



Share Your Vision

PTZ Optics 20X ZCAM with NDI®|HX using NDI® 4



User Manual

Model Nos. PT20X-NDI-ZCAM

V2.0

(English)

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Copyright Notice

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Preface

Thank you for using the HD Professional Video Box Camera. This manual introduces the function, installation, and operation of the HD box camera. Prior to installation and usage, please read the manual thoroughly. If you have any questions about the capabilities of the product, call our toll-free number 1-800-486-5276.

Precautions

- This product can only be used in the specified conditions in order to avoid any damage to the unit itself.
- 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, submit a ticket at help.ptzoptics.com.
- Never operate outside of the specified operating temperature range, humidity, or with any other power supply than the one originally provided with the unit.
- Please use a soft dry cloth to clean the unit. If the unit is very dirty, clean it with diluted neutral detergent; do not use any type of solvents, which may damage the surface.

Warning

- **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 12V DC with a maximum current supply of 1A. Polarity of the power supply plug is critical and is as follows:



- **Handling**
 - Avoid any stress, vibration, or moisture during transportation, storage, installation, and operation.
 - Do not expose the camera to any corrosive solid, liquid, or gas to avoid damage to the cover which is made of a plastic material.
 - Never power the camera on before installation is complete.
- **Do not dismantle the camera** – PTZOptics is not responsible for any unauthorized modification or dismantling.

Warranty

PTZOptics includes a limited parts & labor warranty for all PTZOptics manufactured cameras. 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.

Supplied Accessories

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

- Camera 1
- AC Power Supply 1
- Quick Start Guide 1

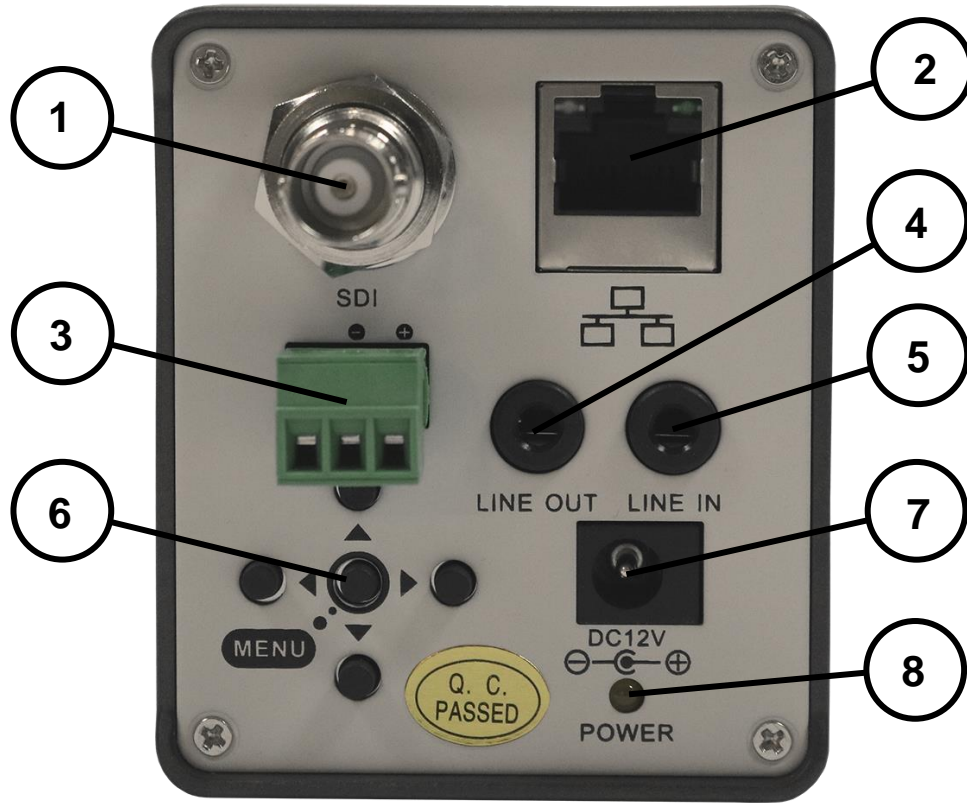


FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radiofrequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning - This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Connection Guide



- | | |
|----------------------------|---|
| 1. SDI | 3G-SDI connection |
| 2. Network | RJ45 port for NDI® HX & network streaming / control |
| 3. RS485 | 2-pin phoenix connection for joystick controller |
| 4. Line Out | 3.5mm audio connection (not functional) |
| 5. Line In | 3.5mm audio connection |
| 6. Menu Navigation Buttons | Open / Close & traverse OSD menu |
| 7. DC12V | DC 12V power connection |
| 8. Power Indicator | Indicated power on / off |

**Note: To utilize PoE & SDI simultaneously, you will need a PoE Splitter.*

Features

- Image Sensor
 - Panasonic 1/2.7", 2.07 million effective pixels, HD CMOS sensor.
 - Olympus high quality telephoto lens supporting 20X optical zoom and optional 16X digital zoom.
 - Full HD 1920x1080p resolution up to 60 frames per second.
 - 2D & 3D noise reduction with our latest "low noise CMOS sensor".
 - 0.05 Lux @ F1.8 AGC On.
 - Wide angle 60.7° horizontal field of view.
 - Dynamic Range Control (DRC) for higher image quality and detail across simultaneously well lit and shadowed scenes.
 - High SNR (signal to noise ratio) of the CMOS sensor (≥55dB), combined with 2D & 3D noise reduction algorithms, effectively reduces noise, even under low illuminated conditions.
- Video Outputs
 - Simultaneous NDI®|HX / IP network streaming & 3G-SDI
 - NDI®|HX Full HD network streaming up to 1080p 30 frames per second.
 - 3G-SDI Full HD video output up to 1080p 60 frames per second.
 - RTSP, RTMP, & RTMPS streaming using H.264, H.265, or MJPEG.
 - Line level audio embeds over NDI®|HX / network stream. Uses AAC audio encoding for better sound quality and lower bandwidth usage.
- Control and Settings
 - NDI®|HX control through NDI® approved platforms that offer control
 - PTZOptics VISCA over IP
 - Web-based IP remote control interface
 - RS-485 VISCA, Pelco-D, & Pelco-P control
 - Button controls on the back of the 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 buttons to traverse the OSD menu.
 - Press in and hold the Left Menu Navigation button for 3+ seconds to toggle between Dynamic and Static IP addressing.
 - Press in and hold the Up Menu Navigation button to zoom in.
 - Press in and hold the Down Menu Navigation button to zoom out.
- Installation
 - Standard 1/4-20 female thread for camera mounting
 - 12V DC 2A Power Supply
 - PoE 802.3af
- Warranty
 - 5-year warranty

**Note: To utilize PoE & SDI simultaneously, you will need a PoE Splitter.*

Technical Specifications

| | |
|---------------------------------|---|
| Model | PT20X-NDI-ZCAM |
| Type Camera | PTZOptics Color Video Box Camera with NDI® HX using NDI® 4 HD 1080p |
| Video System | 1080p-60/50/30/25, 1080i-60/50, 720p-60/50 (IP Streams & NDI® HX are limited to a max resolution of 1080p30) |
| Sensor | 1/2.7" CMOS, Effective Pixel: 2.07M |
| Scanning Mode | Progressive |
| Lens | 20x, f4.42mm ~ 88.5mm, F1.8 ~ F2.8 |
| Digital Zoom | 16x |
| Minimal Illumination | 0.05 Lux (@F1.8, AGC On) |
| Shutter | 1/30s ~ 1/10000s |
| White Balance | Auto, Indoor, Outdoor, OnePush, Manual, VAR |
| Backlight Compensation | Support |
| Digital Noise Reduction | 2D & 3D Digital Noise Reduction |
| Video S/N | ≥55dB |
| Horizontal Field of View | 3.36° ~ 60.7° |
| Vertical Field of View | 1.89° ~ 34.1° |
| Image Flip | Support |
| Image Mirror | Support |
| Image Freeze | Support |
| PoE | Support (802.3af)* |
| Face Detection | Not supported |
| Local Storage | Not supported |
| Number of Presets | 255 |
| Preset Accuracy | 0.1° |
| Input / Output Interface | |
| HD Output | 1 x RJ45 NDI® HX / IP Network 10/100 Ethernet port 1 x 3G-SDI: BNC type, 800mVp-p, 75Ω, Along to SMPTE 424M standard |
| Network Interface | 1 x RJ45: 10/100/1000M Adaptive Ethernet ports |
| Audio Interface | 1 x 3.5mm audio interface, Line In (NDI® HX & IP Network stream only) (Unbalanced stereo) |
| Communication Interface | 1 x RS-485: 3-pin Phoenix port, Max Distance 1200m, Protocol VISCA/Pelco-D/Pelco-P |
| Power Jack | JEITA type (DC IN 12V) |
| IP Video Features | |
| Video Compression | NDI® HX using NDI® 4/ H.264 / H.265 / MJPEG |
| Video Stream | Two (2) IP video output streams available |
| First Stream Resolutions | 1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360 |
| Second Stream Resolutions | 1280x720, 1024x576, 720x480, 720x408, 640x360, 480x270, 320x240, 320x180 |
| Video Bit Rate | 32Kbps ~ 20480Kbps |
| Bit Rate Type | Variable Rate / Fixed Rate |
| Frame Rate | 3G-SDI: 50Hz: 1 ~ 50 FPS, 60Hz: 1 ~ 60 FPS NDI® HX / IP Stream: 50Hz: 1 ~ 25 FPS, 60Hz: 1 ~ 30 FPS |
| Audio Compression | AAC |
| Audio Bit Rate | 96Kbps, 128Kbps, 256Kbps |
| Supported Protocols | TCP/IP, HTTP, RTSP, RTMP, DHCP, Multicast, NDI® etc. |
| Generic Specifications | |
| Input Voltage | DC 12V / PoE (802.3af*) (optional) |
| Current Consumption | 0.5A (Max) |
| Operating Temperature | -10°C ~ 40°C (14°F ~ 104°F) |
| Storage Temperature | -40°C ~ 60°C (-40°F ~ 140°F) |
| Humidity Range | 10% - 80% |
| Power Consumption | 6W (Max) |
| MTBF | >30000h |
| Size in. (W x D x H) | 2.4" W x 5.7" D 3.0" H |
| Size mm. (W x D x H) | 60.9mm W x 144.7mm D x 76.2" H |
| Camera Weight | 1.40 lbs. (0.63 kg) |

*Note: To utilize PoE & SDI simultaneously, you will need a PoE Splitter.

NDI[®]|HX with NDI[®] 4 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[®]|HX compatible device.

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

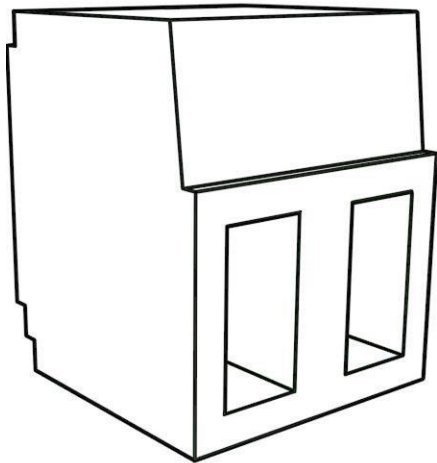
Step 2 (Optional). Configure your camera settings from the NDI Config tab in the camera's web interface.

Step 3. Select your camera. The NDI feed will utilize the camera's device friendly name.

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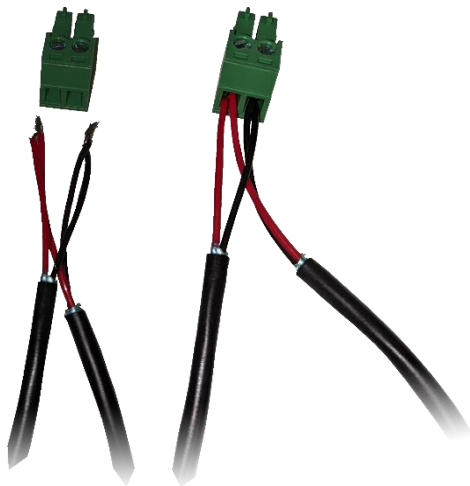
Please note that your NDI License key is non-transferrable.

RS-485 Interface

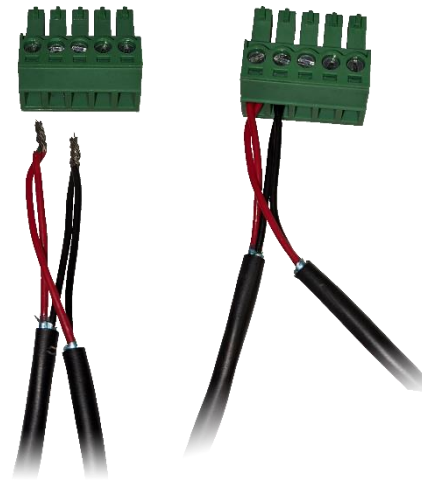


To utilize an RS-485 connection, you will need an unterminated two (2) conductor cable.

1. First, connect the positive (red) wire to the camera's positive phoenix connector port (left).
2. Then, connect the negative (black) wire to the camera's negative phoenix connector port (right).
3. Next, connect the positive and negative wires to the positive and negative ports on your joystick controller.
4. To connect multiple cameras, you have the option to connect via daisy-chain or home run.
5. In either method, multiple wires will be connected to a single phoenix connector port.



RS-485 Daisy-Chain connection



RS-485 Home Run connection

Serial Communication Control

In default working mode, the camera is able to connect to a VISCA controller with an RS-232 and/or RS-485 serial interface.

RS-485 Communication Control

The camera can be controlled via RS-485, Half-duplex mode, with support for VISCA, Pelco-D, or Pelco-P protocol. The parameters of RS485 are as follows:

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

Start bit: 1 bit.

Data bit: 8 bits.

Stop bit: 1 bit.

Parity bit: none.

PTZOptics VISCA Command List

Part 1: Camera Issued Commands

| ACK / Completion Messages | | | |
|---------------------------|------------|-----------------------------|--|
| Command | Function | Command Packet | Comments |
| ACK / Completion Messages | ACK | z0 4y FF (y: Socket No.) | Returned when the command is accepted. |
| | Completion | z0 5y FF (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 (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 (y: Socket No.) | Returned when no command is executed in a socket specified nu the cancel command, or when an invalid Socket No. is specified. |
| | Command Not Executable | z0 6y 41 FF (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 mode. |

z = Camera Address + 8

Part 2: PTZOptics 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) |
| | 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 p q r s FF | |
| CAM_Focus | Stop | 8x 01 04 08 00 FF | p = 0 (low) – 7 (high) |
| | 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 | pqrs: Zoom Position (0x04 0x00 0x00 0x00 = Full Zoom in. 0x00 0x00 0x00 0x00 = Full Zoom out.) |
| | Auto Focus | 8x 01 04 38 02 FF | Auto Focus 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 mode |
| | Indoor | 8x 01 04 35 01 FF | Indoor mode |
| | Outdoor | 8x 01 04 35 02 FF | Outdoor mode |
| | OnePush | 8x 01 04 35 03 FF | One Push White Balance mode |
| | Manual | 8x 01 04 35 05 FF | Manual control mode |
| | ColorTemperature (VAR) | 8x 01 04 35 20 FF | Color Temperature mode |
| CAM_RGain | OnePush Trigger | 8x 01 04 10 05 FF | One Push White Balance Trigger |
| | Reset | 8x 01 04 03 00 FF | Manual control of red 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: Red Gain | |
| CAM_BGain | Reset | 8x 01 04 04 00 FF | Manual control of blue 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: Blue Gain |
| CAM_ColorTemp | Reset | 8x 01 04 20 00 FF | Default ColorTemperature settings |
| | Up | 8x 01 04 20 02 FF | |
| | Down | 8x 01 04 20 03 FF | |
| | Direct | 8x 01 04 20 0p 0q FF | pq: ColorTemperature 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 exposure mode |
| | Shutter Priority | 8x 01 04 39 0A FF | Shutter priority auto exposure mode |
| | Iris Priority | 8x 01 04 39 0B FF | Iris priority auto exposure mode |
| | Bright | 8x 01 04 39 0D FF | Bright manual exposure mode |
| CAM_Iris | Reset | 8x 01 04 0B 00 FF | Default Iris position |
| | Up | 8x 01 04 0B 02 FF | Iris setting |
| | 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 position |
| | Up | 8x 01 04 0A 02 FF | Shutter setting |
| | 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 | Default Bright position |
| | Up | 8x 01 04 0D 02 FF | Bright setting |
| | 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 | Default ExpComp position |

| | | | |
|---------------------|------------------|---|---|
| | Up | 8x 01 04 0E 02 FF | ExpComp setting |
| | Down | 8x 01 04 0E 03 FF | |
| | Direct | 8x 01 04 4E 00 00 0p 0q FF | |
| CAM_Backlight | On | 8x 01 04 33 02 FF | Backlight 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_Picture Effect | 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 (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 | Direct | 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) to 0x18 (high) WW: Tilt Speed 0x01 (low) to 0x14 (high) |
| | Down | 8x 01 06 01 VV WW 03 02 FF | |
| | Left | 8x 01 06 01 VV WW 01 03 FF | |
| | Right | 8x 01 06 01 VV WW 02 03 FF | |
| | UpLeft | 8x 01 06 01 VV WW 01 01 FF | |
| | UpRight | 8x 01 06 01 VV WW 02 01 FF | |
| | DownLeft | 8x 01 06 01 VV WW 01 02 FF | |
| | DownRight | 8x 01 06 01 VV WW 02 02 FF | |
| | Stop | 8x 01 06 01 VV WW 03 03 FF | |
| | AbsolutePosition | 8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | YYYY: Pan position, ZZZZ: Tilt position |
| | RelativePosition | 8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | |
| Home | 8x 01 06 04 FF | | |
| Reset | 8x 01 06 05 FF | | |
| Pan_TiltLimitSet | LimitSet | 8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | W: 1 (UpRight), 0: DownLeft YYYY: Pan position, ZZZZ: Tilt position |
| | LimitClear | 8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF | |
| 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_AWB Sensitivity | High | 8x 01 04 A9 00 FF | |
| | Normal | 8x 01 04 A9 01 FF | |
| | Low | 8x 01 04 A9 02 FF | |
| CAM_AFZone | Top | 8x 01 04 AA 00 FF | AF Zone weight select |
| | Center | 8x 01 04 AA 01 FF | |
| | Bottom | 8x 01 04 AA 02 FF | |
| CAM_ColorHue | Direct | 8x 01 04 4F 00 00 00 0p FF | P: Color Hue setting 0h (-14°) to Eh (+14°) |
| 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 | |
| | Medium | 8x 0B 01 02 FF | |
| | Low | 8x 0B 01 03 FF | |
| | Off | 8x 0B 01 04 FF | |

| | | | |
|--------------------|--------------------------|----------------------|-------------------|
| CAM_Multicast Mode | Multicast Mode | 8x 0B 01 23 0p FF | p=1: On, p=2: Off |
| CAM_PTZMotion Sync | PTZ Motion Sync On | 8x 0A 11 13 02 FF | |
| | PTZ Motion Sync Off | 8x 0A 11 13 03 FF | |
| | PTZ MS Upper Speed Limit | 8x 0A 11 14 pq FF | pq: Speed stage |
| | PTZ MS Lower Speed Limit | 8x 0A 11 14 pq FF | |
| CAM_UACStatus | Toggle USB Audio | 8x 2a 02 a0 04 0p FF | p=2: On, p=3: Off |

x = Camera Address + 8

Part 3: PTZOptics VISCA Query Command List

| | | | |
|----------------------------------|----------------|-------------------------------|---|
| 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_FocusAFModelInq | 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_WBModelInq | 8x 09 04 35 FF | y0 50 00 FF | Auto |
| | | y0 50 01 FF | Indoor |
| | | y0 50 02 FF | Outdoor |
| | | y0 50 03 FF | OnePush |
| | | y0 50 05 FF | Manual |
| | | y0 50 20 FF | ColorTemperature |
| CAM_RGainInq | 8x 09 04 43 FF | y0 50 00 00 0p 0q FF | pq: Red Gain |
| CAM_BGainInq | 8x 09 04 44 FF | y0 50 00 00 0p 0q FF | pq: Blue Gain |
| CAM_ColorTempInq | 8x 09 04 20 FF | y0 50 pq FF | pq: ColorTemperature position |
| CAM_AEModelInq | 8x 09 04 39 FF | y0 50 00 FF | Full Auto |
| | | y0 50 03 FF | Manual |
| | | y0 50 0A FF | Shutter Priority (SAE) |
| | | y0 50 0B FF | Iris Priority (AAE) |
| | | 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_ExpCompModelInq | 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_BacklightModelInq | 8x 09 04 33 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_Noise2DModelInq | 8x 09 04 50 FF | y0 50 02 FF | Auto Noise 2D |
| | | y0 50 03 FF | Manual Noise 2D |
| CAM_Noise2DLevel | 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 5 |
| CAM_FlickerModelInq | 8x 09 04 55 FF | y0 50 0p FF | p=0: Off, 1: 50Hz, 2: 60Hz |
| CAM_ApertureModelInq (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_MenuModelInq | 8x 09 06 06 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_PictureEffectModelInq | 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 0h (60%) to Eh (200%) |
| CAM_PanTiltPosInq | 8x 09 06 12 FF | y0 50 0w 0w 0w 0w 0z 0z 0z FF | WWWW: Pan position, 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 | pg: 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 0h (-14°) to Eh (+14°) |
| 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 Packet | Inquiry Packet | Comments |
| CAM_LensBlockInq | 8x 09 7E 7E 00 FF | y0 50 0u 0u 0u 0u 00 00 0v 0v 0v 0v 00 0w 00 FF | UUUU: Zoom position VVVV: Focus position 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 ww 00 xx 0z FF | PP: Red Gain, QQ: Blue Gain R: WB Mode, S: Aperture TT: AE Mode, U.bit2: Backlight U.bit1: Exposure Comp, VV: Shutter position. WW: Iris position, XX Bright position, Z: Exposure Comp position |
| CAM_OtherBlockInq | 8x 09 7E 7E 02 FF | y0 50 0p 0q 00 0r 00 00 00 00 00 00 00 00 00 FF | P.bit0: Power 1: On, 0: Off Q.bit2: LR Reverse: 1: On, 0: Off R.bit3~0: Picture Effect Mode |
| CAM_EnlargmentBlockInq | 8x 09 7E 7E 03 FF | y0 50 00 00 00 00 00 00 00 0p 0q rr 0s 0t 0u FF | P: AF sensitivity Q.bit0: Picture flip: 1: On, 0: Off RR.bit6~3: Color Gain (0h (60%) to Eh (200%)) S: Flip 0: Off, 1: Flip-H, 2: FlipV, 3: Flip-HV T.bit2~0: NR2D level U: Gain limit |

y = (x + 8) - X = VISCA Address

Part 4: PTZOptics 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 | p = 0 (low) – 7 (high) |
| | Tele (Standard) | 81 01 04 07 02 FF | |
| | Wide (Standard) | 81 01 04 07 03 FF | |
| | Tele (Variable) | 81 01 04 07 2p FF | |
| | Wide (Variable) | 81 01 04 07 3p FF | |
| | Direct | 81 01 04 47 p q r s FF | |
| CAM_Focus | Stop | 81 01 04 08 00 FF | p = 0 (low) – 7 (high) |
| | Far (Standard) | 81 01 04 08 02 FF | |
| | Near (Standard) | 81 01 04 08 03 FF | |
| | Far (Variable) | 81 01 04 08 2p FF | |
| | Near (Variable) | 81 01 04 08 3p FF | |
| | Direct | 81 01 04 48 0p 0q 0r 0s FF | pqrs: Zoom Position (0x04 0x00 0x00 0x00 = Full Zoom in. 0x00 0x00 0x00 0x00 = Full Zoom out.) |
| | Auto Focus | 81 01 04 38 02 FF | Auto Focus 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 mode |
| | Indoor | 81 01 04 35 01 FF | Indoor mode |
| | Outdoor | 81 01 04 35 02 FF | Outdoor mode |
| | OnePush | 81 01 04 35 03 FF | One Push White Balance mode |
| | Manual | 81 01 04 35 05 FF | Manual control mode |
| | ColorTemperature (VAR) | 81 01 04 35 20 FF | Color Temperature mode |
| CAM_RGain | OnePush Trigger | 81 01 04 10 05 FF | One Push White Balance Trigger |
| | Reset | 81 01 04 03 00 FF | Manual control of red 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: Red Gain | |
| CAM_BGain | Reset | 81 01 04 04 00 FF | Manual control of blue 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: Blue Gain |
| CAM_ColorTemp | Reset | 81 01 04 20 00 FF | Default ColorTemperature settings |
| | Up | 81 01 04 20 02 FF | |
| | Down | 81 01 04 20 03 FF | |
| | Direct | 81 01 04 20 0p 0q FF | pq: ColorTemperature 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 exposure mode |
| | Shutter Priority | 81 01 04 39 0A FF | Shutter priority auto exposure mode |
| | Iris Priority | 81 01 04 39 0B FF | Iris priority auto exposure mode |
| | Bright | 81 01 04 39 0D FF | Bright manual exposure mode |
| CAM_Iris | Reset | 81 01 04 0B 00 FF | Default Iris position |
| | Up | 81 01 04 0B 02 FF | Iris setting |
| | 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 position |
| | Up | 81 01 04 0A 02 FF | Shutter setting |
| | 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 | Default Bright position |
| | Up | 81 01 04 0D 02 FF | Bright setting |
| | 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 | Default ExpComp position |

| | | | |
|---------------------|------------------|---|---|
| | Up | 81 01 04 0E 02 FF | ExpComp setting |
| | Down | 81 01 04 0E 03 FF | |
| | Direct | 81 01 04 4E 00 00 0p 0q FF | |
| CAM_Backlight | On | 81 01 04 33 02 FF | Backlight 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_Picture Effect | 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 (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 | Direct | 81 01 04 49 00 00 00 0p FF | P: Color Gain setting 0h (60%) to Eh(200%) |
| Pan_TiltDrive | Up | 81 01 06 01 VV WW 03 01 FF | VV: Pan Speed 0x01 (low) to 0x18 (high) WW: Tilt Speed 0x01 (low) to 0x14 (high) |
| | 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 | YYYY: Pan position, ZZZZ: Tilt position |
| | AbsolutePosition | 81 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | |
| | RelativePosition | 81 01 06 03 VV WW 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 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | W: 1 (UpRight), 0: DownLeft YYYY: Pan position, ZZZZ: Tilt position |
| | LimitClear | 81 01 06 07 01 0W 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_AWB Sensitivity | High | 81 01 04 A9 00 FF | |
| | Normal | 81 01 04 A9 01 FF | |
| | Low | 81 01 04 A9 02 FF | |
| 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 setting 0h (-14°) to Eh (+14°) |
| 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 | |
| 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_Multicast Mode | Multicast Mode | 81 0B 01 23 0p FF | p=1: On, p=2: Off |
| CAM_PTZMotion Sync | PTZ Motion Sync On | 81 0A 11 13 02 FF | |
| | PTZ Motion Sync Off | 81 0A 11 13 03 FF | |
| | PTZ MS Upper Speed Limit | 81 0A 11 14 pq FF | pq: Speed stage |
| | PTZ MS Lower Speed Limit | 81 0A 11 14 pq FF | |
| CAM_UACStatus | Toggle USB Audio | 81 2a 02 a0 04 0p FF | p=2: On, p=3: Off |

Part 5: PTZOptics VISCA over IP Query Command List

| | | | |
|----------------------------------|----------------|----------------------------------|---|
| CAM_PowerInq | 81 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 | 81 09 04 47 FF | y0 50 0p 0q 0r 0s FF | pqrs: Zoom position |
| CAM_FocusAFModelInq | 81 09 04 38 FF | y0 50 02 FF | Auto Focus |
| | | y0 50 03 FF | Manual Focus |
| CAM_FocusPosInq | 81 09 04 48 FF | y0 50 0p 0q 0r 0s FF | pqrs: Focus Position |
| CAM_WBModelInq | 81 09 04 35 FF | y0 50 00 FF | Auto |
| | | y0 50 01 FF | Indoor |
| | | y0 50 02 FF | Outdoor |
| | | y0 50 03 FF | OnePush |
| | | y0 50 05 FF | Manual |
| | | y0 50 20 FF | ColorTemperature |
| CAM_RGainInq | 81 09 04 43 FF | y0 50 00 00 0p 0q FF | pq: Red Gain |
| CAM_BGainInq | 81 09 04 44 FF | y0 50 00 00 0p 0q FF | pq: Blue Gain |
| CAM_ColorTempInq | 81 09 04 20 FF | y0 50 pq FF | pq: ColorTemperature position |
| CAM_AEModelInq | 81 09 04 39 FF | y0 50 00 FF | Full Auto |
| | | y0 50 03 FF | Manual |
| | | y0 50 0A FF | Shutter Priority (SAE) |
| | | y0 50 0B FF | Iris Priority (AAE) |
| | | y0 50 0D FF | Bright |
| CAM_ShutterPosInq | 81 09 04 4A FF | y0 50 00 00 0p 0q FF | pq: Shutter position |
| CAM_IrisPosInq | 81 09 04 4B FF | y0 50 00 00 0p 0q FF | pq: Iris position |
| CAM_BrightPosInq | 81 09 04 4D FF | y0 50 00 00 0p 0q FF | pq: Bright position |
| CAM_ExpCompModelInq | 81 09 04 3E FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_ExpCompPosInq | 81 09 04 4E FF | y0 50 00 00 0p 0q FF | pq: ExpComp position |
| CAM_BacklightModelInq | 81 09 04 33 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_Noise2DModelInq | 81 09 04 50 FF | y0 50 02 FF | Auto Noise 2D |
| | | y0 50 03 FF | Manual Noise 2D |
| CAM_Noise2DLevel | 81 09 04 53 FF | y0 50 0p FF | Noise Reduction (2D) p: 0 to 5 |
| CAM_Noise3DLevel | 81 09 04 54 FF | y0 50 0p FF | Noise Reduction (3D) p: 0 to 5 |
| CAM_FlickerModelInq | 81 09 04 55 FF | y0 50 0p FF | p=0: Off, 1: 50Hz, 2: 60Hz |
| CAM_ApertureModelInq (Sharpness) | 81 09 04 05 FF | y0 50 02 FF | Auto Sharpness |
| | | y0 50 03 FF | Manual Sharpness |
| CAM_ApertureInq (Sharpness) | 81 09 04 42 FF | y0 50 00 00 0p 0q FF | pq: Aperture gain |
| SYS_MenuModelInq | 81 09 06 06 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_PictureEffectModelInq | 81 09 04 63 FF | y0 50 02 FF | Off |
| | | y0 50 04 FF | B&W |
| CAM_LR_ReverseInq | 81 09 04 61 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_PictureFlipInq | 81 09 04 66 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_ColorGainInq | 81 09 04 49 FF | y0 50 00 00 00 0p FF | P: Color gain 0h (60%) to Eh (200%) |
| CAM_PanTiltPosInq | 81 09 06 12 FF | y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF | WWWW: Pan position, ZZZZ: Tilt position |
| CAM_GainLimitInq | 81 09 04 2C FF | y0 50 0q FF | p: Gain limit |
| CAM_AFSensitivityInq | 81 09 04 58 FF | y0 50 01 FF | High |
| | | y0 50 02 FF | Normal |
| | | y0 50 03 FF | Low |
| CAM_BrightnessInq | 81 09 04 A1 FF | y0 50 00 00 0p 0q FF | pq: Brightness position |

| | | | |
|-----------------------|-------------------|----------------------|-------------------------------------|
| CAM_ContrastInq | 81 09 04 A2 FF | y0 50 00 00 0p 0q FF | pq: Contrast position |
| CAM_FlipInq | 81 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 | 81 09 04 AA FF | y0 50 00 FF | Top |
| | | y0 50 01 FF | Center |
| | | y0 50 02 FF | Bottom |
| CAM_ColorHueInq | 81 09 04 4F FF | y0 50 00 00 00 0p FF | P: Color Hue 0h (-14°) to Eh (+14°) |
| CAM_AWBSensitivityInq | 81 09 04 A9 FF | y0 50 00 FF | High |
| | | y0 50 01 FF | Normal |
| | | y0 50 02 FF | Low |
| CAM_UACInq | 81 2A 02 A0 04 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |

| Block Inquiry Command List | | | |
|----------------------------|-------------------|--|--|
| Command | Command Packet | Inquiry Packet | Comments |
| CAM_LensBlockInq | 81 09 7E 7E 00 FF | y0 50 0u 0u 0u 0u 00 00 0v 0v 0v 0v 00 0w 00 FF | UUUU: Zoom position VVVV: Focus position W.bit0: Focus mode 1: Auto, 0: manual |
| CAM_CameraBlockInq | 81 09 7E 7E 01 FF | y0 50 0p 0p 0q 0q 0r 0s tt 0u vv ww 00 xx 0z FF | PP: Red Gain, QQ: Blue Gain R: WB Mode, S: Aperture TT: AE Mode, U.bit2: Backlight U.bit1: Exposure Comp, VV: Shutter position. WW: Iris position, XX Bright position, Z: Exposure Comp position |
| CAM_OtherBlockInq | 81 09 7E 7E 02 FF | y0 50 0p 0q 00 0r 00 00 00 00 00 00 00 00 00 FF | P.bit0: Power 1: On, 0: Off Q.bit2: LR Reverse: 1: On, 0: Off R.bit3~0: Picture Effect Mode |
| CAM_EnlargmentBlockInq | 81 09 7E 7E 03 FF | y0 50 00 00 00 00 00 00 00 0p 0q rr 0s 0t 0u FF | P: AF sensitivity Q.bit0: Picture flip: 1: On, 0: Off RR.bit6~3: Color Gain (0h (60%) to Eh (200%)) S: Flip 0: Off, 1: Flip-H, 2: FlipV, 3: Flip-HV T.bit2~0: NR2D level U: Gain limit |

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 | 0x00 | 0x00 | 0x00 | 0x00 | SUM |
| Set Preset | 0xFF | Address | 0x00 | 0x03 | 0x00 | Preset ID | SUM |
| Clear Preset | 0xFF | Address | 0x00 | 0x05 | 0x00 | Preset ID | SUM |
| Call Preset | 0xFF | Address | 0x00 | 0x07 | 0x00 | Preset ID | SUM |
| 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

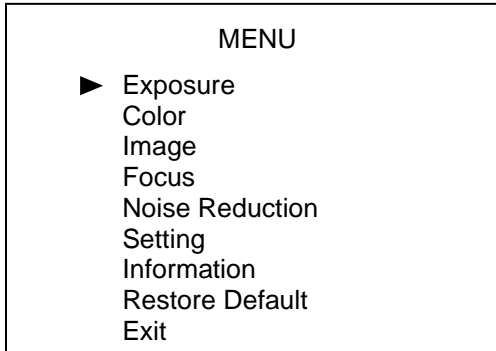
| Function | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|------------------------------|-------|---------|-------|-------|-----------------|----------------|-------|-------|
| Up | 0xA0 | Address | 0x00 | 0x08 | Pan Speed | Tilt Speed | 0xAF | XOR |
| Down | 0xA0 | Address | 0x00 | 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 | 0x0 | 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 |

On Screen Display Menu

Main Menu

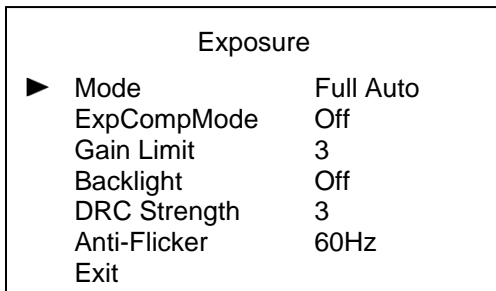
There are many ways to adjust the camera's On Screen Display (OSD) Menu. The following instructions will go over the OSD Menu while the Menu Navigation buttons.

Press the [MENU] button to display the OSD Menu. Use the arrow buttons to traverse the OSD menu, and the [MENU] button to make selections.



Exposure

Move the cursor to the "Exposure" option and press the [MENU] button to enter the Exposure page, as shown in the figure below.



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

ExpCompMode: Exposure Compensation mode
Options include: On, Off
(Only available in Auto mode)

ExpComp: Exposure Compensation value.
Options include: -7 ~ +7
(Only available once ExpCompMode is On)

Backlight: Backlight Compensation mode
Options include: On, Off
(Only available in Auto mode)

Bright: Brightness Intensity.
Options include: 0 ~ 17
(Only available in Bright mode)

Gain Limit: Maximum Gain Limit.
Options include: 0 ~ 15
(Only available in Auto, AAE, Bright, & WDR modes)

Anti-Flicker: Anti-Flicker (lighting)
Options include: Off, 50Hz, 60Hz
(Only available in Auto, AAE, & Bright modes)

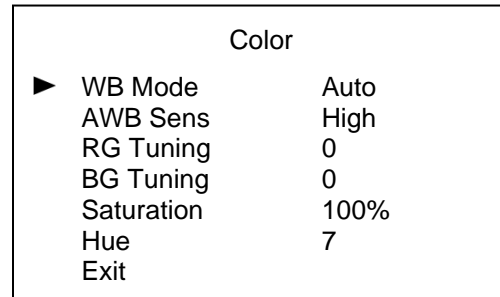
Iris: Camera Iris value.
Options include: Close, F11.0, F9.6, F8.0, F6.8, F5.6, F4.8, F4.0, F3.4, F2.8, F2.4, F2.0, F1.8
(Only available in AAE & Manual modes)

Shutter: Camera Shutter value.
Options include: 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
(Only available in SAE & Manual modes)

DRC Strength: Dynamic Range Control strength.
Options include: 0 ~ 8

Color

Move the cursor to the "Color" option and press the [MENU] button to enter the Color page, as shown in the figure below.



WB Mode: Modes include: Auto, Indoor, Outdoor, OnePush, Manual, VAR

R Gain: Red Gain value.
Options include: 0 ~ 255
(Only available in Manual mode)

B Gain: Blue Gain value.
Options include: 0 ~ 255
(Only available in Manual mode)

ColorTemp: Color Temperature (Kelvin)
Options include: 2500K ~ 8000K
(Only available in VAR mode)

RG Tuning: Red Gain Tuning.
Options include: -10 ~ +10
(Only available in Auto, OnePush, & VAR)

BG Tuning: Blue Gain Tuning.
Options include: -10 ~ +10
(Only available in Auto, OnePush, & VAR)

Saturation: Color Saturation value.
Options include: 60% ~ 200%

Hue: Color Hue value.
Options include: 0 ~ 14

AWB Sens: Auto White Balance Sensitivity.
Options include: Low, Medium, High
(Only available in Auto & OnePush modes)

Image

Move the cursor to the “Image” option and press the [MENU] button to enter the Image page, as shown in the figure below.

| Image | |
|-------------|---------|
| ▶ Luminance | 7 |
| Contrast | 9 |
| Sharpness | 2 |
| Flip-H | Off |
| Flip-V | Off |
| Gamma | Default |
| Style | Bright |
| Exit | |

Luminance: Brightness value.
Options include: 0 ~ 14

Contrast: Contrast value.
Options include: 0 ~ 14

Sharpness: Sharpness value.
Options include: Auto, 0 ~ 15

Flip-H: Flip image horizontally.
Options include: On, Off

Flip-V: Flip image vertically.
Options include: On, Off

B&W Mode: Toggle Black & White mode.
Options include: On, Off

Gamma: Gamma value.
Options include: Default, 0.45, 0.5, 0.56, 0.63

Style: Camera image style.
Options include: Norm, Clarity (LED), Clarity, Bright, Soft, 5S

Focus

Move the cursor to the “Focus” option and press the [MENU] button to enter the Focus page, as shown in the figure below.

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

D-Zoom Limit: Digital Zoom Limit
Options include: x1, x2, x4, x8, x16

AF Sense: Auto Focus Sensitivity
Options include: Low, Middle, High

Auto Focus: Enable / Disable Auto Focus
Options include: On, Off

Noise Reduction

Move the cursor to the “Noise Reduction” option and press the [MENU] button to enter the Noise Reduction page, as shown in the figure below.

| Noise Reduction | |
|-----------------|---|
| ▶ NR2D-Level | 1 |
| NR3D-Level | 3 |
| Exit | |

NR2D-Level: 2D noise reduction value.
Options include: Auto, Off, 1 ~ 5

NR3D-Level: 3D noise reduction value.
Options include: Off, 0 ~ 8

Setting

Move the cursor to the “Setting” option and press the [MENU] button to enter the Setting page, as shown in the figure below.

| Setting | |
|--------------|---------|
| ▶ Language | EN |
| Protocol | VISCA |
| VISCA Addr | 1 |
| Baud Rate | 9600 |
| Video Format | 1080p30 |
| Lens | Type2 |
| Exit | |

Language: OSD language.
Options include: English, Chinese, Russian, French, Spanish, Italian, German

Protocol: Control protocol
Options include: VISCA, Pelco-D, Pelco-P

VISCA Addr: Control address
Options include: (VISCA): 1 ~ 7, (Pelco-D): 0 ~ 254, (Pelco-P): 0 ~ 31

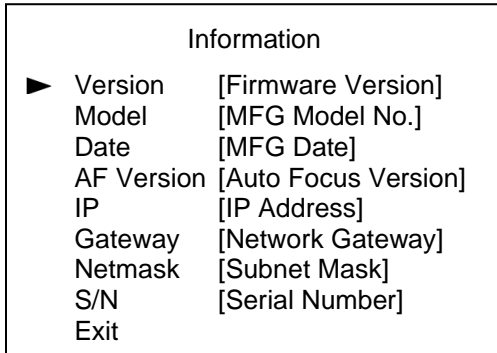
Baudrate: Control speed
Options include: 2400, 4800, 9600, 19200, 38400

Video Format: SDI output resolution
Options include: 1080p60, 1080p30, 720p60, 1080i60

Lens: Lens type (recommended to leave at default value)
Options include: Type2, Type1

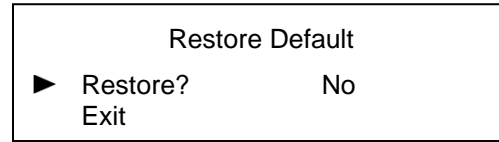
Information

Move the cursor to the “Information” option and press the [MENU] button to enter the Communication Setup page, as shown in the figure below.



Restore Default

Move the cursor to the “Restore Default” option and press the [MENU] button to enter the Restore Default page, as shown in the figure below.



Restore?: Restore OSD settings to default value. Options include: Yes, No

P/T Limit Reset: Reconfigure pan & tilt parameters. Options include: Yes, No

Note: Press the [MENU] button to confirm. All camera parameters will return to default, including VISCA addresses

Network Connection

1. Operating Environment

Operating System: Windows 2000 / 2003 / XP / Vista / 7 / 8.1 / 10, Mac Catalina and later

Network Protocol: TCP/IP

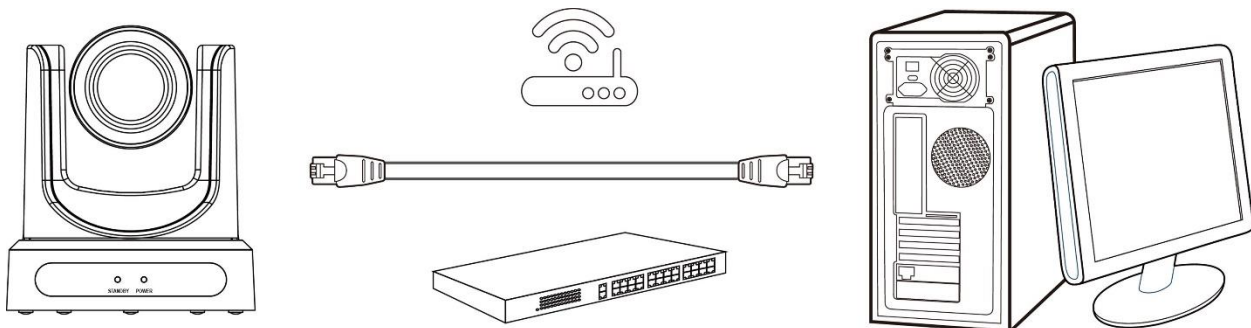
Client PC: P4 / 128M RAM / 40GHD / support for scaled graphics card, support for DirectX8.0 or more advanced version.

2. Equipment Installation

1. Connect the camera to your network via a CAT5 or CAT cable directly to your network switch.
2. Turn on the camera.
3. Once powered on, the orange network light will illuminate and the green light will start flashing.

3. Network Connection

Connect the camera & PC to the LAN as shown below.



Connections to LAN via CAT5 or CAT6 cable

Assigning an IP Address

By default, the camera has the IP address “192.168.100.88”. You have several methods to change this IP address to match your network scheme. Please see the instructions below for your preferred setup.

DHCP

If your network supports DHCP, you can have it automatically assign an IP using one of the methods below.

- Hold down the Left Navigation Button for 3+ seconds to toggle between dynamic and static IP addressing.
- Upgrade Tool v2.7/v2.8 – Select DHCP from Config the tab

Static Address

If you want to give your camera a more permanent IP address, assign the camera a static IP address using the method below.

1. Upgrade Tool v2.7/v2.8 – Assign a static IP address from the Config tab



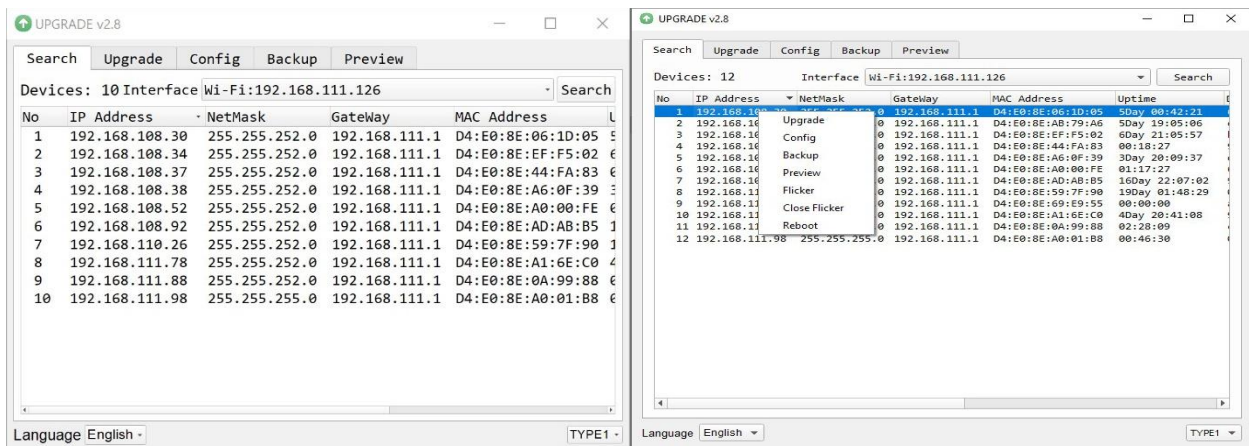
For more information on using the Upgrade tool, please see Using the Upgrade Tool below.

Using the Upgrade Tool

You can use the Upgrade Tool to assign a dynamic IP address, static IP address, firmware upgrade the camera, backup core files, and lastly; restore core files. Please follow the instructions below for best use.

Search Tab

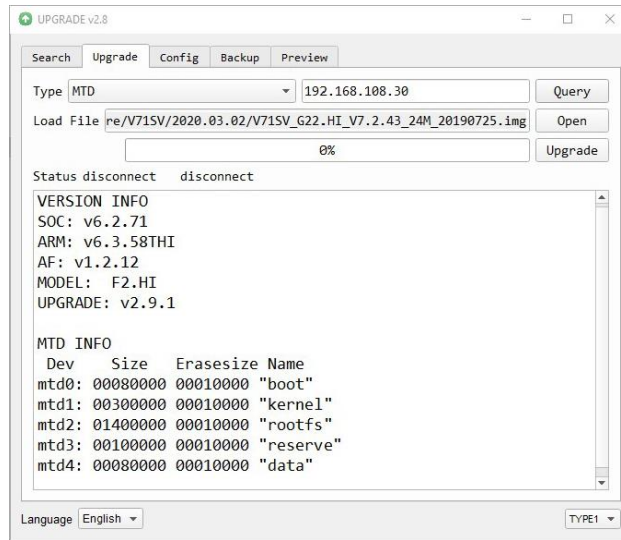
Use the Search Tab to find your camera on your network. The “Interface” dropdown allows you to select which network to search. After selecting the proper network type, click the “Search” button to begin your search.



Once you find the camera you wish to adjust, right click the corresponding IP address to reveal the control menu. From here, select the corresponding tab for the way you want to adjust your camera.

Upgrade Tab

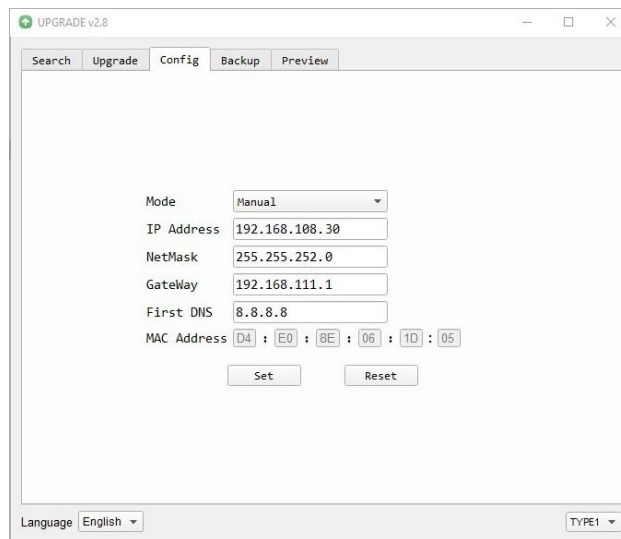
The Upgrade Tab allows you to firmware upgrade the camera. To acquire the latest firmware for your PTZOptics camera, for to <https://ptzoptics.com/firmware-finder>.



To ensure you follow the proper firmware upgrade method, follow the [PTZOptics SDI/NDI Firmware Upgrade Instructions](#).

Config Tab

The Config tab allows you to change the network parameters of a camera. To properly access this interface, right-click a camera from the Search tab, and select “Config” from the menu.



To assign a static IP address, you’ll need to know of a free IP address in your network range, your subnet mask, Gateway, & First DNS.



To find this information, check out the section [Discovering your Network Info](#) below.

Alternatively, you can click the “Mode” dropdown and select “DHCP” to have your network auto fill this information.

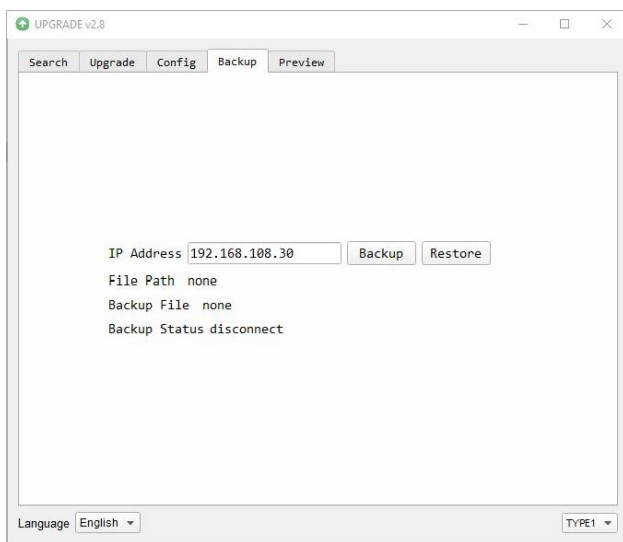
In either case, once the network information is filled, click the “Set” button to apply these parameters. The camera will restart with the new network settings.

Backup Tab

The Backup tab allows you to backup and restore files. For best results, name each backup file something specific to the camera (such as the serial number).

These files consist of:

- Serial Number
- MAC Address¹
- Presets²
- Other core camera files.

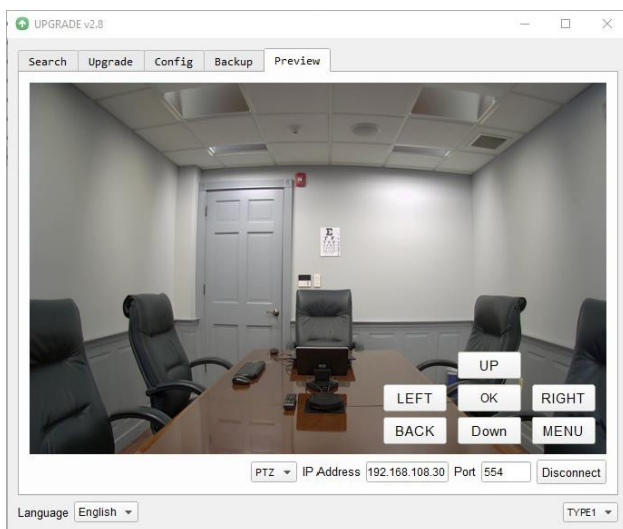


¹Because the MAC Address is stored in this backup file, ensure you do not apply/restore it to a different camera, as that will change the second camera's MAC address to the first camera's MAC address.

²Presets are not always saved properly and may need to be re-set.

Preview Tab

The Preview tab allows you to view the RTSP feed of your camera. You can send the camera to the Preview tab from the Search tab, or simply type in the IP address into the field and click "Connect".

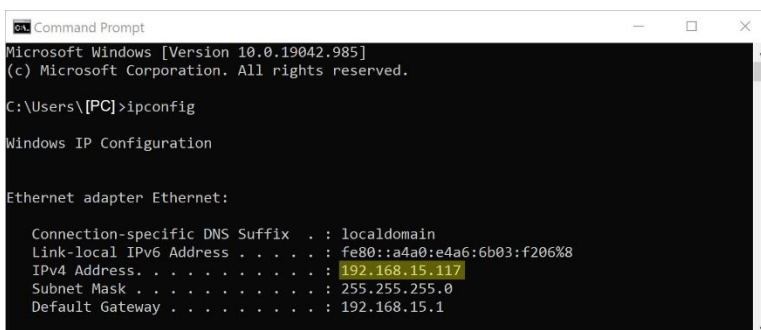


Discovering your Network Info

To discover your IP address range/scheme, Subnet Mask, Gateway, & First DNS, follow the instructions below for Windows or Mac OS. You may need to talk with your IT department to obtain this information.

Windows

1. Open the Start menu and type “CMD” into the search bar.
2. Once the Command Prompt is open, type in “ipconfig” and press the Enter key.
3. Scroll down to the section titled “Ethernet adapter Ethernet” or “Ethernet adapter Wireless Network Connection”.
4. Locate the “IPv4 Address” in that section. This is your computers local IP address.



```
Command Prompt
Microsoft Windows [Version 10.0.19042.985]
(c) Microsoft Corporation. All rights reserved.

C:\Users\[PC]>ipconfig

Windows IP Configuration

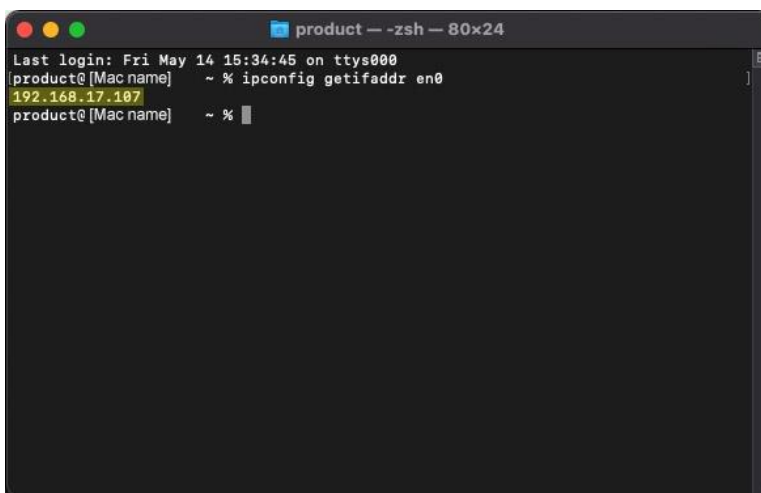
Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : localdomain
    Link-local IPv6 Address . . . . . : fe80::a4a0:e4a6:6b03:f206%8
    IPv4 Address. . . . . : 192.168.15.117
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.15.1
```

5. In the example above, the PC’s local address is “192.168.15.117”, making the network range “192.168.15”.

Mac

1. Open a new Finder window and go to the Applications folder.
2. Open the Utilities folder and select the Terminal program.
3. Once the Terminal program is open, type in “ipconfig getifaddr en0” and press the Enter key.



```
product --zsh-- 80x24
Last login: Fri May 14 15:34:45 on ttys000
product@[Mac name] ~ % ipconfig getifaddr en0
192.168.17.107
product@[Mac name] ~ %
```

4. In the example above, the Mac’s local address is 192.168.17.107”, making the network range “192.168.17”.

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.

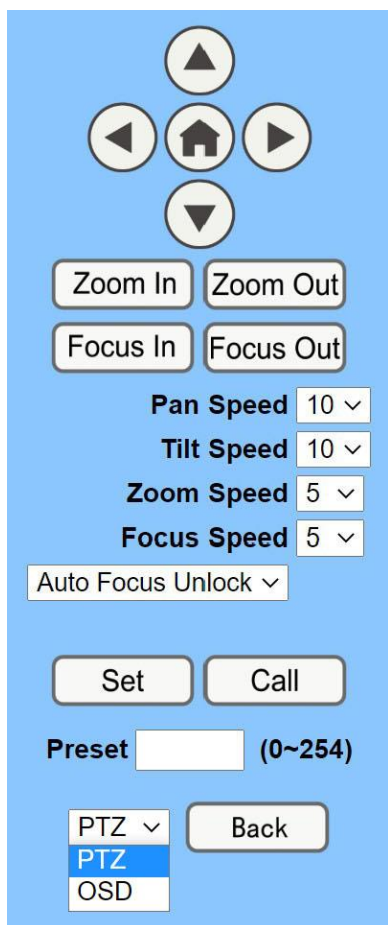
The status bar below the video feed can be used to pause / play the video feed, adjust the audio level, and switch between full screen and windowed view.

The plugin dropdown allows you to select how you view the RTSP feed in the web interface. For best results, set the Second Stream to "MJPEG", and select the "JPEG" from the plugin dropdown.

The Preset Information button allows you to Set, Call, and Name presets 1 ~ 9.

Directional Arrows

Use the PTZ / OSD dropdown to select how the Directional Arrows behave. While "PTZ" is selected, you will have control over Pan, Tilt, and calling the Home position. When "OSD" is selected, the On Screen Display Menu will open, allowing you to use the Directional Arrows to traverse the OSD Menu.



Directional Arrows: Use the Up / Down / Left / Right buttons to Pan / Tilt the camera or traverse the OSD Menu.

Home Button: Use the Home Button to send the camera to the Home position, or to make a selection within the OSD Menu.

Zoom In / Out: Use the Zoom In and Zoom Out buttons for narrow (tele) or 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 Pan, Tilt, Zoom, and Focus Speed dropdowns to adjust the speed at which you control the camera.

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

PTZ Presets: 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 the PTZ Preset position.

PTZ / OSD Dropdown: Use the PTZ / OSD Dropdown to select Pan / Tilt / Zoom control, or On Screen Display Menu Control.

Video

Video Settings

720p120: On Off

Video Format: 60Hz ▾

Encode Level: highprofile ▾

NDI Preset: High ▾

First stream

Encode Protocol: H264 ▾

Resolution: 1920x1080 ▾

Bit Rate: 12288 (32~20480) kbps

Frame Rate: 60 ▾ fps

I Key Frame Interval: 120 (2~1200)

Bit Rate Control: CBR VBR

Fluctuate Level: 1 ▾

Slice Split Enable: On Off

Split Mode: Fixed blocks Fixed bytes

Slice Size: 68 blocks/bytes

Second stream

Encode Protocol: H264 ▾

Resolution: 640x360 ▾

Bit Rate: 2048 (32~6144) kbps

Frame Rate: 30 ▾ fps

I Key Frame Interval: 60 (2~1200)

Bit Rate Control: CBR VBR

Fluctuate Level: 1 ▾

Slice Split Enable: On Off

Split Mode: Fixed blocks Fixed bytes

Slice Size: 23 blocks/bytes

Video Format: Supports 50Hz (PAL), 60Hz (NTSC), & Dial Priority formats.

Encode Level: Supports baseline, mainprofile, highprofile, & SVC-T.

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

Encode Protocol: Supports H.264, H.265, & MJPEG

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 feed 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).

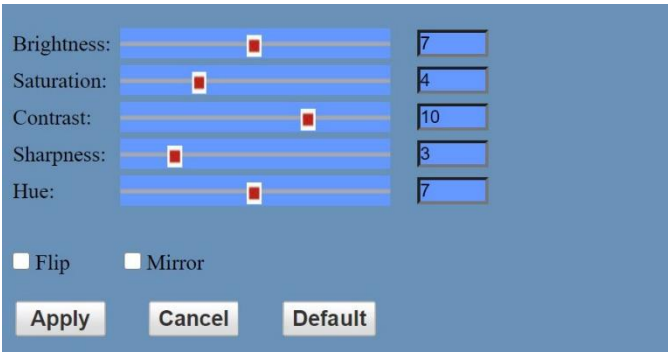
Fluctuate Level: Limit the fluctuation magnitude of variable rate. Supports 1 ~ 6.

Slice Split Enable: Enable / Disable splice split function.

Split Mode: Supports Fixed blocks and Fixed bytes.

Slice Size: Set the slice size.

Image



Brightness: [Slider] [7]

Saturation: [Slider] [4]

Contrast: [Slider] [10]

Sharpness: [Slider] [3]

Hue: [Slider] [7]

Flip Mirror

Apply Cancel Default

Brightness: Brightness slider. Default: 7

Saturation: Saturation slider. Default: 4

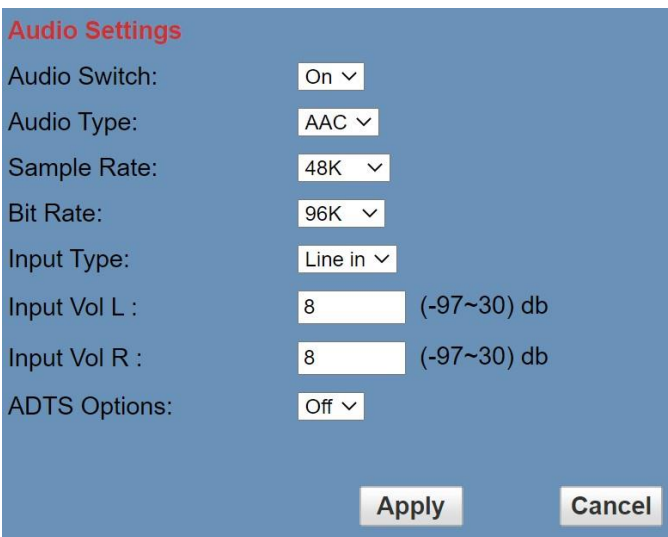
Contrast: Contrast slider. Default: 10

Sharpness: Sharpness slider. Default: 3

Hue: hue slider. Default: 7

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

Audio



Audio Settings

Audio Switch: On ▾

Audio Type: AAC ▾

Sample Rate: 48K ▾

Bit Rate: 96K ▾

Input Type: Line in ▾

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

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

ADTS Options: Off ▾

Apply Cancel

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.

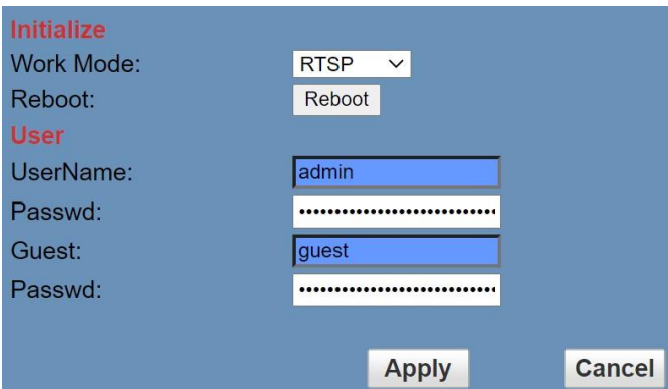
Input Vol L: Volume of left channel. -91 ~ +30 dB

Input Vol R: Volume of right channel. -91 ~ +30 dB

ADTS Options: Enable / Disable Audio Data Transport Stream.

System

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



Initialize

Work Mode: RTSP ▾

Reboot: Reboot

User

UserName: admin

Passwd:

Guest: guest

Passwd:

Apply Cancel

Reboot: Used to power cycle the camera.

Username: Username to log in to device.
Username: "admin"

Password: Password to log in to device.
Default password: "admin"

Guest (Username): Guest username to log in to device.
Username: "guest".

Guest (Password): Guest password to log in to device.
Default password: "guest".

Note: The custom password field is limited to 15 characters. Passwords longer than this will be forced to 15 characters.

Network

Lan Settings

IP Configuration Type: Fixed IP Address

IP Address: 192.168.108.44

Subnet Mask: 255.255.252.0

Gateway: 192.168.111.1

DNS Address: 192.168.111.1

MAC Address: D4 : E0 : 8E : 01 : A6 : 98

Apply Cancel

Port Settings

HTTP Port number: 80 (80)

RTSP Port: 554 (554)

PTZ Port: 5678 (5678)

UDP Port: 1259 (1259)

Sony Visca: 52381

SRT Settings

SRT: On Off

SRT Port: 4578

SRT Encry: Off

SRT Password: 1234567891 (SRT Password length greater than 9 bits)

Control Protocol Settings

Pelco-D Address: 0 (0-254)

Pelco-P Address: 0 (0-31)

RTMP(S) Settings

First stream: On Off Video Audio

MRL: rtmp://192.168.100.138/live/stream0

Second stream: On Off Video Audio

MRL: rtmp://192.168.100.138/live/stream1

RTSP Settings

RTSP Auth: On Off

ONVIFSettings

ONVIF: On Off

ONVIF Auth: On Off

Multicast Settings

Multicast: On Off

Address: 234.1.2.88

Port: 6688

SDK Settings

Active Connection: On Off

Address: 192.168.100.138

Port: 1234

NTP Settings

time zone: (GMT-05:00) Eastern Time (US & Canada)

NTP time sync: On Off

NTP Address: Windows NTP Mac NTP Custom NTP

Server address: time.apple.com

Time interval: 1440 minutes

Main time show: On Off

Position: X 0 Y 0 (0~100)

Sub time show: On Off

Position: X 0 Y 0 (0~100)

Apply Cancel

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.

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 addresses.

Pelco-D Address: 0 ~ 254.

Pelco-P Address: 0 ~ 31.

RTMP(S) 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's Video & Audio.

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

Second Stream: Enable / Disable Stream 2's Video & Audio.

(Second Stream) MRL: Text field for RTMPS Stream 2'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 the ONVIF protocol.

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 is the port used for the Multicast. Default: 6688.

SDK Settings: The SDK Settings section allows you to adjust the Software Development Kit settings of the camera.

Active Connection: Enable / Disable the SDK active connection.

Address: Adjust the Multicast address.

Port: This port is used for the SDK protocol. Default: 1234.

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.

NTP Address: Enable Windows NTP, Mac NTP, or Custom NTP.

Server Address: Text field for Custom 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

NDI® Config

NDI® Config

NDI® Local Device Name: PTZOpticsCamera

NDI® Local Device Channel: Chan1

NDI® Receive Group: Public

Enable NDI® Discovery Server: On Off

NDI® Discovery Server: 192.168.1.2

Enable NDI® Multicast Server: On Off

NDI® Multicast Address: 239.255.0.10

NDI® Multicast Mask: 255.255.0.0

NDI® Multicast TTL: 1

NDI® Firmware Version: PT4.6.1

Apply Cancel

NDI® Local Device Name: The friendly name the camera will show up as within NDI® devices. For best results, give all 'live' camera the same Local Device Name. e.g., 'PTZ Cameras' or "Box Cameras".

NDI® Local Device Channel: The channel name the camera will utilize within NDI® devices. For best results, set a unique Local Device Channel for each camera. e.g., 'Wide Shot' or 'Tight Shot'.

NDI® Receive Group: The NDI® Receive Group allows you to limit which users on your LAN can see the NDI® source. For best results, the Receive Group should remain "Public". Once the Receive Group is changed, you will need to join the Receive Group through NDI® Access Manager.

Enable NDI® Discovery Server: Enable / Disable the NDI® Discovery server.

NDI® Discovery Server: Server address field when NDI® Discovery server is enabled.

Enable NDI® Multicast Server: Enable / Disable the NDI® Multicast Server.

NDI® Multicast Address: Multicast address field when NDI® Multicast server is enabled.

NDI® Multicast Mask: Used to adjust the NDI® Multicast Subnet Mask.

NDI® Multicast TTL: Used to adjust the Multicast Time-To-Live interval.

NDI® Firmware Version: Displays the current NDI® version on the camera.

For more information on how to utilize the NDI Discover server, check out <https://support.newtek.com/hc/en-us/articles/218109477-NDI-Discovery-and-Registration>.

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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" (中文), or "Russian" (Русский).

PTZOptics HTTP-CGI Camera Control

HTTP-CGI – Control

Pan & Tilt

`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

`http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]&[zoom speed]`

[Action]: zoomin, zoomout, zoomstop

[Zoom Speed]: 1 (Slowest) ~ 7 (Fastest)

Focus

`http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]&[focus speed]`

[Action]: focusin, focusout, focusstop

[Focus Speed]: 1 (Slowest) ~ 7 (Fastest)

Focus Lock

`http://[camera ip]/cgi-bin/param.cgi?ptzcmd&[action]_mfocus`

[Action]: lock, unlock

Home Position

`http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&home`

PT Reset

`http://[camera ip]/cgi-bin/param.cgi?pan_tiltdrive_reset`

Preset

`http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]&[position number]`

[Action]: posset, poscall

[Position Number]: 0 ~ 89, 100 ~ 254

Direct Position Recall

`http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&[mode]&[pan speed]&[tilt speed]&[pan position]&[tilt position]`

[Mode]: abs (Absolute position), rel (Relative position)

[Pan Speed]: 1 (Slowest) ~ 24 (Fastest)

[Tilt Speed]: 1 (Slowest) ~ 20 (Fastest)

[Pan Position]: 0001 ~ 0990 (pan right), FFFE ~ F670 (pan left), 0000 / FFFF (home position)

[Tilt Position]: 0001 ~ 0510 (tilt up), FFFE ~ FE51 (tilt down), 0000 / FFFF (home position)

Direct Zoom Recall

`http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&zoomto&[zoom speed]&[zoom position]`

[Zoom Speed]: 0 (Slowest) ~ 7 (Fastest)

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

HTTP-CGI – Navigation

OSD Access

http://[camera ip]/cgi-bin/param.cgi?navigate_mode&[mode]

[Mode]: OSD, PTZ

OSD Menu Navigation

http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]

[Action]: up, down, left, right

OSD Menu Selection

http://[camera ip]/cgi-bin/param.cgi?navigate_mode&[mode]

[Mode]: CONFIRM, OSD_BACK

HTTP-CGI – Image Adjustment

Image Settings

http://[camera ip]/cgi-bin/param.cgi?post_image_value&[mode]&[level]

[Mode]: bright, saturation, contrast, sharpness, hue

[Level]: 0 ~ 14

Image Orientation

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 PTZOptics 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 to be 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.

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.

To retrieve your series of four (4) video files, 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]/videol.mp4
Video 2: http://[camera ip]/videol.mp4
Video 3: http://[camera ip]/videol.mp4
Video 4: http://[camera ip]/videol.mp4

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.

Maintenance and Troubleshooting

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 close to powerful electromagnetic radiation, such as TV or radio transmitters, etc.

Troubleshooting

- No image
 - Check whether the power cord is connected, voltage is OK, & Power LED is illuminated.
 - Check that the video cable is connected correctly.
 - If SDI, make sure that the destination device is accessing the SDI port that you plugged into.
 - Check that the iris is not closed.
- Abnormal display of image
 - Check the resolution of the camera. Be sure to use a resolution and frame rate that is supported by your software / hardware.
- Image is shaky or vibrating
 - Check whether the camera is mounted solidly or sitting on a steady horizontal and level surface.
 - Check the building and any supporting furniture for vibration. Ceiling mounts are often affected by building vibration more than wall mounts.
 - Any external vibration that is affecting the camera will be more apparent when in tele zoom (zoomed in) settings.

Control

- Serial communication does not control the camera
 - Verify that the RS-485 cable is connected correctly and using the proper pinout.
 - Verify the communication settings of the control software or device (e.g. joystick).
 - Verify that the communication port on the controlling device is activated (e.g. Com port on PC).
 - Verify that all communication settings in the OSD Setup Menu correlate to the commands being used (e.g. VISCA address).

Certifications

- FCC – Tested under FCC 47 CFR Part 15, Subpart B, Class A:2011, ANSI C63.4 – 2014
- CE – Tested under EMC 2014/30/EU
 - EN 55032:2015
 - EN 61000-3-2:2014
 - EN 61000-3-3:2013
 - EN 55035:2017
- RoHS – Tested under RoHS Directive 2011/65/EU & 2015/863
 - IEC 62321-3-1:2013
 - IEC 62321-5:2013
 - IEC 62321-4:2013+AMD1:2017
 - IEC 62321-7-1:2015
 - IEC 62321-7-2:2017
 - IEC 62321-6:2015
 - IEC 62321-8:2017

Changelog

| | |
|---------------------|---|
| June/2021 – Rev 2.0 | Release of User Manual “2.0” NDI® HX update to NDI® 4 on cameras |
| Oct/2020 – Rev 1.5 | Updated warranty information |