

# **PTZOptics 12X NDI<sup>®</sup>|HX ZCAM**



## **User Manual**

**Model No: PT12X-NDI-ZCAM**

**V1.4.1**

**(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.

## Warranty

PTZOptics includes a limited parts & labor warranty for all PTZOptics manufactured cameras. Warranty lengths are shown below. The warranty is valid only if PTZOptics receives proper notice of such defects during the warranty period. PTZOptics, at its option, will repair or replace products that prove to be defective. PTZOptics manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry standard practices.

| Serial Number        | Warranty        |
|----------------------|-----------------|
| VE1231999 and before | 3 year warranty |
| VF0101001 and after  | 5 year warranty |





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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
- PoE Splitter\* ..... 1
- Quick Start Guide..... 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 1A.

Polarity of the power supply plug is critical and is detailed in the image below.



### ● Handling

- Avoid any stress, vibration, or moisture during transportation, storage, installation and operation.
- Do not expose camera to any corrosive solid, liquid, or gas to avoid damage to the casing or components.
- Never power camera on before installation is complete.

### ● Do not dismantle the camera

- The manufacturer is not responsible for any unauthorized modification or dismantling.

\*PoE Splitters are included with serial numbers vg02250001 and beyond.

## Features

- Image Sensor
  - Panasonic 1/2.7" HD CMOS sensor
  - Full HD 1920x1080p resolution up to 60 frames per second (3G-SDI)
  - 2D & 3D noise reduction with our latest "low noise CMOS sensor"
  - 0.05 Lux @ F1.8 AGC ON
  - 72.5° Field of View
  - Dynamic Range Control (DRC) for higher image quality and detail across simultaneously well lit and shadowed scenes
- Video Outputs
  - Simultaneous NDI® | HX / IP network streaming and 3G-SDI output capabilities
  - NDI® | HX High Definition video output up to 30 frames per second
  - 3G-SDI High Definition video output up to 60 frames per second
  - RTSP, RTMP, & RTMPS streaming using H.264, H.265, & MJPEG
  - Support for line level microphone encoding over NDI® | HX & IP network stream. Uses AAC audio encoding for better sound quality and lower bandwidth usage.
- Control and Settings
  - PTZOptics VISCA over IP
  - NDI® | HX control through NDI® approved platforms that offer control.
  - RS485 remote camera control interface
  - Web-based IP remote control interface
  - Button controls on back of camera
    - Press in the Menu Navigation button to open the On Screen Display (OSD) menu.
    - Press in the Menu Navigation button to select an option within the OSD menu.
    - Press up/down/left/right on the Menu Navigation to traverse the OSD menu.
    - Hold left on Menu Navigation button for 5+ to toggle between Dynamic and Static IP addressing.
- Installation
  - Standard 1/4-20 female thread for camera mounting
  - Power over Ethernet – Supports PoE 802.3af\*
  - 12VDC 1A Power Supply provided for non-PoE infrastructure
- Warranty
  - 5-year warranty

*\*Note: For a high quality and reliable SDI signal we recommend utilizing the included PoE Splitter when powering via PoE.*

## Product Specifications

|                               |   |
|-------------------------------|---|
| <b>Model</b>                  | PT12X-NDI-ZCAM  |
| <b>Type</b>                   | PTZOptics 3G-SDI HD 1080p Color Video Box Camera  |
| <b>Features</b>               |   |
| Video System                  | HD: 1080p-60/50/30/25, 1080i-60/50, 720p 60/50<br>SD: NTSC, PAL (NDI®   HX / IP Network feed limited to 30 FPS) |
| Sensor                        | Panasonic 1/2.7", CMOS, Total Pixels: 2.12M, Effective Pixels: 2.07M  |
| Scanning Mode                 | Progressive   |
| Lens                          | 12x; f3.5mm – 42.3mm; 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      | 6.9° - 72.5°  |
| Vertical Angle of View        | 3.9° - 44.8°  |
| Image Flip                    | Support   |
| Image Mirror                  | Support   |
| Number of Presets             | 255   |
| Preset Accuracy               | 0.1°  |
| Video coding standards        | H.264, H.265, MJPEG   |
| Video Freeze                  | Support   |
| Face Detection                | Not Supported   |
| <b>Input/Output Interface</b> |   |
| HD Output                     | 1 x 3G-SDI: BNC type, 800mVp-p, 75Ω, Along to SMPTE 424M standard   |
|                               | 1 x RJ45 NDI®   HX / IP Network streaming 10/100 Ethernet Port  |
| Network Interface and Output  | 1 x RJ45: 10M/100M Adaptive Ethernet port   |
| Audio Input                   | 1 x 3.5mm audio interface, Line In (NDI   HX & IP Stream only) (Unbalanced stereo)                              |
| Audio Output                  | Not active on this model  |
| Control Input / Output        | 1 x RS-485: 3pin Phoenix port, Max Distance: 1200m, Protocol: VISCA/Pelco-D/Pelco-P                             |
| <b>IP Video Features</b>      |   |
| Video Compression             | NDI®   HX / H.264 / H.265 / M-JPEG  |
| Video Stream                  | Two (2) IP video output streams available   |
| First Stream Resolution       | 1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360  |

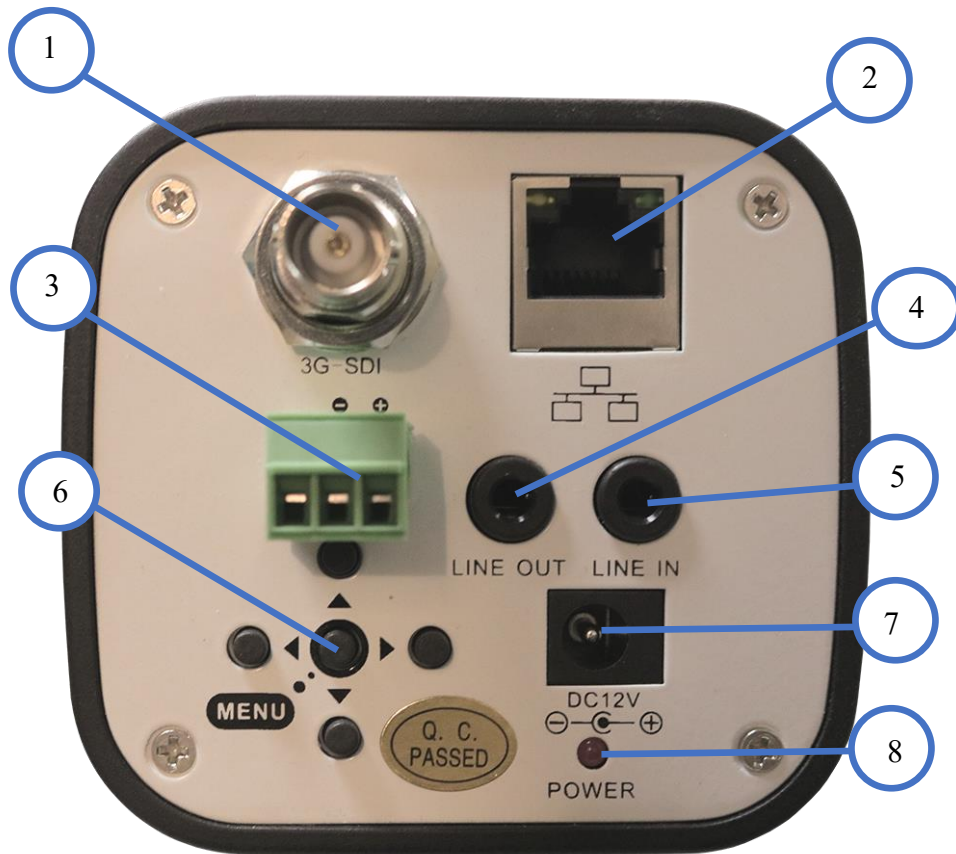


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|                               |   |
|-------------------------------|---|
| Second Stream Resolution      | 1280x720, 1024x576, 720x576, 720x480, 720x408, 640x360, 480x270, 320x240, 320x180 |
| Video Bit Rate                | 32Kbps ~ 20480Kbps  |
| Bit Rate Type                 | Variable Rate, Fixed Rate   |
| Frame Rate                    | 3G-SDI: 50Hz: 1fps ~ 50fps, 60Hz: 1fps ~ 60fps                                    |
|                               | NDI®   HX / IP Network Stream: 50Hz: 1fps ~ 25fps, 60Hz: 1fps ~ 30fps             |
| Audio Compression             | AAC   |
| Audio Bit Rate                | 96Kbps, 128Kbps, 256Kbps  |
| Support Protocols             | TCP/IP, HTTP, RTSP, RTMP, DHCP, Multicast, etc.                                   |
| <b>General Specifications</b> |   |
| Power Connector               | JEITA type (DC IN 12V) or RJ45 via PoE 802.3af*                                   |
| Input Voltage                 | 12VDC (10.8 – 13.0V DC)   |
| Current Consumption           | 0.3A (Max)  |
| Operating Temperature         | 14°F - 104°F [-10°C ~ 40°C]   |
| Storage Temperature           | -40°F - 140°F [-40°C ~ 60°C]  |
| Operating Humidity            | 10% - 80%   |
| Power Consumption             | 6W (Max)  |
| MTBF                          | >30000h   |
| Dimensions (w x h x d) in.    | 3.1" x 2.9" x 5.7" (6.3" including SDI)   |
| Dimensions (w x h x d) mm.    | 78mm x 73mm x 143mm (160mm including SDI)   |
| Weight                        | 1.45 lbs. [0.66 kg]   |
| Boxed Weight                  | 2.0 lbs [0.90 kg]   |

*\*Note: For a high quality and reliable SDI signal we recommend utilizing the included PoE Splitter when powering via PoE.*

## Back of the Camera



- |                                     |                            |
|-------------------------------------|----------------------------|
| 1. 3G-SDI Video Output              | 5. Audio Line Input        |
| 2. RJ-45 Network/NDI® HX Connection | 6. Menu Navigation Buttons |
| 3. Phoenix Connector (RS485)        | 7. DC12V Power Jack        |
| 4. Audio Line Output (Not active)   | 8. Power LED Indicator     |

*Note: For a high quality and reliable SDI signal we recommend utilizing the included PoE Splitter when powering via PoE.*



## Serial Communication Control

In default working mode, the camera is able to connect to a VISCA controller with an RS485 serial interface.

➤ 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 or 9600 bps.

Start bit: 1 bit.

Data bit: 8 bits.

Stop bit: 1 bit.

Parity bit: none.

**Note:** As this camera does not have pan or tilt functionality, not all of the commands in the following command list will apply.

## 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. |

| 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.  |

z = Camera Address + 8

**Part 2: VISCA Command List**

| Command       | Function          | Command Packet             | Comments                                     |  |
|---------------|-------------------|----------------------------|--|--|
| CAM_Power     | On                | 8x 01 04 00 02 FF          | Power ON/OFF                                 |  |
|               | Off               | 8x 01 04 00 03 FF          |  |  |
| CAM_Zoom      | Stop              | 8x 01 04 07 00 FF          | p = 0(low) - 7(high)<br>pqrs: Zoom Position  |  |
|               | Tele (Standard)   | 8x 01 04 07 02 FF          |  |  |
|               | Wide (Standard)   | 8x 01 04 07 03 FF          |  |  |
|               | Tele (Variable)   | 8x 01 04 07 2p FF          |  |  |
|               | Wide (Variable)   | 8x 01 04 07 3p FF          |  |  |
|               | Direct            | 8x 01 04 47 0p 0q 0r 0s FF |  |  |
| CAM_Focus     | Stop              | 8x 01 04 08 00 FF          | p = 0(low) - 7(high)<br>pqrs: Focus Position |  |
|               | Far (Standard)    | 8x 01 04 08 02 FF          |  |  |
|               | Near (Standard)   | 8x 01 04 08 03 FF          |  |  |
|               | Far (Variable)    | 8x 01 04 08 2p FF          |  |  |
|               | Near (Variable)   | 8x 01 04 08 3p FF          |  |  |
|               | Direct            | 8x 01 04 48 0p 0q 0r 0s FF |  |  |
|               | Auto Focus        | 8x 01 04 38 02 FF          |  | AF On/Off  |
|               | Manual Focus      | 8x 01 04 38 03 FF          |  |  |
|               | Auto/Manual       | 8x 01 04 38 10 FF          |  |  |
|               | Focus Lock        | 8x 0a 04 68 02 FF          |  | Prevents any other operation or command from adjusting the current focus state |
| Focus Unlock  | 8x 0a 04 68 03 FF |                            |  |  |
| 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                          |  |
|               | Color Temperature | 8x 01 04 35 20 FF          | Color Temperature 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_ColorTemp | Reset             | 8x 01 04 20 00 FF          | Default ColorTemperature setting             |  |
|               | Up                | 8x 01 04 20 02 FF          |  |  |
|               | Down              | 8x 01 04 20 03 FF          |  |  |



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|                     |                  |                            |  |
|---------------------|------------------|----------------------------|--|
|                     | Direct           | 8x 01 04 20 0p 0q FF       | pq: Color Temperature position 0x00: 2500K ~ 0x37: 8000K |
| 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_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_Shutter         | Reset            | 8x 01 04 0A 00 FF          | Default Shutter setting                                  |
|                     | Up               | 8x 01 04 0A 02 FF          |  |
|                     | Down             | 8x 01 04 0A 03 FF          |  |
|                     | Direct           | 8x 01 04 4A 00 00 0p 0q FF | pq: Shutter Position                                     |
| CAM_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_Flicker         | -                | 8x 01 04 23 0p FF          | p: Flicker Settings (0: Off, 1: 50Hz, 2: 60Hz)           |
| 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       |  |
| Preset Recall Speed | Preset Speed     | 8x 01 06 01 p FF           | p: speed grade, the values are (0x01~0x18)               |
| 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_ColorGain       | Diret            | 8x 01 04 49 00 00 00 0p FF | p: Color Gain setting 0h (60%) to Eh (200%)              |
| Pan_tiltDrive       | Up               | 8x 01 06 01 VV WW 03 01 FF | VV: Pan speed 0x01 (low speed) to 0x18 (high             |



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|                    |                  |   |  |
|--------------------|------------------|---|--|
|                    | Down             | 8x 01 06 01 VV WW 03 02 FF                      | speed)   |
|                    | Left             | 8x 01 06 01 VV WW 01 03 FF                      | WW: Tilt speed 0x01 (low speed) to 0x14 (high speed) |
|                    | Right            | 8x 01 06 01 VV WW 02 03 FF                      | YYYY: Pan Position                                   |
|                    | Upleft           | 8x 01 06 01 VV WW 01 01 FF                      | ZZZZ: Tilt Position                                  |
|                    | 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 |
|                    | LimitClear       | 8x 01 06 07 01 0W<br>07 0F 0F 0F 07 0F 0F 0F FF | ZZZZ: Tilt Position                                  |
| 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_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 0h (-14 degrees) to Eh (+14 degrees)    |
| OSD_Control        | Open / Close     | 8x 01 04 3F 02 5F FF                            |  |
|                    | Navigate Up      | 8x 01 06 01 0E 0E 03 01 FF                      |  |
|                    | Navigate Down    | 8x 01 06 01 0E 0E 03 02 FF                      |  |
|                    | Navigate Left    | 8x 01 06 01 0E 0E 01 03 FF                      |  |
|                    | Navigate Right   | 8x 01 06 01 0E 0E 02 03 FF                      |  |
|                    | Enter            | 8x 01 06 06 05 FF                               |  |
|                    | Return           | 8x 01 06 06 04 FF                               |  |
| CAM_NDIMode        | High             | 8x 0B 01 01 FF                                  |  |



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|                   |                      |                      |                   |
|-------------------|----------------------|----------------------|-------------------|
|                   | Medium               | 8x 0B 01 02 FF       |                   |
|                   | Low                  | 8x 0B 01 03 FF       |                   |
|                   | Off                  | 8x 0B 01 04 FF       |                   |
| CAM_MulticastMode | Multicast Mode       | 8x 0B 01 23 0p FF    | p=1: On, p=2: Off |
| CAM_PTZMotionSync | PTZ Motion Sync On   | 8x 0A 11 13 02 FF    |                   |
|                   | PTZ Motion Sync Off  | 8x 0A 11 13 03 FF    |                   |
|                   | MS Lower Speed Limit | 8x 0A 11 14 pq FF    | pq: speed stage   |
| CAM_UACStatus     | Toggle USB Audio     | 8x 2A 02 A0 04 0p FF | p=2: On, p=3: Off |

### Part 3: VISCA Query Command List

| 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                       |
|                      |                | y0 50 20 FF          | ColorTemperature Mode        |
| 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_BacklightModeInq            | 8x 09 04 33 FF | y0 50 02 FF                         | On   |
|                                 |                | y0 50 03 FF                         | Off  |
| CAM_Nosise2DModeInq             | 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)              |
| CAM_ApertureModeInq (Sharpness) | 8x 09 04 05 FF | y0 50 02 FF                         | Auto Sharpness   |
|                                 |                | y0 50 03 FF                         | Manual Sharpness   |
| CAM_ApertureInq (Sharpness)     | 8x 09 04 42 FF | y0 50 00 00 0p 0q FF                | pq: Aperture Gain  |
| SYS_MenuModeInq                 | 8x 09 06 06 FF | y0 50 02 FF                         | On   |
|                                 |                | y0 50 03 FF                         | Off  |
| CAM_PictureEffectModeInq        | 8x 09 04 63 FF | y0 50 02 FF                         | Off  |
|                                 |                | y0 50 04 FF                         | B&W  |
| 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_ColorGainInq                | 8x 09 04 49 FF | y0 50 00 00 00 0p FF                | p: Color Gain setting 0h (60%) to Eh (200%)                |
| 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_GainLimitInq                | 8x 09 04 2C FF | y0 50 0q FF                         | p: Gain Limit  |
| 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_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) |



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|-----------------------|-------------------|-------------|--------|
| CAM_AWBSensitivityInq | 8x 09 04 A9 FF    | y0 50 00 FF | High   |
|                       |                   | y0 50 01 FF | Normal |
|                       |                   | y0 50 02 FF | Low    |
| CAM_UACInq            | 8x 2A 02 A0 04 FF | y0 50 02 FF | On     |
|                       |                   | y0 50 03 FF | Off    |

| 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].



**Part 4: VISCA over IP Command List**

| Command       | Function          | Command Packet             | Comments   |
|---------------|-------------------|----------------------------|--|
| CAM_Power     | On                | 81 01 04 00 02 FF          | Power ON/OFF   |
|               | Off               | 81 01 04 00 03 FF          |  |
| CAM_Zoom      | Stop              | 81 01 04 07 00 FF          |  |
|               | Tele (Standard)   | 81 01 04 07 02 FF          |  |
|               | Wide (Standard)   | 81 01 04 07 03 FF          |  |
|               | Tele (Variable)   | 81 01 04 07 2p FF          | p = 0(low) - 7(high)   |
|               | Wide (Variable)   | 81 01 04 07 3p FF          |  |
|               | Direct            | 81 01 04 47 0p 0q 0r 0s FF | pqrs: Zoom Position  |
| CAM_Focus     | Stop              | 81 01 04 08 00 FF          |  |
|               | Far (Standard)    | 81 01 04 08 02 FF          |  |
|               | Near (Standard)   | 81 01 04 08 03 FF          |  |
|               | Far (Variable)    | 81 01 04 08 2p FF          | p = 0(low) - 7(high)   |
|               | Near (Variable)   | 81 01 04 08 3p FF          |  |
|               | Direct            | 81 01 04 48 0p 0q 0r 0s FF | pqrs: Focus Position   |
|               | Auto Focus        | 81 01 04 38 02 FF          | AF On/Off  |
|               | Manual Focus      | 81 01 04 38 03 FF          |  |
|               | Auto/Manual       | 81 01 04 38 10 FF          |  |
|               | Focus Lock        | 81 0a 04 68 02 FF          | Prevents any other operation or command from adjusting the current focus state |
| Focus Unlock  | 81 0a 04 68 03 FF |                            |  |
| CAM_WB        | Auto              | 81 01 04 35 00 FF          | Normal Auto  |
|               | Indoor mode       | 81 01 04 35 01 FF          | Indoor mode  |
|               | Outdoor mode      | 81 01 04 35 02 FF          | Outdoor mode   |
|               | OnePush mode      | 81 01 04 35 03 FF          | One Push WB mode   |
|               | Manual            | 81 01 04 35 05 FF          | Manual Control mode  |
|               | Color Temperature | 81 01 04 35 20 FF          | Color Temperature mode   |
|               | OnePush trigger   | 81 01 04 10 05 FF          | One Push WB Trigger  |
| CAM_RGain     | Reset             | 81 01 04 03 00 FF          | Manual Control of R Gain   |
|               | Up                | 81 01 04 03 02 FF          |  |
|               | Down              | 81 01 04 03 03 FF          |  |
|               | Direct            | 81 01 04 43 00 00 0p 0q FF | pq: R Gain   |
| CAM_Bgain     | Reset             | 81 01 04 04 00 FF          | Manual Control of B Gain   |
|               | Up                | 81 01 04 04 02 FF          |  |
|               | Down              | 81 01 04 04 03 FF          |  |
|               | Direct            | 81 01 04 44 00 00 0p 0q FF | pq: B Gain   |
| CAM_ColorTemp | Reset             | 81 01 04 20 00 FF          | Default ColorTemperature setting   |
|               | Up                | 81 01 04 20 02 FF          |  |
|               | Down              | 81 01 04 20 03 FF          |  |

|                     |                  |                            |  |
|---------------------|------------------|----------------------------|--|
|                     | Direct           | 81 01 04 20 0p 0q FF       | pq: Color Temperature position 0x00: 2500K ~ 0x37: 8000K |
| CAM_AE              | Full Auto        | 81 01 04 39 00 FF          | Automatic Exposure mode                                  |
|                     | Manual           | 81 01 04 39 03 FF          | Manual Control mode                                      |
|                     | Shutter priority | 81 01 04 39 0A FF          | Shutter Priority Automatic Exposure mode                 |
|                     | Iris priority    | 81 01 04 39 0B FF          | Iris Priority Automatic Exposure mode                    |
|                     | Bright           | 81 01 04 39 0D FF          | Bright Mode(Manual control)                              |
| CAM_Iris            | Reset            | 81 01 04 0B 00 FF          | Iris Setting   |
|                     | Up               | 81 01 04 0B 02 FF          |  |
|                     | Down             | 81 01 04 0B 03 FF          |  |
|                     | Direct           | 81 01 04 4B 00 00 0p 0q FF | pq: Iris Position  |
| CAM_Shutter         | Reset            | 81 01 04 0A 00 FF          | Default Shutter setting                                  |
|                     | Up               | 81 01 04 0A 02 FF          |  |
|                     | Down             | 81 01 04 0A 03 FF          |  |
|                     | Direct           | 81 01 04 4A 00 00 0p 0q FF | pq: Shutter Position                                     |
| CAM_Bright          | Reset            | 81 01 04 0D 00 FF          | Bright Setting   |
|                     | Up               | 81 01 04 0D 02 FF          |  |
|                     | Down             | 81 01 04 0D 03 FF          |  |
|                     | Direct           | 81 01 04 0D 00 00 0p 0q FF | pq: Bright Position                                      |
| CAM_ExpComp         | On               | 81 01 04 3E 02 FF          | Exposure Compensation On/Off                             |
|                     | Off              | 81 01 04 3E 03 FF          |  |
|                     | Reset            | 81 01 04 0E 00 FF          | Exposure Compensation Amount Setting                     |
|                     | Up               | 81 01 04 0E 02 FF          |  |
|                     | Down             | 81 01 04 0E 03 FF          |  |
|                     | Direct           | 81 01 04 4E 00 00 0p 0q FF | pq: ExpComp Position                                     |
| CAM_BackLight       | On               | 81 01 04 33 02 FF          | Back Light Compensation On/Off                           |
|                     | Off              | 81 01 04 33 03 FF          |  |
| CAM_Flicker         | -                | 81 01 04 23 0p FF          | p: Flicker Settings (0: Off, 1: 50Hz, 2: 60Hz)           |
| CAM_PictureEffect   | Off              | 81 01 04 63 00 FF          | Picture Effect Setting                                   |
|                     | B&W              | 81 01 04 63 04 FF          |  |
| CAM_Memory          | Reset            | 81 01 04 3F 00 pp FF       | pp: Memory Number (=0 to 127)                            |
|                     | Set              | 81 01 04 3F 01 pp FF       |  |
|                     | Recall           | 81 01 04 3F 02 pp FF       |  |
| Preset Recall Speed | Preset Speed     | 81 01 06 01 p FF           | p: speed grade, the values are (0x01~0x18)               |
| CAM_LR_Reverse      | On               | 81 01 04 61 02 FF          | Image Flip Horizontal On/Off                             |
|                     | Off              | 81 01 04 61 03 FF          |  |
| CAM_PictureFlip     | On               | 81 01 04 66 02 FF          | Image Flip Vertical On/Off                               |
|                     | Off              | 81 01 04 66 03 FF          |  |
| CAM_ColorGain       | Diret            | 81 01 04 49 00 00 00 0p FF | p: Color Gain setting 0h (60%) to Eh (200%)              |



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|--------------------|------------------|---|--|
| Pan_tiltDrive      | Up               | 81 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             | 81 01 06 01 VV WW 03 02 FF                      |  |
|                    | Left             | 81 01 06 01 VV WW 01 03 FF                      |  |
|                    | Right            | 81 01 06 01 VV WW 02 03 FF                      |  |
|                    | Upleft           | 81 01 06 01 VV WW 01 01 FF                      |  |
|                    | Upright          | 81 01 06 01 VV WW 02 01 FF                      |  |
|                    | DownLeft         | 81 01 06 01 VV WW 01 02 FF                      |  |
|                    | DownRight        | 81 01 06 01 VV WW 02 02 FF                      |  |
|                    | Stop             | 81 01 06 01 VV WW 03 03 FF                      |  |
|                    | AbsolutePosition | 81 01 06 02 VV WW<br>0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |  |
|                    | RelativePosition | 81 01 06 03 VV WW<br>0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF |  |
|                    | Home             | 81 01 06 04 FF                                  |  |
| Reset              | 81 01 06 05 FF   |   |  |
| Pan_tiltLimitSet   | LimitSet         | 81 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       | 81 01 06 07 01 0W<br>07 0F 0F 0F 07 0F 0F 0F FF |  |
| CAM_Brightness     | Direct           | 81 01 04 A1 00 00 0p 0q FF                      | pq: Brightness Position  |
| CAM_Contrast       | Direct           | 81 01 04 A2 00 00 0p 0q FF                      | pq: Contrast Position  |
| CAM_Flip           | Off              | 81 01 04 A4 00 FF                               | Single Command For Video Flip  |
|                    | Flip-H           | 81 01 04 A4 01 FF                               |  |
|                    | Flip-V           | 81 01 04 A4 02 FF                               |  |
|                    | Flip-HV          | 81 01 04 A4 03 FF                               |  |
| CAM_SettingSave    | Save             | 81 01 04 A5 10 FF                               | Save Current Setting   |
| CAM_AWBSensitivity | High             | 81 01 04 A9 00 FF                               | High   |
|                    | Normal           | 81 01 04 A9 01 FF                               | Normal   |
|                    | Low              | 81 01 04 A9 02 FF                               | Low  |
| CAM_AFZone         | Top              | 81 01 04 AA 00 FF                               | AF Zone weight select  |
|                    | Center           | 81 01 04 AA 01 FF                               |  |
|                    | Bottom           | 81 01 04 AA 02 FF                               |  |
| CAM_ColorHue       | Direct           | 81 01 04 4F 00 00 00 0p FF                      | p: Color Hue 0h (-14 degrees) to Eh (+14 degrees)  |
| OSD_Control        | Open / Close     | 81 01 04 3F 02 5F FF                            |  |
|                    | Navigate Up      | 81 01 06 01 0E 0E 03 01 FF                      |  |
|                    | Navigate Down    | 81 01 06 01 0E 0E 03 02 FF                      |  |
|                    | Navigate Left    | 81 01 06 01 0E 0E 01 03 FF                      |  |
|                    | Navigate Right   | 81 01 06 01 0E 0E 02 03 FF                      |  |
|                    | Enter            | 81 01 06 06 05 FF                               |  |
|                    | Return           | 81 01 06 06 04 FF                               |  |



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|-------------------|----------------------|----------------------|-------------------|
| CAM_NDIMode       | High                 | 81 0B 01 01 FF       |                   |
|                   | Medium               | 81 0B 01 02 FF       |                   |
|                   | Low                  | 81 0B 01 03 FF       |                   |
|                   | Off                  | 81 0B 01 04 FF       |                   |
| CAM_MulticastMode | Multicast Mode       | 81 0B 01 23 0p FF    | p=1: On, p=2: Off |
| CAM_PTZMotionSync | PTZ Motion Sync On   | 81 0A 11 13 02 FF    |                   |
|                   | PTZ Motion Sync Off  | 81 0A 11 13 03 FF    |                   |
|                   | MS Lower Speed Limit | 81 0A 11 14 pq FF    | pq: speed stage   |
| CAM_UACStatus     | Toggle USB Audio     | 81 2A 02 A0 04 0p FF | p=2: On, p=3: Off |

### Part 5: VISCA over IP Query Command List

| Inquiry Command List |                |                      |                              |
|----------------------|----------------|----------------------|------------------------------|
| Command              | Command packed | Inquiry Packet       | Comments                     |
| CAM_PowerInq         | 81 09 04 00 FF | 90 50 02 FF          | On                           |
|                      |                | 90 50 03 FF          | Off (Standby)                |
|                      |                | 90 50 04 FF          | Internal power circuit error |
| CAM_ZoomPosInq       | 81 09 04 47 FF | 90 50 0p 0q 0r 0s FF | pqrs: Zoom Position          |
| CAM_FocusAFMode Inq  | 81 09 04 38 FF | 90 50 02 FF          | Auto Focus                   |
|                      |                | 90 50 03 FF          | Manual Focus                 |
| CAM_FocusPosInq      | 81 09 04 48 FF | 90 50 0p 0q 0r 0s FF | pqrs: Focus Position         |
| CAM_WBModeInq        | 81 09 04 35 FF | 90 50 00 FF          | Auto                         |
|                      |                | 90 50 01 FF          | Indoor mode                  |
|                      |                | 90 50 02 FF          | Outdoor mode                 |
|                      |                | 90 50 03 FF          | OnePush mode                 |
|                      |                | 90 50 05 FF          | Manual                       |
|                      |                | 90 50 20 FF          | ColorTemperature Mode        |
| CAM_RGainInq         | 81 09 04 43 FF | 90 50 00 00 0p 0q FF | pq: R Gain                   |
| CAM_BGainInq         | 81 09 04 44 FF | 90 50 00 00 0p 0q FF | pq: B Gain                   |
| CAM_AEModeInq        | 81 09 04 39 FF | 90 50 00 FF          | Full Auto                    |
|                      |                | 90 50 03 FF          | Manual                       |
|                      |                | 90 50 0A FF          | Shutter priority             |
|                      |                | 90 50 0B FF          | Iris priority                |
|                      |                | 90 50 0D FF          | Bright                       |
| CAM_ShutterPosInq    | 81 09 04 4A FF | 90 50 00 00 0p 0q FF | pq: Shutter Position         |
| CAM_IrisPosInq       | 81 09 04 4B FF | 90 50 00 00 0p 0q FF | pq: Iris Position            |
| CAM_BrightPosInq     | 81 09 04 4D FF | 90 50 00 00 0p 0q FF | pq: Bright Position          |
| CAM_ExpCompMod eInq  | 81 09 04 3E FF | 90 50 02 FF          | On                           |
|                      |                | 90 50 03 FF          | Off                          |



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|                                 |                |                                     |   |
|---------------------------------|----------------|-------------------------------------|---|
| CAM_ExpCompPosInq               | 81 09 04 4E FF | 90 50 00 00 0p 0q FF                | pq: ExpComp Position                          |
| CAM_BacklightModeInq            | 81 09 04 33 FF | 90 50 02 FF                         | On  |
|                                 |                | 90 50 03 FF                         | Off   |
| CAM_Nosise2DModeInq             | 81 09 04 50 FF | 90 50 02 FF                         | Auto Noise 2D                                 |
|                                 |                | 90 50 03 FF                         | Manual Noise 3D                               |
| CAM_Nosise2DLevel               | 81 09 04 53 FF | 90 50 0p FF                         | Noise Reduction (2D) p: 0 to 5                |
| CAM_Noise3DLevel                | 81 09 04 54 FF | 90 50 0p FF                         | Noise Reduction (3D) p: 0 to 8                |
| CAM_FlickerModeInq              | 81 09 04 55 FF | 90 50 0p FF                         | p: Flicker Settings(0: OFF, 1: 50Hz, 2: 60Hz) |
| CAM_ApertureModeInq (Sharpness) | 81 09 04 05 FF | 90 50 02 FF                         | Auto Sharpness                                |
|                                 |                | 90 50 03 FF                         | Manual Sharpness                              |
| CAM_ApertureInq (Sharpness)     | 81 09 04 42 FF | 90 50 00 00 0p 0q FF                | pq: Aperture Gain                             |
| SYS_MenuModeInq                 | 81 09 06 06 FF | 90 50 02 FF                         | On  |
|                                 |                | 90 50 03 FF                         | Off   |
| CAM_PictureEffectModeInq        | 81 09 04 63 FF | 90 50 02 FF                         | Off   |
|                                 |                | 90 50 04 FF                         | B&W   |
| CAM_LR_ReverseInq               | 81 09 04 61 FF | 90 50 02 FF                         | On  |
|                                 |                | 90 50 03 FF                         | Off   |
| CAM_PictureFlipInq              | 81 09 04 66 FF | 90 50 02 FF                         | On  |
|                                 |                | 90 50 03 FF                         | Off   |
| CAM_ColorGainInq                | 81 09 04 49 FF | 90 50 00 00 00 0p FF                | p: Color Gain setting 0h (60%) to Eh (200%)   |
| Pan-tiltPosInq                  | 81 09 06 12 FF | 90 50 0w 0w 0w 0w<br>0z 0z 0z 0z FF | www: Pan Position<br>zzzz: Tilt Position      |
| CAM_GainLimitInq                | 81 09 04 2C FF | 90 50 0q FF                         | p: Gain Limit                                 |
| CAM_AFSensitivityInq            | 81 09 04 58 FF | 90 50 01 FF                         | High  |
|                                 |                | 90 50 02 FF                         | Normal  |
|                                 |                | 90 50 03 FF                         | Low   |
| CAM_BrightnessInq               | 81 09 04 A1 FF | 90 50 00 00 0p 0q FF                | pq: Brightness Position                       |
| CAM_ContrastInq                 | 81 09 04 A2 FF | 90 50 00 00 0p 0q FF                | pq: Contrast Position                         |
| CAM_FlipInq                     | 81 09 04 A4 FF | 90 50 00 FF                         | Off   |
|                                 |                | 90 50 01 FF                         | Flip-H  |
|                                 |                | 90 50 02 FF                         | Flip-V  |
|                                 |                | 90 50 03 FF                         | Flip-HV                                       |
| CAM_AFZone                      | 81 09 04 AA FF | 90 50 00 FF                         | Top   |
|                                 |                | 90 50 01 FF                         | Center  |
|                                 |                | 90 50 02 FF                         | Bottom  |



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|-----------------------|-------------------|----------------------|--|
| CAM_ColorHueInq       | 81 09 04 4F FF    | 90 50 00 00 00 0p FF | p: Color Hue setting 0h (- 14 degrees) to Eh (+14 degrees) |
| CAM_AWBSensitivityInq | 81 09 04 A9 FF    | 90 50 00 FF          | High   |
|                       |                   | 90 50 01 FF          | Normal   |
|                       |                   | 90 50 02 FF          | Low  |
| CAM_UACInq            | 81 2A 02 A0 04 FF | 90 50 02 FF          | On   |
|                       |                   | 90 50 03 FF          | Off  |

### Part 6: 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   |

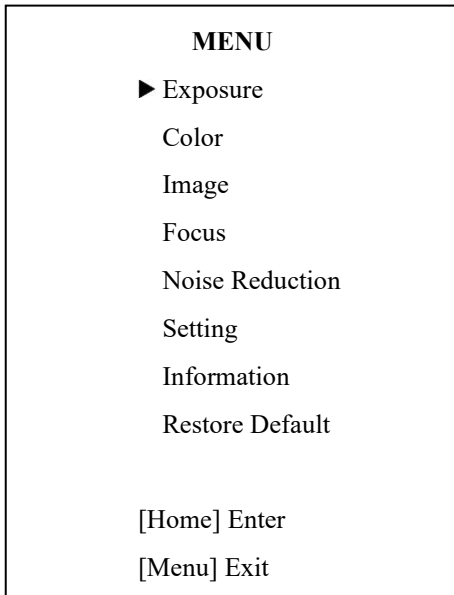
**Part 7: Pelco-P Protocol Command List**

| 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

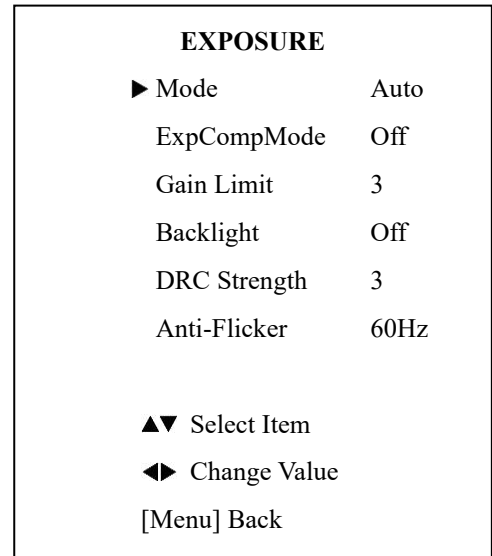
### 1. MENU

Press [MENU] button to display the On Screen Display 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 the [HOME] key to enter the exposure page, as shown in the following figure.



**Exposure Mode:** Modes include: Full Auto, Manual, SAE, AAE, Bright, WDR

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

**ExpComp:** Exposure compensation value, optional items: -7 ~ 7 (Effective only when ExpCompMode is 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, WDR, & Bright mode).

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

**Shutter:** 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 SAE mode).

**DRC Strength:** Dynamic Range Control strength, optional items: 0 ~ 8. (Not effective in WDR)

**Strength:** WDR strength, optional items: 0 ~ 6 (Effective only in WDR)



### 3. COLOR

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

| COLOR           |      |
|-----------------|------|
| ▶ WB Mode       | Auto |
| AWB Sens        | High |
| RG Tuning       | 0    |
| BG Tuning       | 0    |
| Saturation      | 100% |
| Hue             | 7    |
| ▲▼ Select Item  |      |
| ◀▶ Change Value |      |
| [Menu] Back     |      |

**WB-Mode:** Modes include: Auto, Indoor, Outdoor, One Push, Manual, VAR.

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

**B Gain:** 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 tuning, optional items: -10 ~ +10.

**BG Tuning:** Blue gain tuning, optional items: -10 ~ +10.

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

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

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

(Effective only in Auto & One Push mode)

### 4. IMAGE

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

| IMAGE           |         |
|-----------------|---------|
| ▶ Luminance     | 7       |
| Contrast        | 10      |
| Sharpness       | 3       |
| Flip-H          | Off     |
| Flip-V          | Off     |
| Gamma           | Default |
| Style           | Clarity |
| ▲▼ Select Item  |         |
| ◀▶ Change Value |         |
| [Menu] Back     |         |

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

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

**Sharpness:** Sharpness adjustment, optional items: 0 ~ 14

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

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

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

**Style:** Optional items: Clarity, Norm, 5S, Soft, & Bright

**LDC:** Optional items: Off, -10 ~ +10

### 5. FOCUS

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

**FOCUS**

- ▶ D-Zoom Limit    x1
- AF Sense        High
- Auto Focus     On

- ▲▼ Select Item
- ◀▶ Change Value
- [Menu] Back

**D-Zoom Limit:** Digital Zoom Limit, optional items: x1, x2, x4, x8, x16

**AF Sense:** Auto Focus Sensitivity, options items: High, Middle, Low

**Auto Focus:** Toggle Auto Focus, optional items: On, Off

**6. NOISE REDUCTION**

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

**NOISE REDUCTION**

- ▶ NR2D-Level 1
- NR3D-Level 3

- ▲▼ Select Item
- ◀▶ Change Value
- [Menu] Back

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

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

**7. SETTING**

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

**SETTING**

- ▶ Language        EN
- Protocol        VISCA
- Visca Addr     1
- Baudrate       9600
- Video Format    1080p30
- Lens            Type2
- Auto Focus Lock Off

- ▲▼ Select Item
- ◀▶ Change Value

**Language:** Optional items: EN, & Chinese

**Protocol:** Optional items: VISCA, PELCO-D, PELCO-P.

**V\_AddrFix:** Fixed VISCA address: Options include: Off, On

**Visca Addr:** Optional items: 1-7.

**Baudrate:** Optional items: 2400, 4800, 9600, 19200, & 38400.

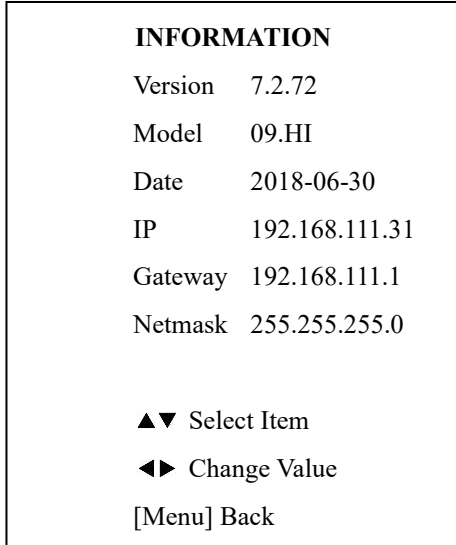
**Video Format:** Optional Items: 720p60, 1080i60, 1080p60, 1080p30

**EPTZ:** Optional Items: On & Off (Currently not functioning)

**Zoom Limit:** Optional Items: 1.5x, 2x, 3x, 4x, & 8x (Currently not functioning)

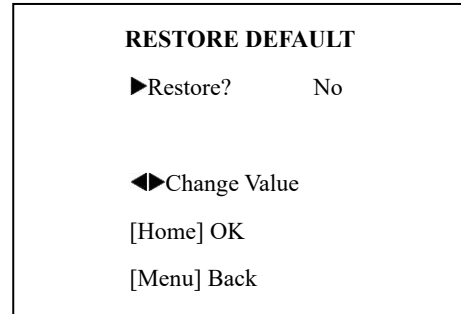
### 8. INFORMATION

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



### 9. RESTORE DEFAULT

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



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

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

## Network Connection

### 1. Operating Environment

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

Network Protocol: TCP / IP

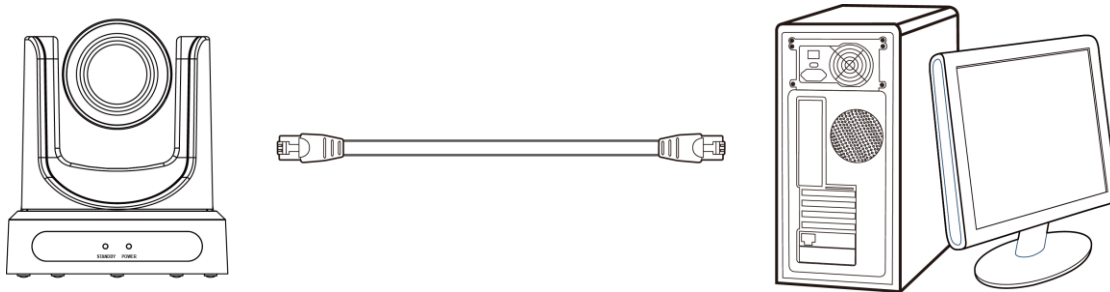
Client PC: P4 / 128M RAM / 40GHD / support for scaled graphics card, support for DirectX8.0 or more advanced version.

### 2. Equipment Installation

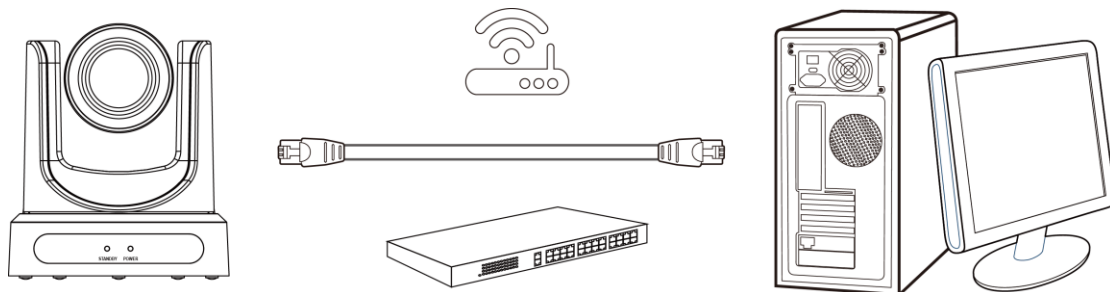
- 1) Connect camera to your network via a CAT5 or CAT6 patch cable or directly to your PC via a CAT5 or CAT6 cross over cable.
- 2) Turn on camera power.
- 3) If successful, the orange network light will illuminate and the green light will start flashing. If unsuccessful, the cable is bad, you are using the wrong cable, 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:



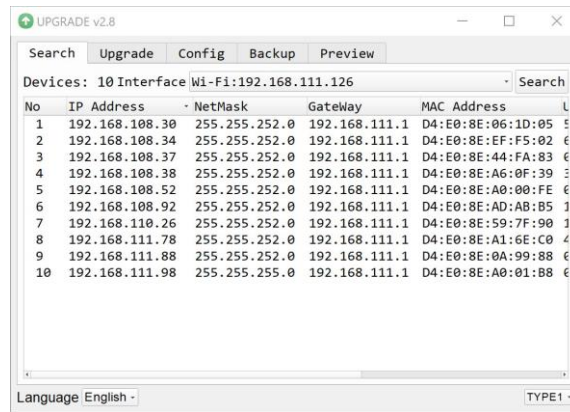
Picture 1.1 Direct connections via “cross-over” network cable



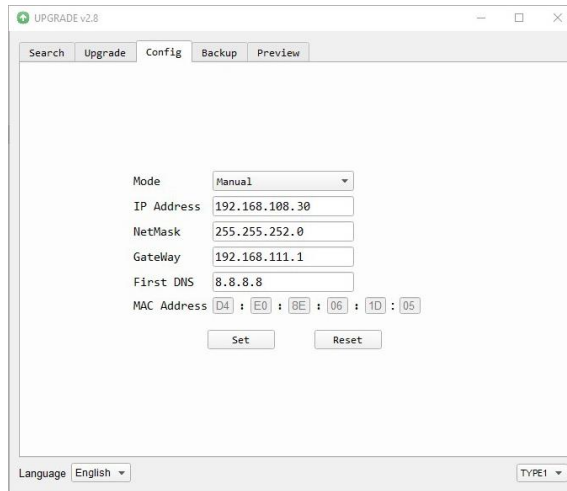
Picture 1.2 Connections to LAN via patch cable to LAN wall jack or LAN switch

## Setting up a Network Video Stream

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, an active network port on your network, and finally, power on the camera.
2. Next, go online and download the IP Address Settings Tool. It's available for Windows & Mac OS at [ptzoptics.com/download](http://ptzoptics.com/download).
3. Once you complete the download, launch the "Upgrade v2.8C" tool. Select your network connection type from the "Interface" dropdown menu and click "Search".



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 IP address of 192.168.100.99.
  - a. See the "Additional Network Info" section to identify your network scheme.
5. Right-click on the camera you wish to change the IP address of and select "Config".
  - a. You have two (2) options for assigning the IP address of your camera. You can manually assign the IP address by assigning a static IP address, or you can have a DHCP server automatically assign a dynamic IP address to your camera.
  - b. Note: In more complex network environments, you may need to request a static IP address, Network Mask, Default Gateway, & First DNS from your IT department.



6. After assigning an IP address to the camera, you can reach the Web Interface by typing in the camera's IP address into a web browser. To log in, type in "admin" into the username and password fields.  
From the Web Interface, you have two (2) ways to view the video feed.
  - a. Set the secondary stream to MJPEG.
  - b. Install the PTZOptics ActiveX Plugin and use Internet Explorer.
    - i. For more detail, go to [help.ptzoptics.com](http://help.ptzoptics.com).
7. From the Web Interface, you can control the camera using the arrows on the left side. You can also adjust many of your camera's settings via this IP interface.
8. You can now receive an RTSP stream from your camera. To view the RTSP stream, type in "rtsp://[Camera IP address]:554/1" for the first (HD) stream, and "rtsp://[Camera IP address]:554/2" for the second (SD) stream.
9. You can test the RTSP streaming in VLC Media Player. Once VLC is installed and launched, click the "Media" drop down menu and select "Open Network Stream"

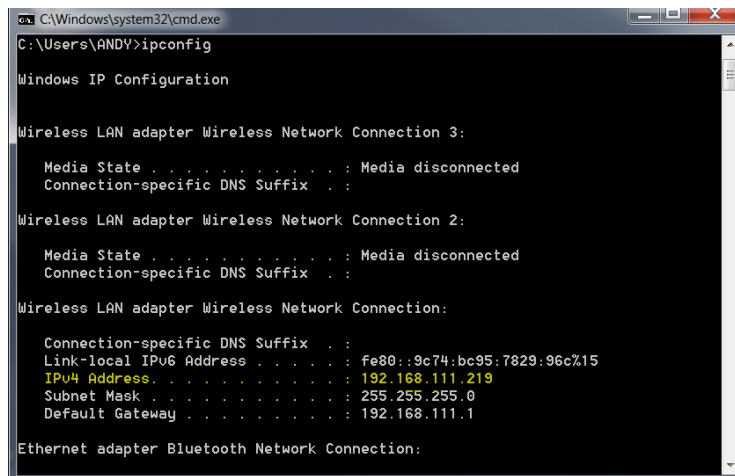
## Additional Network Info

### Discovering your Network IP range

You can discover the IP range of your network by using the Command Prompt for Windows, or the Terminal app for Macs and following the steps below.

#### Windows

1. Type “CMD” into the search bar in the start menu.
2. Type in “ipconfig” and press “Enter” on your keyboard.
3. Scroll down to “IPv4 Address”. This is your computer’s local IP address.



```
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:

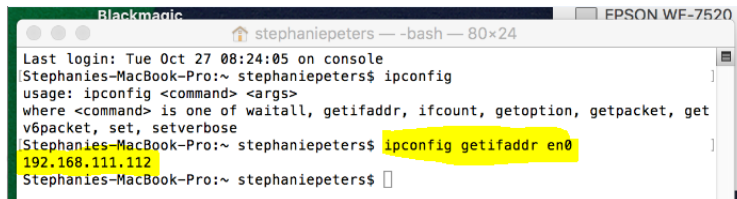
    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::9c74:bc95:7829:96c%15
    IPv4 Address. . . . . : 192.168.111.219
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.111.1

Ethernet adapter Bluetooth Network Connection:
```

4. In the example above, the PC’s local address is “192.168.111.219”, making the IP range “192.168.111”.

#### Mac

1. Open a new finder window and go to Applications, then Utilities, and select the Terminal program.
2. Type in “IP config get if addr en0” and press “Enter” on your keyboard.



```
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$
```

3. In the example above, the Mac’s local address is “192.168.111.112”, making the IP range “192.168.111”

## Camera Web Interface

The Web Interface allows you to control the camera, view the video feed, and adjust many of the camera’s settings.

### Menu

The Menu allows you to traverse the Web Interface. By default, the “Live” option is selected.

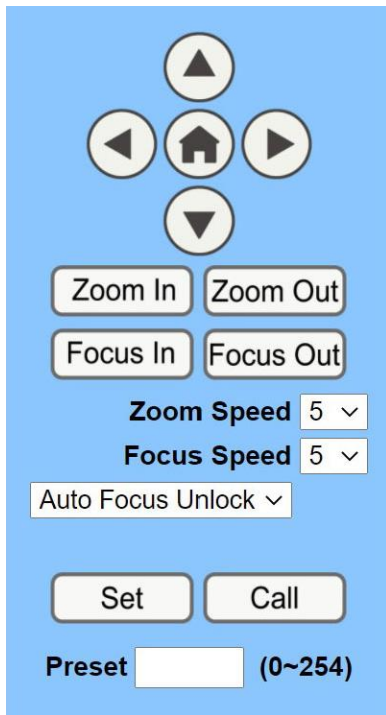
### Live

This tab allows you to view the video feed of the camera.

The status bar below the video feed can be used to pause / play the video feed, adjust the audio level, and switch between full screen and windowed view.

### Directional Arrows

Use the Menu button to open the cameras On Screen Display menu. When the On Screen Display menu is open, you can use the Directional Arrows to traverse the OSD Menu. When finished, you can press the Menu button again to close.



**On Screen Display Menu Control:** Use the Up / Down / Left / Right buttons to traverse the OSD Menu.

**Home Button:** Use the Home Button to send the video to the home position (fully zoomed out), open the OSD menu, and make selections within the OSD Menu.

**Zoom In:** Use the Zoom Out button for narrow (tele) views of the scene.

**Zoom Out:** Use the Zoom In button for wide views of the scene.

**Focus In/Out:** Use the Focus In and Focus Out buttons to make manual focus adjustments of the scene.

**Speed Control:** Use the Zoom & Focus Speed dropdowns to adjust the speed at which you zoom and focus the camera.

**Auto Focus Unlock:** Use the Auto Focus Unlock / Lock dropdown to manually lock the focus in the current position.

**PTZ Preset:** After manually positioning the camera in a position you wish to return to, you can save the position as a PTZ Preset. Type a number between 0~254 into the Preset box and press the “Set” button to save that position. Click the “Call” button to send the camera back to that PTZ Preset position.



## Video

**Video Settings**

Video Format:

Encode Level:

NDI Preset:

**First stream**

Encode Protocol:

Resolution:

Bit Rate:  (32~20480) kbps

Frame Rate:  fps

I Key Frame Interval:  (2~1200)

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:  (2~1200)

Bit Rate Control:  CBR  VBR

Fluctuate Level:

Slice Split Enable:  On  Off

Split Mode:  Fixed blocks  Fixed bytes

Slice Size:  blocks/bytes

**Video Format:** Supports 50Hz (PAL), 60Hz (NTSC), & OSD formats.

**Encode Level:** Supports baseline, mainprofile, highprofile, & svc-t.

**NDI Preset:** Supports Off, Medium, & Low.

**Encode Protocol:** Supports H.264, H.265, and MJPEG protocols.

**Resolution:** The first stream supports: 1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360.

The second stream supports: 1280x720, 1024x576, 720x480, 720x408, 640x360, 480x270, 320x240, 320x180

**Bit Rate:** Adjust the maximum bit rate of the network video. The higher the bit rate, the clearer the image will be. Bit rates set too high can congest the network and cause the video to not transmit properly, causing the video to appear worse. Range: 32 – 20480 kbps

**Frame Rate:** Adjust the frame rate of the network video. The higher the frame rate the smoother the video will appear.

**I-Key Frame Interval:** Adjust how frequently a keyframe is produced.

**Bit Rate Control:** Supports Constant bit rate (CBR) & Variable bit rate (VBR)

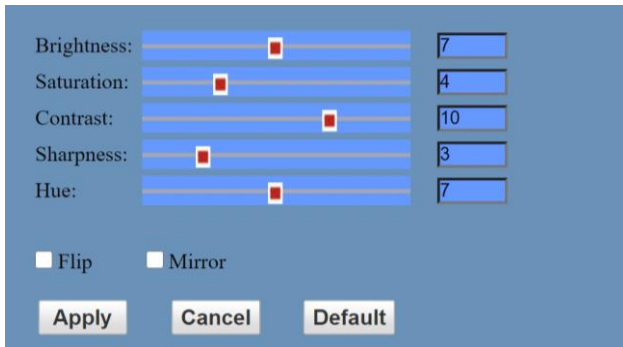
**Fluctuate Level:** Limit the fluctuation magnitude of variable rate. Supports 1 ~ 6.

**Slice Split Enable:** Enable / Disable splice split function.

**Split Mode:** Supports Fixed blocks and fixed bytes.

**Slice Size:** Set the Slice Size

## Image



**Brightness:** Brightness slider. Default: 7

**Saturation:** Saturation slider. Default: 3

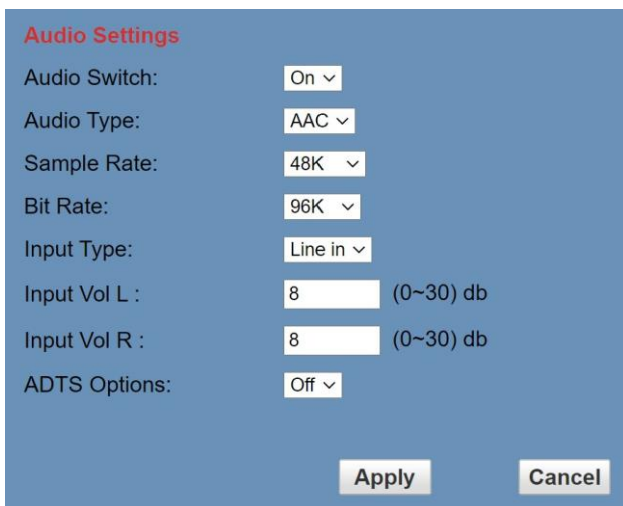
**Contrast:** Contrast slider. Default 7

**Sharpness:** Sharpness slider. Default: 1

**Hue:** Hue slider. Default: 7

**Flip & Mirror:** Check the Flip and/or Mirror buttons to rotate the image accordingly.

## Audio



**Audio Switch:** Enable / Disable audio embedding

**Audio Type:** AAC

**Sample Rate:** Options include: 44.1K & 48K

**Bit Rate:** Options include: 96K, 128K, & 256K

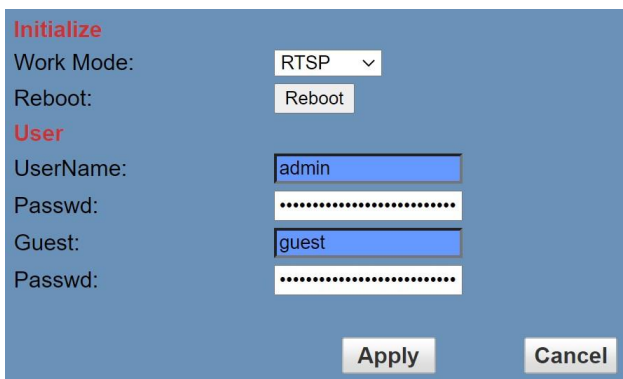
**Input Type:** Line in.

**Input Vol L:** Volume of left channel. 0 ~ 30 db

**Input Vol R:** Volume of right channel. 0 ~ 30 db

**ADTS Options:** Enable / Disable ADTS

## System



**Work Mode:** Options include: RTSP, SDK, & Multicast.

**Reboot:** Used to power cycle the camera

**Username:** Username to login to device. Username: “admin”.

**Password:** Password to login to device. Default password: “admin”.

**Guest (Username):** Guest username to login to device. Username: “guest”.

**Guest (Password):** Guest password to login to device. Default password: “guest”.

## Network

**Lan Settings**

IP Configuration Type:

IP Address:

Subnet Mask:

Gateway:

DNS Address:

MAC Address:

**Port Settings**

HTTP Port number:  (80)

RTSP Port:  (554)

PTZ Port:  (5678)

UDP Port:  (1259)

**Control Protocol Settings**

Pelco-D Address:  (0~254)

Pelco-P Address:  (0~31)

**RTMP(S) Settings**

First stream:  On  Off  Video  Audio

MRL:

Second stream:  On  Off  Video  Audio

MRL:

**RTSP Settings**

RTSP Auth:  On  Off

**ONVIF Settings**

ONVIF:  On  Off

ONVIF Auth:  On  Off

**Multicast Settings**

Multicast:  On  Off

Address:

Port:

**NTP Settings**

time zone:

NTP time sync:  On  Off

Server address:

Time interval:  minutes

Main time show:  On  Off

Position: X  Y  (0~100)

Sub time show:  On  Off

Position: X  Y  (0~100)

**LAN Settings:** The Lan Settings section allows you to adjust the IP parameters of the camera. The default IP address of the camera is 192.168.100.99. You cannot change the MAC address.

**IP Configuration Type:** Fixed IP Address (Static) & Dynamic IP Address (DHCP).

**IP Address:** Camera's IP address.

**Subnet Mask:** Network Subnet Mask.

**Gateway:** Network Gateway.

**DNS Address:** Network Domain Name Server address.

**MAC Address:** The camera's MAC address.

**Apply & Cancel Buttons:** Apply or cancel the changes made to the LAN Settings section.



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**Port Settings:** The Port Settings section allows you to adjust the network ports of the camera.

**HTTP Port:** This port is used for HTTP-CGI control, and for the web application. Default: 80.

**RTSP Port:** This port is used for the RTSP streaming protocol. Default 554.

**PTZ Port:** This port is used for the TCP/IP control protocol. Default: 5678.

**UDP Port:** This port is used for the UDP control protocol. Default: 1259

**Control Protocol Settings:** The Control Protocol Settings section allows you to adjust the Pelco-D & Pelco-P control address.

**Pelco-D Address:** 0 ~ 254

**Pelco-P Address:** 0 ~ 31

**RTMP Settings:** The RTMP(S) Settings section allows you to enable or disable the two (2) RTMPS stream's video and audio sources.

**First Stream:** Enable / Disable Stream 1 Video & Audio

**(First Stream) MRL:** Text field for RTMPS Stream 1's Media Resource Locator (MRL)

**Second Stream:** Enable / Disable Stream 2 Video & Audio

**(Second Stream) MRL:** Text field for RTMPS Stream 2's Media Resource Locator (MRL)

**Third Stream:** Enable / Disable Stream 3 Video & Audio

**(Third Stream) MRL:** Text field for RTMPS Stream 3's Media Resource Locator (MRL)

**RTSP Settings:** The RTSP Settings section allows you to enable or disable RTSP Authorization.

**RTSP Auth.:** Enable / Disable RTSP authorization.

**ONVIF Settings:** The ONVIF Settings section allows you to adjust the ONVIF settings of the camera.

**ONVIF:** Enable / Disable ONVIF protocol control.

**ONVIF Auth.:** Enable / Disable ONVIF authorization.

**Multicast Settings:** The Multicast Settings section allows you to adjust the Multicast settings of the camera.

**Multicast:** Enable / Disable the Multicast protocol.

**Address:** Adjust the Multicast address.

**Port:** This port is used for the Multicast protocol. Default: 6688.

**NTP Settings:** The NTP Settings section allows you to enable / disable the Network Time Protocol of the camera.

**Time Zone:** Adjust the time zone you wish to use with NTP.

**NTP Time Sync:** Enable / Disable NTP Time Sync

**Server Address:** Text field for NTP server.

**Time Interval:** Adjust the Time Interval in minutes. Default: 1440

**Main Time Show:** Enable / Disable Main Time

**Position:** Main Time position

**Sub Time Show:** Enable / Disable Sub Time

**Position:** Sub Time position

**Apply & Cancel Buttons:** Apply or cancel the changes made to the Network Settings section.

## Information

The Information section displays the device information, firmware version, & device friendly name. You can adjust the device friendly name as needed to designate the camera.

## Language

The Language selection dropdown allows you to change the language of the Web Interface. Select either “English”, “Chinese”, or “Russian”.

## Network Camera Control Protocol

### Control Notes:

PTZ over TCP/UDP

The camera currently supports various PTZ control methods, including RS232, RS485, IR remote control, web interface, HTTP-CGI and TCP/UDP protocol.

The camera includes an internal TCP server. The default port number is 5678. When client and server set up a TCP connection, the client sends PTZ command to the internal server and the server will then parse and execute the PTZ commands.

The camera includes an internal UDP server. The default port number is 1259. When client and server set up a UDP connection, the client sends PTZ commands to the internal server and the server will then parse and execute the PTZ commands.

**The command format based on VISCA is shown above in the Serial Communication Control Section**

## HTTP-CGI – Control

### Pan and Tilt Control

`http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[Action]&[Pan Speed]&[Tilt Speed]`

**[Action]:** UP, DOWN, LEFT, RIGHT, LEFTUP, RIGHTUP, LEFTDOWN, RIGHTDOWN, PTZSTOP

**[Pan Speed]:** 1 (Slowest) – 24 (Fastest)

**[Tilt Speed]:** 1 (Slowest) – 20 (Fastest)

### Zoom Control

`http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[Action]&[Zoom Speed]`

**[Action]:** ZOOMIN, ZOOMOUT, ZOOMSTOP

**[Zoom Speed]:** 1 (Slowest) – 7 (Fastest)

### Focus Control

`http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[Action]&[Focus Speed]`

**[Action]:** FOCUSIN, FOCUSOUT, FOCUSSTOP

**[Focus Speed]:** 1 (Slowest) – 7 (Fastest)

### Focus Lock Control

`http://[Camera IP]/cgi-bin/param.cgi?ptzcmd&[Action]_mfocus`

**[Action]:** LOCK, UNLOCK



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## Preset Control

[http://\[Camera IP\]/cgi-bin/ptzctrl.cgi?ptzcmd&\[Action\]&\[Position Number\]](http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[Action]&[Position Number])

**[Action]:** POSSET, POSCALL

**[Position Number]:** 0 – 89 (Range 1), 100 – 254 (Range 2)

## Home Position Recall

[http://\[Camera IP\]/cgi-bin/ptzctrl.cgi?ptzcmd&home](http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&home)

## PT Reset

[http://\[Camera IP\]/cgi-bin/param.cgi?pan\\_tiltdrive\\_reset](http://[Camera IP]/cgi-bin/param.cgi?pan_tiltdrive_reset)

## Direct Position Recall Control

[http://\[Camera IP\]/cgi-bin/ptzctrl.cgi?ptzcmd&\[Mode\]&\[Pan Speed\]&\[Tilt Speed\]&\[Pan Position\]&\[Tilt Position\]](http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[Mode]&[Pan Speed]&[Tilt Speed]&[Pan Position]&[Tilt Position])

**[Mode]:** ABS, REL

**[Pan Speed]:** 1 (Slowest) – 24 (Fastest)

**[Tilt Speed]:** 1 (Slowest) – 20 (Fastest)

**[Pan Position]:** 0001 (First step pan right), 0990 (Last step pan right), FFFE (First step pan left), F670 (Last step pan left)

**[Tilt Position]:** 0001 (First step tilt up), 0510 (Last step tilt up), FFFE (First step tilt down), FE51 (Last step tilt down)

## Direct Zoom Recall Control

[http://\[Camera IP\]/cgi-bin/ptzctrl.cgi?ptzcmd&zoomto&\[Zoom Speed\]&\[Zoom Position\]](http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&zoomto&[Zoom Speed]&[Zoom Position])

**[Zoom Speed]:** 1 (Slowest) – 7 (Fastest)

**[Zoom Position]:** 0000 (Full wide), 4000 (Full tele)

## HTTP-CGI – Navigation

### OSD Menu Control

[http://\[Camera IP\]/cgi-bin/param.cgi?navigate\\_mode&\[Mode\]](http://[Camera IP]/cgi-bin/param.cgi?navigate_mode&[Mode])

**[Mode]:** OSD (OSD Open), PTZ (OSD Close)

### OSD Menu Navigation Control

[http://\[Camera IP\]/cgi-bin/ptzctrl.cgi?ptzcmd&\[Action\]](http://[Camera IP]/cgi-bin/ptzctrl.cgi?ptzcmd&[Action])

**[Action]:** UP, DOWN, LEFT, RIGHT

### OSD Menu Selection Control

[http://\[Camera IP\]/cgi-bin/param.cgi?navigate\\_mode&\[Mode\]](http://[Camera IP]/cgi-bin/param.cgi?navigate_mode&[Mode])

**[Mode]:** CONFIRM, OSD\_BACK

## HTTP-CGI – Image Adjustment

### Image Settings Control

`http://[Camera IP]/cgi-bin/param.cgi?post_image_value&[Mode]&[Level]`

**[Mode]:** BRIGHT, SATURATION, CONTRAST, SHARPNESS, HUE

**[Level]:** 0 - 14

### Image Orientation Control

`http://[Camera IP]/cgi-bin/param.cgi?post_image_value&[Mode]&[State]`

**[Mode]:** FLIP, MIRROR

**[State]:** 1 (Flip / Mirror), 0 (Default)

### Default Image Settings

`http://[Camera IP]/cgi-bin/param.cgi?get_image_default_conf`

## HTTP-CGI – Inquiries

### Video

`http://[Camera IP]/cgi-bin/param.cgi?get_media_video`

Network Video Configuration

### Audio

`http://[Camera IP]/cgi-bin/param.cgi?get_media_audio`

Network Audio Configuration

### Network

`http://[Camera IP]/cgi-bin/param.cgi?get_network_conf`

Network Configuration

### Information

`http://[Camera IP]/cgi-bin/param.cgi?get_device_conf`

Camera Information

### Serial Number

`http://[Camera IP]/cgi-bin/param.cgi?get_serial_number`

Serial Number

*\*Not always accurate*



## Photobooth Functionality

Your PTZ Optics camera can quickly and easily take a series of four (4) still image or video files that are stored on the camera and made accessible with a standard web browser on the same network.

### Photos

You have two (2) options to initiate a series of four (4) still images being captured...

You can enter the following HTTP string into any web browser on the same network as the camera to initiate a series of four (4) still images.

```
http://[Camera IP]/cgi-bin/booth.cgi?0&4&[Delay]&photo&0
```

In this example, **[Delay]** is utilized to add additional delay, in seconds, between still images being taken. **[Delay]** can have any value from 1 – 9 seconds.

You can also press the “[F1]” button on your IR remote to initiate a “quick capture” that has, approximately, a four (4) second delay between four (4) still images being captured.

To retrieve your series of four (4) still images, you will need to open a standard web browser with network access to the camera and use the following HTTP strings to retrieve the still image files as desired.

```
Image 1: http://[Camera IP]/photo1.jpg
```

```
Image 2: http://[Camera IP]/photo2.jpg
```

```
Image 3: http://[Camera IP]/photo3.jpg
```

```
Image 4: http://[Camera IP]/photo4.jpg
```

### Videos

You have two (2) options to initiate a series of four (4) videos being captured...

You can enter the following HTTP string into any web browser on the same network as the camera to initiate a series of four (4) video recordings.

```
http://[Camera IP]/cgi-bin/booth.cgi?0&4&[Delay]&video&[Length]
```

In this example, **[Delay]** is utilized to add additional delay, in seconds, between videos being taken. **[Delay]** can have any value from 1 – 9 seconds.

In this example, **[Length]** is utilized to adjust the overall length, in seconds, of each video file. **[Length]** can have any value from 1 – 10 seconds.

You can also press the “[F2]” button on your IR remote to initiate a “quick capture” that has, approximately, a four (4)





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second delay between four (4) ten (10) second videos being captured.

To retrieve your series of four (4) videos, you will need to open a standard web browser with network access to the camera and use the following HTTP strings to retrieve the still image files as desired.

Video 1: [http://\[Camera IP\]/video1.mp4](http://[Camera IP]/video1.mp4)

Video 2: [http://\[Camera IP\]/video2.mp4](http://[Camera IP]/video2.mp4)

Video 3: [http://\[Camera IP\]/video3.mp4](http://[Camera IP]/video3.mp4)

Video 4: [http://\[Camera IP\]/video4.mp4](http://[Camera IP]/video4.mp4)

Video note: It can take the camera time for the video files to be fully captured and processed. If they are not retrievable, please wait an additional 30 – 60 seconds for the process to complete.



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## NDI® | HX Connection

The NDI® | HX connection allows you to connect and control your camera through any NDI compatible hardware or software on your Local Area Network. Once your camera is setup on a LAN, you can utilize the NDI® | HX connection.

### Two Easy Steps:

1. Download and install the latest NDI Tools.
2. Select your camera within the NDI compatible device.

**Step 1:** Download and install the NDI® | HX Tools from <https://www.ndi.tv/tools/>

**Step 2:** Select your camera. The NDI® feed will utilize the camera's device friendly name.

## Upgrading the NDI® | HX

If you have a PTZOptics non-NDI camera, you can upgrade it by following the four (4) steps below.

1. Purchase a PTZOptics NDI License. Visit <https://ptzoptics.com/where-to-buy/> for more information
2. Open NDI Studio Monitor and select the camera you wish to upgrade.
3. Click the "Register" button in the bottom right section of Studio Monitor.
4. Enter your NDI License key and click "Enable NDI".

If you have additional camera(s) to upgrade, please repeat the steps above for each camera. A separate NDI License is required for each camera.

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*Please note that your NDI License key is non-transferrable.*

## 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 that the SDI cable is connected correctly.
    1. If SDI, make sure that the destination device is accessing the SDI port that you plugged into.
  3. If powering via Power over Ethernet, make sure to use the PoE Splitter for a high quality and reliable SDI signal.
- 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.



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## Control

- 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 RS485 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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