

## **PTZ Optics 30x SDI (Gen 2)**



### **User Manual**

**Model Nos: PT30X-SDI-GY-G2 & PT30X-SDI-WH-G2**

**V1.2**

**(English)**

Please check [PTZOPTICS.com](http://PTZOPTICS.com) for the most up to date version of this document

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## Preface

Thank you for using the HD Professional Video Conferencing Camera. This manual introduces the function, installation and operation of the HD camera. Prior to installation and usage, please read the manual thoroughly.

## Precautions

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

- Don't subject the camera to rain or moisture.
- Don't remove the cover. Removal of the cover may result in an electric shock, in addition to voiding the warranty. In case of abnormal operation, contact the manufacturer.
- Never operate outside of the specified operating temperature range, humidity, or with any other power supply than the one originally provided with the camera.
- Please use a soft dry cloth to clean the camera. If the camera is very dirty, clean it with diluted neutral detergent; do not use any type of solvents, which may damage the surface.

## Note

This is an FCC Class A Digital device. As such, unintentional electromagnetic radiation may affect the image quality of TV in a home environment.

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## Supplied Accessories

When you unpack your camera, check that all the supplied accessories are included:

- Camera.....1
- AC Power Adaptor.....1
- Power Cord.....1
- RS232 Cable .....1
- IR Remote Controller .....1
- User Manual .....1

## Notes

### ● Electrical Safety

Installation and operation must be in accordance with national and local electric safety standards. Do not use any power supply other than the one originally supplied with this camera.

### ● Polarity of power supply

The power supply output for this product is 12VDC with a maximum current supply of 2A. Polarity of the power supply plug is critical and is as follows.

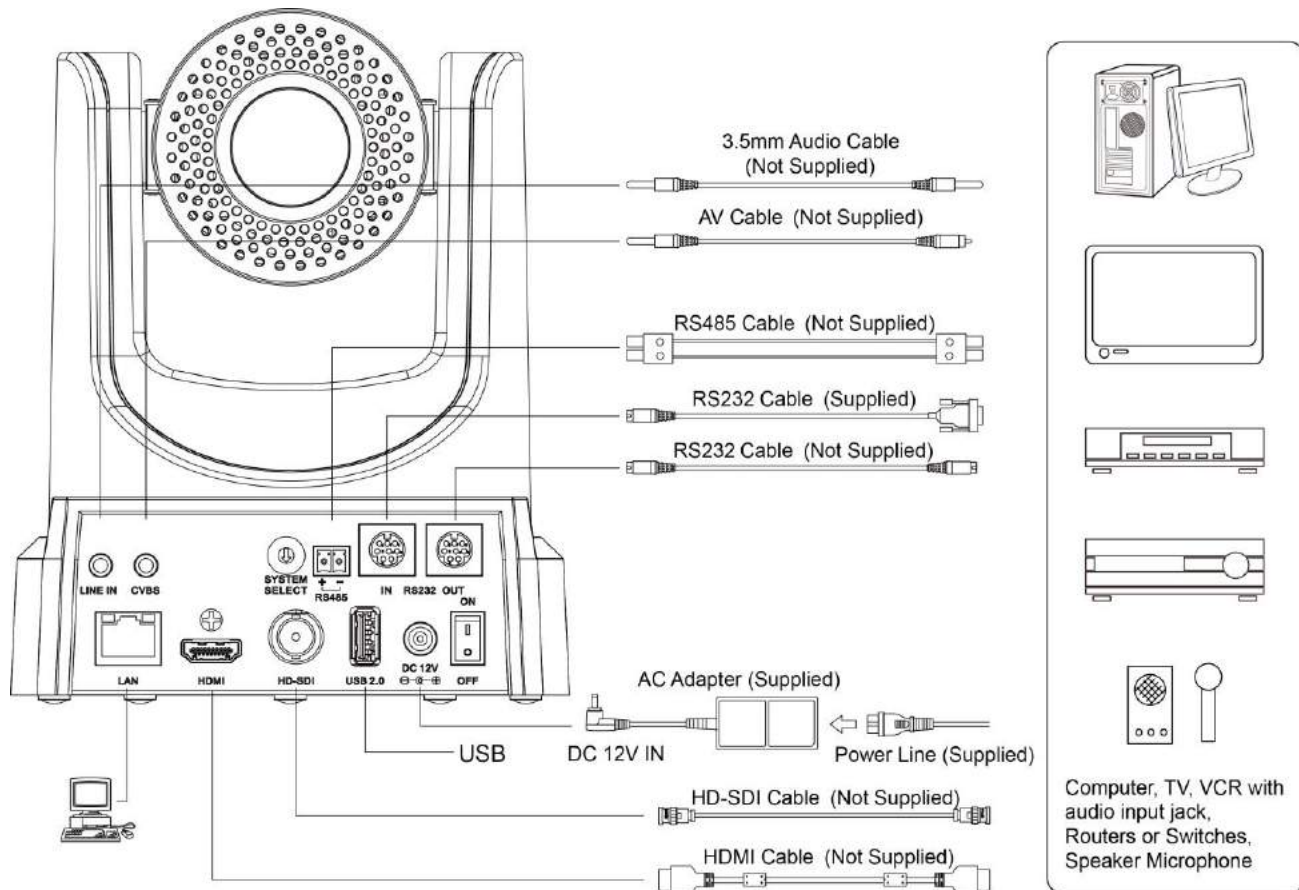


### ● Handling

- Avoid any stress, vibration, or moisture during transportation, storage, installation and operation.
- Do not lift or move the camera by grasping the camera head. Do not turn the camera head by hand. Doing so may result in mechanical damage.
- Do not expose camera to any corrosive solid, liquid, or gas to avoid damage to the cover which is made of a plastic material.
- Ensure that there are no obstacles in the tilt or pan ranges of the camera lens.
- Never power camera on before installation is complete.
- **DO NOT DISMANTLE THE CAMERA** – The manufacturer is not responsible for any unauthorized modification or dismantling.

## Quick Start

**Step1.** Please check that all connections are correct before powering on the camera.



**Step2.** Set the system select switch for your desired video output resolution and frame rate.

For many applications, setting 0 (1080p-60) will provide the best overall performance.

For highest possible resolution, use setting 0 (1080p-60) or 6 (1080p-30), however your actual realized frame rate may be limited to a lower value than 60 fps by your software and/or network connection.

**NOTE:** After changing this dial, you need to restart the camera to see the effect. Turn the camera off.

| VIDEO SYSTEM |         |   |        |
|--------------|---------|---|--------|
| 0            | 1080p60 | 8 | 720p30 |
| 1            | 1080p50 | 9 | 720p25 |
| 2            | 1080i60 | A | -      |
| 3            | 1080i50 | B | -      |
| 4            | 720p60  | C | -      |
| 5            | 720p50  | D | 576i   |
| 6            | 1080p30 | E | 480i   |
| 7            | 1080p25 | F | -      |

**CAUTION:** After changing the system (rotary) switch, you need to restart the camera to take effect.

**Step3.** Press the Switch ON button on the rear of the camera, the power lamp will illuminate.

**Step4.** The Pan-Tilt mechanism will rotate the lens to the maximum position of top right after the camera starts, then it will return to the “center”. The process of initialization is now complete.

*(Note: If the position preset 0 has been stored, the position preset 0 will be called up after initialization in lieu of “home”)*

**Step5. (Optional)** If you want to restore the factory default settings, press [MENU] button to display the OSD menu. Select the item [MENU] -> [RESTORE DEFAULT] -> [Restore].Set the value [Yes], press [HOME] button to restore the factory default settings.

**RESTORE DEFAULT**

►Restore      Yes

◄◄Change Value

[Home] OK

[Menu] Back

## Features

1. Supports simultaneous 3G-SDI, HDMI and IP network streaming for up to 1080P@60\*.
2. Supports non-simultaneous CVBS (composite video) output via RCA connector (480i or 576i).
3. Includes Panasonic's high quality, 1/2.7 inch, 2.07 million effective pixels, HD CMOS sensor, which can produce a maximum 1920 x 1080 image with a high quality, maximum output frame rate of 60 fps (frames per second).
4. Ultra-high frame rate 60fps for HDMI and SDI and up to 720@120fps for IP Streaming.
5. Supports IP streaming via RTSP and RTMP and using H.264, H.265 and MJPEG.
6. Microphone & AAC Audio Stream Encoding for IP stream & HDMI - Use line-level microphone for line in input. Uses AAC audio encoding for better sound quality and smaller bandwidth usage.
7. Includes a Tamron, high-quality, telephoto lens, supporting 30x optical zoom and optional 16x digital zoom with wide angle 60.7 degree horizontal field of view in widest zoom setting.
8. The high SNR (signal to noise ratio) of the CMOS sensor ( $\geq 55\text{dB}$ ), combined with 2D and 3D noise reduction algorithms, effectively reduces noise, even under low illumination conditions.
9. Includes DRC (dynamic range control), allowing for greater image quality and detail across images that are both well-lit and shadowed in the same frame.
10. Includes RS232 and RS485 interfaces for wired remote control. All of the parameters of the camera can be remotely controlled by high-speed communications for joystick and central control system applications.
11. Includes web-based IP remote control interface.
12. Freeze - Allows freezing of video image on all outputs to allow for calling next preset without showing camera motion.
13. Power over Ethernet - Supports PoE 802.3af.

**\*Please note:** The camera is unable to perform 1080@60 over IP stream & SDI/HDMI simultaneously



## Product Specifications

|                           |                                                                                                                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>              | PT30X-SDI-GY-G2 and PT30X-SDI-WH-G2                                                                                                                                                                              |
| <b>Type</b>               | PTZOptics SDI HD 1080p Color Video Camera                                                                                                                                                                        |
| <b>Camera</b>             |                                                                                                                                                                                                                  |
| Video System              | HD: 1080p/60, 1080p/50, 1080i/60, 1080i/50, 1080p/30, 1080p/25, 720p/60, 720p/50, 720p30, 720p25 SD: NTSC, PAL<br>*Please note: The camera is unable to perform 1080@60 over IP stream & SDI/HDMI simultaneously |
| Sensor                    | 1/2.7", CMOS, Effective Pixel: 2.07M                                                                                                                                                                             |
| Scanning Mode             | Progressive                                                                                                                                                                                                      |
| Lens                      | 30x, f4.42mm ~ 88.5mm, F1.8 ~ F2.8                                                                                                                                                                               |
| Digital Zoom              | 16x                                                                                                                                                                                                              |
| Minimal Illumination      | 0.05 Lux @ (F1.8, AGC ON)                                                                                                                                                                                        |
| Shutter                   | 1/30s ~ 1/10000s                                                                                                                                                                                                 |
| White Balance             | Auto, Indoor, Outdoor, One Push, Manual, VAR                                                                                                                                                                     |
| Backlight Compensation    | Support                                                                                                                                                                                                          |
| Digital Noise Reduction   | 2D&3D Digital Noise Reduction                                                                                                                                                                                    |
| Video S/N                 | ≥ 55dB                                                                                                                                                                                                           |
| Horizontal Angle of View  | 3.36° ~ 60.7°                                                                                                                                                                                                    |
| Vertical Angle of View    | 1.89° ~ 34.1°                                                                                                                                                                                                    |
| Horizontal Rotation Range | ±170°                                                                                                                                                                                                            |
| Vertical Rotation Range   | -30° ~ +90°                                                                                                                                                                                                      |
| Pan Speed Range           | 1.7° ~ 100°/s                                                                                                                                                                                                    |
| Tilt Speed Range          | 1.7° ~ 69.9°/s                                                                                                                                                                                                   |
| H & V flip                | Support                                                                                                                                                                                                          |
| Image Freeze              | Support                                                                                                                                                                                                          |
| PoE                       | Support (802.3af)                                                                                                                                                                                                |
| Face Detection            | Not Supported                                                                                                                                                                                                    |
| Local Storage             | Not Supported                                                                                                                                                                                                    |
| Number of Preset          | 255                                                                                                                                                                                                              |
| Preset Accuracy           | 0.1°                                                                                                                                                                                                             |
| <b>IPC Features</b>       |                                                                                                                                                                                                                  |
| Video Coding Standard     | H.264/H.265/MJPEG                                                                                                                                                                                                |
| Video Stream              | First stream, Second stream                                                                                                                                                                                      |
| First Stream Resolution   | 1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360                                                                                                                                                         |



#### IPC Features

|                          |                                                                              |
|--------------------------|------------------------------------------------------------------------------|
| Second Stream Resolution | 1280x720, 1024x576, 720x576, 720x408, 640x360, 480x270, 320x240, 320x180     |
| Bit Rate                 | 128Kbps ~ 8192Kbps                                                           |
| Bit Rate Type            | Variable rate, fixed rate                                                    |
| Frame Rate               | 50Hz: 1fps ~ 50fps, 60Hz: 1fps ~ 60fps, 720p120: 120fps, 640x480p240: 240fps |
| Audio Standard           | AAC                                                                          |
| Audio Rate               | 96K, 128K, 256K                                                              |
| Support Protocols        | TCP/IP, HTTP, RTSP, RTMP, Multicast, DHCP, ONVIF etc                         |

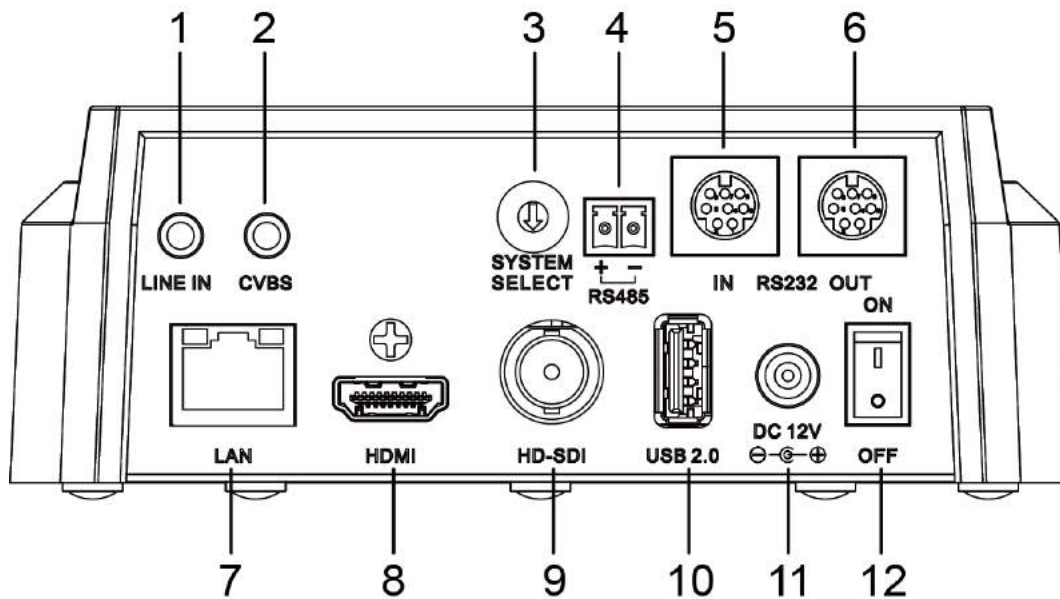
#### Input/Output Interface

|                         |                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------|
| HD Output               | 1 x HDMI: Version 1.3                                                               |
|                         | 1 x HD-SDI: BNC type, 800mVp-p, 75Ω, Along to SMPTE 424M standard                   |
| SD Output               | 1 x CVBS: RCA jack, 1Vp-p, 75Ω                                                      |
| Network Interface       | 1 x RJ45: 10/100/1000M Adaptive Ethernet ports                                      |
| Audio Input             | 1-ch 3.5mm audio interface, Line In                                                 |
| USB                     | 1 x USB2.0: type A jack                                                             |
| Communication Interface | 1 x RS-232 IN: 8pin Min DIN, Max Distance: 30m, Protocol: VISCA/Pelco-D/Pelco-P     |
|                         | 1 x RS-232 OUT: 8pin Min DIN, Max Distance: 30m, Protocol: VISCA network use only   |
|                         | 1 x RS-485: 2pin Phoenix port, Max Distance: 1200m, Protocol: VISCA/Pelco-D/Pelco-P |
| Power Jack              | JEITA type (DC IN 12V)                                                              |

#### Generic Specification

|                       |                                   |
|-----------------------|-----------------------------------|
| Input Voltage         | DC 12V / PoE (802.3af) (optional) |
| Current Consumption   | 1.0A (Max)                        |
| Operating Temperature | -10°C ~ 40°C (14°F ~ 104°F)       |
| Storage Temperature   | -40°C ~ 60°C (-40°F ~ 140°F)      |
| Power Consumption     | 12W (Max)                         |
| MTBF                  | >30000h                           |
| Size                  | 169mm x 142mm x 164mm             |
| Net Weight            | 1.35 Kg                           |

## Main Unit



- |                                                 |                                        |
|-------------------------------------------------|----------------------------------------|
| 1.Audio LINE IN Interface (HDMI & IP)           | 7.Network (IP streaming & control)     |
| 2.CVBS (composite video SD) Interface           | 8.HDMI (Digital Video Output)          |
| 3.System select dial (resolution)               | 9.HD-SDI (Serial Digital Video Output) |
| 4.RS485 jack                                    | 10.USB 2.0 (USB Storage)               |
| 5.RS232 IN jack                                 | 11.DC 12V power jack                   |
| 6.RS232 OUT jack (pass through for daisy chain) | 12.Power switch                        |

## IR Remote Controller

### 1. Standby Button

Press this button to enter standby mode. Press it again to enter normal mode.

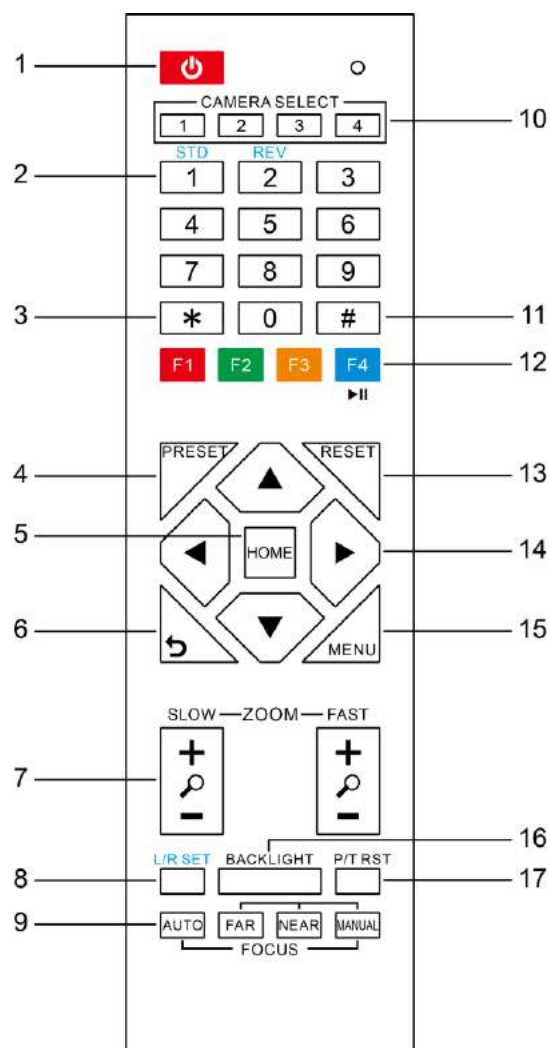
NOTE: Power consumption in standby mode is approximately half of the normal mode.

### 2. Position Buttons

To set preset or call preset.

### 3. \* Button

For multiple function.



### 4&13. Set/Clear Preset Buttons

Set preset: Store a preset position

[PRESET] + Numeric button (0-9): Setting a corresponding numeric key preset position

NOTE: Preset 0 - 9 via remote control and the rest from web, keyboard and the serial port.

Clear preset: Erase a preset position [RESET] + Numeric button (0-9), or: [\*] + [#] + [RESET]: Erase all presets

### 5&14. Pan/Tilt Control Buttons

Press the arrow buttons to perform panning and tilting. Press the [HOME] button to face the camera back to front.

### 6. Return Button

Press the button to back previous menu.

### 7. Zoom Buttons

Zoom+: Zoom In (Slow and fast speed)

Zoom-: Zoom Out (Slow and fast speed)

### 8. L/R Set Button

Set the left & right direction of the remote control.

Simultaneously press [L/R Set] + [1]: Normal direction.

Simultaneously press [L/R Set] + [2]: Left and right direction will be reversed.

### 9. Focus Buttons

Used for focus adjustment.

Press [AUTO] to adjust the focus on the center of the object automatically. To adjust the focus manually, press the [MANUAL] button, and adjust it with [Far] (focus on far object) and [Near] (focus on near object).

### 10. Camera Address Select Buttons

Press the button corresponding to the camera which you want to operate with the remote controller.

### 11. # Button

For multiple function.

## 12. Multiple Function Buttons

Function 1. Set camera IR address

Press 3 keys contiguously can set camera IR address as follow:

[\*] + [#] + [F1]: Address 1

[\*] + [#] + [F2]: Address 2

[\*] + [#] + [F3]: Address 3

[\*] + [#] + [F4]: Address 4

Function 2. Image freezing function

Press [F4] to start the freeze function. The word "Freeze" displays on the upper left corner. After five seconds, the display disappears automatically (though the freeze feature continues). To cancel the freeze, press the [F4] key the word "Unfreeze" displays on the upper left corner. After five seconds, the display disappears automatically.

## 15. Menu Button

Menu button: Press this button to enter or exit the OSD menu.

## 16. Backlight Button

Backlight button: Press this button to enable the backlight compensation. Press it again to disable the backlight compensation.

NOTE: Effective only in auto exposure mode.

NOTE: If there is a light behind the subject, the subject will appear dark. In this case, press the backlight ON / OFF button. To cancel this function, press the backlight ON / OFF button.

## 17. P/T RST Button

Press the button to self-calibrate pan and tilt once again.

### Shortcuts for some 'Set' Functions

[\*] + [#] + [1]: Display OSD menu in English

[\*] + [#] + [3]: Display OSD menu in Chinese

[\*] + [#] + [4]: Show IP address

[\*] + [#] + [6]: Quickly restore the default settings

[\*] + [#] + [8]: Show the camera version

[\*] + [#] + [9]: Quickly set mount mode (flip / normal) 1. Standby Button

Press this button to enter standby mode. Press it again to enter normal mode.

NOTE: Power consumption in standby mode is approximately half of the normal mode.

## Using IR Remote Controller

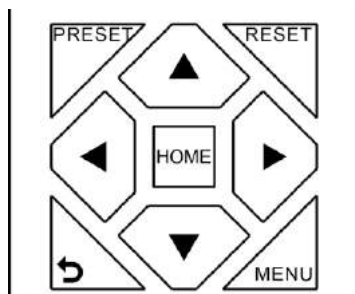
When the camera is operational, you can use the remote controller to perform panning, tilting, zooming and focusing, as well as store and call back preset positions.

Button Instructions:

1. In these instructions, 'press the button' means to press and release. A special note will be given if holding a button down for more than one second is required.

2. When a button-combination is required, do it in sequence (not simultaneously). For example, '[\*] + [#] + [F1]' means press [\*] first and then press [#] and then press [F1].

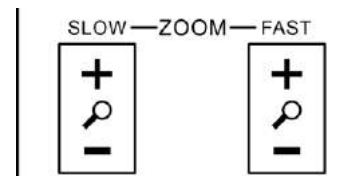
### 1. Pan/Tilt Control



|                                |              |
|--------------------------------|--------------|
| Tilt up:                       | Press [▲]    |
| Tilt down:                     | Press [▼]    |
| Pan left:                      | Press [◀]    |
| Pan right:                     | Press [▶]    |
| Face the camera back to front: | Press [HOME] |

**Press and hold** the up/down/left/right buttons, to keep panning or tilting from slow to fast, (until the camera reaches the mechanical limit). The camera stops as soon as the button is released.

### 2. Zoom Control



Zoom Out: press [+] button under FAST or SLOW

Zoom In: press [-] button under FAST or SLOW

**Press and hold** the button, to keep zooming in or out (until the lens reaches the mechanical limit). The lens stops as soon as the button is released.

### 3. Focus Control



**AUTO:** Change focus mode to AF, which allows the camera to adjust the focus automatically on the center of the image.

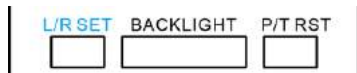
**MANUAL:** Change focus mode to MF, which allows the user to adjust the focus manually (see FOCUS FAR & FOCUSNEAR).

**FOCUS FAR:** Press [FAR] button(NOTE: Effective only in MANUAL focus mode)

**FOCUS NEAR:** Press [NEAR] button(NOTE: Effective only in MANUAL focus mode)

**Press and hold** the FOCUS [FAR] or FOCUS [NEAR] button, allows for continuous adjustment, stopping as soon as the button is released.

#### 4. BACKLIGHT. L/R SET and P/T RST Controls



Reverse Pan controls direction: Press and hold [L/R SET] button while pressing [1] *aka* [STD] button for normal pan controls. Press and hold [L/R SET] button while pressing [2] *aka* [REV] button for reversed pan controls.

Backlight Compensation Control: Press [BACKLIGHT] button to enable backlight compensation. Press it again to disable backlight compensation. (Note: Backlight is only effective in full auto exposure mode)

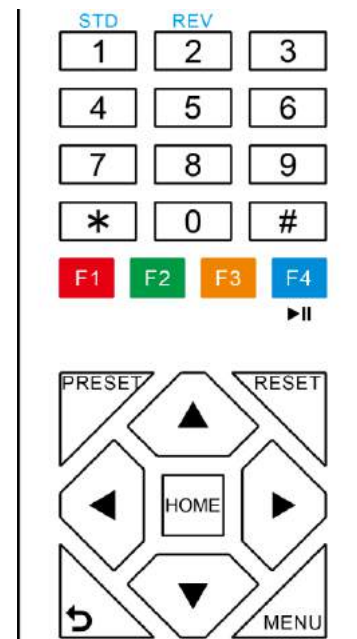
Pan Tilt Control Self Calibration: Press [P/T RST] button to recalibrate the Pan and Tilt limits.

#### 5. Standby Control



Press [⏻] button to put camera in 'standby' mode. In standby mode the camera will provide no image, respond to no commands and use less than half its normal power. Press [⏻] button again to put camera in normal mode.

#### 6. Presets - Setting and Clearing



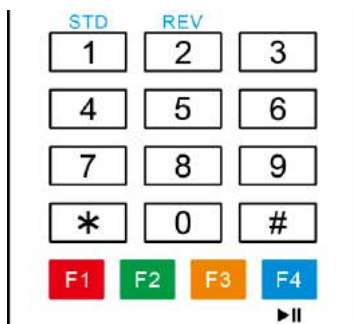
1. To store a preset position: The user should manually setup the desired shot using the Pan Tilt and Zoom controls. Press the [PRESET] button first and then press the numeric button [0-9] to which you want to assign the shot. Ten total preset positions (0-9) are available from the IR remote control (255 available via RS232/RS485/IP Interfaces).

2. To erase the memory content of a preset position: The user should press the [RESET] button first and then press the numeric button 0-9 associated with that preset.

#### Note:

Pressing [\*]+[#]+[RESET] in sequence will erase all presets in the memory.

## 7. Recalling Presets



Pressing any of the numeric buttons [0-9] directly will recall a stored preset position and settings.

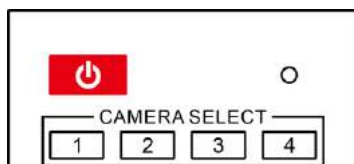
### Note:

No action will be executed if a specific numeric preset position has not yet been saved.

### Note:

Presets assigned via the IP interface do not correlate to presets set via the IR remote control.

## 8. Camera Selection



Press the [1-4] button corresponding to the camera with the IR address that you want to operate. This allows for up to 4 cameras to be operated via the same IR remote in the same room.

## 9. Camera IR Address Set



Press 3 buttons in the sequence shown below to set/change the camera's IR address. This allows up to 4 cameras to be controlled from the same IR remote control. Be sure that only one camera is picking up the IR signal when you perform this function. If multiple cameras receive the command, they will all change to the new address.

Address1: [\*]+[ # ]+[F1]

Address 2: [\*]+[ # ]+[F2]

Address 3: [\*]+[ # ]+[F3]

Address 4: [\*]+[ # ]+[F4]

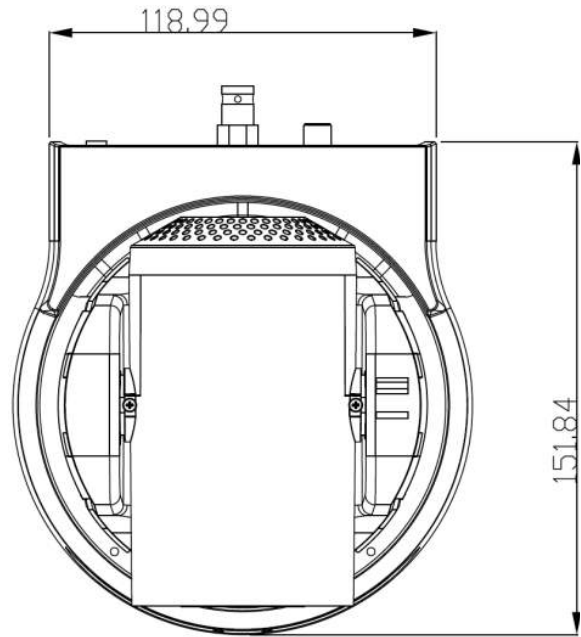
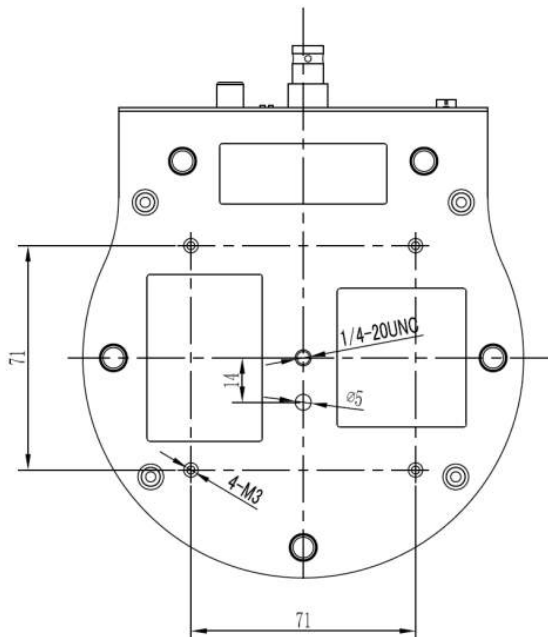
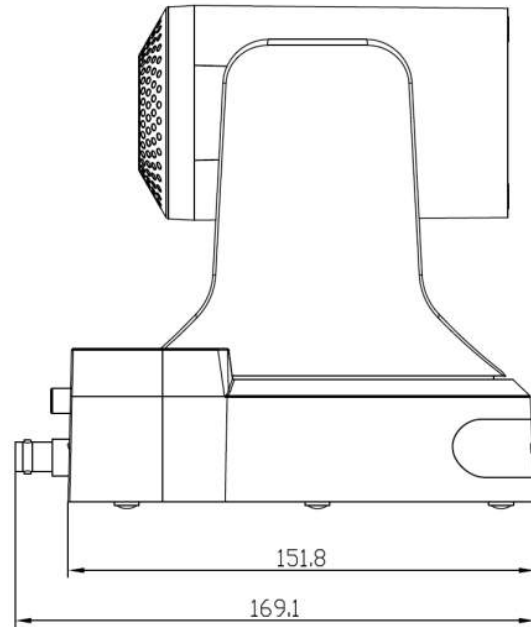
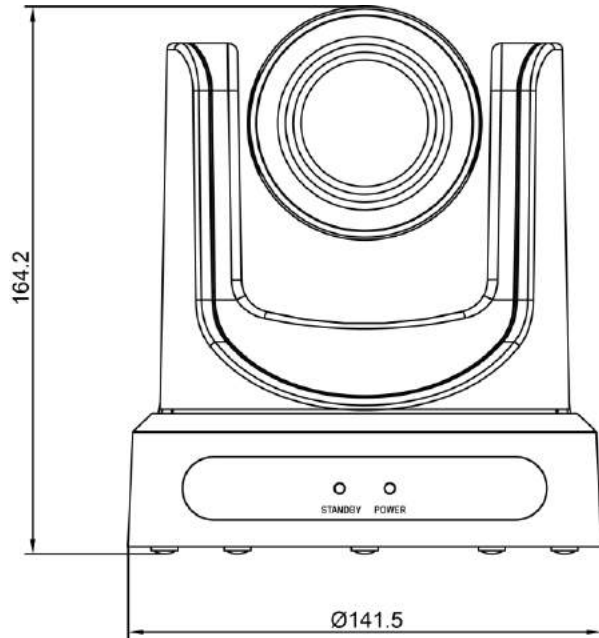
## 10. Image Freeze



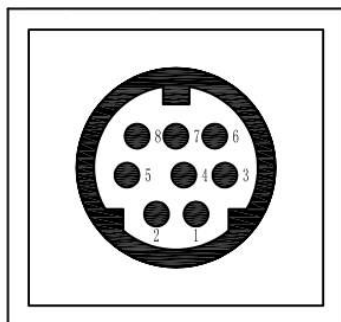
Press the [▶||] button to freeze or unfreeze the video image. This can be useful while recalling presets to hide camera motion from your viewers.



## Dimensional Drawings (mm)



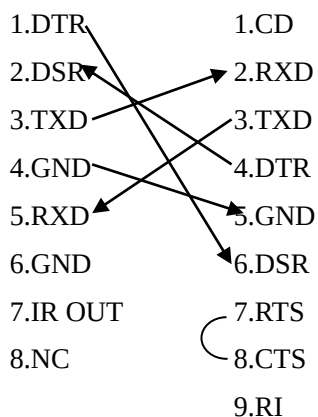
## RS-232 Interface



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

### Camera

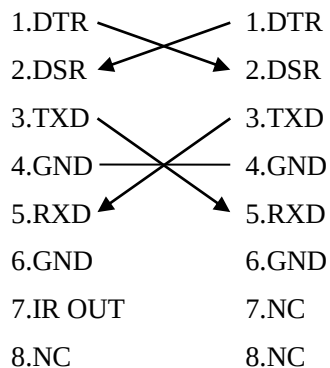
### PC/Controller DB-9



### For Control Daisy Chain

#### 1<sup>st</sup> Camera

#### 2<sup>nd</sup> Camera Mini DIN



## Serial Communication Control

In default working mode, the camera is able to connect to a VISCA controller with an RS232C serial interface.

➤ RS232 Communication Control

The camera can be controlled via RS232. The parameters of RS232C are as follows:

Baud rate: 2400, 4800, 9600 or 38400 bps.

Start bit: 1 bit.

Data bit: 8 bits.

Stop bit: 1bit.

Parity bit: none.

➤ RS485 Communication Control

The camera can be controlled via RS485, Half-duplex mode, with support for VISCA, Pelco-D or Pelco-P protocol.

The parameters of RS485 are as follows:

Baud rate: 2400, 4800, 9600 or 38400 bps.

Start bit: 1 bit.

Data bit: 8 bits.

Stop bit: 1 bit.

Parity bit: none.

When powered on, Pan and Tilt will rotate to the maximum position of top right after the camera powered up. Then it will return to the “center”. The process of initialization is now complete. (Note: If the position preset 0 has been stored, the position preset 0 will be called up after initialization, in lieu of “center”). After initialization is complete, then the user can control the camera with commands in the command list.

## VISCA Command List

### Part 1: Camera-Issued Messages

| ACK/Completion Message  |            |                             |                                              |
|-------------------------|------------|-----------------------------|----------------------------------------------|
| Command                 | Function   | Command Packet              | Comments                                     |
| ACK/Completion Messages | ACK        | z0 4y FF<br>(y: Socket No.) | Returned when the command is accepted.       |
|                         | Completion | z0 5y FF<br>(y: Socket No.) | Returned when the command has been executed. |

z = Camera Address + 8

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

## Part 2: Camera Control Commands

| Command       | Function        | Command Packet                            | Comments                                    |
|---------------|-----------------|-------------------------------------------|---------------------------------------------|
| AddressSet    | Broadcast       | 88 30 01 FF                               | Address setting                             |
| IF_Clear      | Broadcast       | 88 01 00 01 FF                            | I/F Clear                                   |
| CAM_Power     | On              | 8x 01 04 00 02 FF                         | Power ON/OFF                                |
|               | Off             | 8x 01 04 00 03 FF                         |                                             |
| CAM_Zoom      | Stop            | 8x 01 04 07 00 FF                         |                                             |
|               | Tele(Standard)  | 8x 01 04 07 02 FF                         |                                             |
|               | Wide(Standard)  | 8x 01 04 07 03 FF                         |                                             |
|               | Tele(Variable)  | 8x 01 04 07 2p FF                         | p = 0(low) - 7(high)                        |
|               | Wide(Variable)  | 8x 01 04 07 3p FF                         |                                             |
|               | Direct          | 8x 01 04 47 0p 0q 0r 0s FF                | pqrs: Zoom Position                         |
| CAM_Focus     | Stop            | 8x 01 04 08 00 FF                         |                                             |
|               | Far(Standard)   | 8x 01 04 08 02 FF                         |                                             |
|               | Near(Standard)  | 8x 01 04 08 03 FF                         |                                             |
|               | Far(Variable)   | 8x 01 04 08 2p FF                         | p = 0(low) - 7(high)                        |
|               | Near(Variable)  | 8x 01 04 08 3p FF                         |                                             |
|               | Direct          | 8x 01 04 48 0p 0q 0r 0s FF                | pqrs: Focus Position                        |
|               | Auto Focus      | 8x 01 04 38 02 FF                         | AF On/Off                                   |
|               | Manual Focus    | 8x 01 04 38 03 FF                         |                                             |
|               | Auto/Manual     | 8x 01 04 38 10 FF                         |                                             |
| CAM_ZoomFocus | Direct          | 8x 01 04 47 0p 0q 0r 0s<br>0t 0u 0v 0w FF | pqrs: Zoom Position<br>tuvw: Focus Position |
| CAM_WB        | Auto            | 8x 01 04 35 00 FF                         | Normal Auto                                 |
|               | Indoor mode     | 8x 01 04 35 01 FF                         | Indoor mode                                 |
|               | Outdoor mode    | 8x 01 04 35 02 FF                         | Outdoor mode                                |
|               | OnePush mode    | 8x 01 04 35 03 FF                         | One Push WB mode                            |
|               | Manual          | 8x 01 04 35 05 FF                         | Manual Control mode                         |
|               | OnePush trigger | 8x 01 04 10 05 FF                         | One Push WB Trigger                         |
| CAM_RGain     | Reset           | 8x 01 04 03 00 FF                         | Manual Control of R Gain                    |
|               | Up              | 8x 01 04 03 02 FF                         |                                             |
|               | Down            | 8x 01 04 03 03 FF                         |                                             |
|               | Direct          | 8x 01 04 43 00 00 0p 0q FF                | pq: R Gain                                  |
| CAM_Bgain     | Reset           | 8x 01 04 04 00 FF                         | Manual Control of B Gain                    |
|               | Up              | 8x 01 04 04 02 FF                         |                                             |
|               | Down            | 8x 01 04 04 03 FF                         |                                             |
|               | Direct          | 8x 01 04 44 00 00 0p 0q FF                | pq: B Gain                                  |

|                              |                      |                            |                                                     |
|------------------------------|----------------------|----------------------------|-----------------------------------------------------|
| CAM_AE                       | Full Auto            | 8x 01 04 39 00 FF          | Automatic Exposure mode                             |
|                              | Manual               | 8x 01 04 39 03 FF          | Manual Control mode                                 |
|                              | Shutter priority     | 8x 01 04 39 0A FF          | Shutter Priority Automatic Exposure mode            |
|                              | Iris priority        | 8x 01 04 39 0B FF          | Iris Priority Automatic Exposure mode               |
|                              | Bright               | 8x 01 04 39 0D FF          | Bright Mode(Manual control)                         |
| CAM_SlowShutter              | AutoSlowShutterLimit | 8x 01 04 2A 0p 00 FF       |                                                     |
| CAM_Iris                     | Reset                | 8x 01 04 0B 00 FF          | Iris Setting                                        |
|                              | Up                   | 8x 01 04 0B 02 FF          |                                                     |
|                              | Down                 | 8x 01 04 0B 03 FF          |                                                     |
|                              | Direct               | 8x 01 04 4B 00 00 0p 0q FF | pq: Iris Position                                   |
| CAM_Gain                     | Reset                | 8x 01 04 0C 00 FF          | Gain Setting                                        |
|                              | Up                   | 8x 01 04 0C 02 FF          |                                                     |
|                              | Down                 | 8x 01 04 0C 03 FF          |                                                     |
|                              | Direct               | 8x 01 04 0C 00 00 0p 0q FF | pq: Gain Position                                   |
|                              | Gain Limit           | 8x 01 04 2C 0p FF          | p: Gain Position                                    |
| CAM_Bright                   | Reset                | 8x 01 04 0D 00 FF          | Bright Setting                                      |
|                              | Up                   | 8x 01 04 0D 02 FF          |                                                     |
|                              | Down                 | 8x 01 04 0D 03 FF          |                                                     |
|                              | Direct               | 8x 01 04 0D 00 00 0p 0q FF | pq: Bright Position                                 |
| CAM_ExpComp                  | On                   | 8x 01 04 3E 02 FF          | Exposure Compensation On/Off                        |
|                              | Off                  | 8x 01 04 3E 03 FF          |                                                     |
|                              | Reset                | 8x 01 04 0E 00 FF          | Exposure Compensation Amount Setting                |
|                              | Up                   | 8x 01 04 0E 02 FF          |                                                     |
|                              | Down                 | 8x 01 04 0E 03 FF          |                                                     |
|                              | Direct               | 8x 01 04 4E 00 00 0p 0q FF | pq: ExpComp Position                                |
| CAM_BackLight                | On                   | 8x 01 04 33 02 FF          | Back Light Compensation On/Off                      |
|                              | Off                  | 8x 01 04 33 03 FF          |                                                     |
| CAM_NR(2D)Mode               | Auto                 | 8x 01 04 50 02 FF          | ND2D Auto/Manual                                    |
|                              | Manual               | 8x 01 04 50 03 FF          |                                                     |
| CAM_NR(2D)Level              | -                    | 8x 01 04 53 0p FF          | p: NR Setting (0: Off, level 1 to 5)                |
| CAM_NR(3D)Level              | -                    | 8x 01 04 54 0p FF          | p: NR Setting (0: Off, level 1 to 8)                |
| CAM_Flicker                  | -                    | 8x 01 04 23 0p FF          | p: Flicker Settings<br>(0: Off, 1: 50Hz, 2: 60Hz)   |
| CAM_DHotPixel                | -                    | 8x 01 04 56 0p FF          | p: Dynamic Hot Pixel Setting (0: Off, level 1 to 6) |
| CAM_ApertureMode( sharpness) | Auto                 | 8x 01 04 05 02 FF          | Sharpness Auto                                      |
|                              | Manual               | 8x 01 04 05 02 FF          | Sharpness Manual                                    |

|                         |                  |                                                 |                                                                                                                                                          |
|-------------------------|------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAM_Aperture(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                                                                                                                                        |
| CAM_PictureEffect       | Off              | 8x 01 04 63 00 FF                               | Picture Effect Setting                                                                                                                                   |
|                         | B&W              | 8x 01 04 63 04 FF                               |                                                                                                                                                          |
| CAM_Memory              | Reset            | 8x 01 04 3F 00 pp FF                            | pp: Memory Number(=0 to 127)                                                                                                                             |
|                         | Set              | 8x 01 04 3F 01 pp FF                            |                                                                                                                                                          |
|                         | Recall           | 8x 01 04 3F 02 pp FF                            |                                                                                                                                                          |
| CAM_LR_Reverse          | On               | 8x 01 04 61 02 FF                               | Image Flip Horizontal On/Off                                                                                                                             |
|                         | Off              | 8x 01 04 61 03 FF                               |                                                                                                                                                          |
| CAM_PictureFlip         | On               | 8x 01 04 66 02 FF                               | Image Flip Vertical On/Off                                                                                                                               |
|                         | Off              | 8x 01 04 66 03 FF                               |                                                                                                                                                          |
| CAM_RegisterValue       | -                | 8x 01 04 24 mn 0p 0q FF                         | mm: Register No. (=00-7F)<br>pp: Register Value (=00-7F)                                                                                                 |
| CAM_ColorGain           | Diret            | 8x 01 04 49 00 00 00 0p FF                      | p: Color Gain setting 0h (60%) to Eh (200%)                                                                                                              |
| SYS_Menu                | Off              | 8x 01 06 06 03 FF                               | Turns off the menu screen                                                                                                                                |
| Pan_tiltDrive           | 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<br>ZZZZ: Tilt Position |
|                         | Down             | 8x 01 06 01 VV WW 03 02 FF                      |                                                                                                                                                          |
|                         | Left             | 8x 01 06 01 VV WW 01 03 FF                      |                                                                                                                                                          |
|                         | Right            | 8x 01 06 01 VV WW 02 03 FF                      |                                                                                                                                                          |
|                         | Upleft           | 8x 01 06 01 VV WW 01 01 FF                      |                                                                                                                                                          |
|                         | Upright          | 8x 01 06 01 VV WW 02 01 FF                      |                                                                                                                                                          |
|                         | DownLeft         | 8x 01 06 01 VV WW 01 02 FF                      |                                                                                                                                                          |
|                         | DownRight        | 8x 01 06 01 VV WW 02 02 FF                      |                                                                                                                                                          |
|                         | Stop             | 8x 01 06 01 VV WW 03 03 FF                      |                                                                                                                                                          |
|                         | AbsolutePosition | 8x 01 06 02 VV WW<br>0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |                                                                                                                                                          |
|                         | RelativePosition | 8x 01 06 03 VV WW<br>0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |                                                                                                                                                          |
|                         | Home             | 8x 01 06 04 FF                                  |                                                                                                                                                          |
|                         | Reset            | 8x 01 06 05 FF                                  |                                                                                                                                                          |
| Pan_tiltLimitSet        | LimitSet         | 8x 01 06 07 00 0W<br>0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | W: 1 UpRight 0: DownLeft<br>YYYY: Pan Limit Position<br>ZZZZ: Tilt Position                                                                              |
|                         | LimitClear       | 8x 01 06 07 01 0W<br>07 0F 0F 0F 07 0F 0F 0F FF |                                                                                                                                                          |
| CAM_AFSensitivity       | High             | 8x 01 04 58 01 FF                               | AF Sensitivity High/Normal/Low                                                                                                                           |
|                         | Normal           | 8x 01 04 58 02 FF                               |                                                                                                                                                          |



|                    |         |                            |                                                             |
|--------------------|---------|----------------------------|-------------------------------------------------------------|
|                    | Low     | 8x 01 04 58 03 FF          |                                                             |
| CAM_SettingReset   | Reset   | 8x 01 04 A0 10 FF          | Reset Factory Setting                                       |
| CAM_Brightness     | Direct  | 8x 01 04 A1 00 00 0p 0q FF | pq: Brightness Position                                     |
| CAM_Contrast       | Direct  | 8x 01 04 A2 00 00 0p 0q FF | pq: Contrast Position                                       |
| CAM_Flip           | Off     | 8x 01 04 A4 00 FF          | Single Command For Video Flip                               |
|                    | Flip-H  | 8x 01 04 A4 01 FF          |                                                             |
|                    | Flip-V  | 8x 01 04 A4 02 FF          |                                                             |
|                    | Flip-HV | 8x 01 04 A4 03 FF          |                                                             |
| CAM_SettingSave    | Save    | 8x 01 04 A5 10 FF          | Save Current Setting                                        |
| CAM_Iridix         | Direct  | 8x 01 04 A7 00 00 0p 0q FF | pq: Iridix Position                                         |
| CAM_AWBSensitivity | High    | 8x 01 04 A9 00 FF          | High                                                        |
|                    | Normal  | 8x 01 04 A9 01 FF          | Normal                                                      |
|                    | Low     | 8x 01 04 A9 02 FF          | Low                                                         |
| CAM_AFZone         | Top     | 8x 01 04 AA 00 FF          | AF Zone weight select                                       |
|                    | Center  | 8x 01 04 AA 01 FF          |                                                             |
|                    | Bottom  | 8x 01 04 AA 02 FF          |                                                             |
| CAM_ColorHue       | Direct  | 8x 01 04 4F 00 00 00 0p FF | p: Color Hue setting 0h (– 14 degrees) to Eh ( +14 degrees) |

### Part 3: Query Commands

| Inquiry Command List  |                |                      |                                               |
|-----------------------|----------------|----------------------|-----------------------------------------------|
| Command               | Command packed | Inquiry Packet       | Comments                                      |
| CAM_PowerInq          | 8x 09 04 00 FF | y0 50 02 FF          | On                                            |
|                       |                | y0 50 03 FF          | Off(Standby)                                  |
|                       |                | y0 50 04 FF          | Internal power circuit error                  |
| CAM_ZoomPosInq        | 8x 09 04 47 FF | y0 50 0p 0q 0r 0s FF | pqrs: Zoom Position                           |
| CAM_FocusAFMode Inq   | 8x 09 04 38 FF | y0 50 02 FF          | Auto Focus                                    |
|                       |                | y0 50 03 FF          | Manual Focus                                  |
| CAM_FocusPosInq       | 8x 09 04 48 FF | y0 50 0p 0q 0r 0s FF | pqrs: Focus Position                          |
| CAM_WBModeInq         | 8x 09 04 35 FF | y0 50 00 FF          | Auto                                          |
|                       |                | y0 50 01 FF          | Indoor mode                                   |
|                       |                | y0 50 02 FF          | Outdoor mode                                  |
|                       |                | y0 50 03 FF          | OnePush mode                                  |
|                       |                | y0 50 05 FF          | Manual                                        |
| CAM_RGainInq          | 8x 09 04 43 FF | y0 50 00 00 0p 0q FF | pq: R Gain                                    |
| CAM_BGainInq          | 8x 09 04 44 FF | y0 50 00 00 0p 0q FF | pq: B Gain                                    |
| CAM_AEModeInq         | 8x 09 04 39 FF | y0 50 00 FF          | Full Auto                                     |
|                       |                | y0 50 03 FF          | Manual                                        |
|                       |                | y0 50 0A FF          | Shutter priority                              |
|                       |                | y0 50 0B FF          | Iris priority                                 |
|                       |                | y0 50 0D FF          | Bright                                        |
| CAM_ShutterPosInq     | 8x 09 04 4A FF | y0 50 00 00 0p 0q FF | pq: Shutter Position                          |
| CAM_IrisPosInq        | 8x 09 04 4B FF | y0 50 00 00 0p 0q FF | pq: Iris Position                             |
| CAM_BrightPosInq      | 8x 09 04 4D FF | y0 50 00 00 0p 0q FF | pq: Bright Position                           |
| CAM_ExpCompModeInq    | 8x 09 04 3E FF | y0 50 02 FF          | On                                            |
|                       |                | y0 50 03 FF          | Off                                           |
| CAM_ExpCompPosInq     | 8x 09 04 4E FF | y0 50 00 00 0p 0q FF | pq: ExpComp Position                          |
| CAM_BacklightMode Inq | 8x 09 04 33 FF | y0 50 02 FF          | On                                            |
|                       |                | y0 50 03 FF          | Off                                           |
| CAM_Nosise2DMode Inq  | 8x 09 04 50 FF | y0 50 02 FF          | Auto Noise 2D                                 |
|                       |                | y0 50 03 FF          | Manual Noise 3D                               |
| CAM_Nosise2DLevel     | 8x 09 04 53 FF | y0 50 0p FF          | Noise Reduction (2D) p: 0 to 5                |
| CAM_Noise3DLevel      | 8x 09 04 54 FF | y0 50 0p FF          | Noise Reduction (3D) p: 0 to 8                |
| CAM_FlickerModeInq    | 8x 09 04 55 FF | y0 50 0p FF          | p: Flicker Settings(0: OFF, 1: 50Hz, 2: 60Hz) |
|                       |                | y0 50 02 FF          | Auto Sharpness                                |

|                                 |                   |                                  |                                                                                                                                                                         |
|---------------------------------|-------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAM_ApertureModelInq(Sharpness) | 8x 09 04 05 FF    | y0 50 03 FF                      | Manual Sharpness                                                                                                                                                        |
| CAM_ApertureInq(Sharpness)      | 8x 09 04 42 FF    | y0 50 00 00 0p 0q FF             | pp: Aperture Gain                                                                                                                                                       |
| CAM_PictureEffectModeInq        | 8x 09 04 63 FF    | y0 50 02 FF                      | Off                                                                                                                                                                     |
|                                 |                   | y0 50 04 FF                      | B&W                                                                                                                                                                     |
| CAM_MemoryInq                   | 8x 09 04 3F FF    | y0 50 0p FF                      | p: Memory number last operated.                                                                                                                                         |
| SYS_MenuModeInq                 | 8x 09 06 06 FF    | y0 50 02 FF                      | On                                                                                                                                                                      |
|                                 |                   | y0 50 03 FF                      | Off                                                                                                                                                                     |
| CAM_LR_ReverseInq               | 8x 09 04 61 FF    | y0 50 02 FF                      | On                                                                                                                                                                      |
|                                 |                   | y0 50 03 FF                      | Off                                                                                                                                                                     |
| CAM_PictureFlipInq              | 8x 09 04 66 FF    | y0 50 02 FF                      | On                                                                                                                                                                      |
|                                 |                   | y0 50 03 FF                      | Off                                                                                                                                                                     |
| CAM_RegisterValueInq            | 8x 09 04 24 mm FF | y0 50 0p 0p ff                   | mm: Register No. (00 to FF) pp: Register Value (00 to FF)                                                                                                               |
| CAM_ColorGainInq                | 8x 09 04 49 FF    | y0 50 00 00 00 0p FF             | p: Color Gain setting 0h (60%) to Eh (200%)                                                                                                                             |
| CAM_IDInq                       | 8x 09 04 22 FF    | y0 50 0p 0q 0r 0s FF             | pqrs: Camera ID                                                                                                                                                         |
| CAM_VersionInq                  | 8x 09 00 02 FF    | y0 50 ab cd<br>mn pq rs tu vw FF | ab: Factory Code(00: VHD, 01:MR, 08:T)<br>cd: Hardware Version<br>mnpq: ARM Version<br>rstu: FPGA Version<br>vw: Camera model<br>01: C Type<br>02: M Type<br>03: S Type |
| VideoSystemInq                  | 8x 09 06 23 FF    | y0 50 00 FF                      | 1920x1080i60                                                                                                                                                            |
|                                 |                   | y0 50 01 FF                      | 1920x1080p30                                                                                                                                                            |
|                                 |                   | y0 50 02 FF                      | 1280x720p60                                                                                                                                                             |
|                                 |                   | y0 50 04 FF                      | NTSC                                                                                                                                                                    |
|                                 |                   | y0 50 05 FF                      | NTSC                                                                                                                                                                    |
|                                 |                   | y0 50 06 FF                      | NTSC                                                                                                                                                                    |
|                                 |                   | y0 50 07 FF                      | 1920x1080p60                                                                                                                                                            |
|                                 |                   | y0 50 08 FF                      | 1920x1080i50                                                                                                                                                            |
|                                 |                   | y0 50 09 FF                      | 1920x1080p25                                                                                                                                                            |
|                                 |                   | y0 50 0A FF                      | 1280x720p50                                                                                                                                                             |
|                                 |                   | y0 50 0C FF                      | PAL                                                                                                                                                                     |
|                                 |                   | y0 50 0D FF                      | PAL                                                                                                                                                                     |



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|                       |                |                                     |                                                                                        |
|-----------------------|----------------|-------------------------------------|----------------------------------------------------------------------------------------|
|                       |                | y0 50 0E FF                         | PAL                                                                                    |
| IR_Receive            | 8x 09 06 08 FF | y0 50 02 FF                         | On                                                                                     |
|                       |                | y0 50 03 FF                         | Off                                                                                    |
| Pan-tiltMaxSpeedInq   | 8x 09 06 11 FF | y0 50 ww zz FF                      | ww: Pan Max Speed<br>zz: Tilt Max Speed                                                |
| Pan-tiltPosInq        | 8x 09 06 12 FF | y0 50 0w 0w 0w 0w<br>0z 0z 0z 0z FF | www: Pan Position<br>zzzz: Tilt Position                                               |
| CAM_TypeInq           | 8x 09 00 03 FF | y0 50 01 FF                         | C Type                                                                                 |
|                       |                | y0 50 02 FF                         | M Type                                                                                 |
|                       |                | y0 50 03 FF                         | S Type                                                                                 |
| CAM_DateInq           | 8x 09 00 04 FF | y0 50 0r ss uu vv ww 0D FF          | Version dater: Big Version Numbers: Little<br>Version Numberuuuu: Yearvv: Monthww: Day |
| CAM_ModelInq          | 8x 09 04 A6 FF | y0 50 00 FF                         | Mode0                                                                                  |
|                       |                | y0 50 02 FF                         | Mode2                                                                                  |
| CAM_GainLimitInq      | 8x 09 04 2C FF | y0 50 0q FF                         | p: Gain Limit                                                                          |
| CAM_DHotPixelInq      | 8x 09 04 56 FF | y0 50 0q FF                         | p: Dynamic Hot Pixel Setting (0: Off, level 1 to 6)                                    |
| CAM_AFSensitivityInq  | 8x 09 04 58 FF | y0 50 01 FF                         | High                                                                                   |
|                       |                | y0 50 02 FF                         | Normal                                                                                 |
|                       |                | y0 50 03 FF                         | Low                                                                                    |
| CAM_BrightnessInq     | 8x 09 04 A1 FF | y0 50 00 00 0p 0q FF                | pq: Brightness Position                                                                |
| CAM_ContrastInq       | 8x 09 04 A2 FF | y0 50 00 00 0p 0q FF                | pq: Contrast Position                                                                  |
| CAM_FlipInq           | 8x 09 04 A4 FF | y0 50 00 FF                         | Off                                                                                    |
|                       |                | y0 50 01 FF                         | Flip-H                                                                                 |
|                       |                | y0 50 02 FF                         | Flip-V                                                                                 |
|                       |                | y0 50 03 FF                         | Flip-HV                                                                                |
| CAM_IridixInq         | 8x 09 04 A7 FF | y0 50 00 00 0p 0q FF                | pq: Iridix Position                                                                    |
| CAM_AFZone            | 8x 09 04 AA FF | y0 50 00 FF                         | Top                                                                                    |
|                       |                | y0 50 01 FF                         | Center                                                                                 |
|                       |                | y0 50 02 FF                         | Bottom                                                                                 |
| CAM_ColorHueInq       | 8x 09 04 4F FF | y0 50 00 00 00 0p FF                | p: Color Hue setting 0h (– 14 degrees) to Eh (+14 degrees)                             |
| CAM_AWBSensitivityInq | 8x 09 04 A9 FF | y0 50 00 FF                         | High                                                                                   |
|                       |                | y0 50 01 FF                         | Normal                                                                                 |
|                       |                | y0 50 02 FF                         | Low                                                                                    |

| Block Inquiry Command List |                   |                                                    |                                                                                                                                                                                                                        |
|----------------------------|-------------------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Command                    | Command packed    | Inquiry Packet                                     | Comments                                                                                                                                                                                                               |
| CAM_LensBlockInq           | 8x 09 7E 7E 00 FF | y0 50 0u 0u 0u 0u 00 00 0v 0v<br>0v 0v 00 0w 00 FF | uuuu: Zoom Position<br>vvvv: Focus Position<br>w.bit0: Focus Mode 1: Auto 0: Manual                                                                                                                                    |
| CAM_CameraBlockInq         | 8x 09 7E 7E 01 FF | y0 50 0p 0p 0q 0q 0r 0s tt 0u vv<br>ww 00 xx 0z FF | pp: R_Gain<br>qq: B_Gain<br>r: WB Mode<br>s: Aperture<br>tt: AE Mode<br>u.bit2: Back Light<br>u.bit1: Exposure Comp.<br>vv: Shutter Position<br>ww: Iris Position<br>xx: Bright Position<br>z: Exposure Comp. Position |
| CAM_OtherBlockInq          | 8x 09 7E 7E 02 FF | y0 50 0p 0q 00 0r 00 00 00 00<br>00 00 00 00 00 FF | p.bit0: Power 1:On, 0:Off<br>q.bit2: LR Reverse 1:On, 0:Off<br>r.bit3~0: Picture Effect Mode                                                                                                                           |
| CAM_EnlargementBlockInq    | 8x 09 7E 7E 03 FF | y0 50 00 00 00 00 00 00 0p<br>0q rr 0s 0t 0u FF    | p: AF sensitivity<br>q.bit0: Picture flip(1:On, 0:Off)<br>rr.bit6~3: Color Gain(0h(60%) to Eh(200%))<br>s: Flip(0: Off, 1:Flip-H, 2:Flip-V, 3:Flip-HV)<br>t.bit2~0: NR2D Level<br>u: Gain Limit                        |

**Note:**

The [x] in the above table is the camera address, [y] = [x + 8].

## Pelco-D Protocol Command List

| Function                     | Byte1 | Byte2   | Byte3 | Byte4 | Byte5           | Byte6          | Byte7 |
|------------------------------|-------|---------|-------|-------|-----------------|----------------|-------|
| Up                           | 0xFF  | Address | 0x00  | 0x08  | Pan Speed       | Tilt Speed     | SUM   |
| Down                         | 0xFF  | Address | 0x00  | 0x10  | Pan Speed       | Tilt Speed     | SUM   |
| Left                         | 0xFF  | Address | 0x00  | 0x04  | Pan Speed       | Tilt Speed     | SUM   |
| Right                        | 0xFF  | Address | 0x00  | 0x02  | Pan Speed       | Tilt Speed     | SUM   |
| 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   |
| Clear Preset                 | 0xFF  | Address | 0x00  | 0x05  | 0x00            | Preset ID      | SUM   |
| Call Preset                  | 0xFF  | Address | 0x00  | 0x07  | 0x00            | Preset ID      | SUM   |
| Auto Focus                   | 0xFF  | Address | 0x00  | 0x2B  | 0x00            | 0x01           | SUM   |
| Manual Focus                 | 0xFF  | Address | 0x00  | 0x2B  | 0x00            | 0x02           | 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 Command List

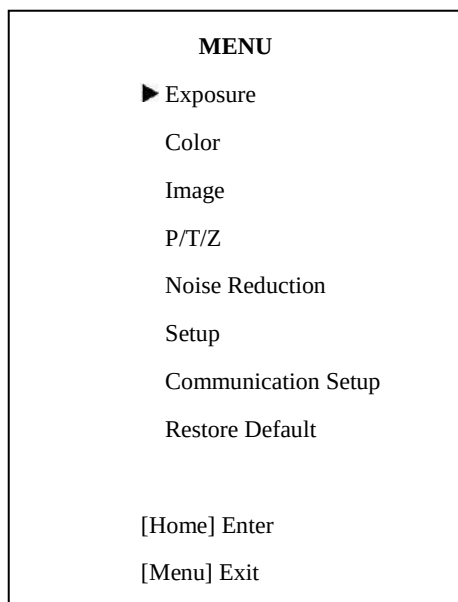
| Function                     | Byte1 | Byte2   | Byte3 | Byte4 | Byte5           | Byte6          | Byte7 | Byte8 |
|------------------------------|-------|---------|-------|-------|-----------------|----------------|-------|-------|
| Up                           | 0xA0  | Address | 0x00  | 0x08  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| Down                         | 0xA0  | Address | 0x00  | 0x10  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| Left                         | 0xA0  | Address | 0x00  | 0x04  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| Right                        | 0xA0  | Address | 0x00  | 0x02  | Pan Speed       | Tilt Speed     | 0xAF  | XOR   |
| 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   |
| 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   |
| Auto Focus                   | 0xA0  | Address | 0x00  | 0x2B  | 0x00            | 0x01           | 0xAF  | XOR   |
| Manual Focus                 | 0xA0  | Address | 0x00  | 0x2B  | 0x00            | 0x02           | 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   |



## Menu Settings

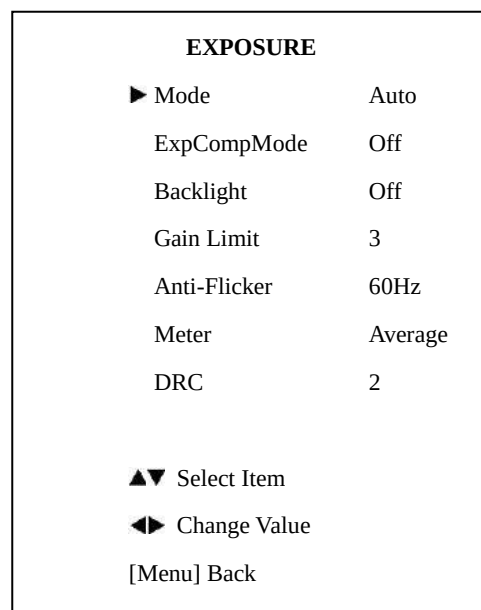
### 1. MENU

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



### 2. EXPOSURE

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



**Mode:** Exposure mode, optional items: Auto, Manual, SAE, AAE, Bright.

**ExpCompMode:** Exposure compensation mode, optional items: On, Off (Effective only in Auto mode).

**ExpComp:** Exposure compensation value, optional items: -7~7 (Effective only in ExpCompMode item to On).

**Backlight:** Set the backlight compensation, optional items: On, Off (Effective only in Auto mode).

**Bright:** Intensity control, optional items: 00~17 (Effective only in Bright mode).

**Gain Limit:** Maximum gain limit, optional items: 0 ~ 15 (Effective only in Auto, AAE, Bright mode).

**Anti-Flicker:** Anti-flicker, optional items: Off, 50Hz, 60Hz (Effective only in Auto, Bright mode).

**Meter:** optional items: Average, Center, Bottom, Top.

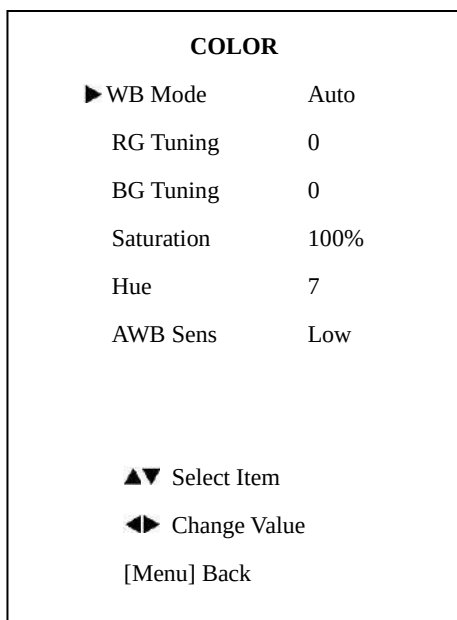
**Iris:** Aperture value, optional items: F1.8, F2.0, F2.4, F2.8, F3.4, F4.0, F4.8, F5.6, F6.8, F8.0, F9.6, F11.0, Close (Effective only in Manual, AAE mode).

**Shutt:** Shutter value, optional items: 1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000 (Effective only in Manual, SAE mode).

**DRC:** DRC strength, optional items: 0 ~ 8.

### 3. COLOR

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



**WB-Mode:** White balance mode. optional items: Auto, Indoor, Outdoor, One Push, Manual, VAR.

**RG:** Red gain, optional items: 0~255 (Effective only in Manual mode).

**BG:** Blue gain, optional items: 0~255 (Effective only in Manual mode).

**colortemp:** Optional items: 2500K ~ 8000K (Effective only in VAR mode).

**RG Tuning:** Red gain fine-tuning, optional items: -10 ~ +10 (Effective only in AWB sens is Low).

**BG Tuning:** Blue gain fine-tuning, optional items: -10 ~ +10 (Effective only in AWB sens is Low).

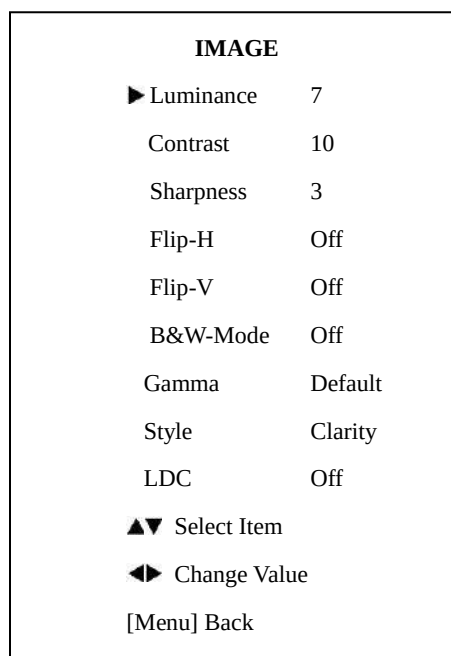
**Saturation:** optional items: 60% ~ 200%.

**Hue:** Chroma adjustment, optional items: 0 ~ 14.

**AWB Sens:** The white balance sensitivity, optional items: Low, Normal, High.

### 4. IMAGE

Move the cursor to the Image item in the main menu and press [HOME] button, IMAGE menu appears, as shown in the following figure.



**Luminance:** Brightness adjustment, optional items: 0 ~ 14.

**Contrast:** Contrast adjustment, optional items: 0 ~ 14.

**Sharpness:** Sharpness adjustment, optional items: Auto, 0 ~ 15.

**Flip-H:** Image flipped horizontally, optional items: On, Off.

**Flip-V:** Image Flip Vertical, optional items: On, Off.

**B&W Mode:** Optional items: On, Off.

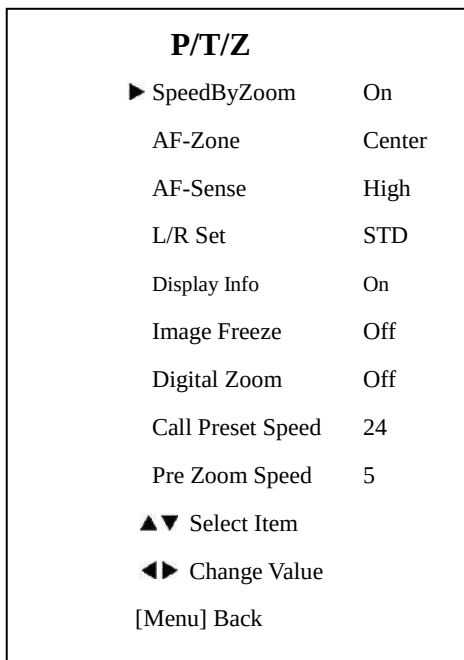
**Gamma:** Optional items: Default, 0.45, 0.5, 0.56, 0.63.

**Style:** Optional items: Norm, Clarity, Clarity (LED), Bright, Soft, 5S.

**LDC:** Optional items: Off, On.

## 5. P/T/Z

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



**SpeedByZoom:** The depth of field scale switch, optional items: On, Off.

**AF-Zone:** Interested in focusing area, optional items: Top, Center, Bottom.

**AF-Sense:** Automatic focusing sensitivity options, optional items: Low, Normal, High.

**L/R Set:** Optional items: STD, REV.

**Display Info:** Optional items: On, Off.

**Image Freeze:** Optional items: On, Off.

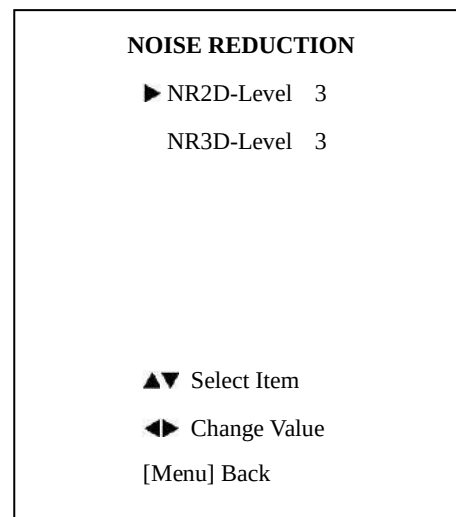
**Digital Zoom:** Optional items: Off, 2x, 4x, 8x, 16x.

**Call Preset Speed:** Optional items: 1 ~ 24.

**Pre Zoom Speed:** Optional items: 0 ~ 7.

## 6. NOISE REDUCTION

Move the main menu cursor to [NOISE REDUCTION], and press [HOME] key enter the noise reduction page, as shown in the following figure.

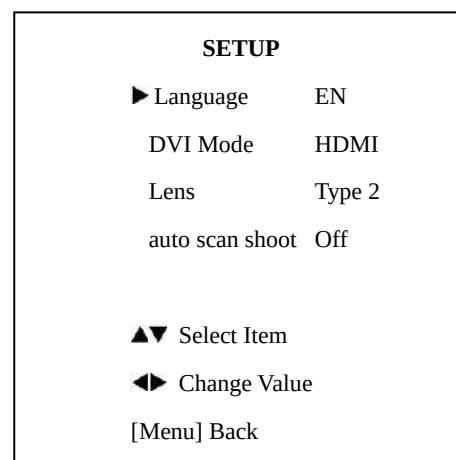


**NR2D Level:** 2D noise reduction, optional items: Off, Auto, 1 ~ 5.

**NR3D Level:** 3D noise reduction, optional items: Off, 1 ~ 8.

## 7. SETUP

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



**Language:** Optional items: EN, Chinese, Russian.

**DVI Mode:** Optional items: DVI, HDMI.

**Lens:** Optional items: Type1, Type2.

**auto scan shoot:** Optional items: On, Off.

## 8. COMMUNICATION SETUP

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

| COMMUNICATION SETUP |        |
|---------------------|--------|
| ►Protocol           | VISCA  |
| V_Address           | 1      |
| V_AddrFix           | Off    |
| Net Mode            | Serial |
| Baudrate            | 9600   |
| ▲▼ Select Item      |        |
| ◀▶ Change Value     |        |
| [Menu] Back         |        |

**Protocol:** Control protocol type, optional items: AUTO, VISCA, PELCO-D, PELCO-P.

**V\_Address:** Optional items: 1 ~ 7.

**P\_D\_Address:** Optional items: 0 ~ 254. (Effective only in PELCO-D protocol).

**P\_P\_Address:** Optional items: 0 ~ 31. (Effective only in PELCO-P protocol).

**V\_AddrFix:** If you can change through the serial port of infrared switch, optional items: On, Off (When set to On, useless in 88 30 01 FF Command).

**Net Mode:** Set the serial port control networking, optional items: Serial, Paral.

**Baudrate:** Serial port baud rate, optional items: 2400, 4800, 9600, 38400.

## 9. RESTORE DEFAULT

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

| RESTORE DEFAULT |    |
|-----------------|----|
| ►Restore?       | No |
| ◀▶Change Value  |    |
| [Home] OK       |    |
| [Menu] Back     |    |

**Restore:** Confirm restore factory settings, optional items: Yes, No.

Note: Press [HOME] button to confirm, all parameter restore default, include IR Remote address and VISICA address.

## Network Connection

### 1. Operating Environment

Operating System: Windows 2000/2003/XP/Vista/7/8.1/10

Network Protocol: TCP/IP

Client PC: P4/128M RAM/40GHD/ support for scaled graphics card, support for DirectX8.0 or more advanced version.

### 2. Equipment Installation

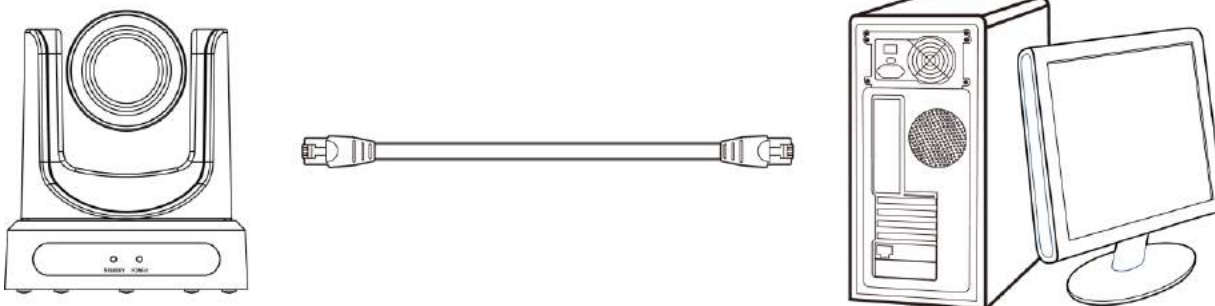
1) Connect camera to your network via a CAT5 or CAT6 patch cable or directly to your PC via a CAT5 or CAT6 cross over cable.

2) Turn on camera power.

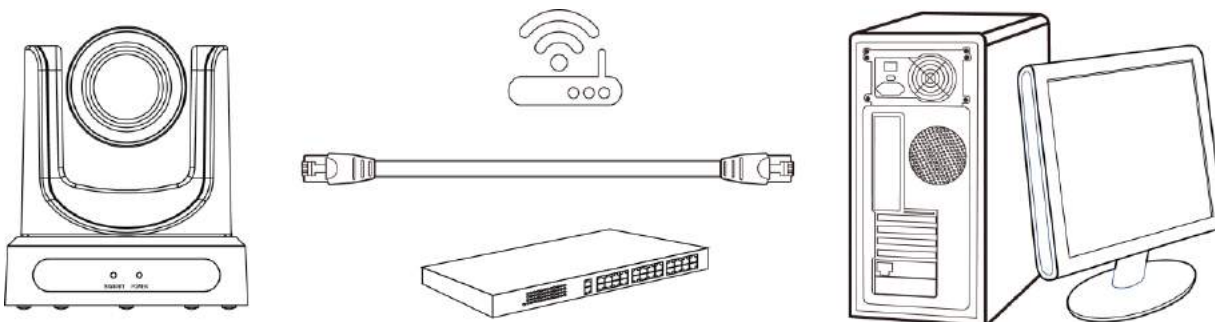
3) If successful, the orange network light will illuminate and the green light will start flashing. If unsuccessful, the patch cable is bad, you are using the wrong cable (patch aka “straight-thru” cable for connection through a LAN; crossover for a direct PC connection) or you have connected to an inactive network jack.

### 3. Network Connection

Connection method between network camera and computer, as in pictures 1.1 and 1.2, below:



**Picture 1.1 Direct connections via “cross-over” network cable**

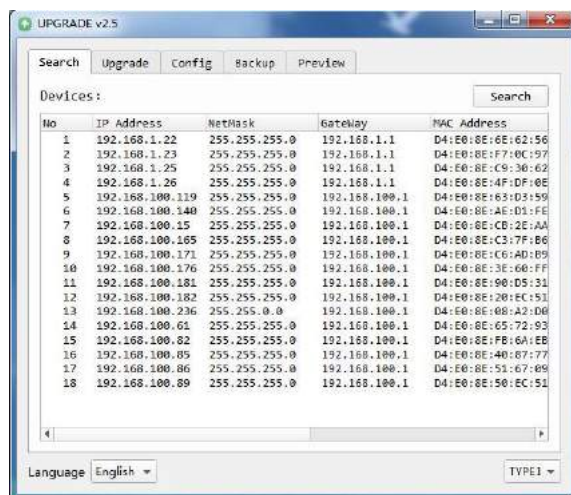


**Picture 1.2 Connections to LAN via patch cable to LAN wall jack or LAN switch**

## Setting up a Network Video Stream with the PTZ Optics Camera

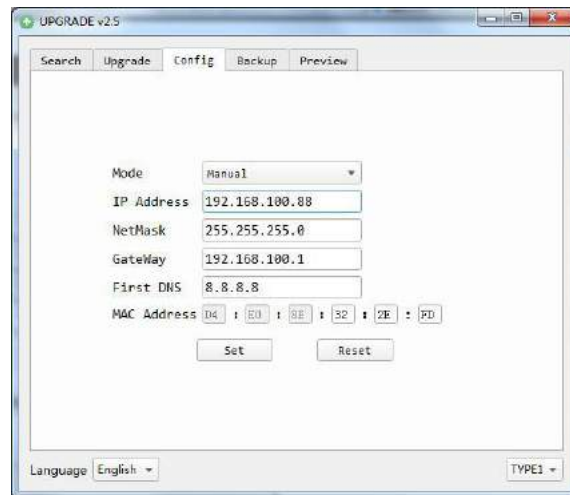
(Also see information on “Camera Web Interface” in the following section)

1. The first thing you are going to want to do to get your camera up and streaming on your network is to connect your camera to power, to an active network port on your network and finally to power the camera on.
2. Next, go online and download the IP address setting tool, for Windows Operating Systems, from the [PTZOptics Download Page](#).
3. Once you complete the installation and launch the tool “UPGRADE v2.6C” you should be able to click the “Search” button to locate all of the available PTZ Optics cameras on your network.



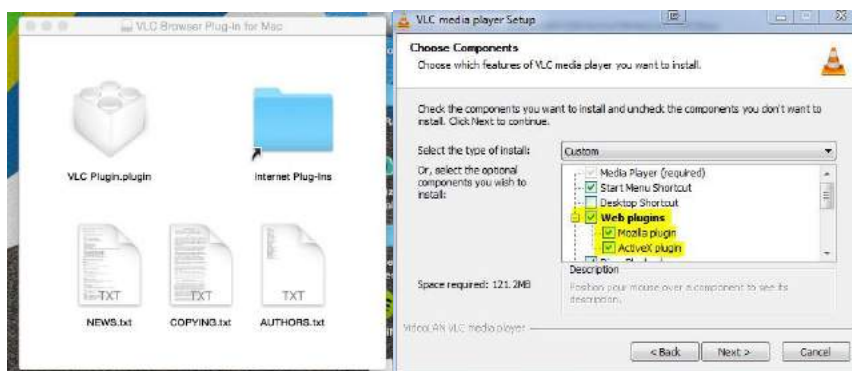
4. The next thing you would want to do is change your cameras IP address to be in the same range as your network. The camera comes with a default static IP address of 192.168.100.88. You will need to update that to be in the same range as your network. If you look at my example above, you can see, from other cameras on my network, that my network is set up to be in the range of 192.168.111.XXX. *Please see the “Extras” information at the end of this section for further information on identifying your network IP scheme*
5. Once you know your IP range you can right click on the camera you wish to change the IP address for and select “config” to enter the appropriate network information. *NOTE: if you need to find the IP range of your network, you can do so by following the guide in the “Extras” information at the end of this section.*





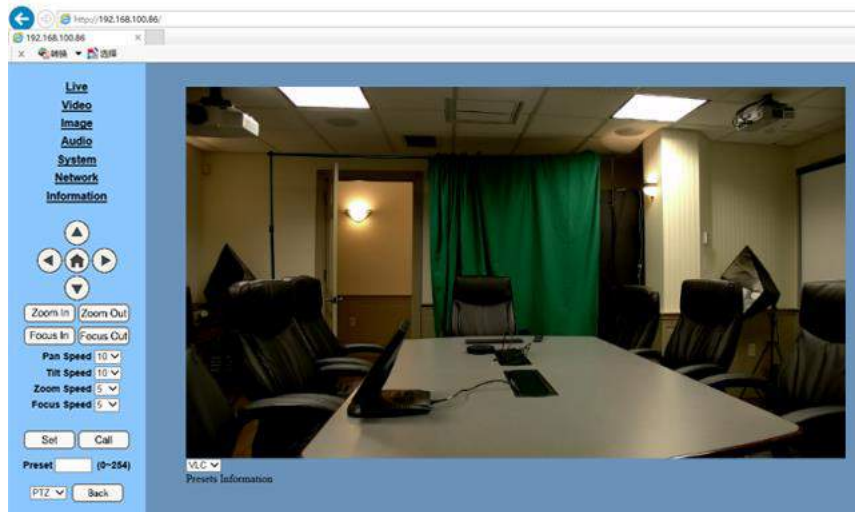
(Note that in more complex network environments you may have to request a “Static IP” from the IT department to prevent any possible network complications in addition to the “Static IP” you will likely need an appropriate Network Mask, Default Gateway and First DNS)

6. Now that you have set the Static IP address of your PTZ Optics camera, you should be able to pull up the video feed in a web browser. *We recommend using Mozilla Firefox ESR. You can view our [knowledge base article](#) for detailed setup instructions.*
7. If you follow the steps in the knowledge base article above and type in the Static IP address you assigned to your camera, in step 4, you will be prompted for a Username and Password, by default both are “admin”.
8. You may be prompted to download the VLC Player Plugin; be sure to allow for both the Mozilla plugin and the ActiveX plugin if on a PC. If you are on a MAC, you need to move the VLC plugin, once downloaded, into the internet plugins folder. See the images below, or refer to our [knowledge base article](#), for further clarification.

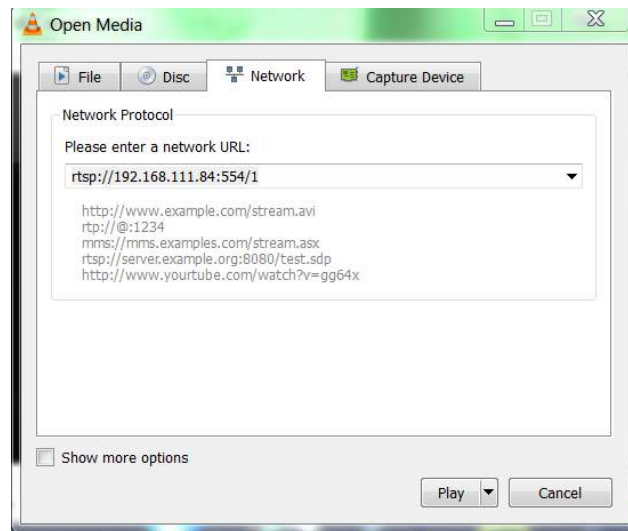


9. You should now be able to see the IP interface in the browser of your live camera feed. You should have full P/T/Z control over your camera using the P/T/Z controls on the left side. You can adjust many of your cameras settings via this IP interface.

*The main thing to note about the IP interface is that all presets set in the IP interface will not be the same as the IR remote presets and vice-versa.*



10. You should now be able to receive an RTSP stream from your camera. The following video, <https://www.youtube.com/watch?v=hmql0hjT0UI&feature=youtu.be>, shows how to setup an RTSP stream in Wirecast as an example. You'll see how to use ONVIF to easily set up two (2) PTZ Optics cameras with Wirecast, note that the ONVIF feature must be enabled in the "Network" settings for ONVIF discovery to work properly.
11. You can test the RTSP stream in VLC media player. Once you install VLC and launch the program you should be able to go to the "Media" drop down menu and then select "Open Network Stream". In the network URL, you should enter "rtsp://<camera-ip-address>:554/1". In the example below, for a PTZ Optics camera with the static IP address of 192.168.111.84, the RTSP stream would be accessed by entering rtsp://192.168.111.84:554/1. The "554" part is the port number used by the cameras, and the "1" is the stream number. (There are two RTSP network streams available; one for HD content "1" and one for SD content "2").





## EXTRAS

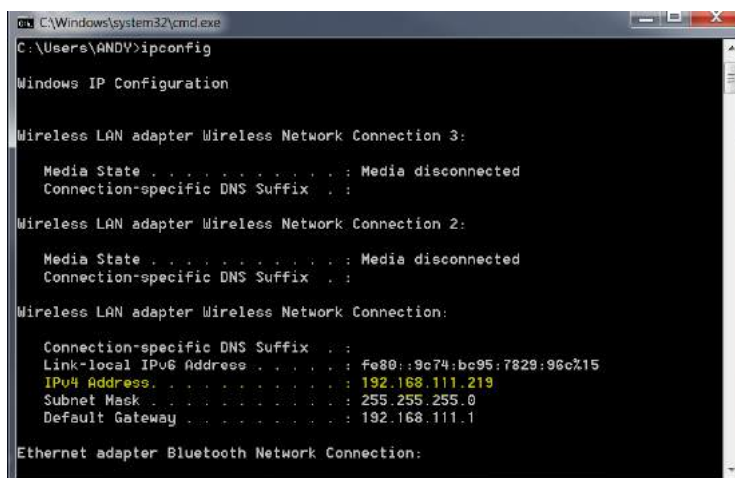
**Discovering your Network IP range.** *NOTE: Changing your IP address without talking to your network admin could lead to conflicts with your network. If you change your address to one that is already in use it will cause communication problems.*

If you need to discover the IP address range of your network you can do so by using command prompt for Windows or Terminal for Macs.

To do this on a PC, you would type “CMD” into your search bar in the Windows menu. You should see a black box pop up with the ability to type in the box.

If you type “ipconfig” and hit “Enter” on your keyboard you will see a bunch of information pop up in your command prompt.

When you see “IPV4 Address” that is your computers IP address on your current network. So you would use the first 3 sets of numbers from this as your IP range.



```
C:\Windows\system32\cmd.exe
C:\Users\ANDY>ipconfig

Windows IP Configuration

Wireless LAN adapter Wireless Network Connection 3:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . :

Wireless LAN adapter Wireless Network Connection 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . :

Wireless LAN adapter Wireless Network Connection:

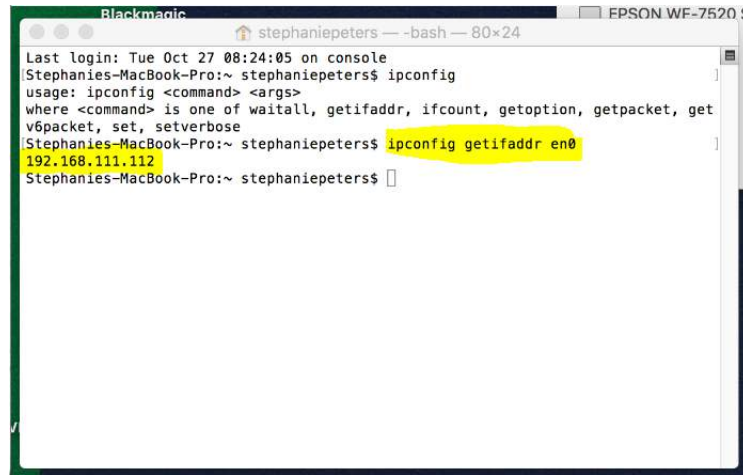
    Connection-specific DNS Suffix . . :
    Link-local IPv6 Address . . . . . : fe80::9c74:bc95:7829:96c%15
    IPv4 Address. . . . . : 192.168.111.219
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.111.1

Ethernet adapter Bluetooth Network Connection:
```

If you need to find the IP range of your MAC computer, you would first open a new finder window and then go to Applications, and then Utilities. You should see the program “Terminal” in that menu, select that program.

Now, you would type in “IP config get if addr en0” Once you type this string and click “Enter” on your keyboard you will receive back an IP address.

So the IP range of my network, according to my MAC is 192.168.111.xxx, you can use this to figure out the IP range in which your camera needs to be set.

A terminal window titled 'Blackmagic' with a user 'stephaniepeters' at a prompt. The command 'ipconfig' has been entered, and the output shows the IP address '192.168.111.112' for the 'en0' interface. The text '192.168.111.112' and 'ipconfig getifaddr en0' are highlighted in yellow.

```
Blackmagic
stephaniepeters ~ -bash — 80x24
Last login: Tue Oct 27 08:24:05 on console
Stephanies-MacBook-Pro:~ stephaniepeters$ ipconfig
usage: ipconfig <command> <args>
where <command> is one of waitall, getifaddr, ifcount, getoption, getpacket, get
v6packet, set, setverbose
Stephanies-MacBook-Pro:~ stephaniepeters$ ipconfig getifaddr en0
192.168.111.112
Stephanies-MacBook-Pro:~ stephaniepeters$
```

## Camera Web Interface

### 1 Homepage introduction

#### 1.1 Home Page

All pages include two (2) areas:

On the left is the menu and camera control

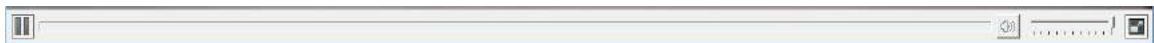
On the right is real time monitoring - displaying a live video image and the available settings

#### 1.2 Live Video viewing window

Click “**Live**” in the menu area. The video viewing window will be resized based upon video resolution, the higher the resolution is, the bigger the playing area is. Double click the viewing window and it will show in full-screen.

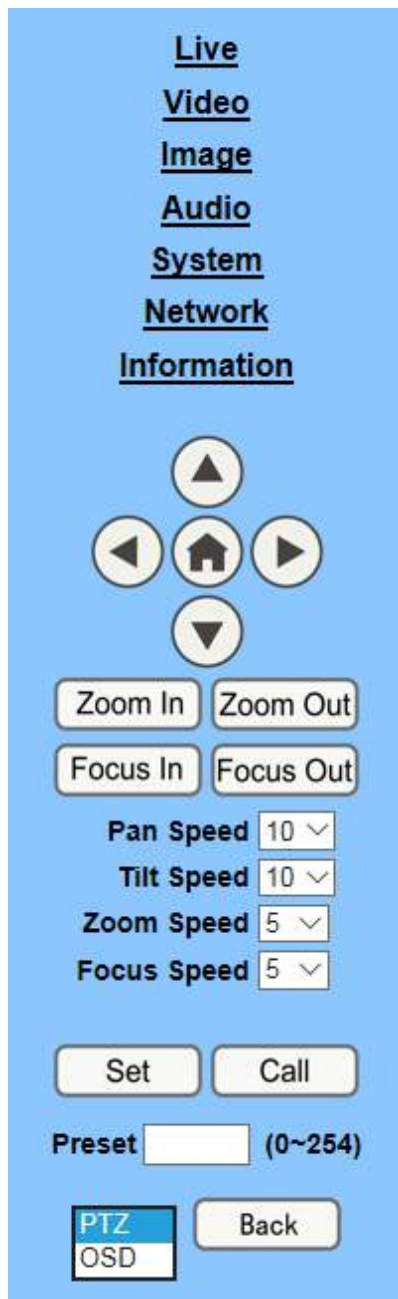
Double click again, and it will return to the initial size.

The Status bar in the viewing window is as shown below:



- 1) Video playback/pause button: controls real-time video. Pause to freeze the image, play to return to live video.
- 2) Audio control buttons: Mute and Volume controls for audio input on camera, if being used.
- 3) Full screen button will switch between Full Screen and Windowed view.

### 1.3 PTZ Control



1) Pan and Tilt control: Up, Down, Left and Right arrows and the home button allow you to manually drive the camera to the desired position.

2) Zoom: Zoom In and Zoom Out buttons allow for wide or narrow (tele) view of the space.

3) Focus: Focus In and Focus Out buttons allow for fine manual focus adjustment if the camera has any problems auto focusing on a difficult object.

4) PTZ Speeds: Pan speed can be set at any rate between 1 - 24, Tilt speed can be set at any rate between 1 - 20.

Zoom and Focus speeds can be set at any rate between 0 – 7.

5) PTZ Presets: After manually setting up a shot that you would like to return to later, you can save presets for quick recall of these positions. Type a number between 0 and 254 into the Preset box.

Click the "Set" button to save the current location with that preset number. Click the "Call" button to cause the camera to return to that position. This enables smooth, quick and convenient control without the need to manually drive the camera.

6) PTZ/OSD dropdown: From the dropdown menu, clicking the OSD option will open the on-screen display menu of the camera giving you control from within the IP interface.

## 1.4 Language selection

Language English ▾

Click either “Russian”, “Chinese” or “English” to change the language of the menu.

# 1 Media

## 1.1 Video Setup

Click "Video". The streaming parameters may now be set in the right side area. The camera can send two (2) simultaneous streams. For example, you can send one stream in HD and one in SD so that both PCs and phones may have their own compatible stream resolution.

**Video Settings**

720p120: ☐ On ☒ Off

Video Format:

Encode Level:

NDI Mode:

**First stream**

Encode Protocol:

Resolution:

Bit Rate:  (32~20480) kbps

Frame Rate:  fps

I Key Frame Interval:  (2~150)

Bit Rate Control: ☒ CBR ☐ VBR

Fluctuate Level:

Slice Split Enable: ☐ On ☒ Off

Split Mode: ☒ Fixed blocks ☐ Fixed bytes

Slice Size:  blocks/bytes

**Second stream**

Encode Protocol:

Resolution:

Bit Rate:  (32~6144) kbps

Frame Rate:  fps

I Key Frame Interval:  (2~150)

Bit Rate Control: ☒ CBR ☐ VBR

Fluctuate Level:

Slice Split Enable: ☐ On ☒ Off

Split Mode: ☒ Fixed blocks ☐ Fixed bytes

Slice Size:  blocks/bytes

**1) 720p120**

Turn On/Off 720p120 function.

**2) Video Format**

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

**3) Encode Level**

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

**4) NDI Mode**

Support Off, High, Medium and Low four mode.

**5) Encode Protocol**

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

**6) Resolution**

First stream support 1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360, second stream support 1280x720, 1024x576, 720x576, 720x408, 640x360, 480x270, 320x240, 320x180, the bigger resolution is, the clearer the image will be, more network bandwidth will be taken.

**7) Bit Rate**

User can assign bit flow/stream, normally speaking, the bigger bit flow is, the clearer the image will be. The bit allocation must combine with network bandwidth, when the network bandwidth is too narrow and the allocated bit flow is too big, will cause video signal flow not to be transmitted normally, the video effect will be worse.

**8) Frame Rate**

User can specify the size of the frame rate, generally, the frame rate greater, the image more smooth; Frame rate is smaller, the more sense of beating.

**9) I Key Frame Interval**

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

**10) Bit Rate Control**

Code stream control way:

Constant bit rate: video coder will be coding according to preset speed.

Variable bit rate: video coder will adjust the speed based on preset speed to gain the best image quality.

**11) Fluctuate Level**

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

**12) Slice Split Enable**

Enable or disable slice split function.

**13) Split Mode**

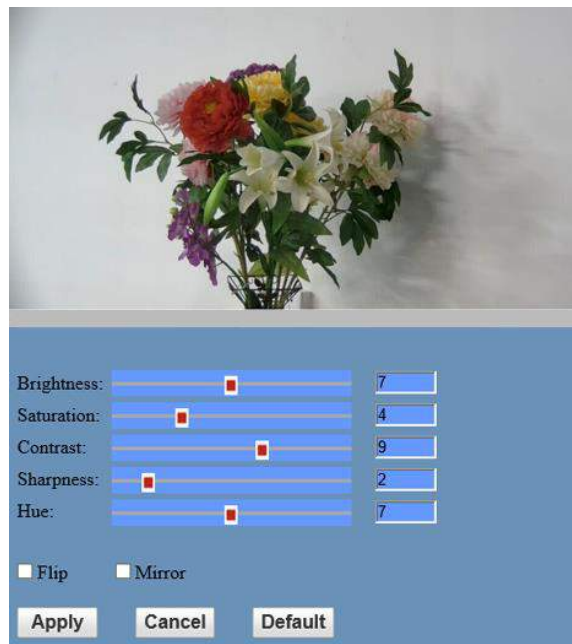
Select split mode, optional items: Fixed blocks, Fixed bytes.

**14) Slice Size**

Set the size of slice.

**1.2 Image Setup** *(Note that changes here will impact your OSD settings)*

Click “Image”. The image parameters may now be set in the right-side area.



**1) Brightness**

Image bright 0~14, slider control, on the right shows the corresponding numerical. Default value is 7.

**2) Saturation**

Saturation 0~14, slider control, on the right shows the corresponding numerical. Default value is 4.

**3) Contrast**

Contrast 0~14, slider control, on the right shows the corresponding numerical. Default value is 9.

**4) Sharpness**

Sharpness 0~15, slider control, on the right shows the corresponding numerical. Default value is 2.

**5) Hue**

Hue 0~14, slider control, on the right shows the corresponding numerical. Default value is 7.

**6) Flip & Mirror**

Tick Flip to realize image upside down, tick mirror to realize image around the mirror.

Default value is not tick.

### 1.3 Audio Setup

Click “Audio”. The audio parameters may now be set in the right-side area.

**Audio Settings**

Audio Switch: On ▾

Audio Type: AAC ▾

Sample Rate: 48K ▾

Bit Rate: 96K ▾

Input Type: Line in ▾

Input Vol L : 8 (-97~30) db

Input Vol R : 8 (-97~30) db

ADTS Options: Off ▾

Apply Cancel

**1) Audio Switch**

Turn On/Off audio switch.

**2) Audio Type**

Audio type AAC.

**3) Sample Rate**

Sample rate 44.1 K and 48 K selectable.

**4) Bit Rate**

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

**5) Input Type**

Input type line in.

**6) Input VolL**

The volume of the left channel.

**7) Input VolR**

The volume of the right channel.

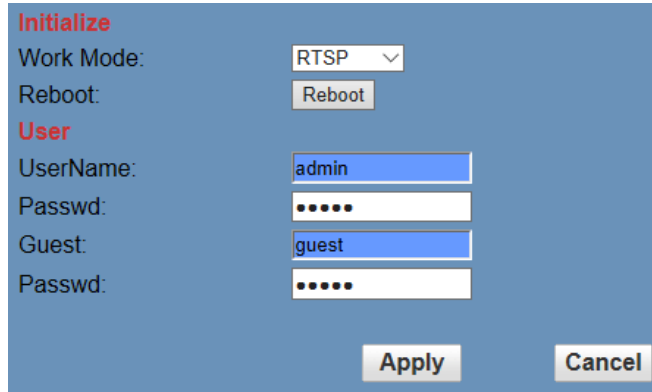
**8) ADTS Options**

Optional items: On, Off.



## 1.4 System Settings

Click “System”. The system parameters may now be set in the right-side area.



The image shows a 'System Settings' dialog box with a blue background. It is divided into two sections: 'Initialize' and 'User'. Under 'Initialize', there is a 'Work Mode' dropdown menu set to 'RTSP' and a 'Reboot' button. Under 'User', there are four input fields: 'UserName' (containing 'admin'), 'Passwd' (containing five dots), 'Guest' (containing 'guest'), and another 'Passwd' (containing five dots). At the bottom right, there are 'Apply' and 'Cancel' buttons.

### 1) Work Mode

Work Mode is RTSP.

### 2) Reboot

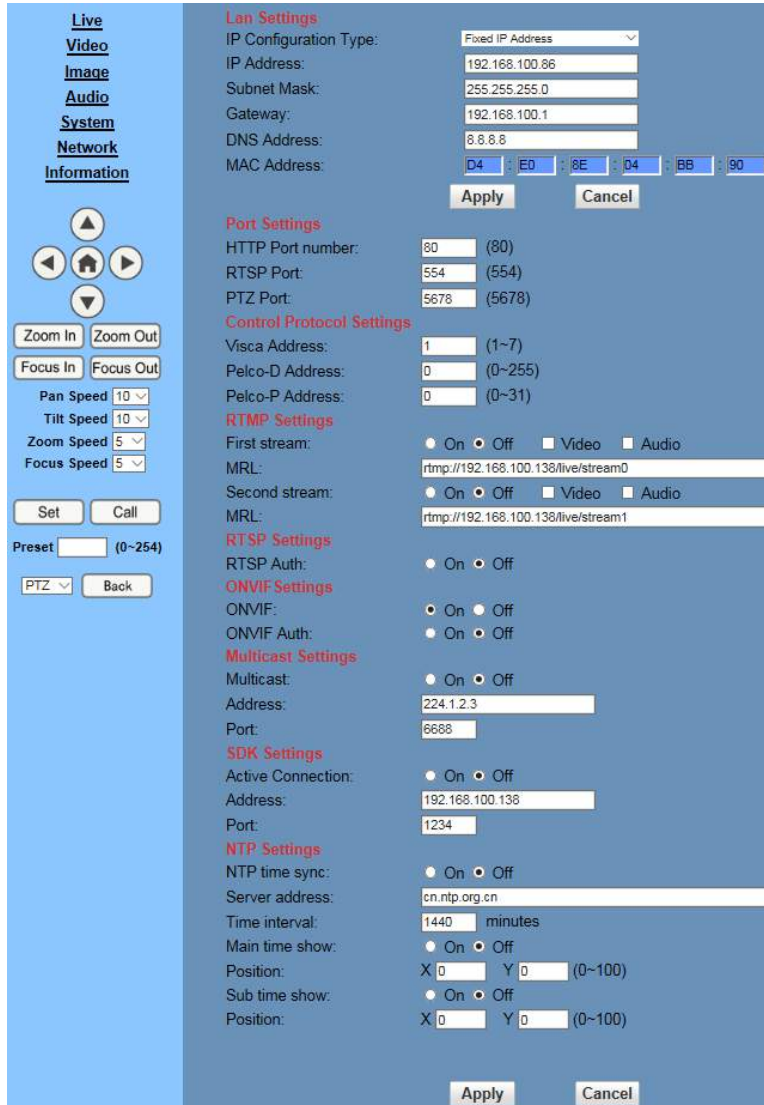
Click the “Reboot” button, system restart.

### 3) Username and password

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

## 1.5 Network Settings

Click “Network”. The network parameters may now be set in the right side area.



The screenshot shows the PTZ OPTICS web interface. On the left is a navigation menu with tabs: Live, Video, Image, Audio, System, Network, and Information. Below these are navigation buttons (up, down, left, right, home) and zoom/focus controls (Zoom In, Zoom Out, Focus In, Focus Out). There are also speed sliders for Pan, Tilt, Zoom, and Focus, and buttons for Set, Call, Preset, PTZ, and Back.

The main content area is divided into several sections:

- Lan Settings:** IP Configuration Type (Fixed IP Address), IP Address (192.168.100.88), Subnet Mask (255.255.255.0), Gateway (192.168.100.1), DNS Address (8.8.8.8), and MAC Address (D4 : ED : 8E : D4 : B6 : 90). Buttons: Apply, Cancel.
- Port Settings:** HTTP Port number (80), RTSP Port (554), and PTZ Port (5678). Buttons: Apply, Cancel.
- Control Protocol Settings:**
  - Visca Address (1)
  - Pelco-D Address (0)
  - Pelco-P Address (0)
- RTMP Settings:** First stream and Second stream settings with On/Off radio buttons and checkboxes for Video and Audio. MRLs are provided for each.
- RTSP Settings:** RTSP Auth (On/Off).
- ONVIF Settings:** ONVIF (On/Off) and ONVIF Auth (On/Off).
- Multicast Settings:** Multicast (On/Off), Address (224.1.2.3), and Port (6688).
- SDK Settings:** Active Connection (On/Off), Address (192.168.100.138), and Port (1234).
- NTP Settings:** NTP time sync (On/Off), Server address (cn.ntp.org.cn), Time interval (1440 minutes), Main time show (On/Off), and Position settings for both main and sub time shows.

Buttons: Apply, Cancel.

### 1) Lan Settings

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

### 2) Port Settings

While the IP address identifies the device, the camera uses multiple ports for different functions.

**HTTP Port:** This is the port for the web application (the default http port: 80)

**RTSP Port:** The camera supports the RTSP streaming protocol. The default port: 554.

**PTZ Port:** Supports camera control via the TCP protocol. The default port: 5678.

### 3) Control Protocol Settings

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

**4) RTMP Settings**

Setting the camera stream, can set up two stream, in the two stream selection control code stream of “On”, “Off”, “Video”, “Audio”, etc.

**5) RTSP Settings**

Turn On/Off RTSP auth.

**6) ONVIF Settings**

Turn On/Off ONVIF and ONVIF auth.

**7) Multicast Settings**

Turn On/Off multicast. Setting multicast address (default value is 224.1.2.3) and port (default value is 6688).

**8) SDK Settings**

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

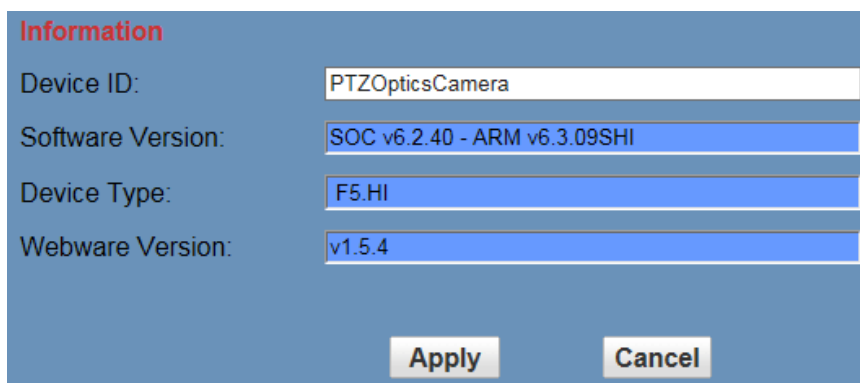
**9) NTP Settings**

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

## 1.6 Device Information

Click “Information”

Shows the current device information, as shown below. You may change the device ID as required for your application.



The screenshot shows a blue-themed dialog box titled "Information" in red text. It contains four rows of labels and values:

|                   |                              |
|-------------------|------------------------------|
| Device ID:        | PTZOpticsCamera              |
| Software Version: | SOC v6.2.40 - ARM v6.3.09SHI |
| Device Type:      | F5.HI                        |
| Webware Version:  | v1.5.4                       |

At the bottom right of the dialog box are two buttons: "Apply" and "Cancel".

## Maintenance and Troubleshooting

### Camera Maintenance

- If the camera will not be used for a long time, please turn off the power switch.
- Use a soft cloth or lotion-free tissue to clean the camera body.
- Use a soft dry lint-free cloth to clean the lens. If the camera is very dirty, clean it with a diluted neutral detergent. Do not use any type of solvent or harsh detergent, which may damage the surface.

### Unqualified Applications

- Do not shoot extremely bright objects for a long period of time, such as sunlight, ultra-bright light sources, etc...
- Do not operate in unstable lighting conditions, otherwise the image may flicker.
- Do not operate close to powerful electromagnetic radiation, such as TV or radio transmitters, etc...

### Troubleshooting

- No image
  1. Check whether the power cord is connected, voltage is OK, POWER lamp is lit.
  2. Check whether the camera can “self-test” after startup (camera will do a brief pan-tilt tour and return to the home position, or if preset 0 is set, the camera will return to the preset 0 position).
  3. Check the BOTTOM dip switch and make sure the two dip switches are both set OFF. These switches are not used in operating mode.
  4. Check that the HDMI cable is connected correctly.
    1. If HDMI, make sure that the destination device is accessing the HDMI port that you plugged into.
    2. If SDI, make sure that the destination device is accessing the SDI port that you plugged into.
- Abnormal display of image
  1. Check setting of rotary dial on rear of camera. Be sure to use a resolution and refresh rate that is supported by your software.
- Image is shaky or vibrating.
  1. Check whether camera is mounted solidly or sitting on a steady horizontal and level surface.
  2. Check the building and any supporting furniture for vibration. Ceiling mounts are often affected by building vibration more than wall mounts.
  3. Any external vibration that is affecting the camera will be more apparent when in tele zoom (zoomed in) settings.

## Control

- IR remote controller does not control the camera
  1. Does one of the 4 “Camera Select” buttons (top row of remote) light up when you press any button on the remote?  
If not, change the batteries in the remote.
  2. Are the camera and remote set to the same IR address? You can use press [\*] + [#] + [1] (3 buttons in sequence) on the remote to set the camera to address 1. Press “Camera Select” 1 on the remote to control the camera.
  3. Try removing other sources of IR interference (e.g. sunlight, fluorescent lighting).
- Serial communication does not control the camera
  1. Make sure the camera is on and functioning with the IR remote control.
  2. Verify that the RS232 cable is connected correctly and using the proper pinout.
  3. Verify the communication settings of the control software or device (e.g. joystick).
  4. Verify that the communication port on the controlling device is activated (e.g. Com port on PC).
  5. Verify that all communication settings in the OSD Setup Menu correlate to the commands being used (e.g. VISCA address).

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