



**Vision+ N3 20X**

# **User Manual**



**V1.0**



# ===== CONTENT =====

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|                               |                    |
|-------------------------------|--------------------|
| CONTENT .....                 | 1                  |
| SAFETY GUIDES .....           | 2                  |
| USE CHECK .....               | 4                  |
| PRODUCT HIGHLIGHTS .....      | 6                  |
| CAMERA SPEC .....             | 7                  |
| INTERFACE DESCRIPTION .....   | 9                  |
| CAMERA DIMENSION .....        | 10                 |
| INSTALLATION .....            | 11                 |
| IR REMOTE CONTROLLER .....    | 13                 |
| VISCA IN(RS232 PORT) .....    | 15                 |
| VISCA PROTOCOL .....          | 17                 |
| PELCO-D PROTOCOL .....        | <a href="#">30</a> |
| PELCO-P PROTOCOL .....        | 31                 |
| OSD MENU .....                | 32                 |
| UVC CONTROL .....             | 36                 |
| WEB SETTING .....             | 37                 |
| VIEW RTSP VIDEO VIA VLC ..... | 45                 |
| NDI TOOLS .....               | 46                 |
| VISCA OVER IP .....           | 48                 |

# ===== SAFETY GUIDES =====

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● Before operation, please fully read and follow all instructions in the manual. For your safety, always keep this manual with the camera.

● The camera power voltage is 12V DC, rated current is 2A. We suggest you use it with the original power supply adapter supplied by the factory.

● Please keep the power cable, video cable and control cable in a safe place. Protect all cables especially the connectors.

● Operational environment:  $-10^{\circ}\text{C}\sim 50^{\circ}\text{C}$ , humidity less than 80%.

● To avoid any danger, please keep the camera away from the corrosive liquid.

● Avoid stress, vibration and damp during transportation, storage and installation.

● Do not remove the camera housing and cover. For any service, please contact authorized technicians.

● Video cable and control cable should be individually shielded, and cannot be substituted with other cables. Do not direct the camera lens towards strong light, such as the sun or the intensive light.

● Use a dry and soft cloth to clean the camera housing. Applied with neutral cleaning agent when there is need to clean. To avoid damage on the camera lens, never use strong or abrasive cleaning agents on the camera housing.

● Do not move the camera by holding the camera head. To avoid mechanical trouble, do not rotate the camera head by hand.

● Put the camera on fixed and smooth desk or platform, avoid leaned installation.

● Power Supply Polarity:

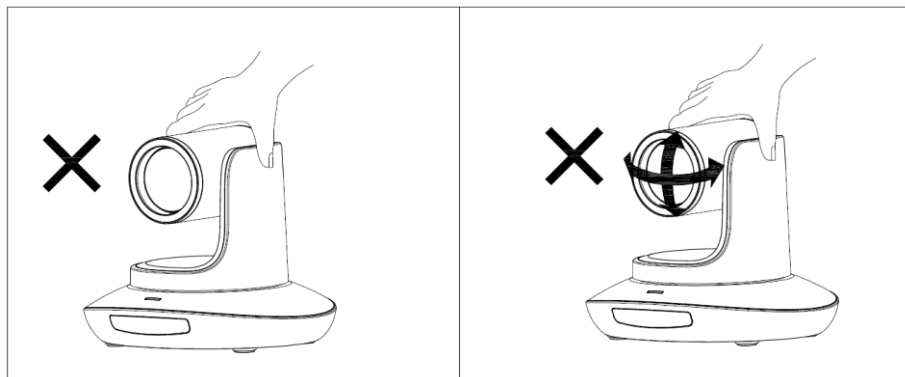


# ===== SAFETY GUIDES =====

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## Attention !

▲ The video quality may be affected by the specific frequencies of electromagnetic field.



▲ Never grasp the head of the camera, and never move the camera by hand when it is working, otherwise, mechanism maybe destroyed.

## Declaration:

■ Instructional Manual is for reference only. Please refer to the actual product.

■ Please contact Customer Service staff for the latest programs and supplementary documentations.

■ In case of any doubt or dispute in the instruction manual, the final interpretation of the company shall prevail.

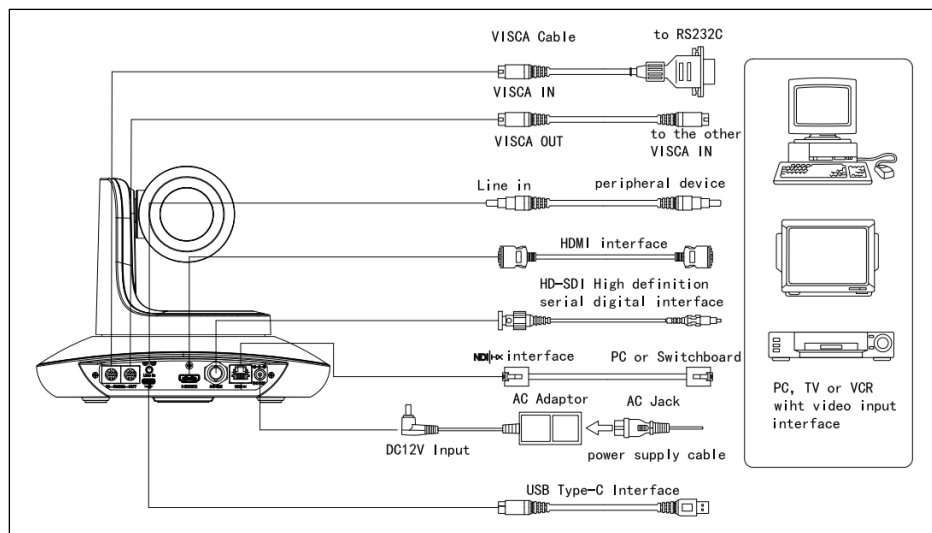
# ===== USE CHECK =====

## PACKING LIST

Check all below items when open the package

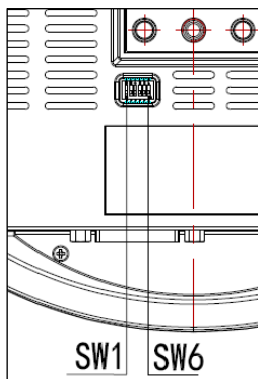
|                           |      |
|---------------------------|------|
| Camera .....              | 1PCS |
| Power Adapter .....       | 1PCS |
| Power Cable.....          | 1PCS |
| Remote Controller.....    | 1PCS |
| USB Type-C Cable.....     | 1PCS |
| RS232 Cable .....         | 1PCS |
| User Manual.....          | 1PCS |
| QC PASS .....             | 1PCS |
| Shock-absorbing Pad ..... | 1PCS |

## QUICK START



# ===== USE CHECK =====

## Dial Switch Setting (at the bottom of the camera)



| Dial Switch (ARM) |      |      |                |
|-------------------|------|------|----------------|
|                   | SW-1 | SW-2 | Instruction    |
| 1                 | OFF  | OFF  | Upgrading mode |
| 2                 | ON   | OFF  | Debugging mode |
| 3                 | OFF  | ON   | Undefined      |
| 4                 | ON   | ON   | Working mode   |

| Dial Switch |      |      |             |
|-------------|------|------|-------------|
|             | SW-3 | SW-4 | Instruction |
| 1           | OFF  | OFF  | Reserved    |
| 2           | ON   | OFF  | Reserved    |
| 3           | OFF  | ON   | Reserved    |
| 4           | ON   | ON   | Reserved    |

| Dial Switch |      |      |              |
|-------------|------|------|--------------|
|             | SW-5 | SW-6 | Instruction  |
| 1           | OFF  | OFF  | Undefined    |
| 2           | ON   | OFF  | Working mode |
| 3           | OFF  | ON   | Undefined    |
| 4           | ON   | ON   | Undefined    |

# === PRODUCT HIGHLIGHTS ===

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- ★ Adopting the most advanced image processing DSP, 1/2.8 inch 2.4MP sensor.
- ★ High-Definition Optical Lens: 20x optical zoom, with 60-degree field of view.
- ★ FHD 1080P60 video output from NDI®|HX (or Ethernet), while supporting H.264, H.265 encoding.
- ★ Support POE+: one single ethernet cable to get video, control, and power supply.
- ★ Fast video format switch.
- ★ Special Focusing Algorithm: fast and precise focusing performance when zooming or moving.
- ★ Unique camera design with patent.
- ★ Smooth PTZ mechanical design, accurate pan tilt motor control.
- ★ Support field upgrade, one-click software upgrade through WebUI.
- ★ Support Line in input.
- ★ Support NDI®|HX, HDMI, SDI high-quality audio output.
- ★ NDI®|HX, HDMI, SDI, USB Type-C outputs, fit for different scenarios.
- ★ Standard VISCA, PELCO-D, PELCO-D control protocol, quickly set up through OSD menu.
- ★ Support Auto-Tracking and lock the first person captured by the camera.
- ★ Supplied with multi-functional IR remote controller, can set IP address via OSD menu.
- ★ Standard Sony VISCA over IP protocol, support network video and control transmission simultaneously.
- ★ Support SRT protocol for secure transmission of high-quality, low-latency video over WANs.
- ★ Support for the latest NDI®|HX3, easy plug and play for live streaming.
- ★ Support RTMP protocol directly streaming to Youtube Live, Facebook Live and other platform.
- ★ Support Auto tracking.
- ★ Multi language menu: support Chinese, English and Russian.



# CAMERA SPEC



| Vision+ N3 20X      |                                                                                                                                                 |                                                                                                                                               |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Sensor              | 1/2.8inch high quality, 2.4 MP CMOS Sensor                                                                                                      |                                                                                                                                               |
| Video Format        | HDMI                                                                                                                                            | 1920*1080P60/59.94/50/30/29.97/25/24/23.98<br>1920*1080I60/59.94/50<br>1280*720P60/59.94/50/30/29.97/25                                       |
|                     | SDI                                                                                                                                             | 1920*1080P60/59.94/50/30/29.97/25/24/23.98<br>1920*1080I60/59.94/50<br>1280*720P60/59.94/50/30/29.97/25                                       |
|                     | USB                                                                                                                                             | MJPEG, H.264, HEVC: 1920*1080P60;<br>1280*720P60; 1024*576P60; 800*448P60<br>NV12, YUY2: 1920*1080P5; 1280*720P15;<br>1024*576P25; 800*448P30 |
|                     | IP(NDI® HX)                                                                                                                                     | 1920*1080P15~60; 1280*720P15~60;<br>1024*576P15~60; 640*360P30                                                                                |
| Video Interface     | HDMI, SDI, RJ45(NDI® HX), USB Type-C                                                                                                            |                                                                                                                                               |
| Audio Interface     | 3.5mm Line in                                                                                                                                   |                                                                                                                                               |
| Focal Length        | 4.9mm~98mm                                                                                                                                      |                                                                                                                                               |
| Lens magnifications | 20X optical zoom + 4X digital zoom                                                                                                              |                                                                                                                                               |
| Aperture            | F1.5~3                                                                                                                                          |                                                                                                                                               |
| View Angel          | 60°(Wide)~3.2°(Tele)                                                                                                                            |                                                                                                                                               |
| Rotation Angle      | Pan: ±170°; Tilt: -30°~+90°;                                                                                                                    |                                                                                                                                               |
| Rotation Speed      | Pan: 0.1°~120°/s; Tilt: 0.1°~80°/s                                                                                                              |                                                                                                                                               |
| Preset              | Remote controller: 10; RS232: 128; Accuracy: 0.1°                                                                                               |                                                                                                                                               |
| Control Port        | RS232 IN, RJ45(NDI® HX)                                                                                                                         |                                                                                                                                               |
| Network Speed       | 1000M                                                                                                                                           |                                                                                                                                               |
| Video encode        | H.264 / H.265                                                                                                                                   |                                                                                                                                               |
| Bit Rate Control    | Variable Bit Rate, Constant Bit Rate                                                                                                            |                                                                                                                                               |
| Video Bit Rate      | 1024~61440kbps                                                                                                                                  |                                                                                                                                               |
| Protocol            | NDI®HX3, SRT, HTTP, HTTPS, RTSP, RTMP, RTMPS, ONVIF, VISCA over IP(TCP&UDP), VISCA, PELCO P/D, SSDP, FreeD, NTP, RTP Multicast, WebRTC, MPEG-TS |                                                                                                                                               |

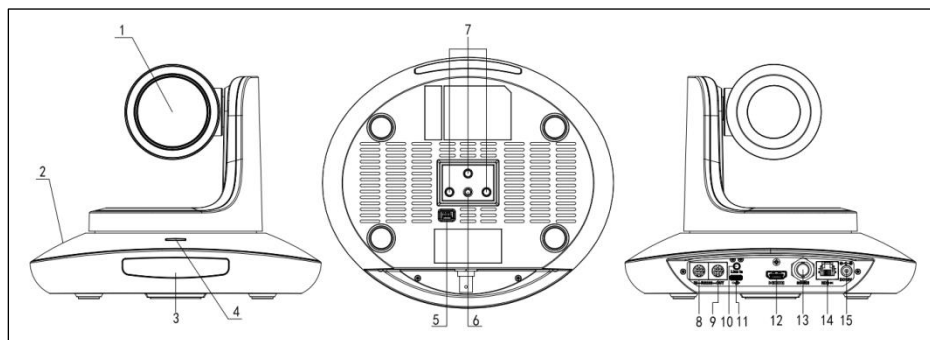


## CAMERA SPEC



|                            |                                                                   |
|----------------------------|-------------------------------------------------------------------|
| <b>POE+</b>                | Supported                                                         |
| <b>Daisy Chain</b>         | Support RS232 serial daisy chain                                  |
| <b>Minimum Lux</b>         | 0.7lux                                                            |
| <b>White Balance</b>       | Auto / Manual / ATW / Push / Indoor / Outdoor / Color Temperature |
| <b>Exposure</b>            | Auto / Manual / Iris / Bright                                     |
| <b>Focus</b>               | Auto / Manual                                                     |
| <b>Iris</b>                | Auto / Manual                                                     |
| <b>Shutter</b>             | Auto / Manual                                                     |
| <b>Auto Track</b>          | Supported                                                         |
| <b>Gamma select</b>        | Supported                                                         |
| <b>BLC</b>                 | Supported                                                         |
| <b>2D Noise Reduction</b>  | Supported                                                         |
| <b>3D Noise Reduction</b>  | Supported                                                         |
| <b>Anti-flicker</b>        | OFF, 50Hz, 60Hz                                                   |
| <b>Pan Tilt Flip</b>       | Supported                                                         |
| <b>Mirroring</b>           | Supported                                                         |
| <b>Input Voltage</b>       | DC12V/POE+(IEEE802.3at)                                           |
| <b>Dimension</b>           | 220mm×190mm×173mm                                                 |
| <b>Net Weight</b>          | 1.35kg                                                            |
| <b>Working Temperature</b> | -10°C~50°C                                                        |
| <b>Working Humidity</b>    | ≤80%                                                              |

# == INTERFACE DESCRIPTION ==



1.Camera Lens

2.Camera Base

3.IR Receiver Panel

4.Power Indicator Light

5.Dial Switch

6.Tripod Screw Hole

7.Installation Hole

8.RS232 ((IN) port

9.RS232 (OUT) port

10.Line in port

11.USB Type-C port

12.HDMI port

13.3G-SDI port

14.RJ45(NDI®|HX) port

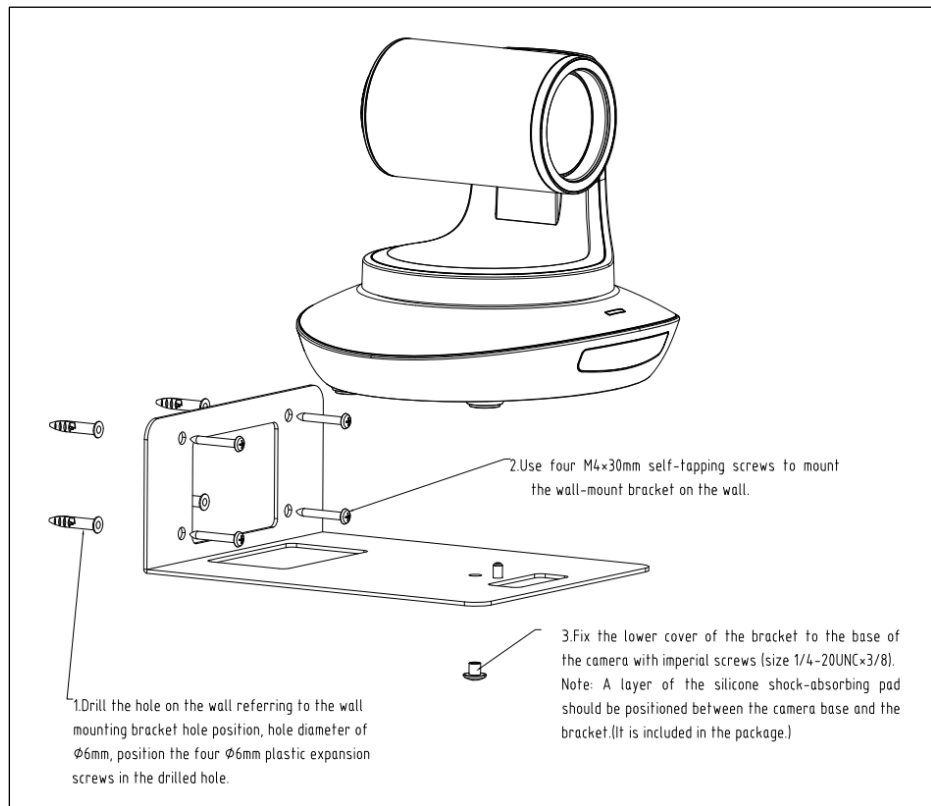
15.DC 12V plug

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# ===== INSTALLATION =====

## Wall-Mount Installation:



1. Drill the hole on the wall referring to the wall mounting bracket hole position, hole diameter of  $\phi 6\text{mm}$ , position the four  $\phi 6\text{mm}$  plastic expansion screws in the drilled hole.

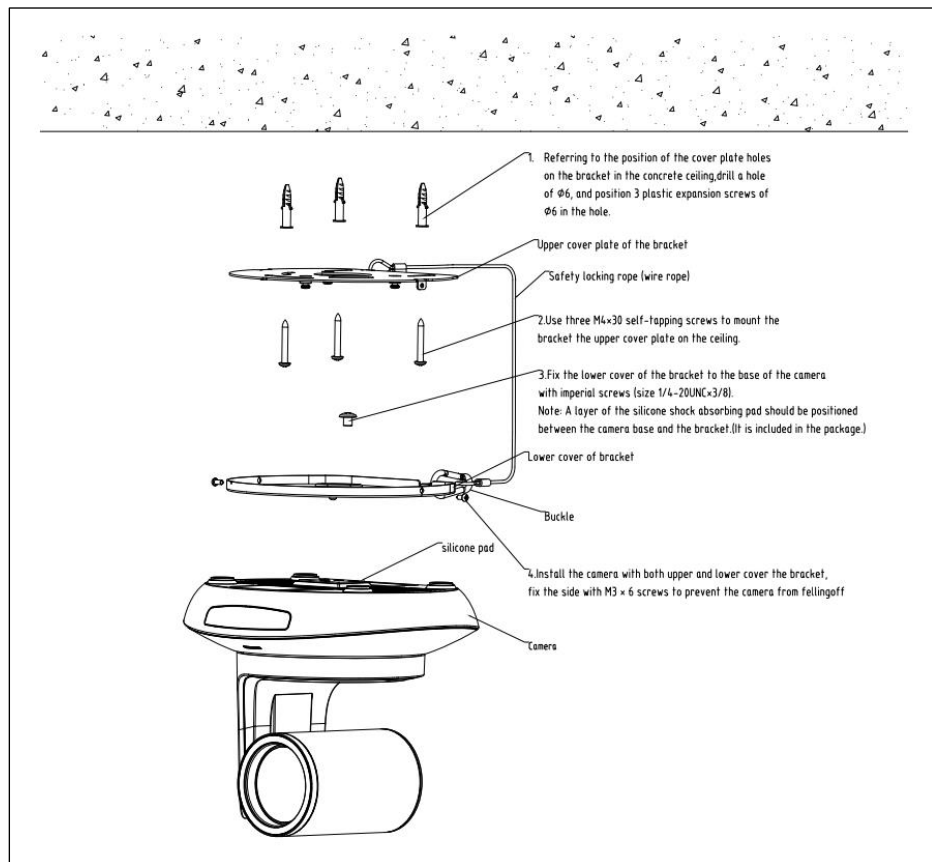
2. Use four M4 $\times$ 30 self-tapping screws to mount the wall-mount bracket on the wall.

3. Fix the lower cover of the bracket to the base of the camera with imperial screws (SIZE 1/4-20UNC $\times$ 3/8)

**Note:** A layer of silicone shock-absorbing pad should be positioned between the camera base and the bracket. (It is included in the package)

# ===== INSTALLATION =====

## Ceiling-Mount Installation :



1. Referring to the position of the cover plate holes on the bracket in the concrete ceiling, drill a hole of  $\phi 6$ , and position 3 plastic expansion screws of  $\phi 6$  in the hole.

2. Use three M4\*30 self-tapping screws to mount the bracket the upper cover plate on the ceiling.

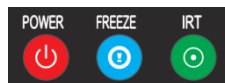
3. Fix the lower cover of bracket to the base of the camera with imperial screws (Size 1/4-20UNC\*3/8)

**Note:** A layer of silicone shock-absorbing pad should be positioned between the camera base and the bracket. (It is included in the package).

4. Install the camera with both upper and lower cover of the bracket, fix the side with M3\*6 screws to prevent the camera from falling off.



# VISCA IN (RS232 PORT)



## POWER

Short press POWER key to enter standby mode from normal working mode. Press it again, the camera will do self-checking, then go back to HOME position. It will go to preset position if power on mode has been set before.

## FREEZE

Short press FREEZE key to freeze/unfreeze the image.

## IRT (IR Transfer/IR Pass)

Open/Close the IR pass function. Once press the IRT key, the camera will receive and pass the IR remote control signal to the codec/terminal.(via VISCA IN port)

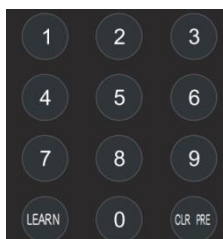


## Set 1 ~ Set 4 ADDRESS SETTING

Long press for 3 seconds until the key light ON, to set camera address.

## CAM1 ~ CAM4 (CAMERA SELETING)

Short press to select the relative camera.



## NUMBER KEY (1-9)

Set Preset: Long press the number key (3 seconds) to set preset.

Run Preset: Short press the number key to run preset.

## CLR PRE (CLEAR PRESET)

CLR PRE+number key: to clear the relative preset.  
Long press to clear all presets.



# VISCA IN (RS232 PORT)



## FOCUS KEY: +/-

Manual focus, only valid under manual focus mode.

## ZOOM KEY: +/-

Set the Zoom rate.

## NAVIGATE KEY: UP/DOWN/LEFT/RIGHT

Under working mode, use navigate key to set the pan tilt, and select menu when enter OSD.

**OK/ HOME KEY:** Under working mode, short press

OK to make the camera go back to HOME position; and confirm the selection when enter OSD.



## AF/MF: AUTO FOCUS/ MANUAL FOCUS

**RESET:** Press 3 seconds to reset camera.

**MENU:** Enter OSD menu under working mode. Use as Go-Back function after entering the menu.



**F1:** F1+OK: Aging mode (Factory debug use only).

**F2:** LEARN+F2+1: Calibration mode (Factory debug use only).

**F3:** Short press: One-touch white balance. (You need to set the white balance mode in the menu to PUSH mode.)

**F4:** Reserved.



## LIMIT L/ LIMIT R/ LIMIT CLR:

LEARN+LIMIT L: Set the pan tilt left limit position.

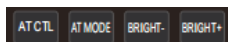
LEARN+LIMIT R: Set the pan tilt right limit position.

LEARN+LIMIT CLR: Clear the limit position.



**AT CTL:** To turn off/on the auto tracking.

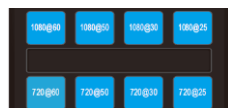
**AT MODE:** Select auto tracking mode. (left/ middle/ right)



**BRIGHT-/ BRIGHT+:** Set image brightness, only valid under bright priority exposure mode.

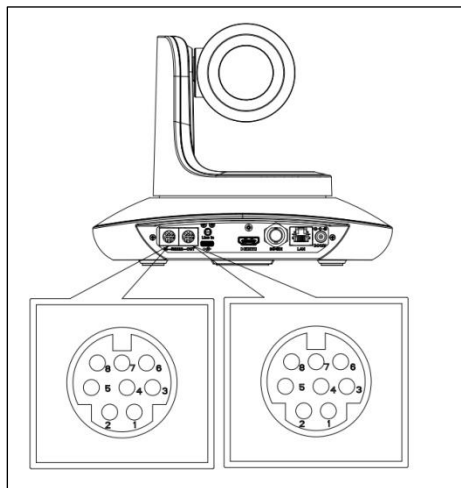
## VIDEO FORMAT KEYS:

Long press 3 seconds to select different video format output.





## VISCA IN (RS232 PORT)



| NO. | V_IN | V_OUT |
|-----|------|-------|
| 1   | DTR  | DTR   |
| 2   | DSR  | DSR   |
| 3   | TXD  | TXD   |
| 4   | GND  | GND   |
| 5   | RXD  | RXD   |
| 6   | A    |       |
| 7   | IR   |       |
| 8   | B    |       |

| V_IN | RS485 |
|------|-------|
| 1    |       |
| 2    |       |
| 3    |       |
| 4    |       |
| 5    |       |
| 6    | A(+)  |
| 7    | IR    |
| 8    | B(-)  |

### VISCA IN 与 Mini DIN

| Camera VISCA IN |        | Mini DIN |     |
|-----------------|--------|----------|-----|
| 1               | DTR    | 1        | DSR |
| 2               | DSR    | 2        | DTR |
| 3               | TXD    | 5        | RXD |
| 4               | GND    | 4        | GND |
| 5               | RXD    | 3        | TXD |
| 6               | A(+)   | 6        | NC  |
| 7               | IR OUT | 7        | NC  |
| 8               | B(-)   | 8        | NC  |

### VISCA IN 与 DB9 Connection

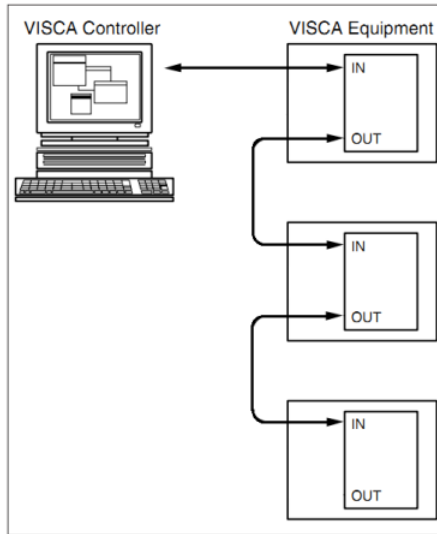
| Camera VISCA IN |        | Windows DB-9 |     |
|-----------------|--------|--------------|-----|
| 1               | DTR    | 6            | DSR |
| 2               | DSR    | 4            | DTR |
| 3               | TXD    | 2            | RXD |
| 4               | GND    | 5            | GND |
| 5               | RXD    | 3            | TXD |
| 6               | A(+)   |              |     |
| 7               | IR OUT |              |     |
| 8               | B(-)   |              |     |



# VISCA IN (RS232 PORT)



## VISCA Network Construction:



## SERIAL PORT CONFIGURATION:

| Parameter | Value                 |
|-----------|-----------------------|
| Baud rate | 2400/4800/9600/115200 |
| Start bit | 1bit                  |
| Date bit  | 8bits                 |
| Stop bit  | 1bit                  |
| Check bit | None                  |



# VISCA PROTOCOL



## Part1 Camera Return Command

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

| Error Messages         |             |                                                                                                                                                                 |
|------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | command     | 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. |

## Part2 Camera Control Command

| Command type   | function          | command                       |                                                              |
|----------------|-------------------|-------------------------------|--------------------------------------------------------------|
| Address Set    | Broadcast         | 88 30 01 FF                   | Address setting                                              |
| IF_Clear       | Broadcast         | 88 01 00 01 FF                | I/F Clear                                                    |
| Command Cancel |                   | 8x 21 FF                      |                                                              |
| CAM_Power      | On                | 8x 01 04 00 02 FF             | Power ON/OFF                                                 |
|                | Off               | 8x 01 04 00 03 FF             | Address setting                                              |
| CAM_Zoom       | Stop              | 8x 01 04 07 00 FF             | p = 0(low)~7(high)                                           |
|                | Tele(Standard)    | 8x 01 04 07 02 FF             |                                                              |
|                | Wide(Standard)    | 8x 01 04 07 03 FF             |                                                              |
|                | Tele(Variable)    | 8x 01 04 07 2p FF             |                                                              |
|                | Wide(Variable)    | 8x 01 04 07 3p FF             |                                                              |
|                | Direct            | 8x 01 04 47 0p 0q 0r 0s FF    | pqrs: Zoom Position<br>(0(wide) ~0x4000(tele))               |
|                | Direct with speed | 8x 0A 04 47 0t 0p 0q 0r 0s FF | t: spd 0~7<br>pqrs: Zoom Position<br>(0(wide) ~0x4000(tele)) |
| CAM_DZoom      | ON                | 8x 01 04 06 02 FF             |                                                              |
|                | OFF               | 8x 01 04 06 03 FF             |                                                              |
|                | Combine Mode      | 8x 01 04 36 00 FF             | Combine with optical                                         |
|                | Separate Mode     | 8x 01 04 36 01 FF             | Separate with optical                                        |
|                | Stop              | 8x 01 04 06 00 FF             | Enable In separate mode                                      |
|                | Tele (Variable)   | 8x 01 04 06 2p FF             | Enable In separate mode                                      |
|                | Wide (Variable)   | 8x 01 04 06 3p FF             | Enable In separate mode                                      |



# VISCA PROTOCOL



| Command type   | function         | command                                |                                                                        |
|----------------|------------------|----------------------------------------|------------------------------------------------------------------------|
|                | Direct           | 8x 01 04 46 0p 0q 0r 0s FF             | Enable In separate mode                                                |
| 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) to 7 (High)                                                  |
|                | Near (Variable)  | 8x 01 04 08 3p FF                      | p=0 (Low) to 7 (High)                                                  |
|                | 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                      |                                                                        |
|                | One Push AF      | 8x 01 04 18 01 FF                      |                                                                        |
| CAM_Zoom Focus | Direct           | 8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF | pqrs: Zoom Position<br>(0(wide)~ 0x4000(tele))<br>tuvw: Focus Position |
| CAM_WB         | Auto             | 8x 01 04 35 00 FF                      |                                                                        |
|                | Indoor           | 8x 01 04 35 01 FF                      |                                                                        |
|                | Outdoor          | 8x 01 04 35 02 FF                      |                                                                        |
|                | One Push         | 8x 01 04 35 03 FF                      |                                                                        |
|                | ATW              | 8x 01 04 35 04 FF                      |                                                                        |
|                | Manual           | 8x 01 04 35 05 FF                      |                                                                        |
|                | One Push Trigger | 8x 01 04 10 05 FF                      |                                                                        |
| CAM_R Gain     | 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 (0~0xFF)                                                    |
| CAM_B Gain     | 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 (0~0xFF)                                                    |
| CAM_AE         | Full Auto        | 8x01 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<br>Automatic Exposure mode                            |
|                | Iris Priority    | 8x 01 04 39 0B FF                      | Iris Priority Automatic<br>Exposure mode                               |
|                | Bright           | 8x 01 04 39 0D FF                      | Bright Mode (Manual<br>control)                                        |



# VISCA PROTOCOL



| Command type        | function  | command                    |                                                                     |
|---------------------|-----------|----------------------------|---------------------------------------------------------------------|
| 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 (0~0x15)                                       |
| CAM_Iris            | Reset     | 8x 01 04 0B 00 FF          | Iris Setting(0~0xD)                                                 |
|                     | 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 (0~0x11)                                          |
| CAM_Gain            | Reset     | 8x 01 04 0C 00 FF          | Gain Setting (0~0x0F)                                               |
|                     | Up        | 8x 01 04 0C 02 FF          |                                                                     |
|                     | Down      | 8x 01 04 0C 03 FF          |                                                                     |
|                     | Direct    | 8x 01 04 0C 00 00 0p 0q FF | pq: Gain Positon (0~0x0E)                                           |
|                     | GainLimit | 8x 01 04 2C 0p FF          | p:GainLimt 0x04~0x0F                                                |
| CAM_AEBright        | 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 l Positon (0~0x1B)                                       |
| CAM_ImageBright     | Direct    | 8x 01 04 A4 00 00 0p 0q FF | pq: Image Bright Positon (0~0x0F)<br>AE_AUTO/AE_SHUTTE<br>R/AE_IRIS |
| CAM_WDR             | On        | 8x 01 04 3D 02 FF          | Exposure Compensation<br>ON/OFF                                     |
|                     | Off       | 8x 01 04 3D 03 FF          |                                                                     |
|                     | Direct    | 8x 01 04 D3 pq FF          | pq: ExpComp Position (0~0x6)                                        |
| CAM_Back Light(BLC) | On        | 8x 01 04 33 02 FF          | BackLight On                                                        |
|                     | Off       | 8x 01 04 33 03 FF          | BackLight Off                                                       |
| CAM_Sharpness       | 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 (0~0x0F)                                          |



# VISCA PROTOCOL



| Command type            | function            | command                    |                                                                               |
|-------------------------|---------------------|----------------------------|-------------------------------------------------------------------------------|
| CAM_Memory(preset)      | Reset               | 8x 01 04 3F 00 pp FF       | pp: Preset Number(=0 to 127)                                                  |
|                         | Set                 | 8x 01 04 3F 01 pp FF       |                                                                               |
|                         | Recall              | 8x 01 04 3F 02 pp FF       |                                                                               |
| CAM_MemoryH (preset)    | Reset               | 8x 01 04 3F 00 0p 0p FF    | pp: Preset Number(=0 to 255)<br>Corresponds to 0 to 9 on the Remote Commander |
|                         | Set                 | 8x 01 04 3F 01 0p 0p FF    |                                                                               |
|                         | Recall              | 8x 01 04 3F 02 0p 0p FF    |                                                                               |
| Freeze                  | Set                 | 8x 01 04 75 0p FF          | p: Freeze switch 3=OFF 2=ON                                                   |
| Preset Freeze Set       | Set                 | 8x 01 04 76 0p FF          | p: Preset Freeze switch 3=OFF 2=ON                                            |
| Preset Speed Set        | Set                 | 8x 01 7E 01 0B 00 qq FF    | qq:Preset speed 2~24 default:15                                               |
| Preset Speed Adj        | adj                 | 8x 01 7E 01 1B 0p FF       | p: direction adjustment 3= down 2=up                                          |
| CAM_LR_Reverse          | On                  | 8x 01 04 61 02 FF          | Image Flip Horizontal ON/OFF                                                  |
|                         | Off                 | 8x 01 04 61 03 FF          |                                                                               |
| CAM_Picture Flip        | On                  | 8x 01 04 66 02 FF          | Image Flip Vertical ON/OFF                                                    |
|                         | Off                 | 8x 01 04 66 03 FF          |                                                                               |
| CAM_RS485Ctl            | On                  | 8x 01 06 A5 02 FF          |                                                                               |
|                         | Off                 | 8x 01 06 A5 03 FF          |                                                                               |
| CAM_Saturation          | Saturation          | 8x 01 04 A1 00 00 0p 0q FF | pq:saturation level 0x00~0x0f                                                 |
| CAM_Contrast            | Contrast            | 8x 01 04 A2 00 00 0p 0q FF | pq:Contrast level 0x00~0x0f                                                   |
| CAM_Speed By Zoom       | On                  | 8x 01 06 A0 02 FF          |                                                                               |
|                         | Off                 | 8x 01 06 A0 03 FF          |                                                                               |
| CAM_PT Speed            | PT Speed            | 8x 01 04 C1 00 00 0p 0q FF | pq:PT speed 0x05~0x18                                                         |
| CAM_Zoom Speed          | Zoom Speed          | 8x 01 04 D1 00 00 0p 0q FF | pq:Zoom speed 0x01~0x07                                                       |
| CAM_Zoom Display        | On                  | 8x 01 06 C2 02 FF          |                                                                               |
|                         | Off                 | 8x 01 06 C2 03 FF          |                                                                               |
| CAM_Freeze              | Freeze              | 8x 01 04 75 0p FF          | p: Freeze switch 3=OFF, 2=ON                                                  |
| CAM_Preset Freeze Set   | Preset Freeze Set   | 8x 01 04 76 0p FF          | p: Preset Freeze switch 3=OFF, 2=ON                                           |
| CAM_Preset PT Speed Set | Preset PT Speed Set | 8x 01 7E 01 0B 00 qq FF    | qq:Preset PT Speed 02~24 default:15                                           |



# VISCA PROTOCOL



| Command type                           | function              | command                 |                                            |
|----------------------------------------|-----------------------|-------------------------|--------------------------------------------|
| CAM_Preset Zoom Speed Set              | Preset Zoom Speed Set | 81 01 7E 01 2B 00 qq FF | qq:Preset Zoom Speed<br>01~07 default:5    |
| CAM_Preset Speed Adj                   | Preset Speed Adj      | 8x 01 7E 01 1B 0p FF    | p: Adjustment of direction<br>3=down, 2=up |
| CAM_IR address                         | IR address            | 8x 01 06 D8 0p FF       | p:IR address 1~4                           |
| CAM_Gamma                              | Gamma set             | 8x 01 04 5B 0p FF       | P:Gamma NO. (0~4)                          |
| CAM_2D Noise Reduction                 | Direct                | 8x 01 04 A5 0p FF       | (0~0x01)                                   |
| CAM_3D Noise Reduction                 | Direct                | 8x 01 04 53 0p FF       | (0~0x05)                                   |
| CAM_AT_OnOff                           | Direct                | 8x 01 04 C8 0p FF       | P: 0 = off<br>1 = on                       |
| CAM_AT_TargetChange                    | Target change         | 8x 01 04 CA 0p FF       | P:0x02 right move<br>P:0x03 left move      |
| CAM_TargetLocation                     | Target location       | 8x 01 04 CB 0p FF       | P: 0:mid 1:left<br>2:right                 |
| CAM_TargetRatio                        | Target ratio          | 8x 01 04 CC 0p 0q FF    | Pq:(6~20)Human is 1/pq<br>in the pic       |
| CAM_AT_ChangeTime                      | Direct                | 8x 01 04 CD 0p 0q FF    | pq: t*10                                   |
| CAM_AT_BlackBoardMode                  | Direct                | 8x 01 04 CE 0p FF       | p: 1=Enable 0=Disable                      |
| CAM_AT_HilightTarget                   | Direct                | 8x 01 04 CF 0p FF       | p: 1=Enable 0=Disable                      |
| CAM_AT_LeftUp_Limit (preset#251)       | Direct                | 8x 01 04 3F 0p 0F 0B FF | p: 1=Set 2=Call 3=Clear                    |
| CAM_AT_RightDown_Limit(preset#253)     | Direct                | 8x 01 04 3F 0p 0F 0D FF | p: 1=Set 2=Call 3=Clear                    |
| CAM_AT_InitialPosition (preset#255)    | Direct                | 8x 01 04 3F 0p 0F 0F FF | p: 1=Set 2=Call 3=Clear                    |
| CAM_AT_BlackBoard Position(preset#252) | Direct                | 8x 01 04 3F 0p 0F 0C FF | p: 1=Set 2=Call 3=Clear                    |
| CAM_AT_ZoomLock                        | Direct                | 8x 01 04 D6 0p FF       | p: 1=Enable 0=Disable                      |
| CAM_AT_LimitEnable                     | Direct                | 8x 01 04 D7 0p FF       | p: 1=Enable 0=Disable                      |



# VISCA PROTOCOL



| Command type              | function | command                                            |                                                                                                                                                                                                                                                                                                        |
|---------------------------|----------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAM_AudioSet              | Direct   | 8x 01 04 D8 0p 0q 0r 0s 0t 0u<br>0m 0n 0h 0i 0j FF | 0p: 0x01-ON 0x00-OFF<br>0q: 0x01-line in<br>rstu: samplerate<br>mn: volume 0~100<br>h: encode mode<br>4: LPCM 5: ACC<br>ij: bitrate*1000                                                                                                                                                               |
| FLICK                     | 50HZ     | 8x 01 04 23 01 FF                                  |                                                                                                                                                                                                                                                                                                        |
|                           | 60HZ     | 8x 01 04 23 02 FF                                  |                                                                                                                                                                                                                                                                                                        |
|                           | OFF      | 8x 01 04 23 00 FF                                  |                                                                                                                                                                                                                                                                                                        |
| Video System Set(Factory) |          | 8x 01 06 35 00 pp FF                               | pp: Video format<br>1080P60 0x00<br>1080P50 0x01<br>1080I60 0x02<br>1080I50 0x03<br>1080P30 0x04<br>1080P25 0x05<br>720P60 0x06<br>720P50 0x07<br>720P30 0x08<br>720P25 0x09<br>1080P5994 0x0E<br>1080I5994 0x0F<br>1080P2997 0x10<br>720P5994 0x13<br>720P2997 0x14<br>1080P24 0x11<br>1080P2398 0x12 |
| Video System Set(Sony)    |          | 8x 01 04 24 72 0p 0q FF                            | pq: Video format<br>1080P60 0x2e<br>1080P50 0x2f<br>1080I60 0x01<br>1080I50 0x04<br>1080P30 0x06<br>1080P25 0x08<br>720P60 0x09<br>720P50 0x0c<br>720P30 0x0e<br>720P25 0x11<br>1080P5994 0x13<br>1080I5994 0x02<br>1080P2997 0x07<br>720P5994 0x0a<br>720P2997 0x0f<br>1080P24 0x2a<br>1080P2398 0x2b |



# VISCA PROTOCOL



| Command type       | function         | command                                   |                                                                                                    |
|--------------------|------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------|
| CAM_ID Write       |                  | 8x 01 04 22 0p 0q 0r 0s FF                | pqrs: Camera ID (=0000 to FFFF)                                                                    |
| DHCP control       | DHCP off         | 8x 01 04 AE 00 FF                         | DHCP off                                                                                           |
|                    | DHCP on          | 8x 01 04 AE 01 FF                         | DHCP on                                                                                            |
| IP address control | IP set           | 8x 01 04 AB 0p 0q 0r 0s 0m 0n 0x 0y FF    | Set ip to: pq.rs.mn.xy                                                                             |
|                    | Mask set         | 8x 01 04 AC 0p 0q 0r 0s 0m 0n 0x 0y FF    | Set mask to: pq.rs.mn.xy                                                                           |
|                    | Gateway set      | 8x 01 04 AD 0p 0q 0r 0s 0m 0n 0x 0y FF    | Set gateway to :<br>pq.rs.mn.xy                                                                    |
| Mainstream         | resolution       | 8x 01 04 C2 00 0p 0q 0r 0s 0m 0n 0x 0y FF | pqrs : Column(x size)<br>mnxy: Line (y size)<br>only support:<br>1920*1080<br>1280*720<br>1024*576 |
|                    | rate             | 8x 01 04 C2 01 0p 0q 0r 0s 0m 0n 0x 0y FF | pqrsmnxy: bitrate<br>(1024~61440kbps)                                                              |
|                    | Encode Mode      | 8x 01 04 C2 02 0p 0q FF                   | Mode sel: 0xpq<br>0x00: h264<br>0x01: h265                                                         |
|                    | Frame Rate       | 8x 01 04 C2 03 0p 0q FF                   | Frame rate: 0xpq<br>(15~60)                                                                        |
|                    | IDR              | 8x 01 04 C2 04 0p 0q FF                   | IDR Setting: 0xpq<br>(1~120)                                                                       |
|                    | Stream Rate Mode | 8x 01 04 C2 05 0p 0q FF                   | Contor mode: 0xpq<br>0x00: CBR<br>0x01: VBR                                                        |
| Sub stream         | resolution       | 8x 01 04 C3 00 0p 0q 0r 0s 0m 0n 0x 0y FF | pqrs : Column(x size)<br>mnxy: Line (y size)<br>only support:<br>640*360                           |
|                    | rate             | 8x 01 04 C3 01 0p 0q 0r 0s 0m 0n 0x 0y FF | pqrsmnxy: bitrate<br>(1024~20480kbps)                                                              |
|                    | Encode Mode      | 8x 01 04 C3 02 0p 0q FF                   | Mode sel: 0xpq<br>0x00: h264<br>0x01: h265                                                         |
|                    | Frame Rate       | 8x 01 04 C3 03 0p 0q FF                   | Frame rate: 0xpq<br>(15~60)                                                                        |
|                    | IDR              | 8x 01 04 C3 04 0p 0q FF                   | IDR Setting: 0xpq<br>(1~120)                                                                       |



# VISCA PROTOCOL



| Command type       | function              | command                                      |                                                                                                                                                                    |
|--------------------|-----------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | Stream Mode      Rate | 8x 01 04 C3 05 0p 0q FF                      | Contor mode: 0xpp<br>0x00: CBR<br>0x01: VBR                                                                                                                        |
| SYS_Menu           | Menu On               | 8x 01 06 06 02 FF                            | Turn on the menu                                                                                                                                                   |
|                    | Menu Off              | 8x 01 06 06 03 FF                            | Turn off the menu                                                                                                                                                  |
|                    | Menu Back             | 8x 01 06 06 10 FF                            | Menu step back                                                                                                                                                     |
|                    | Menu OK               | 8x 01 7E 01 02 00 01 FF                      | Menu ok                                                                                                                                                            |
| IR_Receive         | On                    | 8x 01 06 08 02 FF                            | IR(remote commander)receive<br>ON/OFF                                                                                                                              |
|                    | Off                   | 8x 01 06 08 03 FF                            |                                                                                                                                                                    |
|                    | On/Off                | 8x 01 06 08 10 FF                            |                                                                                                                                                                    |
| Tally control      | Tally on/off          | 8x 01 7E 01 0A 00 0p FF                      | p: 0: OFF(LED off)<br>1: (LED green on)<br>2: (LED red on)<br>4: (LED blue on)                                                                                     |
| Pan_tilt Drive     | Up                    | 8x 01 06 01 VV WW 03 01 FF                   | VV: Pan speed 0x01 (low speed) to 0x18 (high speed)<br>WW: Tilt speed 0x01 (low speed) to 0x14 (high speed)<br>YYYY: Pan Position(TBD)<br>ZZZZ: Tilt Position(TBD) |
|                    | 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                   |                                                                                                                                                                    |
|                    | Up left               | 8x 01 06 01 VV WW 01 01 FF                   |                                                                                                                                                                    |
|                    | Up right              | 8x 01 06 01 VV WW 02 01 FF                   |                                                                                                                                                                    |
|                    | Down Left             | 8x 01 06 01 VV WW 01 02 FF                   |                                                                                                                                                                    |
|                    | Down Right            | 8x 01 06 01 VV WW 02 02 FF                   |                                                                                                                                                                    |
|                    | Stop                  | 8x 01 06 01 VV WW 03 03 FF                   |                                                                                                                                                                    |
|                    | Absolute Position     | 8x 01 06 02 VV WW 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF    |                                                                                                                                                                    |
|                    | Relative Position     | 8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |                                                                                                                                                                    |
|                    | Home                  | 8x 01 06 04 FF                               |                                                                                                                                                                    |
|                    | Reset                 | 8x 01 06 05 FF                               |                                                                                                                                                                    |
| Pan-tilt Limit Set | Set                   | 8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | W: 1: Up Right<br>0: Down Left<br>YYYY: Pan Limit Position(TBD)<br>ZZZZ: Tilt Limit Position(TBD)                                                                  |
|                    | Clear                 | 8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF |                                                                                                                                                                    |

## Part3 Camera Inquiry Command

| Command type  | command        | return      | note         |
|---------------|----------------|-------------|--------------|
| CAM_Power Inq | 8x 09 04 00 FF | y0 50 02 FF | On           |
|               |                | y0 50 03 FF | Off(Standby) |



# VISCA PROTOCOL



| Command type           | command        | return               | note                                            |
|------------------------|----------------|----------------------|-------------------------------------------------|
| CAM_Zoom Pos Inq       | 8x 09 04 47 FF | y0 50 0p 0q 0r 0s FF | pqrs: Zoom Position                             |
| CAM_DZoom On Off Inq   | 8x 09 04 06 FF | y0 50 0p FF          | p: 2: ON 3: OFF                                 |
| CAM_PT Speed Inq(IR)   | 8x 09 04 C1 FF | y0 50 pp FF          | pp: 0x05~0x18                                   |
| CAM_Zoom Speed Inq(IR) | 8x 09 04 D1 FF | y0 50 0p FF          | p:0x00~0x07                                     |
| CAM_Focus Mode Inq     | 8x 09 04 38 FF | y0 50 02 FF          | Auto Focus                                      |
|                        |                | y0 50 03 FF          | Manual Focus                                    |
| CAM_Focus Pos Inq      | 8x 09 04 48 FF | y0 50 0p 0q 0r 0s FF | pqrs: Focus Position                            |
| CAM_2D_Inq             | 8x 09 04 A5 FF | y0 50 03 FF          | (0~0x01)<br>p: 0: off 1: on                     |
| CAM_3D_Inq             | 8x 09 04 53 FF | y0 50 03 FF          | (0~0x05)<br>p:0:off 1: auto<br>2~5: noise level |
| CAM_WB Mode Inq        | 8x 09 04 35 FF | y0 50 00 FF          | Auto                                            |
|                        |                | y0 50 01 FF          | Indoor mode                                     |
|                        |                | y0 50 02 FF          | Outdoor mode                                    |
|                        |                | y0 50 03 FF          | OnePush mode                                    |
|                        |                | y0 50 04 FF          | ATW                                             |
|                        |                | y0 50 05 FF          | Manual                                          |
| CAM_RGain Inq          | 8x 09 04 43 FF | y0 50 00 00 0p 0q FF | pq: R Gain                                      |
| CAM_BGain Inq          | 8x 09 04 44 FF | y0 50 00 00 0p 0q FF | pq: B Gain                                      |
| CAM_Saturation Inq     | 8x 09 04 A1 FF | y0 50 00 00 0p 0q FF | pq: saturation                                  |
| CAM_Contrast Inq       | 8x 09 04 A2 FF | y0 50 00 00 0p 0q FF | pq: contrast                                    |
| CAM_AE Mode Inq        | 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_Flicker Mode Inq   | 8x 09 04 AA FF | y0 50 0p FF          | p: 0: OFF<br>1: 50HZ<br>2: 60HZ                 |
| CAM_Shutter Pos Inq    | 8x 09 04 4A FF | y0 50 00 00 0p 0q FF | pq: Shutter Position                            |



# VISCA PROTOCOL



| Command type           | command           | return                           | note                                      |
|------------------------|-------------------|----------------------------------|-------------------------------------------|
| CAM_Iris Pos Inq       | 8x 09 04 4B FF    | y0 50 00 00 0p 0q FF             | pq: Iris Position                         |
| CAM_Gain Posi Inq      | 8x 09 04 4C FF    | y0 50 00 00 0p 0q FF             | pq: Gain Position                         |
| CAM_Bright Posi Inq    | 8x 09 04 4D FF    | y0 50 00 00 0p 0q FF             | pq: Bright Position                       |
| CAM_WDR Mode Inq       | 8x 09 04 3D FF    | y0 50 02 FF                      | On                                        |
|                        |                   | y0 50 03 FF                      | Off                                       |
| CAM_Pre PT Speed Inq   | 8x 09 7E 01 0B FF | y0 50 pp FF                      | pp: 0x05~0x18                             |
| CAM_Pre Zoom Speed Inq | 8x 09 7E 01 2B FF | y0 50 pp FF                      | pp: 0x01~0x07                             |
| SYS_Menu Mode Inq      | 8x 09 06 06 FF    | y0 50 02 FF                      | On                                        |
|                        |                   | y0 50 03 FF                      | Off                                       |
| CAM_LR_Reverse Inq     | 8x 09 04 61 FF    | y0 50 02 FF                      | On                                        |
|                        |                   | y0 50 03 FF                      | Off                                       |
| CAM_Picture Flip Inq   | 8x 09 04 66 FF    | y0 50 02 FF                      | On                                        |
|                        |                   | y0 50 03 FF                      | Off                                       |
| CAM_ID Inq             | 8x 09 04 22 FF    | y0 50 0p 0q 0r 0s FF             | pqrs: Camera ID                           |
| CAM_DHCP Inq           | 8x 09 04 AE FF    | y0 50 pp FF                      |                                           |
| CAM_IP Inq             | 8x 09 04 AB FF    | y0 50 0p 0p 0q 0q 0r 0r 0s 0s FF |                                           |
| CAM_MASK Inq           | 8x 09 04 AC FF    | y0 50 0p 0p 0q 0q 0r 0r 0s 0s FF |                                           |
| CAM_GATEWAY Inq        | 8x 09 04 AD FF    | y0 50 0p 0p 0q 0q 0r 0r 0s 0s FF |                                           |
| CAM_Version Inq        | 8x 09 00 02 FF    | y0 50 ab cd mn pq rs tu vw FF    |                                           |
| Tally Inq              | 8x 09 7E 01 0A FF | y0 50 0p FF                      | p: tally state                            |
| Freeze Inq             | 8x 09 04 75 FF    | y0 50 0p FF                      | p: Freeze switch 3 = OFF<br>2 = ON        |
| Preset Freeze Inq      | 8x 09 04 76 FF    | y0 50 0p FF                      | p: Preset Freeze switch<br>3 = OFF 2 = ON |



# VISCA PROTOCOL



| Command type              | command                 | return                                                | note                                                                                                                                     |
|---------------------------|-------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| PresetExist Inq           | 8x 09 04 3F 0p<br>0p FF | y0 50 0q FF                                           | pp: preset NO. 0~255<br>q: 0:not saved 1:saved                                                                                           |
| Preset Speed Set Inq      | 8x 09 7E 01 0B<br>FF    | y0 50 pp FF                                           | pp: Preset Speed 2~24<br>default:15                                                                                                      |
| CAM_Inq_AT_OnOff          | 8x 09 04 C8 FF          | y0 50 0p FF                                           | P: 0 = off<br>1 = on                                                                                                                     |
| CAM_Inq_AT_TargetChange   | 8x 09 04 CA FF          | y0 50 0p FF                                           | P:0x02 right move<br>P:0x03 left move                                                                                                    |
| CAM_Inq_TargetLocation    | 8x 09 04 CB FF          | y0 50 0p FF                                           | P: 0:mid 1:left 2:right                                                                                                                  |
| CAM_Inq_TargetRatio       | 8x 09 04 CC FF          | y0 50 0p 0q FF                                        | Pq:(6~20)Human is 1/pq<br>in the pic                                                                                                     |
| CAM_AT_ChangeTime_Inq     | 8x 09 04 CD FF          | y0 50 0p 0q FF                                        | Pq: t*10                                                                                                                                 |
| CAM_AT_BlackBoardMode_Inq | 8x 09 04 CE FF          | y0 50 0p FF                                           | p: 1=Enable 0=Disable                                                                                                                    |
| CAM_AT_HilighTarget_Inq   | 8x 09 04 CF FF          | y0 50 0p FF                                           | p: 1=Enable 0=Disable                                                                                                                    |
| CAM_AT_ZoomLock_Inq       | 8x 09 04 D6 FF          | y0 50 0p FF                                           | p: 1=Enable 0=Disable                                                                                                                    |
| CAM_AT_LimitEnable_Inq    | 8x 09 04 D7 FF          | y0 50 0p FF                                           | p: 1=Enable 0=Disable                                                                                                                    |
| CAM_AudioSet              | 8x 09 04 D8 FF          | 8x 01 04 D8 0p 0q 0r 0s 0t<br>0u<br>0m 0n 0h 0i 0j FF | 0p: 0x01-ON 0x00-OFF<br>0q: 0x01-line in<br>rstu: samplerate<br>mn: volume 0~100<br>h: encode mode<br>4: LPCM 5: ACC<br>ij: bitrate*1000 |
| Video System Inq(Factory) | 8x 09 06 23 FF          | y0 50 pp FF                                           | pp: Video format                                                                                                                         |
| Video System Inq(Sony)    | 8x 09 04 24 72 FF       | y0 50 0p 0p FF                                        | pp: Video format                                                                                                                         |
| IR_Transfer               | 8x 09 06 1A FF          | y0 50 02 FF                                           | On                                                                                                                                       |
|                           |                         | y0 50 03 FF                                           | Off                                                                                                                                      |
| IR_Receive                | 8x 09 06 08 FF          | y0 50 02 FF                                           | On                                                                                                                                       |
|                           |                         | y0 50 03 FF                                           | Off                                                                                                                                      |



# VISCA PROTOCOL



| Command type              | command              | return                              | note                                                                                               |
|---------------------------|----------------------|-------------------------------------|----------------------------------------------------------------------------------------------------|
| Pan-tilt Max Speed Inq    | 8x 09 06 11 FF       | y0 50 ww zz FF                      | ww: Pan Max Speed zz: Tilt Max Speed                                                               |
| Pan-tilt Pos Inq          | 8x 09 06 12 FF       | y0 50 0w 0w 0w 0w<br>0z 0z 0z 0z FF | www: Pan Position<br>zzzz: Tilt Position                                                           |
| Mainstream Resolution Inq | 8x 09 04 C2 00<br>FF | y0 50 0p 0q 0r 0s 0m 0n 0x<br>0y FF | pqrs : Column(x size)<br>mnxy: Line (y size)<br>only support:<br>1920*1080<br>1280*720<br>1024*576 |
| Main stream Rate Inq      | 8x 09 04 C2 01<br>FF | y0 50 0p 0q 0r 0s 0m 0n 0x<br>0y FF | pqrsmnxy: bitrate<br>(1024~61440kbps)                                                              |
| Main Encode Mode Inq      | 8x 09 04 C2 02<br>FF | y0 50 pp FF                         | Mode sel:0xpp<br>0x00: h264<br>0x01: h265                                                          |
| Main Frame Rate Inq       | 8x 09 04 C2 03<br>FF | y0 50 pp FF                         | Frame rate:0xpp<br>(15~60)                                                                         |
| Main IDR Inq              | 8x 09 04 C2 04<br>FF | y0 50 pp FF                         | IDR Setting:0xpp<br>(1~120)                                                                        |
| Main Stream Rate Mode Inq | 8x 09 04 C2 05<br>FF | y0 50 pp FF                         | Contor mode:0xpp<br>0x00: CBR<br>0x01: VBR                                                         |
| Sub stream Resolution Inq | 8x 09 04 C3 00<br>FF | y0 50 0p 0q 0r 0s 0m 0n 0x<br>0y FF | pqrs : Column(x size)<br>mnxy: Line (y size)<br>only support:<br>640*360                           |
| Sub stream Rate Inq       | 8x 09 04 C3 01<br>FF | y0 50 0p 0q 0r 0s 0m 0n 0x<br>0y FF | pqrsmnxy: bitrate<br>(1024~20480kbps)                                                              |
| Sub Encode Mode Inq       | 8x 09 04 C3 02<br>FF | y0 50 pp FF                         | Mode sel:0xpp<br>0x00: h264<br>0x01: h265                                                          |
| Sub Frame Rate Inq        | 8x 09 04 C3 03<br>FF | y0 50 pp FF                         | Frame rate:0xpp<br>(15~60)                                                                         |
| Sub IDR Inq               | 8x 09 04 C3 04<br>FF | y0 50 pp FF                         | IDR Setting:0xpp<br>(1~120)                                                                        |
| Sub Stream Rate Mode Inq  | 8x 09 04 C3 05<br>FF | y0 50 pp FF                         | Contor mode:0xpp<br>0x00: CBR<br>0x01: VBR                                                         |



# VISCA PROTOCOL



## VISCA PAN TILT ABSOLUTE POSITION VALUE

| PAN ANGLE | VISCA value | TILT ANGLE | VISCA value |
|-----------|-------------|------------|-------------|
| -170      | 0xF670      | -30        | 0xFE50      |
| -135      | 0xF868      | 0          | 0x0000      |
| -90       | 0xFAF0      | 30         | 0x01B0      |
| -45       | 0xFD78      | 60         | 0x0360      |
| 0         | 0x0000      | 90         | 0x510       |
| 45        | 0x0288      |            |             |
| 90        | 0x0510      |            |             |
| 135       | 0x0798      |            |             |
| 170       | 0x0990      |            |             |

## VISCA PAN TILT SPEED VALUE

| Pan(Degree/Second) |     | Tilt(Degree/Second) |     |
|--------------------|-----|---------------------|-----|
| 0                  | 0.3 | 0                   | 0.3 |
| 1                  | 1   | 1                   | 1   |
| 2                  | 1.5 | 2                   | 1.5 |
| 3                  | 2.2 | 3                   | 2.2 |
| 4                  | 2.4 | 4                   | 3.6 |
| 5                  | 2.6 | 5                   | 4.7 |
| 6                  | 2.8 | 6                   | 6   |
| 7                  | 3.0 | 7                   | 8   |
| 8                  | 3.2 | 8                   | 10  |
| 9                  | 3.4 | 9                   | 12  |
| 10                 | 3.8 | 10                  | 15  |
| 11                 | 4.5 | 11                  | 18  |
| 12                 | 6   | 12                  | 23  |
| 13                 | 9   | 13                  | 30  |
| 14                 | 15  | 14                  | 39  |
| 15                 | 19  | 15                  | 48  |
| 16                 | 25  | 16                  | 59  |
| 17                 | 32  | 17                  | 69  |
| 18                 | 38  | 18                  | 80  |
| 19                 | 45  |                     |     |
| 20                 | 58  |                     |     |
| 21                 | 75  |                     |     |
| 22                 | 88  |                     |     |
| 23                 | 105 |                     |     |
| 24                 | 120 |                     |     |

# ■■■■ PELCO-D PROTOCOL ■■■■

| 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   |
| Up left                      | 0xFF  | Address | 0x00  | 0x0C  | Pan Speed       | Tilt Speed     | SUM   |
| Up right                     | 0xFF  | Address | 0x00  | 0x0A  | Pan Speed       | Tilt Speed     | SUM   |
| Down Left                    | 0xFF  | Address | 0x00  | 0x14  | Pan Speed       | Tilt Speed     | SUM   |
| Down Right                   | 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   |
| Set Preset                   | 0xFF  | Address | 0x00  | 0x03  | 0x00            | Preset ID      | SUM   |
| Stop                         | 0xFF  | Address | 0x00  | 0x00  | Pan Speed       | Tilt Speed     | 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   |

# ■■■■ PELCO-P PROTOCOL ■■■■

| 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   |
| Up left                      | 0Xa0  | Address | 0x00  | 0x0C  | Pan Speed       | Tilt Speed     | 0Xaf  | XOR   |
| Up right                     | 0Xa0  | Address | 0x00  | 0x0A  | Pan Speed       | Tilt Speed     | 0Xaf  | XOR   |
| Down Left                    | 0Xa0  | Address | 0x00  | 0x14  | Pan Speed       | Tilt Speed     | 0Xaf  | XOR   |
| Down Right                   | 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   |
| Focus Far                    | 0Xa0  | Address | 0x00  | 0x80  | 0x00            | 0x00           | 0Xaf  | XOR   |
| Focus Near                   | 0Xa0  | Address | 0x01  | 0x00  | 0x00            | 0x00           | 0Xaf  | XOR   |
| Stop                         | 0Xa0  | Address | 0x00  | 0x00  | Pan Speed       | Tilt Speed     | 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   |



# OSD MENU



1. Under working mode, press the MENU key on the IR remote controller, to enter the OSD menu as below:

| MENU         |               |   |         |   |
|--------------|---------------|---|---------|---|
| SYSTEM       | PROTOCOL      | < | VISCA   | > |
| EXPOSURE     | ADDRESS       | < | 001     | > |
| IMAGE        | BAUDRATE      | < | 9600    | > |
| QUALITY      | PROTOCOL LOCK | < | OFF     | > |
| PTZ SETTINGS | RS485         | < | ON      | > |
| VIDEO FORMAT | LANGUAGE      | < | ENGLISH | > |
| IP SETTINGS  | AUTO TRACKING | < | OFF     | > |
| RESET        | AT LOCATION   | < | MIDDLE  | > |
| INFORMATIONS | AT RATIO      | < | 1/16    | > |

2. After entering the main menu, use the navigate UP/DOWN key to select the main menu. Once selected, the main menu will change to the blue background, and the right side will show sub-menu options.

3. Press the navigate RIGHT key to enter the sub-menu; use the UP/DOWN key to select the sub-menu; use the LEFT/RIGHT key to select the parameter.

4. Press the MENU key again to return to the previous menu. Press the MENU key continuously to exit the OSD menu.

## 5. OSD Menu Setting List

|        |               |                                          |                  |
|--------|---------------|------------------------------------------|------------------|
| SYSTEM | PROTOCOL      | Optional: VISCA, PLC.P, PLC.D            | Default: VISCA   |
|        | ADDRESS       | VISCA:: 1~7 PLC-P/D: 0~255               | Default: 1       |
|        | BAUDRATE      | Optional: 2400, 4800, 9600, 115200       | Default: 9600    |
|        | PROTOCOL LOCK | Optional: OFF, ON                        | Default: OFF     |
|        | RS485         | Optional: OFF, ON                        | Default: ON      |
|        | LANGUAGE      | Optional: ZH-CH, ENGLISH, ZH-TW, RUSSIAN | Default: ENGLISH |
|        | AT TRACKING   | Optional: OFF, ON                        | Default: OFF     |
|        | AT LOCATION   | Optional: MIDDLE、LEFT、RIGHT              | Default: MIDDLE  |
|        | AT RATIO      | Optional: 1/6~1/20                       | Default: 1/16    |



# OSD MENU



|          |                    |                                                                       |               |
|----------|--------------------|-----------------------------------------------------------------------|---------------|
| EXPOSURE | EXPOSURE MODE      | AUTO、MANUAL、SHUTTER、IRIS、BRIGHT                                       | Default: AUTO |
|          | SHUTTER            | Shutter speed: 1/30~1/10000, only valid under MANUAL and SHUTTER mode | Default: AUTO |
|          | IRIS               | Iris setting: CLOSE~F1.8, only valid under MANUAL and IRIS mode       | Default: AUTO |
|          | GAIN               | Gain setting: 0dB~30dB, only valid under MANUAL mode                  | Default: AUTO |
|          | EXPOSURE BRIGHT    | Bright setting: 0~27, only valid under BRIGHT priority mode.          | Default: AUTO |
|          | BRIGHT             | 0~15                                                                  | Default: 8    |
|          | WIDE DYNAMIC MODE  | OFF/ON                                                                | Default: OFF  |
|          | WIDE DYNAMIC LEVEL | 1~6                                                                   | Default: 1    |
|          | BLC                | OFF/ON                                                                | Default: OFF  |

|       |                    |                                                                        |                 |
|-------|--------------------|------------------------------------------------------------------------|-----------------|
| IMAGE | WHITE BALANCE MODE | Optional: ATW, MANUAL, AUTO, INDOOR, OUTDOOR, PUSH, C.T.               | Default: ATW    |
|       | RED GAIN           | Red gain level: 0~255, only valid under manual white balance mode      | Default: AUTO   |
|       | BLUE GAIN          | Blue gain level:0~255 , only valid under manual white balance mode     | Default: AUTO   |
|       | COLOR TEMPERATURE  | Set the color temperature value: 2500~10000 only valid under C.T. mode | Default: AUTO   |
|       | FLICKER            | Anti-Flicker setting:50/60HZ/OFF, to reduce the video flicker          | Default: 50HZ   |
|       | DIGITAL ZOOM       | OFF/ON                                                                 | Default: OFF    |
|       | FOCUS MODE         | AUTO, MANUAL                                                           | Default: AUTO   |
|       | 3G SDI             | Optional: LEVELA, LEVELB                                               | Default: LEVELA |
|       | FOCUS NEAR LIMIT   | Optional: 1.5M、2M、3M、6M、10M                                            | Default: 1.5M   |

|         |                    |                                                                                                                              |               |
|---------|--------------------|------------------------------------------------------------------------------------------------------------------------------|---------------|
| QUALITY | 2D NOISE REDUCTION | 2D noise reduction: the bigger value is, the less noise on image is, the lower resolution is                                 | Default: OFF  |
|         | 3D NOISE REDUCTION | 3D noise reduction: OFF/AUTO/0~4, the bigger value is, the less motion noise on image is. High value will cause image smear. | Default: AUTO |
|         | SHARPNESS          | Sharpness setting: 0~15, the higher value is, edge of the image will be sharpened                                            | Default: 6    |



# OSD MENU



|  |                   |                            |                 |
|--|-------------------|----------------------------|-----------------|
|  | CONTRAST          | Set contrast level: 0~15   | Default: 8      |
|  | SATURATION        | Set saturation level: 0~15 | Default: 8      |
|  | GAMMA             | Select gamma level: 0~15   | Default: 8      |
|  | IMAGE STYLE       | USER, NORMAL, COLORFULL    | Default: USER   |
|  | FOCUS SENSITIVITY | HIGH, NORMAL, LOW          | Default: NORMAL |

|              |                   |                          |              |
|--------------|-------------------|--------------------------|--------------|
| PTZ SETTINGS | SPEED BY ZOOM     | Optional: OFF, ON        | Default: ON  |
|              | FLIP              | Flip horizontal          | Default: OFF |
|              | MIRROR            | Flip vertical            | Default: OFF |
|              | PT SPEED          | Set Pan Tilt speed: 5~24 | Default: 18  |
|              | ZOOM SPEED        | Set Zoom speed: 1~7      | Default: 5   |
|              | PRESET FREEZE     | Optional: OFF, ON        | Default: OFF |
|              | PRESET PT SPEED   | Preset head speed: 2~24  | Default: 18  |
|              | PRESET ZOOM SPEED | Preset zoom speed: 1~7   | Default: 5   |
|              | PRESET SAVE AE&AW | Optional: OFF, ON        | Default: OFF |

|              |               |                                         |
|--------------|---------------|-----------------------------------------|
| VIDEO FORMAT | SIZE          | 1080P, 1080I, 720P                      |
|              | FRAME RATE    | 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 |
|              | VI FRAME RATE | 60, 50, 30, 25                          |

**\* VI Frame Rate Setting: The VI frame rate should match with the video output resolution frame rate to ensure smooth video across HDMI/SDI, IP, and USB.**

|             |           |                                |
|-------------|-----------|--------------------------------|
| IP SETTINGS | DHCP      | OFF/ON                         |
|             | IP        | 192.168.001.188 (Example)      |
|             | MASK      | 255.255.255.000 (Example)      |
|             | GATEWAY   | 192.168.001.001 (Example)      |
|             | MAIN SIZE | Current main stream resolution |
|             | BITRATE   | Current main stream bit rate   |
|             | SUB SIZE  | Current sub stream resolution  |
|             | BITRATE   | Current sub stream bit rate    |

|       |              |                                          |
|-------|--------------|------------------------------------------|
| RESET | SYSTEM RESET | Reset communication parameter to default |
|       | CAMERA RESET | Reset image parameter to default         |



# OSD MENU



|  |                |                                     |
|--|----------------|-------------------------------------|
|  | PAN TILI RESET | Reset pan/tilt parameter to default |
|  | ALL RESET      | Reset all parameter to default      |

|                  |              |                             |
|------------------|--------------|-----------------------------|
| INFO<br>RMATIONS | IR ADDRESS   | Camera IR control address   |
|                  | CLIENT       | VISCA                       |
|                  | MODEL NO.    | Model number                |
|                  | ARM VERSION  | ARM firmware version        |
|                  | ISP VERSION  | Camera ISP firmware version |
|                  | RELEASE DATE | Software release date       |

## Set IP Address in Menu

In order to help customers debug, the camera has the support menu to set the IP address. The specific methods are as follows.

1. Press "MENU" to open the menu interface, and select "network parameters" in the menu to call up the IP setting interface.

| MENU         |         |   |                 |  |
|--------------|---------|---|-----------------|--|
| SYSTEM       | DHCP    | : | < OFF >         |  |
| EXPOSURE     | IP      | : | 192.168.001.188 |  |
| IMAGE        | MASK    | : | 255.255.255.000 |  |
| QUALITY      | GATEWAY | : | 192.168.001.001 |  |
| PTZ SETTINGS |         |   |                 |  |
| VIDEO FORMAT |         |   |                 |  |
| IP SETTINGS  |         |   |                 |  |
| RESET        |         |   |                 |  |
| INFORMATIONS |         |   |                 |  |

2. Press the right navigation button to enter the IP setting interface, and select the parameters needed by using the navigation up and down buttons, and then select the IP address, mask, gateway.
3. Short-press the number button to set the corresponding parameters. After setting the parameter, press the "MENU" button again to complete the current parameter setting.
4. To exit the menu, just press the "MENU" button again.

# ===== UVC CONTROL =====

1. Only run the client's software after the camera has completed self-configuration (the IR indicator in blue color and will not flash); otherwise may cause black screen issue.
2. Make sure the camera is recognized by the PC Device Manager.
3. Make sure the interval of video format switching more than 1 seconds, otherwise black video maybe caused.
4. Make sure the interval of control command sending from the server (via USB) to the camera no less than 250ms.
5. Support standard UVC interface.

| UVC properties                                 | VISCA                                     |
|------------------------------------------------|-------------------------------------------|
| PU_BACKLIGHT_COMPENSATION_CONTROL              | 8x 01 04 33 02 FF                         |
| CY_FX_UVC_PU_BRIGHTNESS_CONTROL                | 8x 01 04 A4 00 00 0p 0q FF                |
| CY_FX_UVC_PU_CONTRAST_CONTROL                  | 8x 01 04 A2 00 00 0p 0q FF                |
| CY_FX_UVC_PU_SATURATION_CONTROL                | 8x 01 04 A1 00 00 0p 0q FF                |
| CY_FX_UVC_PU_SHARPNESS_CONTROL                 | 8x 01 04 42 00 00 0p 0q FF                |
| CY_FX_UVC_PU_GAMMA_CONTROL                     | 8x 01 04 5B 0p FF                         |
| CY_FX_UVC_PU_WHITE_BALANCE_TEMPERATURE_CONTROL | 8x 01 04 35 0p FF                         |
| CY_FX_UVC_PU_BACKLIGHT_COMPENSATION_CONTROL    | 8x 01 04 33 0p FF                         |
| CY_FX_UVC_PU_GAIN_CONTROL                      | 8x 01 04 49 00 00 0p 0q FF                |
| CY_FX_UVC_PU_POWER_LINE_FREQUENCY_CONTROL      | 8x 01 04 AA 0p FF                         |
| PU_GAIN_CONTROL                                | 8x 01 04 49 00 00 00 0p FF                |
| CT_ZOOM_ABSOLUTE_CONTROL                       | 8x 01 04 47 0p 0q 0r 0s FF                |
| CT_PANTILT_ABSOLUTE_CONTROL                    | 8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z FF |
| CT_PANTILT_RELATIVE_CONTROL                    | 8x 01 06 01 pp qq rr ss FF                |
| CT_ZOOM_RELATIVE_CONTROL                       | 8x 01 04 07 pp FF                         |



# WEB SETTING

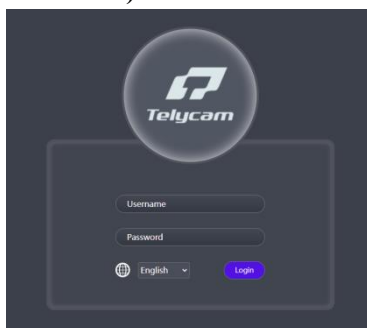


It is not necessary to install additional video player plug-in to preview the local screen on the web interface.

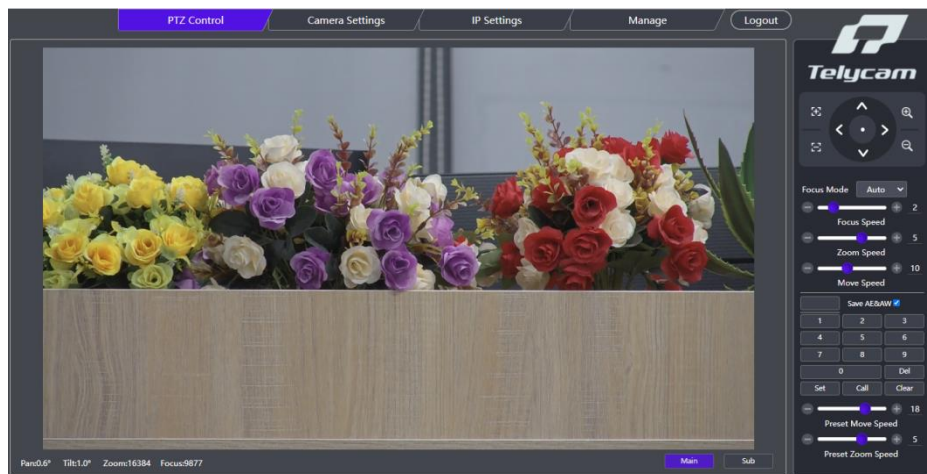
The web interface supports Google Chrome, Firefox, IE, Safari, Opera, 360, QQ and other browsers, adaptability is very good.

## 1. Login

Run browser, input IP address( defaulted IP address is 192.168.1.188), to enter login interface, can select Language (Chinese, English, Korean, Portuguese or Spanish), input admin and password to login as following: **(Default Username: admin Default password: admin)**



## 2. PTZ Control



After successful login, the interface is shown in the above figure. The



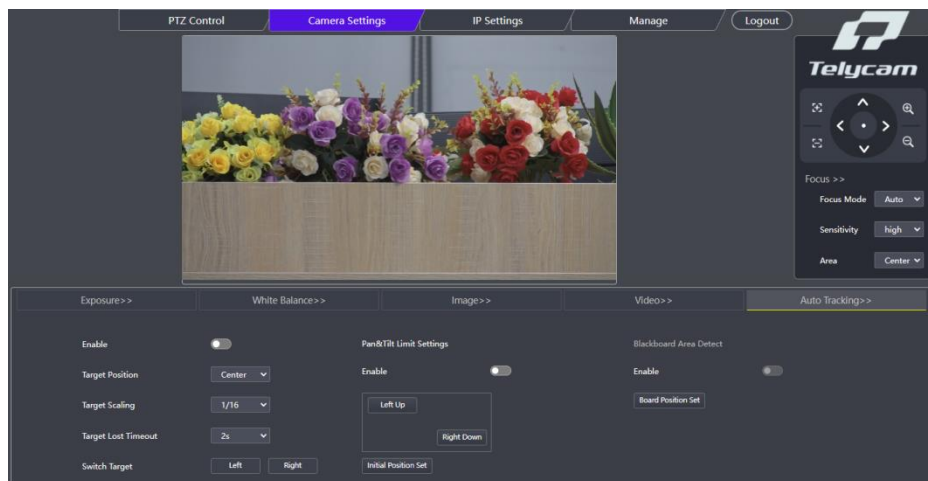
# WEB SETTING



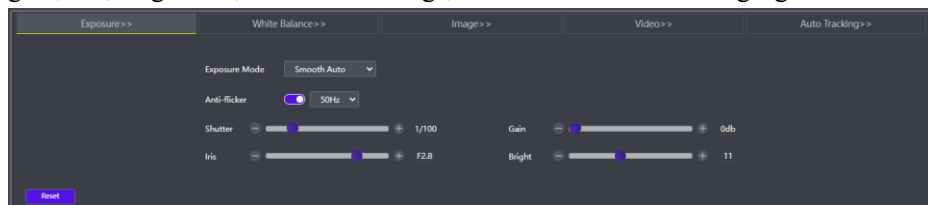
preview interface is displayed on the left, and the functions of camera pan tilt rotation, zoom, focus, and preset position settings can be controlled on the right. Additionally, parameters such as pan tilt and zoom speed can be set through the scroll bar.

## 3. Camera Settings

Click on the "Camera Settings" option to enter the camera settings interface, as shown in the following figure:



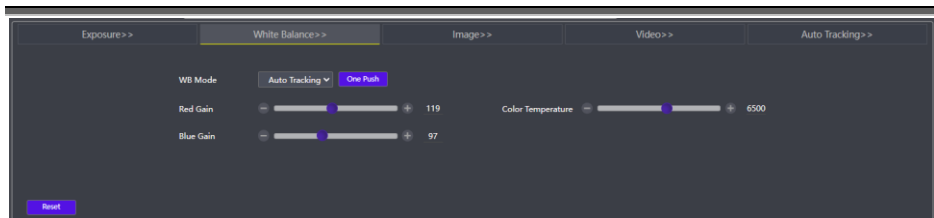
The "Exposure" option allows you to set exposure mode, anti-flicker, shutter, gain, iris, brightness, and other settings, as shown in the following figure:



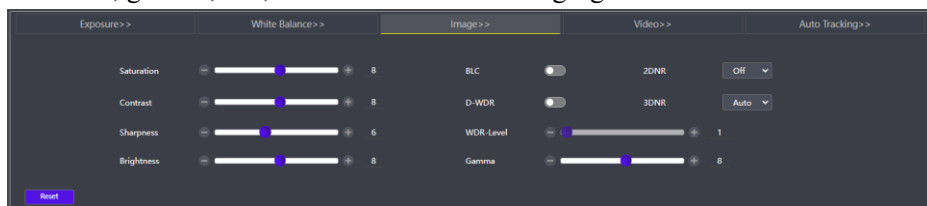
The "White Balance" option includes settings such as white balance mode, red gain, blue gain, and color temperature, as shown in the following figure:



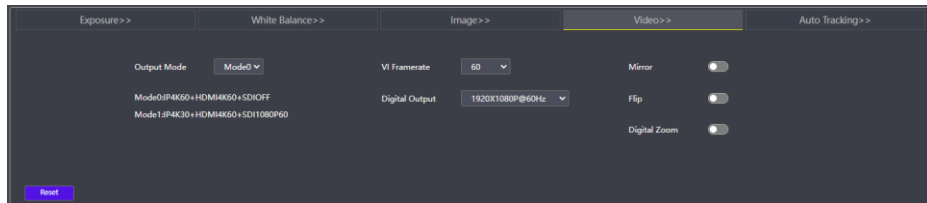
# WEB SETTING



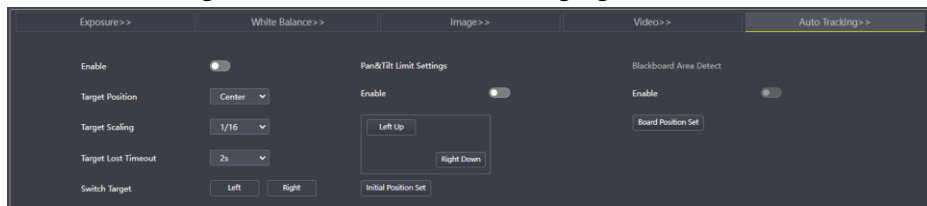
The "Image" option includes settings such as saturation, contrast, sharpness, brightness, backlight compensation, wide dynamic, 2D noise reduction, 3D noise reduction, gamma, etc., as shown in the following figure:



The "Video" option includes settings such as output mode, VI frame rate, digital output, mirror, flip, and digital zoom, as shown in the following figure:



The "Auto Tracking" option includes settings such as tracking switch, target position, target scaling, target loss timeout, target switching, pan tilt limit setting, whiteboard setting, etc., as shown in the following figure:



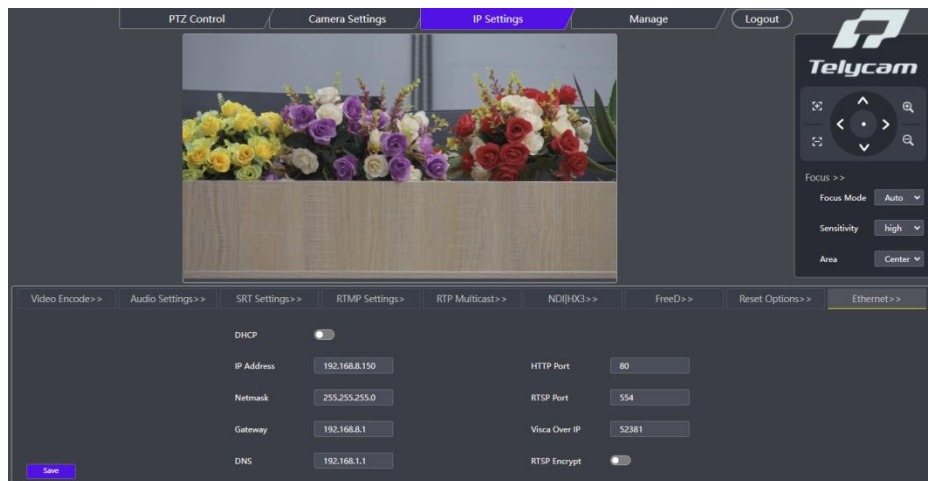


# WEB SETTING

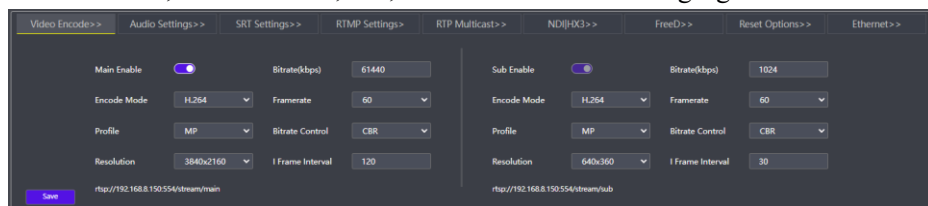


## 4. IP Settings

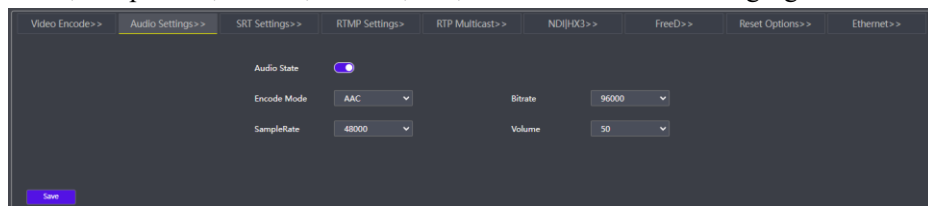
Click on the "IP Settings" option to enter the camera IP settings interface, as shown in the following figure:



The "Video Encoding" option includes settings such as main and sub stream enable, encoding mode, profile, resolution, bit rate, frame rate, bit rate control, I frame interval, RTSP address, etc., as shown in the following figure:



The "Audio Settings" option includes settings such as audio switch, encode mode, sample rate, bit rate, volume, etc., as shown in the following figure:



The "SRT Settings" option includes settings such as mode selection, enable



# WEB SETTING



switch, port, latency, encryption switch, etc., as shown in the following figure:

Video Encode>> Audio Settings>> **SRT Settings>>** RTMP Settings> RTP Multicast>> NDI|HX3>> FreeD>> Reset Options>> Ethernet>>

Mode:

Enable: ☒

Port:

Latency(ms):

Encryption: ☐

Key Length:

Passphrase:

Main Stream:

Sub Stream:

The "RTMP Settings" option includes enable switches and RTMP address settings, as shown in the following figure:

Video Encode>> Audio Settings>> SRT Settings>> **RTMP Settings>>** RTP Multicast>> NDI|HX3>> FreeD>> Reset Options>> Ethernet>>

Stream: Main Sub

Enable: ☒ ☒

RTMP Address:

The "RTP multicast" option includes settings such as enable switch, multicast IP, multicast port, RTSP address, RTP address, etc., as shown in the following figure:

Video Encode>> Audio Settings>> SRT Settings>> RTMP Settings>> **RTP Multicast>>** NDI|HX3>> FreeD>> Reset Options>> Ethernet>>

Main Enable: ☒ Sub Enable: ☒

Multicast IP:  Multicast IP:

Multicast Port:  Multicast Port:

RTSP Address:  RTSP Address:

RTP Address:  RTP Address:

The "NDI | HX3" option includes settings such as NDI enable switch, HX3 switch, device name, channel name, multicast, etc., as shown in the following figure:

Video Encode>> Audio Settings>> SRT Settings>> RTMP Settings>> RTP Multicast>> **NDI|HX3>>** FreeD>> Reset Options>> Ethernet>>

Enable: ☒ Multicast: ☒ Group:

HX3: ☒ Multicast IP:  Discovery: ☒

Device Name:  Multicast Mask:

Channel Name:  Multicast TTL:

The "FreeD" option includes settings such as enable switch, camera ID, mode, IP address, port, interval, etc., as shown in the following figure:



# WEB SETTING



The screenshot shows the 'FreeD' settings page. The top navigation bar includes: Video Encode >>, Audio Settings >>, SRT Settings >>, RTMP Settings >>, RTP Multicast >>, NDI|HX >>, **FreeD >>**, Reset Options >>, and Ethernet >>. The main content area has a dark background. On the left, there is an 'Enable' toggle switch (turned on), a 'Camera ID' input field with the value '0', and a 'Mode' dropdown menu set to 'Always'. On the right, there are input fields for 'IP Address' (127.0.0.1), 'Port' (1025), and 'Interval(ms)' (40). A 'Save' button is located at the bottom left.

The "Reset Options" option includes settings such as reset, reset/reboot, reboot, and parameter batch configuration, as shown in the following figure:

The screenshot shows the 'Reset Options' settings page. The top navigation bar is the same as the previous page, with 'Reset Options >>' highlighted. The main content area has a dark background. It features three buttons: 'Reset', 'Reset/Reboot', and 'Reboot'. Below the 'Reset' button is the text 'Reset image settings to their default values.' Below the 'Reset/Reboot' button is the text 'Reset all camera settings to their default values and reboot'. To the right of these buttons is a 'Profile Manage' section with 'Generate Profile' and 'Import Profile' buttons.

The "Ethernet" option includes parameters such as automatic allocation switch, IP address, net mask, gateway, HTTP port, RTSP port, Visca over IP port, RTSP encryption, etc., as shown in the following figure:

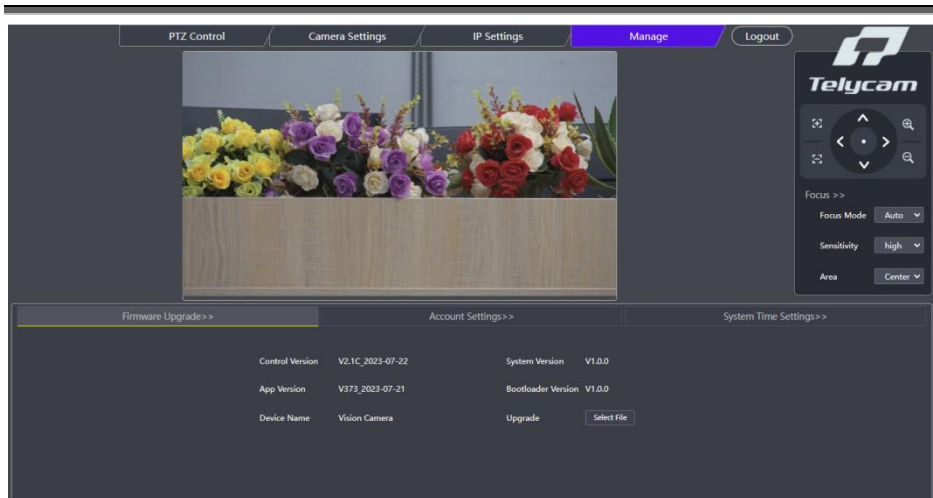
The screenshot shows the 'Ethernet' settings page. The top navigation bar is the same as the previous pages, with 'Ethernet >>' highlighted. The main content area has a dark background. It features a 'DHCP' toggle switch (turned on). Below it are input fields for 'IP Address' (192.168.8.150), 'Netmask' (255.255.255.0), 'Gateway' (192.168.8.1), and 'DNS' (192.168.1.1). To the right, there are input fields for 'HTTP Port' (80), 'RTSP Port' (554), and 'Visca Over IP' (52381). At the bottom right, there is an 'RTSP Encrypt' toggle switch (turned on). A 'Save' button is located at the bottom left.

## 5. Manage

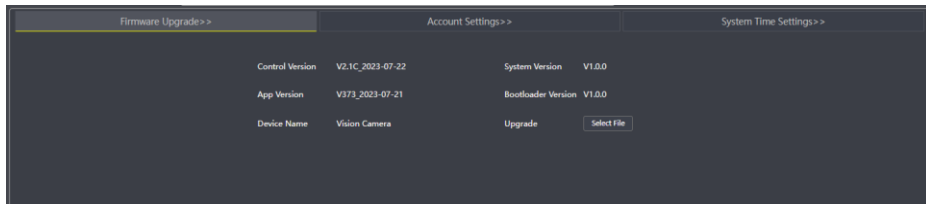
Click on the "Manage" option to enter the camera management interface, as shown in the following figure:



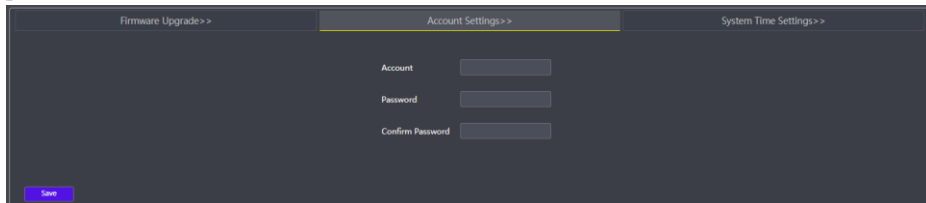
# WEB SETTING



The "Firmware Upgrade" option allows you to view the device name, camera software and hardware version number, and upgrade the camera program through the "Select File" column, as shown in the following figure:



The "Account Settings" option allows you to set the login account and password for the camera:



The "Time Settings" option includes settings for NTP activation, time zone, update interval, NTP server address, and port, as shown in the following figure:



# WEB SETTING



[Firmware Upgrade>>](#)[Account Settings>>](#)[System Time Settings>>](#)

NTP Enable

☒

Time Zone

UTC-600

NTP Update Interval

24h

NTP Server Address

time.nist.gov

NTP Port

80

Save

## 6. Logout

Click "Logout" to return to the login interface.

# == VIEW RTSP VIDEO VIA VLC ==

Default RTSP main streaming address:

`rtsp://192.168.1.188/stream/main`

Default RTSP sub streaming address:

`rtsp://192.168.1.188/stream/sub`

Default RTMP main streaming address:

`rtmp://192.168.1.188:1935/app/rtmpstream0`

Default RTMP sub streaming address:

`rtmp://192.168.1.188:1935/app/rtmpstream1`

1. Run VLC Media Player.
2. Media->network stream, to enter into “open media” interface.
3. Input RTSP address in URL as following:



4. Click play to view the real time image.

**Note:** If there is much image lag, select “more option” to enter into following setting, change buffer time smaller (VLC default buffer time is 1000ms).





# NDI Tools Guide



## 1. Image Preview

A. Download the NDI Tools via <https://ndi.tv/tools/> and install it.

B. Find out the NDI 5 Tools/Studio Monitor via Windows toolbars, and then open it, as bellow:



C. Right click on the Studio Monitor screen, select the preview device:

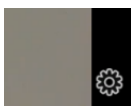


## 2. Pan Tilt Control



Refer to above picture, once open the video via Studio Monitor, it will show up the control panel on the right side, to control camera pan, tilt, zoom, focus, preset, focus.

## 3. Run WEB via Studio Monitor





# NDI Tools Guide



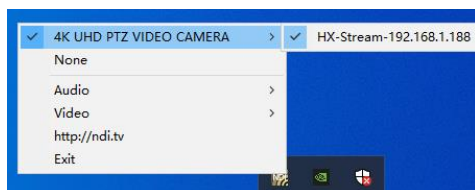
Refer to above picture, once open the video via Studio Monitor, there will show up a setting icon at the lower right corner, single click this icon to enter WEB UI.

## 4. How to use NDI tools to Virtual Input CAMERA

A. Find out the NDI Tools/Virtual Input via Windows toolbars, open it, then it will show up the NDI Virtual Input icon at the Windows toolbars, as bellow picture shows:

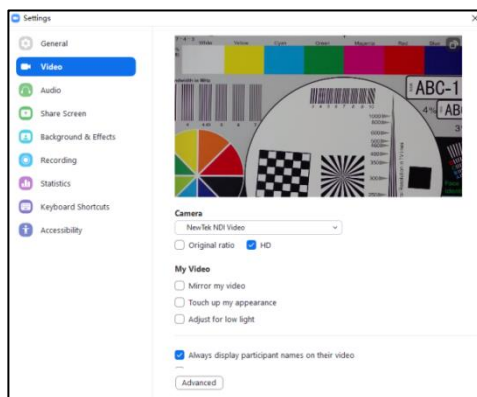


B.Right click on the NDI Virtual Input icon, to select the virtual device name:



C. Take Zoom for example, select NDI Video as video camera, as bellow picture shows:

This also work for other applications, such as GotoMeeting,Skype for Business, Hangouts.



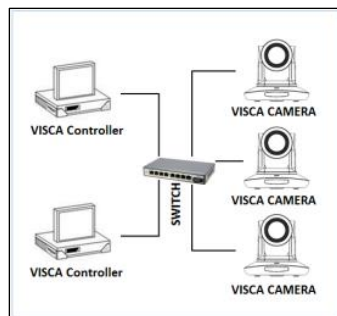
# ===== VISCA over IP =====

## VISCA over IP:

VISCA over IP means VISCA protocol transmit via IP, to reduce RS232/RS485 cable layout (the controller must support IP communication function)

Communication port spec:

- Control port: RJ45 Gigabit LAN
- IP protocol: IPv4
- Transmit protocol: UDP
- IP address: set via web end or OSD menu
- Port address: 52381
- Confirm send/transmission control: depend on applied program
- Applied range: in the same segment, not suitable for bridge network
- Turn on camera: In the menu, set VISCA option to OVER IP or OVER ALL



IP Networking method

## How to use VISCA over IP

### VISCA Command

It means commands from controller to peripheral equipment, when peripheral equipment receives commands, then return ACK. When commands executed, will return complete message.

For different commands, camera will return different message.

### VISCA Inquiry

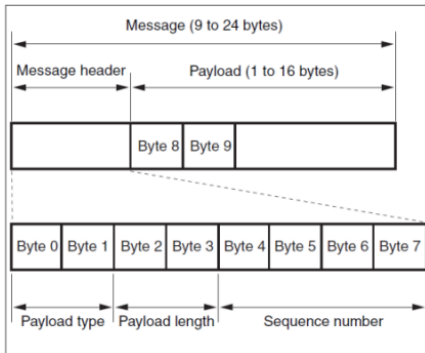
It means inquiry from controller to peripheral equipment when peripheral equipment receives this kind of commands, it will return required message.

### VISCA Reply

It means ACK, complete message, reply or error reply, it is sent from peripheral equipment to controller.

**Command format:** the following is message head and valid message format.

# ===== VISCA over IP =====



Note: LAN output way is big-endian, LSB is in the front.

## Payload type:

Data definition as following:

| Name                         | Value (Byte 0) | Value (Byte1) | Value                                                                                      |
|------------------------------|----------------|---------------|--------------------------------------------------------------------------------------------|
| VISCA command                | 0x01           | 0x00          | Stores the VISCA command.                                                                  |
| VISCA inquiry                | 0x01           | 0x10          | Stores the VISCA inquiry.                                                                  |
| VISCA reply                  | 0x01           | 0x11          | Stores the reply for the VISCA command and VISCA inquiry, or VISCA device setting command. |
| VISCA device setting command | 0x01           | 0x20          | Stores the VISCA device setting command.                                                   |
| Control command              | 0x02           | 0x00          | Stores the control command.                                                                |
| Control reply                | 0x02           | 0x01          | Stores the reply for the control command.                                                  |

## Payload length

Valid data length in Payload (1~16), is command length.

For example, when valid data length is 16 byte

Byte 2 : 0x00

Byte 3 : 0x10

Controller will save sequence number of each command, when one command sent, the sequence number of the command will add 1, when the sequence number becomes the max value, it will change to 0 for next time. The peripheral

# ===== VISCA over IP =====

equipment will save sequence number of each command, and return the sequence number to the controller.

## Payload

According to Payload type, the following data will be saved.

- VISCA command  
Save VISCA command packet
- VISCA inquiry  
Save VISCA message packet
- VISCA reply  
Save VISCA return packet
- VISCA device setting command  
Save VISCA equipment setting command packet.
- Control command

The following data is saved in control command payload

| Name  | Value  | Description                                                                                |
|-------|--------|--------------------------------------------------------------------------------------------|
| RESET | 0x01   | Resets the sequence number to 0. The value that was set as the sequence number is ignored. |
| ERROR | 0x0Fyy | yy=01:Abnormality in the sequence number.                                                  |
|       |        | yy=02:Abnormality in the message(message type).                                            |

- Controlled reply

The following data is saved in return command payload of control command.

| Message | Value | Description      |
|---------|-------|------------------|
| ACK     | 0x01  | Reply for RESET. |

## Delivery confirmation

VISCA over IP uses UDP as transmission communication protocol, UDP communication message transmission is not stable, it is necessary to confirm delivery and resent in application.

Generally, when controller sends a command to peripheral equipment,

# ===== VISCA over IP =====

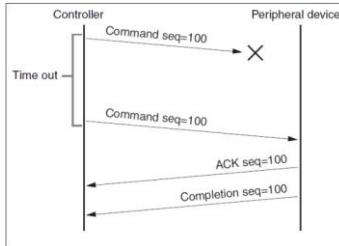
controller will wait for the return message then send the next command, we can detect and confirm if the peripheral equipment receive the commands from return message's lag time. If controller shows it is overtime, it is regarded as error transmission.

If controller shows it is overtime, resend the commands to check peripheral's status, resent command sequence number is same as last command, the following chart list the received message and status after resending the commands.

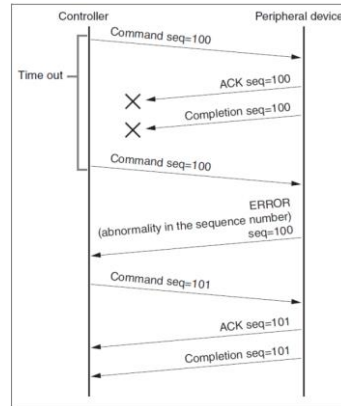
| Lost message                                      | Received message for retransmission               | Status after retransmission                                                                         | Correspondence after retransmission                                                            |
|---------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Command                                           | ACK message                                       | Command is performed by retransmission.                                                             | Continue processing.                                                                           |
| Completion message<br>For the command             | ERROR(Abnormality in the sequence number.)        | Command has been performed.<br>If only the ACK message is lost, the completion message returns.     | If the result by the completion message is needed, retransmit by updating the sequence number. |
| Completion message for the command                | ERROR(Abnormality in the sequence number.)        | Command has been performed.                                                                         | If the result by the completion message is needed, retransmit by updating the sequence number. |
| Inquiry                                           | Reply message                                     | Inquiry is performed by retransmission.                                                             | Continue processing.                                                                           |
| Reply message for the inquiry                     | ERROR(Abnormality in the sequence number.)        | Inquiry has been performed.                                                                         | If the result by the reply message is needed, retransmit by updating the sequence number.      |
| Error message                                     | Error message                                     | Command is not performed. If the error cause eliminates, normal reply is return(ACK, reply message) | Eliminate the error cause. If normal reply returns, continue processing.                       |
| Inquiry of the VISCA device setting command       | Reply message of the VISCA device setting command | Inquiry has been performed by retransmission.                                                       | Continue processing.                                                                           |
| Reply message of the VISCA device setting command | ERROR(Abnormality in the sequence number.)        | Inquiry has been performed.                                                                         | If the result by the reply message is needed, retransmit by updating the sequence number.      |

# ===== VISCA over IP =====

Sequence chart as following



Sequence chart when command lost



Sequence chart when returned message lost

Note: Do not set IP address, sub net mask, gateway parameter in VISCA over IP command, otherwise, it will cause network breaks off. Due to change these parameter, network will be in off status.





**Telecam Technology Co.,Ltd**

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**Add:** 6F, Building A, Shuanghuan Information Technology Industrial Park, No.8, Baoqing Rd, Longgang District, Shenzhen, 518116, China

**Tel:** +86-755-33275155

**Website:** <https://www.telycam.com>

**E-mail:** [telycam@telycam.com](mailto:telycam@telycam.com)