）
（Camera）
（P/T/Z）
（Video Format）
（Version）
（Restore Default）


 [↑↓]Select      [← →]Change Value
 [Menu]Back               [Home]OK
```
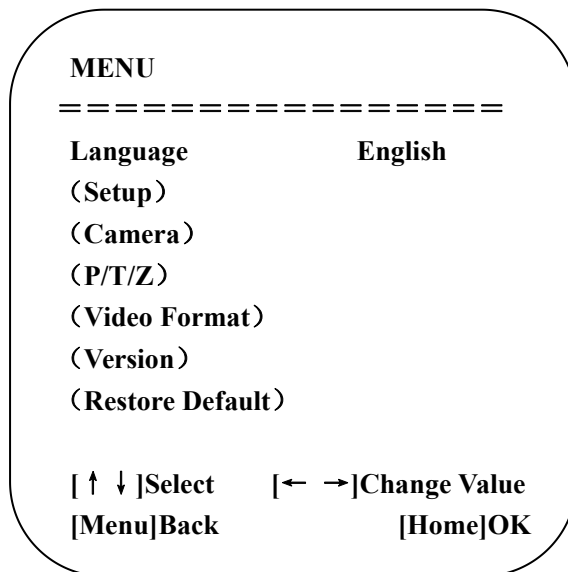
Language： Language setting, Chinese / English

Camera Option：Camera Setting

Version：camera version setting

Restore Default: Reset setting

[↑↓]] Select: for selecting menu

[Menu]Back: Press [MENU] to return

Setup：System setting

P/T/Z：Pan tilt setting

[← →]Change Value: for modify parameters

[Home] OK: Press [Home] to confirm

3.3.2 System Setting

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

```
      SETUP
   ================
   Protocol             Auto
   Visca Address        1
   Visca Address Fix    OFF
   PELCO-P Address      1
   PELCO-D Address      1
   Baudrate             9600


   [ ↑ ↓ ]Select   [← →]Change Value
   [Menu]Back
```

Protocol：VISCA/Pelco-P/Pelco-D/Auto   **Visca ADDR:** VISCA=1~7 Pelco-P=1~255 Pelco-D = 1~255

Baud rate: 2400/4800/9600/115200   **Visca Address Fix:** On/Off

3.3.3 Camera Setting

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

```
      CAMERA
   ================
   （Exposure）
   （Color）
   （Image）
   （Focus）
   （Noise Reduction）
   Style                Default
   [ ↑ ↓ ]Select   [← →]Change Value
   [Menu]Back      [Home]OK
```

Exposure: Enter into Exposure setting   **Image:**Enter into image setting   **Color:** Enter into color setting

Focus: Enter into focus setting   **Noise Reduction:**Enter into noise reduction

 1）**EXPOSURE**

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

```
          EXPOSURE
        ═════════════════
          Mode              Auto
          EV                OFF
          BLC               OFF
          Flicker           50Hz
          G.Limit           3
          DRC               2


          [↑↓]Select    [←→]Change Value
          [Menu]Back
```

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

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

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

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

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

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

WDR: Off,1~8

Shutter Priority:1/25,1/30,1/50,1/60,1/90,1/100,1/120,1/180,1/250,1/350,1/500,1/1000,1/2000,1/3000,1/4000, 1/6000,1/10000(only available in Manual and Shutter priority mode)

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

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

2) COLOR SETTING

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

```
          COLOR
        ═════════════════
          WB Mode             Auto
          RG Tuning           0
          BG Tuning           0
          Saturation          100%
          Hue                 7
          AWB Sensitivity     High


          [↑↓]Select   [←→]Change Value
          [Menu]Back
```

WB Mode: Auto, 3000K、3500K、4000K、4500K、5000K、5500K、6000K、6500K、7000K , Manual, One Push

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

Saturation: 60%,70%,80%,90%,100%,110%,120%,130%   **Hue:** 0~14

AWB Sensitivity: high/middle/low

Color Temp: high/middle/low

Color Style: Default, style1~4.

3) IMAGE

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

```
  IMAGE
  ================
  Brightness            7
  Contrast              7
  Sharpness             4
  Flip-H               OFF
  Flip-V               OFF
  B&W-Mode             Color
  Gamma                Default
  DZoom                OFF
  DCI                  Close
  [↑ ↓]Select    [← →]Change Value
  [Menu]Back
```
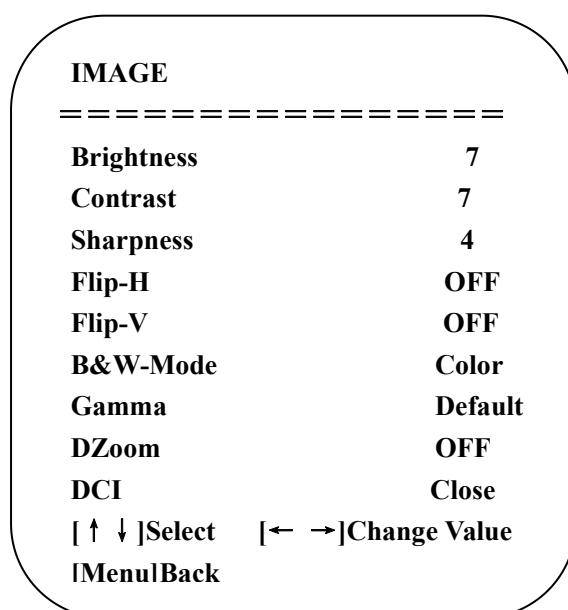
Brightness: 0~14   **Contrast:** 0~14   **Sharpness:** 0~15

Flip-H: On/Off   **Flip-V:** On/Off   **B&W Mode:** color, black/white

Gamma: default, 0.47, 0.50, 0.52, 0.55

DZoom: digital zoom options: On/Off

DCI: Dynamic Contrast: Off,1～8

4) FOCUS

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

```
┌─────────────────────────────────────┐
│                                     │
│   FOCUS                             │
│  ═════════════════════              │
│   Focus Mode              Auto      │
│   AF-Zone                 Center    │
│   AF-Sensitivity          Low       │
│                                     │
│                                     │
│   [↑ ↓]Select      [← →]Change Value│
│   [Menu]Back                        │
│                                     │
└─────────────────────────────────────┘
```

Focus Mode: Auto, manual   **AF-Zone:** Up, middle, down   **AF-Sensitivity:** High, middle, low

5) NOISE REDUCTION

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

```
┌─────────────────────────────────────┐
│                                     │
│    NOISE REDUCTION                  │
│   ═════════════════════             │
│    NR-2D                    3       │
│    NR-3D                    5       │
│    Dynamic Hot Pixel        OFF     │
│                                     │
│    [↑ ↓]Select      [← →]Change Value│
│    [Menu]Back                       │
│                                     │
└─────────────────────────────────────┘
```

2D Noise Reduction: Auto, close, 1~7   **3D Noise Reduction:** Close, 1~8   **Dynamic Hot Pixel:** Close, 1~5

3.3.4 P/T/Z

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

```
┌─────────────────────────────────────┐
│                                     │
│     P/T/Z                           │
│   ═══════════════════════           │
│   ═                                 │
│    Speed by zoom            ON      │
│    Zoom speed               8       │
│    Image Freezing           OFF     │
│    Acc Curve                Slow    │
│                                     │
│    [↑ ↓]Select     [← →]Change Value│
│                                     │
└─────────────────────────────────────┘
```

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

When zoom in, the PT control speed by remoter will become slow),

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

Image Freezing: On/Off

Accelerating Curve: Fast/slow

3.3.5 Video Format

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

```
        VIDEO FORMAT
   ═══════════════════

    1080P60            1080P50
    1080I60            1080I50
    1080P30            1080P25
    720P60             720P50
    720P30             720P25
    1080P59.94         1080I59.94
    1080P29.97         720P59.94
    720P29.97
    [ ↑ ↓ ]Select
    [Menu]Back         [Home]OK
```

Note: 1. 1080P60 Downward Compatibility;

2. Exit menu after modifying parameter to save it after powered off

3.3.6 Version

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

```
   VERSION
   ═══════════════

   MCU Version     2.0.0.15   2015-12-18
   Camera  Version 2.0.0.13    2015-12-18


   AF Version       2.0.0.6    2015-12-11
   Lens             12X(20X)


   [Menu]Back
```

MCU Version: Display MCU version information
Camera Version: Display camera version information
AF Version: Display the focus version information
Lens: Display the lens zoom

3.3.7 Restore Default

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

```
        RESTORE DEFAULT
    = = = = = = = = = = = = = = = = =
    Restore   Default?          NO


    [ ↑ ↓ ]Select     [← →]Change Value
    [Menu]Back        [Home]OK
```

Restore default: options: yes/no; after restoring default, the video format won't be restored.

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

# 3.4 Network Connection

3.4.1 Connecting Mode

Direct connection: Connect the camera and computer by network connecting cable.
Internet connection mode: Connect the camera to Internet by Router or Switch and user can log in the device by browser.

Note: Please do not put the power and network cable in places where can be easily touched to prevent video quality lowered by 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. I.E. The camera default IP address is 192.168.5.163, then segment 5 must be added in the computer. Specific steps are as below:

1)   open the window of Local Area Connection Properties on computer, double click or click the property "Internet"protocol version 4 (TCP/IPv4)to enter into the Internet Protocol Version 4(TCP/IPv4) Properties window.
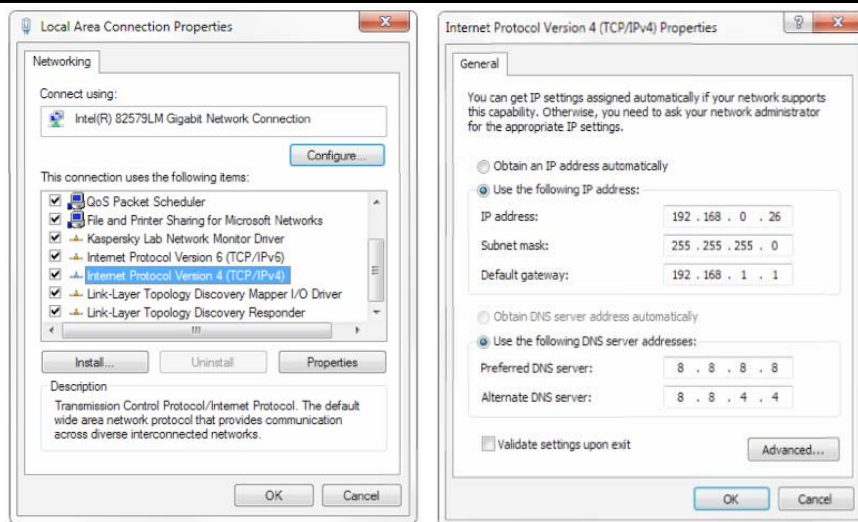
2) select "Advanced" to enter into the Advanced TCP/IP Setting and add IP and subnet mask in the IP browser as picture shown below. Click the "Confirm" to finish the adding of IP segment. User can add the corresponding network segment according to the revised IP address of the camera.
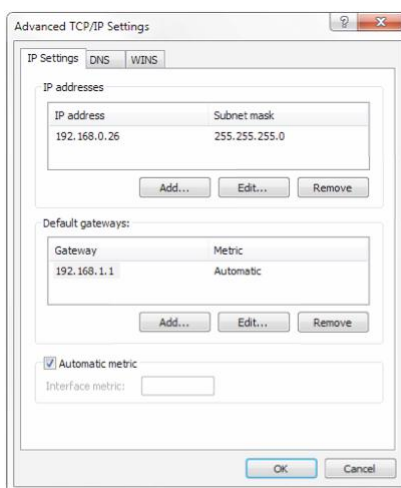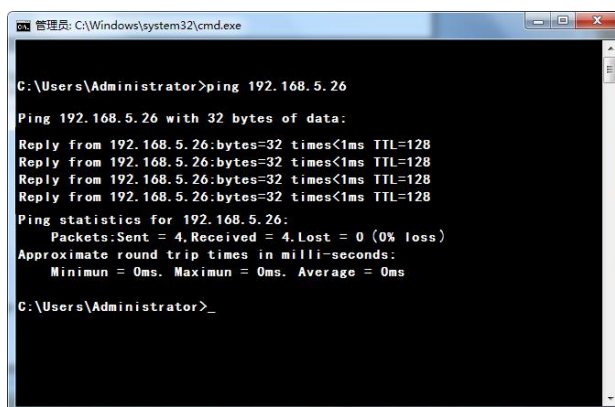

Note: The IP address to be added cannot be same with that of other computers or devices. The existence of this IP address needs to be verified before adding

3) Click the "Start" and select "Operation" to input cmd as picture below to verify if the network segment has been successfully added.
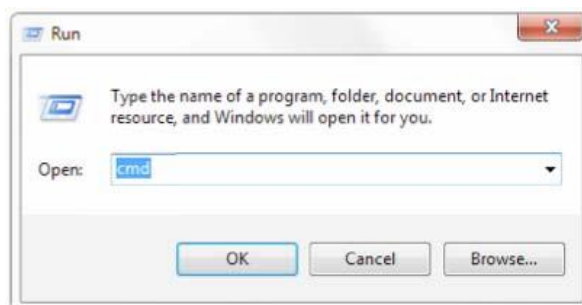
4) Click "OK" and open the DOS command window, input ping 192.168.5.26 and press Enter key, it will show message as below:which means network segment adding is succeed.
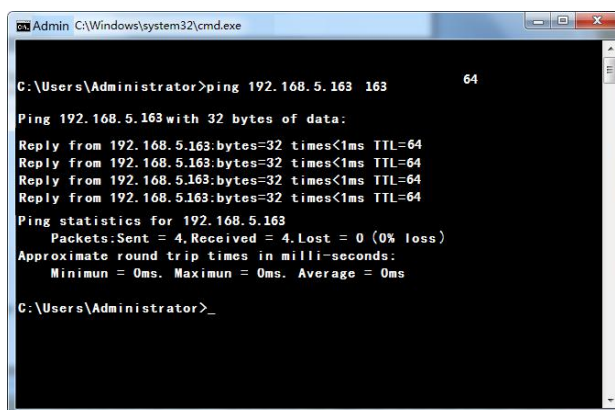

5) User can also to verify network connection as steps above mentioned after the finish of camera self-check. If IP is default, open DOS command window and input 192.168.5.163,then press Enter key. It will show message as below: which means network connection is normal.

3.5 IE Log In

3.5.1 Web client

1) Web client Log In

Input the IP address 192.168.5.163 of the device in the address filed of browser and click Enter button to enter into Web Client login page as below picture. User can login as administrator and normal user. If login as administrator (Default User name/Password: admin), users can preview, playback, configuration and cancel in the Web Client; If login in as normal user(Default User name/Password:user1 or user2),users can only preview, playback and cancel, no option for configuration.

Note: Web access supported browsers: IE,360 browser,Google browser and other conventional browser.

2) Download/Install Plug in

When first using IE browser to access the web conferencing camera, the login page will appear "Playback plug-in is not installed, please download and install!". Click on this message, download and install MRWebXinstall. exe, according to information prompts.

After installing the plug, enter user name and password, click and Sign (initial default user name and password: "admin", users can change the user name and password on their own after entering) into the Web client management interface.

3.5.2 Preview

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

You can record the video and save it on SD Card when SD Card built in. Video can be saved on the Computer at Local.

1) Login as administrator

User name, password, the default admin PTZ control can be carried out, zoom, focus, video capture, sound, zoom, full screen and set the preset position, run, and delete; you can preview, configuration, log off.

2) Login as normal user

Default User name/password: user1 or user2 PTZ control can be carried out, zoom, focus, video capture, sound, zoom, full screen and set the preset position, un,and delete; you can preview and log off.

NOTE: There is no configuration right for normal user login.

3.6 Configuration

Click Configuration to enter into the device parameters setting page

There are the following options: audio configuration, video configuration, network configuration, PTZ configuration, internet access configuration, system configuration, detailed description see the following table.

Menu	Explanation
Local configuration	Including video preview mode,record video packing time,record video storage route settings etc.
Audio configure	Including audio compressing format,sampling frequency,sampling precision,compressing code rate settings etc.
Video configure	Including video encoding,stream release,RTB Broadcasting,video parameters,character-overlapping,character size,video output setting etc.
Network configure	Including basic parameters,Ethernet,DNS, GB28181 etc.
System configure	Including equipment property,system time,user management,version update,Reset,Reboot device settings etc.

3.6.1 Local Configuration

Video Preview Mode: user can choose real-time priority or fluency priority: The delay will be small when under real time priority mode and fluency will be good when under fluency priority mode. Setting based on the user need (Default value: real time normal (2),real time best (1),fluency normal (3),fluency good (4) and fluency best (5))

Recording packing time(minute): Set recording video packing time (default is 10,range from 1~120 minutes)

Recording/Snapshot file storage route: Set local recording video/snapshot file storage route. (Default D: \ MyIPCam\)

Click the Save button to make settings effective.

3.6.2 Audio Configuration

Switch: Choose to enable the audio or not.

Compressing format: Set audio compressing format and the device will reboot automatically after change (default MP3,PCM,AAC optional)

Sampling frequency: Set sampling frequency and the device will reboot automatically after change (default 44100,16000,32000 and 48000 optional)

Sampling precision: Set sampling precision (default 16bits)

Compressing code rate: Set audio compressing code rate (default 64bits,32,48,96,128bits optional)

Note : Click "SAVE",it will remind"Enable has changed. Restart the device to take effect after the success of the save", then please reboot the camera to make new setting effect.

3.6.3 Video Configuration

1) Video encoding

Code stream: Different video output mode setting,use different streams. (Main stream,secondary stream)

Compression Format: Set the video compression format,save and reboot to take it effect (primary/secondary stream default:H.264,H.265 optional)

Profile: Profile Mode Setting (Default HP，BP、MP Optional)

Video Size: Set video image resolution,save and reboot to take it effect (main stream default 1920 * 1080 or 1280 * 720 optional;default secondary stream 640 * 320,320 * 180,1280 * 720,1920 * 1080 optional)

Stream Rate control: Set rate control mode,save and reboot to take it effect (Primary/secondary stream default variable bit rate,fixed rate is for option).

Image Quality: Set the image quality,image quality can be changed only when rate control is variable bit rate,(main stream defaulted is better,secondary stream default is not good, there are best, better, good, bad, worse, worst for options).

Rate (Kb/s): Set the video bit rate (main stream default 4096Kb/s,64-12288Kb/s optional; secondary stream default 1024Kb/s,64-10240Kb/s optional).

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

Key frame interval: Set the key frame interval (primary/secondary stream default 75F,primary/stream 1-300F optional. Secondary stream 1-150F optional).

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

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

2) Stream Release

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

Protocol: primary / secondary stream applies RTMP protocol.

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

Host Address: server IP addresses (default 192.168.5.11)

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

User: Set the user name.

Password: Set the password.

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

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

3) RTP Broadcasting

Main/Sub Stream: On/off；

Protocol: RTP or TS

Address: Default 224.1.2.3. It can be edited.

Port: Main Stream Default Port: 4000，Sub Stream Default Port: 4002〉

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

4) **Video Parameters**

A.Focus: Focus mode,focus range,focus sensitivity can be set.
Focus Mode: set the focus mode (the default auto,manual optional)
Focus range: set the focus range (the default middle,the upper and lower optional)
Focus Sensitivity: Set the focus sensitivity (default is low,high,medium optional)

B.Exposure:Eexposure mode,exposure compensation,back light compensation,anti-flicker,gain limit,wide dynamic, shutter speed,aperture value and brightness can be set.
Exposure Mode: Set the exposure mode (the default automatic,manual,shutter priority,aperture priority,Brightness priority optional)
Exposure compensation: Exposure compensation setting is active when it is auto status (default is off).
Exposure compensation value: Set the exposure compensation value,valid when it is set for auto(default 0,-7 to 7 optional).
BLC: Set back light compensation,valid when it is auto status (default is off).
Anti-flicker: Set up anti-flicker mode,valid when status of automatic,aperture or brightness priority (default 50Hz,closed,60Hz optional).
Gain limit: set the gain limits,auto,active when it is status of aperture or brightness priority(default 3, 0-15 optional).
Dynamic range: set the dynamic range (default 5,0-8 optional).
Shutter speed: active when it is status of manual or shutter-priority (default 1/100，1/25、1/30、1/50、1/60、1/90、1/100、1/120、1/180、1/250、1/350、1/500、1/1000、1/2000、1/3000、1/4000、1/6000、1/10000 optional).
Aperture value: Set the aperture value,active when it is status of manual or aperture-priority(default F1.8,closed, F11,F9.6,F8.0,F6.8,F5.6,F4.8,F4.0,F3.4,F2 .8,F2.4,F2.0,F1.8 optional).
Brightness: Set the brightness value,active when it is a state of brightness priority (default 7,0-23 optional).

C.Color:White balance,saturation,color,white balance,sensitivity,color temperature,gain red and blue gain can be set.
White balance modes: Set the white balance mode (the default automatic, 3000K, 4000K, 5000K, 6500K, manual, One-push optional).
Note: Click the "Correction" button when selected the One-push white balance mode.
Saturation: Set the saturation (default 80%,60%,70%,80%,90%,100%,110%,120%,130%,optional).
Auto white balance Sensitivity: Sensitivity Auto white balance settings (default is low,high,medium optional).
Chroma: Set the chrome (default 7,0-14 optional).
Color Temperature: set color temperature(Default setting:High,with low,middle for options)
Red Gain: Set the red gain,effective when it is manual (default 255,0-255 optional).
Blue Gain: Sets the Blue gain,effective when it is manual (default 199,0-255 optional).

D.Image:Brightness,contrast,sharpness,black and white mode,the gamma curve,Horizontal Flip and Vertical Flip can be set.
Brightness: Set the brightness (default 6,0-14 optional).
Contrast: set the contrast (default 8,0-14 optional).
Sharpness: Set the sharpness value (default 7, 0-15 optional).
Black and white mode: Set black and white mode (default color,black/white optional).
Gamma: Gamma value setting (default,0.45,0.50,0.52,0.55 optional).
Flip Horizontal: Set Flip Horizontal (default Off,On optional).
Flip Vertical: Set vertical flip (default Off,On optional)

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

2D Noise Reduction: Set 2D noise reduction level (default Auto,1-7 and Off optional).
3D Noise Reduction: Set 3D noise reduction level (default 5,1-8 and Off optional).
Dynamic dead pixel correction: Set Dynamic dead pixel correction (default Off,1-8 optional).
　　Click "Refresh"to make revision of any video parameters of a,b,c,d,e effective

5) Character-Overlapping
Display date and time: Set whether to display the time and date (default display).
Display Title: Set whether to display the title (default display).
Font Color of Time: Set font color of time and date (default white,black,yellow,red,blue optional).
Font Color of Title: Set font color of title (default white,black,yellow,red,blue optional).
Moving characters: Set the display position of moving date,time and title ,click on the "up,down,left,right" buttons to move the corresponding character position.
Title Content: Set title content (default CAMERA1).
Time Content: Set time content(default 1970/01/10 05:36:00)
　　Click on the "Save" button and display the "Save successful" message,then valid

6) Character Size
Main stream character size: Set the character size of the display,the device will restart automatically after changed and saved (default 24,24,16 optional)
Secondary stream character size: Set the character size of the display,the device will restart automatically after changed and saved(default 16,24,16 optional)
　　Click on the "Save" button to display "Parameter saved successfully" message,set to take effect

7）Video Output

Output Format: Set the video output format (default 1080P60, 1080P50, 1080P30, 1080P25, 1080I60, 1080I50, 720P60, 720P50 ,720P30, 720P25, 1080P59.94, 1080I59.94, 1080P29.97, 720P59.94, 720P29.97 optional).

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

3.6.4 Network Configuration

1) Network port

Data port: set the data port,the device will restart automatically after changed(default 3000,0-65535 optional).
Web Port: Set Web port,the device will restart automatically after changed (default is 80,0-65535 is optional).
Onvif Port: Set Onvif port,the device will restart automatically after changed(default 2000,0-65535 optional).
Soap Port: Set Soap port (default 1936,0-65535 optional).
RTMP Port: Set RTMP port (default 1935,0-65535 optional).
RTSP Port: Set RTSP port,the device will restart automatically after changed (default 554,0-65535 optional).
Visca Port: Set Visca port,the device will restart automatically after changed (default 3001,0-65535 optional).
　　Click on the "Save" button,it will be valid when display "Save successful".

RTMP access: RTMP: / / equipment IP address: 1935 / live/av0 (av0 main stream; av1 second stream)
RTMP Access : rtmp:// equipment IP address: 1935 / live/av0 (av0 main stream; av1 second stream)

2) Ethernet parameters
DHCP: Enable or disable obtain IP automatically can be set. Save changes and reboot the device to takes effect (Default:OFF)
IP Address: Set the IP address,save changes and reboot the device to takes effect (default 192.168.5.163)

> **Note: This IP address is the same with the one used to login Web page.**

Subnet Mask: Set the subnet mask (default 255.255.255.0).
Default Gateway: Set the default gateway (default 0.0.0.0).

Physical Address: Set the physical address (the parameter is read-only but can not be modified).

Click on the "Save" button,it will be valid when display "Save successful". (Note: To prevent IP conflicts When modify).

3) DNS Parameters

Preferred DNS server: set the preferred DNS server. (Default 0.0.0.0).
Alternate DNS server: Alternate DNS server settings. (Default 0.0.0.0).

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

4）GB28181

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

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

3.6.5 System Configuration

1) Device Properties

Device Name: Set the device name (the default Camera1,user can add their own).
Device ID: Set the device ID (default 1,Read-Only).
System Language: Set the system language (default Simplified Chinese,English optional).Need to re-login after modify and save the setting.

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

2) System Time

Date Format: Set the date format (YYYY-MM-DD default That year - month - day,MM-DD-YYYY namely Month - Day -Year,DD-MM-YYYY date - month - year Optional).
Date separator: set the date separator (default '/','.','-' Optional).
Time Zone: Set the time zone (default East eight districts,other time zones optional).
Time Type: Set the time types (default 24 hours,optional 12 hours).
Time setting: Set time mode (to choose the computer time synchronization,NTP server time synchronization,or set manually).
Computer Time: Set the computer synchronization valid.
Update interval: Set the NTP server automatic updated time interval.Valid after setting NTP server synchronization (default one day,2-10 days Optional).
NTP server address or domain name: Set NTP server address or domain name (default time.nits.gov). Valid after setting NTP server synchronization.
NTP Server Port: Sets the NTP server port (default 123).Valid after setting NTP server synchronization.

Set the time manually,Effective when set manually.

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

3) User Management

Select users: Set the user type (the default administrator,Common User 1,Common User 2 optional)
User name: set the user name (Select User Administrator default admin; select a common user1 default user1; to select a common user 2 default user2; user can modify their own)
Password: Set a password(Select User Administrator default admin; select a common user1 default user1; to select a common user 2 default user2; user can modify their own).
Password confirmation: Confirm the input passwords are the same or not.
　　Click on the "Save" button to display the "Save successfully" message,then the set is to take effect.

> **Note: Please note the case-sensitivity of the user name and password.**
> **If login page by a common user's name and password ,one does not have configuration privileges but can only operate to preview,logoff.**
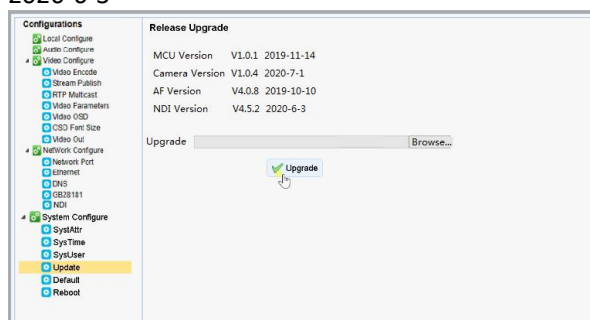
4) Version upgrade

MCU version V1.0.1　　2019-11-14
Camera version V1.0.4　2020-7-1
AF version V4.0.8　　　2019-10-10
NDI version V4.5.2　　　2020-6-3

Users only read the version information above which is consistent with the menu version but can not modify.Different types of the machine has different information.
Update file:
Click "Browse ..." installation,to select the upgrade file in the pop-up window.
Click on the "Upgrade" button,the upgrade dialog will appear. the device will reboot automatically after update successfully. (Note:make sure the power and network is keeping connected during the process.or the upgrade will fail)

> **Note: After the version upgrade is complete, you need to restore factory defaults; a, through web to restore the factory default configuration; b, through the recovery menu; c, remote control shortcut * # 6;**
> **Choose one of the above three ways. If chose a, the IP accounts, passwords also need to be restored to the default.**

5) Restore factory setting

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

6) Reboot

Click on the pop-up "Reboot" button and choose "YES" or "NO",then the device will restart automatically
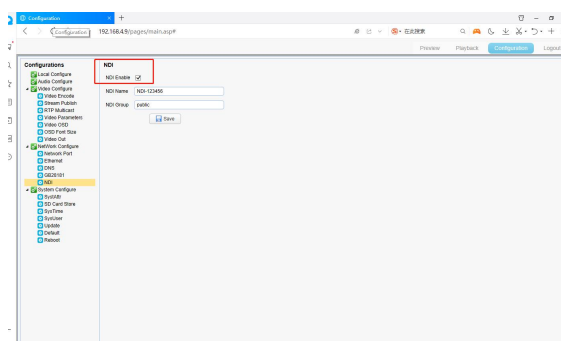
3.7 NDI Instruction

3.7.1 NDI|HX Environment Configuration

1）Connect the LAN port of PC and camera to the same switch or router.

2）Make sure the camera and PC are in the same network segment, with different IP addresses, and the subnet mask and gateway are consistent.
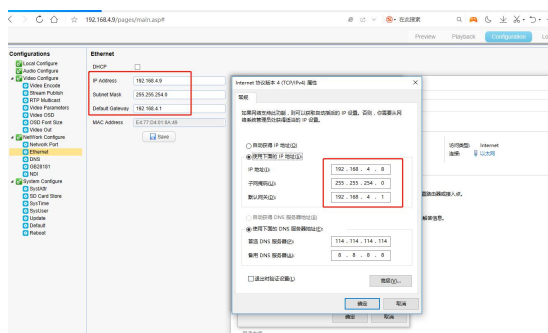
3）.PC login web page to open NDI|HX

4）Enable the NDI Studio Monitor provided on NDI's official website to test whether the NDI|HX function is normal.
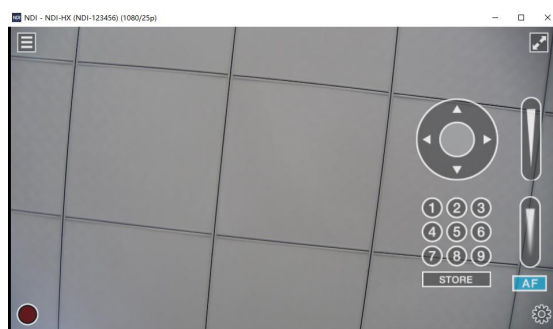
The success of last step indicates that NDI|HX can be used normally.

3.7.2 NDI|HX Network Audio and Video Encoding Parameters

1) NDI|HX Audio Encoding Parameter Configuration

NDI | HX only supports audio format AAC.AAC 48000KHz 64kbps is recommended.
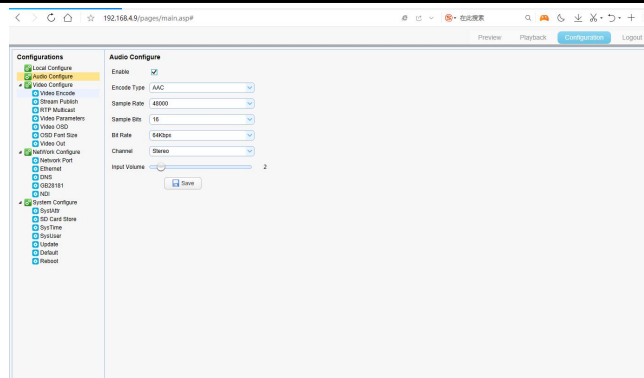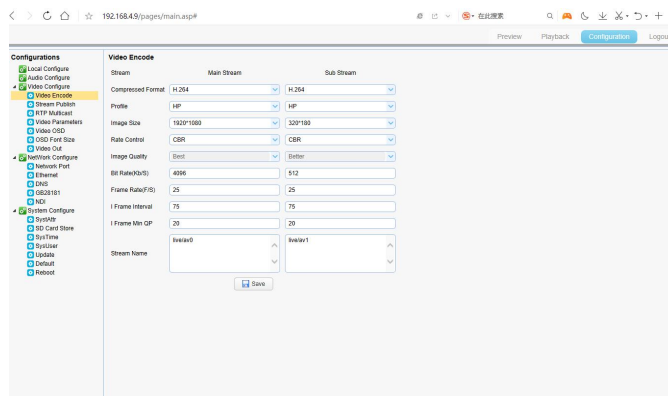
2) NDI|HX Video Encoding Parameter Configuration

High bandwidth mode: Main Stream

Low bandwidth mode: Sub Stream

Recommendation for Configuration of Video Encoding Parameters:

   1, 1920 * 1080: 4096 kb/s

  2, 1280 * 720: 2048 kb/s

  3, 640 * 480: 1024 kb/s

  3, 640 * 360: 1024 kb/s

  4, 320 * 180: 512 kb/s

  4, 320 * 240: 512 kb/s

The higher the bit rate, the better the image quality.Self-configuration according to the actual situation.

Instruction:

1. The high and low bandwidth is switched on at the same time, which can be switched by users according to the actual situation.

2. The frame rate affects the video delay, and the higher the frame rate, the smaller the video delay.

3.The HEVC(H265) format has been supported since NDI4.5, while the previous version only supported the H264 format.

4.When the video frame rate is 60 frames, two streams can be turned on at most at the same time. It is recommended not to acquire other streams when NDI is turned on, so as to ensure the smooth flow of NDI video.

5.Video Out is used for SDI and HDMI. Since SDI and HDMI are turned on by default, it is recommended to adjust the Video Out Format to 720PX with X representing the frame rate.

6.To configure 60FPS for Video frame rate, you need to configure Video Out Format to 1080P60 or 720P60.

7.The frame rate of the video encoding portion is consistent with or multiples of the video output,for example:

If video encoding frame rate is 25, then the video output configuration should be 1080P25, 1080P50 or 720P25, 720P 50;

If video encoding frame rate is 30,then the video output configuration should be 1080P30 or 720P30;

If video encoding frame rate is 60,then the video output configuration should be 1080P60 or 720P60;

3.7.3 NDI|HX Instruction of vmix

1) vmix23 and later version support NDI|HX

2) Open vmix23 and add the NDI source
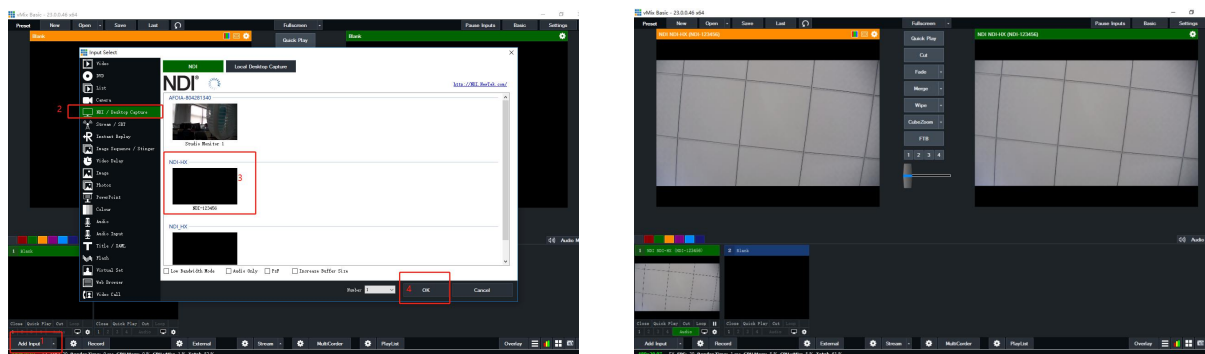
3) Turn on low bandwidth mode
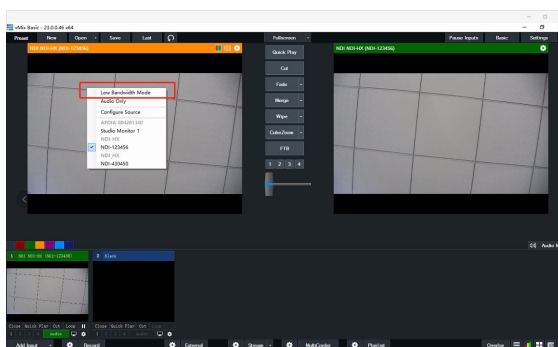
4) vmix configuration delay parameter.The number of frames is based on the frame rate.

For example, if the frame rate is 25FPS, then a frame of data is 40ms and the frames are 5, then the network delay will increase by about 200ms.
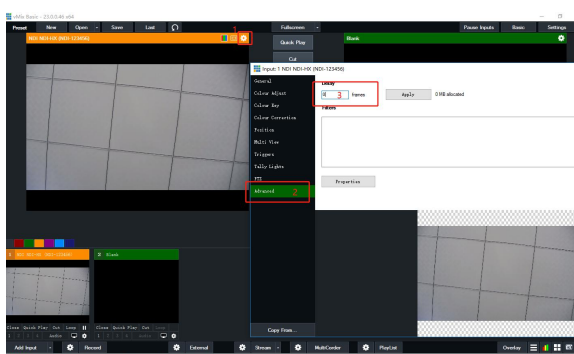
5) The control can select Sony VISCA over IP, the address select the camera IP address, and click Connect.
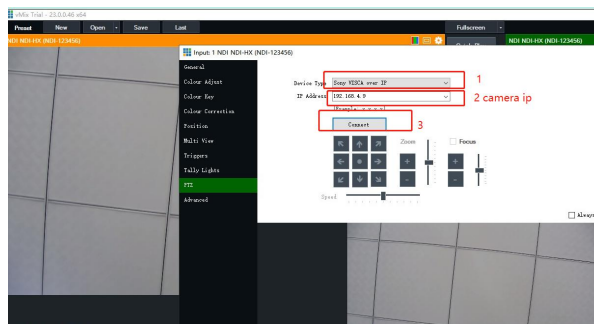
3.7.4 NDI|HX Instruction of OBS

1) Users need download OBS-NDI plug-in from official forum

   OBS-NDI plug-in reference address：https://github.com/Palakis/obs-ndi/releases/tag/4.7.0

2) OBS adds NDI source
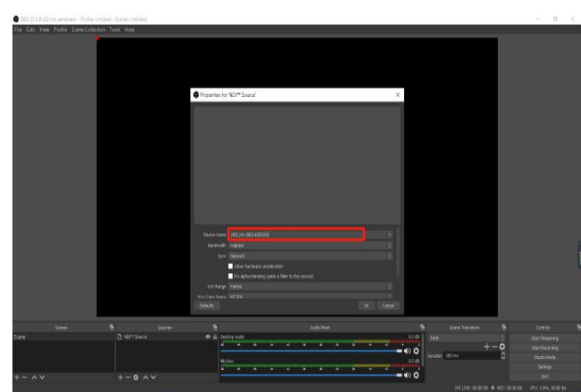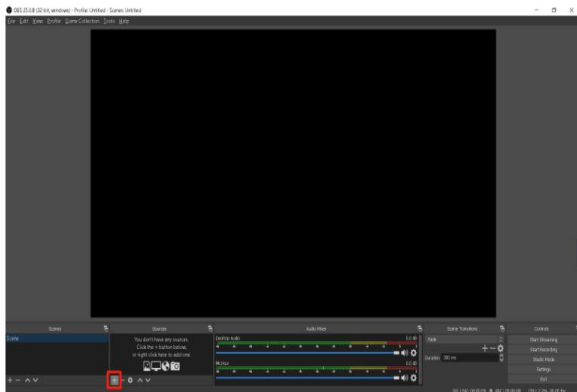
4)Open the audio
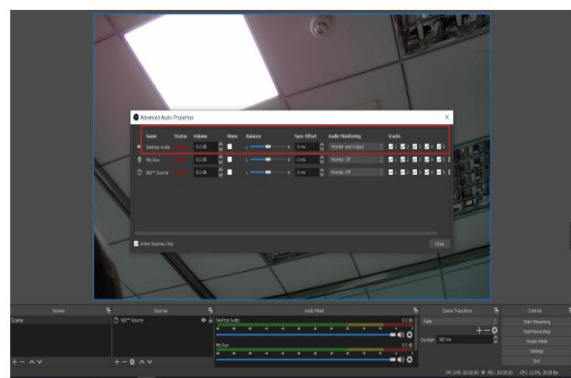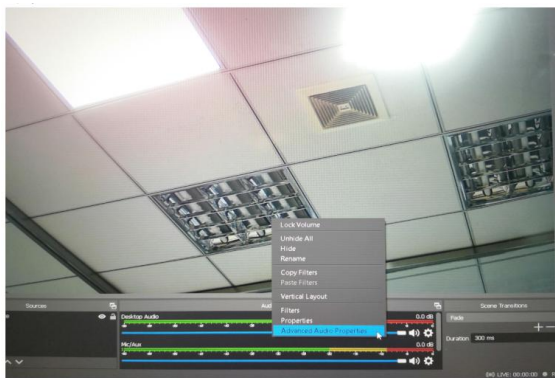
3.7.5 Several Problem solving

1) Whether NDI|HX has significant latency in using vmix ?

A: 1.The client configures the cache, causing the latency to increase.

   2.Set the frame rate to 60 frames can reduce latency.

2) NDI|HX can use vmix to print out the picture normally.,while the screen will be black during the use.Can PTZ be controlled during the process?

A: 1.The computer configuration problem leads to the failure of drawing. Please refer to the minimum configuration provided by NDI's official website.

2.When vmix obtains the NDI source, NDI|HX will request the key frame. If the key frame acquisition time is greater than 100ms, it can only be solved by restarting the camera.Therefore, it is recommended not to fetch other network streams, such as RTSP, RTMP, page preview, etc., when using NDI 60 frames.

3) How long does the NDI|HX delay?

A: The tested average delay is about 130ms, and the lowest delay is about 80ms when NDI|HX's using configuration is 1920* 1080 4096kbs 60fps and video output configuration is 720P60.
Test software:NDI Studio Monitor,turn on low latency mode.

4) How does NDI|HX modify network audio and video parameters?

A: Refer to the section of NDI|HX Network Video and Audio Encoding Parameters Configuration.

5) Can NDI|HX search the source but not get the image?

A: Refer to the section of NDI|HX Environment Configuration.

6) Can NDI|HX normally print out pictures with vmix?

A: vmix23and later version can print out pictures normally.

7) Which format does NDI support, NDI|HX or FULL NDI?

A: NDI|HX compression (h264, h265) is supported, while FULL NDI compression is not supported.
The H265 video compression format is supported only with the latest NDI4.5.2

3.7.6 Setting of NDI Applied to Video Conference Software

1）The NDI camera connects to the NDI signal via a software plug-in provided by the NDI and connects the video and audio directly to the meeting.
NDI software download site: https://www.ndi.tv/tools/#download-tools

2) Install "NewTek NDI 4.1 Tools" , multiple applications will be added to the computer, and in the Video software user will see a camera option named "NewTek NDI Video" and a microphone option named "NewTek NDI Audio".
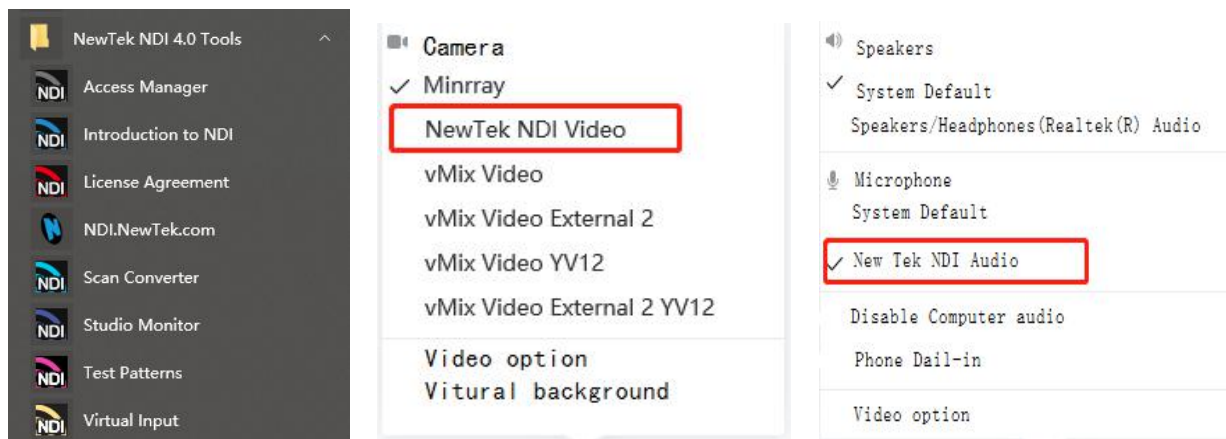
3)In the NDI software, "Studio Monitor" is the drawing program for NDI. Open the program to view the NDI screen and control the camera.

4)Use the NDI camera to join the video conference. First open the "Virtual Input" program in the NDI software. The program will mount a background program in the background, right-click the icon and select the NDI device.
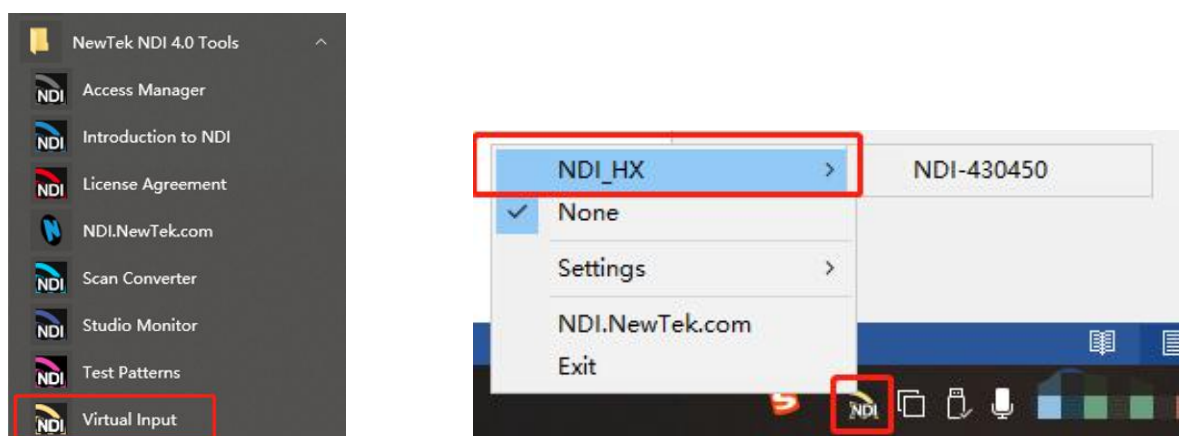
5) When selected, the load is complete. Enter the Video software and click "NewTek NDI Video" to use the NDI camera screen. If the camera is connected to Audio, click "NewTek NDI Audio" from the microphone device to use the camera Audio.
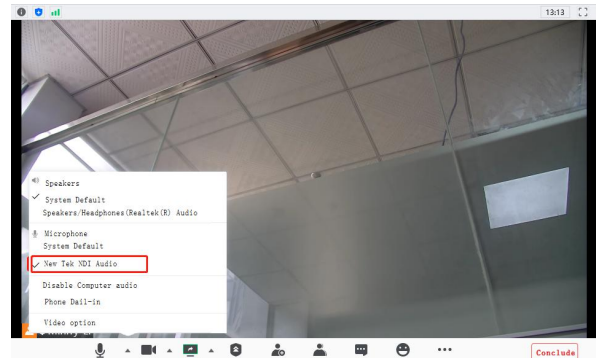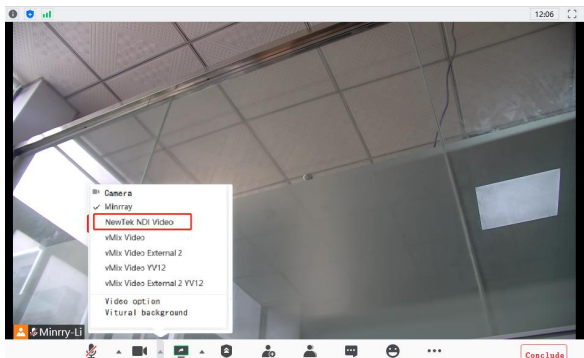
Currently, NDI is supported by Tencent conference, nail, enterprise WeChat, small fish easy connect, ZOOM, Welink, Microsoft Teams.

3.8 Logout

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

Chapter 4 Ordering Codes

4.1 Product

981-0011-03-0   RGB12X-NDI-WH 12X NDI Camera
981-0011-04-0   RGB20X-NDI-WH 20X NDI Camera

Chapter 5 Support

5.1 Contact us

www.rgblink.com

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5.2 Camera Maintenance and Troubleshooting

5.2.1 Camera Maintenance

1) If camera is not used for long time,please turn off power adapter switch and AC plug.

2) Use soft cloth or tissue to clean the camera cover.

3) Use soft cloth to clean the lens; Use neuter cleanser if bad smeared. No use strong or corrosive cleanser or corrosive cleanser avoiding scuffing.

5.2.2 Troubleshooting

1) No video output

———a, Check whether the camera power supply is connected,the voltage is normal,the power indicator is lit.

b, Whether the machine could do self-inspection after restarted.

c, Check whether the bottom of the DIP switch is the normal operating mode (see Table 2.2 and Table 2.3)

d, Check whether the video output cable or video display is normal

2) No image sometimes

———a, Check whether the video output cable or video display is normal

3) Image dithering when zoom-in or zoom-out

———a, Check whether the camera installation position is solid

b,Whether there is shaking machine or objects around the camera

4) Remote controller can not work

——— a, Remote control address is set to 1 (if the machine is set back to the factory defaults,remote control addresses need to be back to 1 too)

b, Check whether the battery is installed on the remote controller or low .

c, Check the camera working mode is the normal operating mode

d, Check the menu whether is closed,camera control through remote controller is only available after exiting the menu.If video output from LAN,menu will not be displayed,menu will automatically exists 30s later,then it can be controlled by remote controller.

5) Serial port can not work.

———a, Check whether the camera serial device protocol,baud rate,address is consistent

b, Check whether the control cable is connected properly

c, Check whether the camera working mode is the normal operating mode

6) Web pages can not log in

———a, Check whether the camera is showing normally.

b, Check whether the network cable is connected properly(Ethernet port yellow light flashes to indicate normal network cable connection)

c, Check whether your computer is added the segment and the segment is consistent with the IP address of the camera

d, Click "Start" and select "Run" and then type "cmd" in the computer;Click "OK" then turn on a DOS command window to enter ping 192.168.5.163. Press the Enter key to appear message as follows: Description network connection is normal

Chapter 6 Appendix

6.1 VISCA Protocol List

6.1.1 Camera Return Command

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

z = camera address + 8

Error Messages		
	Command packet	**Note**
Syntax Error	z0 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted
Command 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.

6.1.2 Camera Control Command

Command	Function	Command packet	Note
AddressSet	Broadcast	88 30 0p FF	p：Address setting
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear
CommandCancel		8x 21 FF	
CAM_Power	On	8x 01 04 00 02 FF	Power ON/OFF
	Off	8x 01 04 00 03 FF	
CAM_Zoom	Stop	8x 01 04 07 00 FF	
	Tele(Standard)	8x 01 04 07 02 FF	
	Wide(Standard)	8x 01 04 07 03 FF	
	Tele(Variable)	8x 01 04 07 2p FF	p = 0(low) - F(high)
	Wide(Variable)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM _Focus	Stop	8x 01 04 08 00 FF	
	Far(Standard)	8x 01 04 08 02 FF	
	Near(Standard)	8x 01 04 08 03 FF	
	Far(Variable)	8x 01 04 08 2p FF	p = 0(low) - F(high)
	Near (Variable)	8x 01 04 08 3p FF	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	pqrs: Focus Position
	Auto Focus	8x 01 04 38 02 FF	
	Manual Focus	8x 01 04 38 03 FF	
CAM _Zoom Focus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position tuvw: Focus Position
CAM_WB	Auto	8x 01 04 35 00 FF	
	3000K	8x 01 04 35 01 FF	

Command	Function	Command packet	Note
	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 Limit	Gain Limit	8x 01 04 2C 0p FF	p: Gain Positon
CAM_Bright	Reset	8x 01 04 0D 00 FF	Bright Setting
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
	Direct	8x 01 04 4D 00 00 0p 0q FF	pq: Bright Positon
CAM_ExpComp	On	8x 01 04 3E 02 FF	Exposure Compensation ON/OFF
	Off	8x 01 04 3E 03 FF	
	Reset	8x 01 04 0E 00 FF	Exposure Compensation Amount Setting
	Up	8x 01 04 0E 02 FF	
	Down	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 00 00 0p 0q FF	pq: ExpComp Position
CAM_Back Light	On	8x 01 04 33 02 FF	Back Light Compensation
	Off	8x 01 04 33 03 FF	
CAM_WDRStrength	Reset	8x 01 04 21 00 FF	WDR Level Setting
	Up	8x 01 04 21 02 FF	
	Down	8x 01 04 21 03 FF	
	Direct	8x 01 04 51 00 00 00 0p FF	p: WDR Level Positon
CAM_NR（2D）		8x 01 04 53 0p FF	P=0-7 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：

Command	Function	Command packet	Note
			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 49 00 00 00 0p FF	P=0-E 0:60%　1:70%　2:80%　3:90% 4:100%　5:110%　6:120% 7:130%　8:140% 9:150% 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 06 08 02 FF	IR(remote commander)receive On/Off
	OFF	8x 01 06 08 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
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

Command	Function	Command packet	Note
			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 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W:1 UpRight 0:DownLeft YYYY: Pan Limit Position(TBD) ZZZZ: Tilt Limit Position(TBD)
	Clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	

6.1.3 Inquiry Command

Command	Function	Command packet	Note
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF	Off(Standby)
CAM_ZoomPosInq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_FocusAFModeInq	8x 09 04 38 FF	y0 50 02 FF	Auto Focus
		y0 50 03 FF	Manual Focus
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_WBModeInq	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_Gain LimitInq	8x 09 04 2C FF	y0 50 0p FF	p: Gain Positon
CAM_ BrightPosiInq	8x 09 04 4D FF	y0 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompModeInq	8x 09 04 3E FF	y0 50 02 FF	On
		y0 50 03 FF	Off

CAM_ExpCompPosInq	8x 09 04 4E FF	y0 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_BacklightModeInq	8x 09 04 33 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_WDRStrengthInq	8x 09 04 51 FF	y0 50 00 00 00 0p FF	p: WDR Strength
CAM_NRLevel(2D) Inq	8x 09 04 53 FF	y0 50 0p FF	P: 2DNRLevel
CAM_NRLevel(3D) Inq	8x 09 04 54 FF	y0 50 0p FF	P:3D NRLevel
CAM_FlickerModeInq	8x 09 04 55 FF	y0 50 0p FF	p: Flicker Settings(0: OFF, 1: 50Hz, 2:60Hz)
CAM_ApertureInq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffectModeInq	8x 09 04 63 FF	y0 50 00 FF	Off
		y0 50 04 FF	B&W
CAM_MemoryInq	8x 09 04 3F FF	y0 50 0p FF	p: Memory number last operated.
SYS_MenuModeInq	8x 09 06 06 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_LR_ReverseInq	8x 09 04 61 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_PictureFlipInq	8x 09 04 66 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ColorSaturationInq	8x 09 04 49 FF	y0 50 00 00 00 0p FF	p: Color Gain setting 0h (60%) to Eh (130%)
CAM_IDInq	8x 09 04 22 FF	y0 50 0p FF	p: Gamma ID
IR_ReceiveInq	8x 09 06 08 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
IR_ReceiveReturn		y0 07 7D 01 04 00 FF	Power ON/OFF
		y0 07 7D 01 04 07 FF	Zoom tele/wide
		y0 07 7D 01 04 38 FF	AF ON/OFF
		y0 07 7D 01 04 33 FF	Camera _Backlight
		y0 07 7D 01 04 3F FF	Camera _Memery
		y0 07 7D 01 06 01 FF	Pan_titleDriver
CAM_BrightnessInq	8x 09 04 A1 FF	y0 50 00 00 0p 0q FF	pq: Brightness Position
CAM_ContrastInq	8x 09 04 A2 FF	y0 50 00 00 0p 0q FF	pq: Contrast Position
CAM_FlipInq	8x 09 04 A4 FF	y0 50 00 FF	Off
		y0 50 01 FF	Flip-H
		y0 50 02 FF	Flip-V
		y0 50 03 FF	Flip-HV
CAM_GammaInq	8x 09 04 5B FF	y0 50 0p FF	p: Gamma setting
CAM_VersionInq	8x 09 00 02 FF	y0 50 ab cd mn pq rs tu vw FF	ab cd : vender ID (0220) mn pq : model ID ST (0510) 、U2(0512)、 U3 (0513)、 HD （？ ？ ） 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 Speed　　zz: Tilt Max Speed
Pan-tiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	wwww: Pan Position　　zzzz: Tilt Position

Note:[X] in the above table indicates the camera address to be operated,【y】=【x + 8】.

6.2 Pelco-D Protocol Command List

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

6.3 Pelco-P Protocol Command List

Function	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Up	0xA0	Address	0x00	0x08	Pan Speed	Tilt Speed	0xAF	XOR
Down	0xA0	Address	0x00	0x10	Pan Speed	Tilt Speed	0xAF	XOR
Left	0xA0	Address	0x00	0x04	Pan Speed	Tilt Speed	0xAF	XOR
Right	0xA0	Address	0x00	0x02	Pan Speed	Tilt Speed	0xAF	XOR
Upleft	0xA0	Address	0x00	0x0C	Pan Speed	Tilt Speed	0xAF	XOR
Upright	0xA0	Address	0x00	0x0A	Pan Speed	Tilt Speed	0xAF	XOR
DownLeft	0xA0	Address	0x00	0x14	Pan Speed	Tilt Speed	0xAF	XOR
DownRight	0xA0	Address	0x00	0x12	Pan Speed	Tilt Speed	0xAF	XOR
Zoom In	0xA0	Address	0x00	0x20	0x00	0x00	0xAF	XOR
Zoom Out	0xA0	Address	0x00	0x40	0x00	0x00	0xAF	XOR
Stop	0xA0	Address	0x00	0x00	0x00	0x00	0xAF	XOR
Focus Far	0xA0	Address	0x01	0x00	0x00	0x00	0xAF	XOR
Focus Near	0xA0	Address	0x02	0x00	0x00	0x00	0xAF	XOR
Set Preset	0xA0	Address	0x00	0x03	0x00	Preset ID	0xAF	XOR
Clear Preset	0xA0	Address	0x00	0x05	0x00	Preset ID	0xAF	XOR
Call Preset	0xA0	Address	0x00	0x07	0x00	Preset ID	0xAF	XOR
Query Pan Position	0xA0	Address	0x00	0x51	0x00	0x00	0xAF	XOR
Query Pan Position Response	0xA0	Address	0x00	0x59	Value High Byte	Value Low Byte	0xAF	XOR
Query Tilt Position	0xA0	Address	0x00	0x53	0x00	0x00	0xAF	XOR
Query Tilt Position Response	0xA0	Address	0x00	0x5B	Value High Byte	Value Low Byte	0xAF	XOR
Query Zoom Position	0xA0	Address	0x00	0x55	0x00	0x00	0xAF	XOR
Query Zoom Position Response	0xA0	Address	0x00	0x5D	Value High Byte	Value Low Byte	0xAF	XOR

6.2 Terms & Definitions

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

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

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

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

●**VGA：** Video Graphics Array. VGA is an analog signal typically used on earlier computers. The signal is non-interlaced in modes 1, 2, and 3 and interlaced when using in mode

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

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

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

● **3G-SDI**: standardized in SMPTE 424M, consists of a single 2.970 Gbit/s serial link that allows replacing dual link HD-SDI.

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

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

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

●**HDMI ：** High Definition Multimedia Interface: An interface used for the transmission of uncompressed high definition video, up to 8 channels of audio, and control signals, over a single cable.
●**HDMI 1.3:** released on June 22 2006, and increased the maximum TMDS clock to 340 MHz (10.2 Gbit/s). Support resolution 1920 × 1080 at 120 Hz or 2560 × 1440 at 60 Hz). It added support for 10 bpc, 12 bpc, and 16 bpc color depth (30, 36, and 48 bit/px), called deep color.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

● **LC**：(Lucent Connector) is a small factor connector (uses only a 1.25mm ferrule diameter) that has a snap coupling mechanism. Because of its small dimensions, it is the perfect fit for high-density connections, XFP, SFP, and SFP+ transceivers.
● **FC** :(Ferrule Connector) is a screw type connector with a 2.5mm ferrule. FC is a round shaped threaded fiber optic connector,mostly used on Datacom, telecom, measurement equipment, single-mode laser.

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

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

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

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

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

USB version and connectors figure：

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

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

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

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

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

●**HDCP:** High-bandwidth Digital Content Protection (HDCP) was developed by Intel Corporation an is in wide use for protection of video during transmission between devices.

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

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

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

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

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

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

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

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

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

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

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

●**DMX512:** The communication standard developed by USITT for entertainment and digital lighting systems.The wide adoption of the Digital Multiplex (DMX) protocol has seen the protocol used for a wide range of other devices including

video controllers. DMX512 is delivered over cable of 2 twisted pairs with 5pin XLR cables for connection.

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

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

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

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

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

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

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

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

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

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

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

●**Colour Burst:** In colour TV systems, a burst of subcarrier frequency located on the back part of the composite video signal. This serves as a colour synchronizing signal to establish a frequency and phase reference for the Chroma signal. Colour burst is 3.58 MHz for NTSC and 4.43 MHz for PAL.

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

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

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

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

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

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

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

6.3 Revision History

The table below lists the changes to the Video Processor User Manual.

Format	Time	ECO#	Description	Principle
V1.0	2020-12-08	0000#	Release	Sylvia