



Share Your Vision

PTZ Optics Studio Pro User Manual

MODEL No.
PT-STUDIOPRO





Preface	1
Precautions	2
Warning	2
Packing List	3
Warranty	3
FCC Statement	4
Copyright Notice	4
Features	5
Camera Features	6
Technical Specifications	8
Powering the LED Light	10
Dimensions	11
Connection Guide	12
IR Remote Controller Guide	13
Shortcut Functions	16
Resetting Your Camera's IP Address	16
On-Screen Display	17
Network Connection	21
NDI ® HX3 Connection	24
Setting & Calling Presets	24
Achieving the Bokeh Effect	29
Web UI	31
Serial & IP Command List	52
Troubleshooting	65

Preface

Before installation and usage, please read the manual thoroughly. If you have any questions or issues with this process, please contact our [Support Team](#).

Precautions

- Do not subject the camera to rain or moisture.
- Do not remove the cover. Removal of the cover will void the camera's warranty and may cause an electric shock. For any abnormal operation, please contact support@ptzoptics.com.
- Never operate outside of the specified operating temperature range or humidity.
- The power supply included in the box is the only power supply to be used with this camera. To purchase a replacement, please visit ptzoptics.com/where-to-buy/.
- Please use a soft cloth to clean the unit. If the unit is very dirty, clean it with diluted neutral detergent; do not use solvents which may damage the surface.

Warning

- Electrical safety
Installation must be in accordance with national and local electric safety standards.
- Polarity of Power Supply
The power supply output for this product is 12V DC with a maximum current supply of 2A. The polarity of the power supply plug is critical and is as follows:



- Handling
 - Avoid subjecting the camera to stress, vibration, or moisture during transportation, storage, installation, and operation.
 - Do not lift or move the camera by grasping the camera head. To avoid mechanical damage, do not turn the camera head by hand.
 - Do not expose the camera to any corrosive solid, liquid, or gas.
 - Please make sure that there are no obstacles in the pan or tilt ranges of the camera lens.
 - After installation is complete, power on the camera.
 - Do not dismantle the camera - PTZOptics is not responsible for any unauthorized modification or dismantling.



- This is an FCC Class-A product. In a domestic environment, this camera may cause radio interference. In the event of radio interference, the user may be required to adequately mitigate it.
- **Remote Control Battery Safety Information:**
- Store batteries in a cool and dry place.
- Do not throw away used batteries in the trash. Properly dispose of used batteries through specially approved disposal methods.
- Remove the batteries if they are not in use for long periods. Battery leakage and corrosion can damage the remote control.
- Do not use old batteries with new batteries.
- Do not mix and use different types of batteries: alkaline, standard (carbon-zinc), or re-chargeable (nickel-cadmium).
- Do not dispose of batteries in a fire. Do not attempt to short-circuit the battery terminals.

Packing List

Please make sure the items below are included in your camera box:

- **Camera**
- **AC Power Supply**
- **USB A-C Cable**
- **LED Panel Light**
- **Quick Start Guide**
- **IR Remote**
- **2 AAA Batteries**

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.

[Here is the link](#) to the PTZOptics Hardware Warranty Documentation. This product has a 5-year warranty.



Covered by one or more claims of the HEVC patents listed at patentlist.accessadvance.com.



FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. 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: This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Copyright Notice

The entire contents of this manual / guide, whose copyright belongs to PTZOptics, may not be cloned, copied, or translated in any way without the explicit permission of the company. The product specifications referred to in this document are for reference only and as such are subject to updating at any time without prior notice.

Features

- **Full-featured USB Interface**

Full-featured USB Type-C interface, compatible with USB 3.0 and USB 2.0, supports audio, encoding output, and UVC 1.5.
- **Precise Focus**

Equipped with TOF close-range assisted focusing, combined with advanced focusing algorithms, it can quickly and stably focus regardless of distance.
- **1080P HD Image**

Adopts a new generation of Panasonic 1/2.8-inch, 2.07 million effective pixel high-quality HD CMOS sensor, which can achieve high-quality images with a maximum resolution of 1920x1080.
- **Easy to Use**

Supports Portrait and Landscape screen switching. Suitable for horizontal and vertical screen display screens. USB plug-and-play, simple and fast. The cold shoe mount allows the panel light or an external microphone to be integrated to enrich the scene.
- **HDMI 1.4b**

Supports HDMI 1.4b, can directly output uncompressed 1080P60 original video.
- **72.5° Wide Lens + 12x Optical Zoom**

Adopts 72.5° high quality ultra wide-angle lens, optical zoom up to 12x, and supports 16x digital zoom.
- **LED Panel Light**

Color adjustment with warm/natural light and dimming range. Can be charged by Studio Pro USB 2.0 port.
- **Supports PoE**

Supports PoE power control, video and audio only needs one network cable to complete.
- **Network Encoding Output**

Supports dual network video stream output (first stream, second stream).
- **Multiple Interfaces**

Supports HDMI, USB 3.0 and network interface, can output 1080P60 video at the same time.
- **Three Power Supply Methods**

Supports USB 5V, DC 12V power adapter and PoE power supply.

Camera Features

- **Camera Control**



Video Templates: The PTZOptics team is making it easy to select the best performance IP video streams for your project by providing easily selectable video templates for NDI and IP streaming.



White Balance Modes: This feature helps in adjusting the color balance in your images, specifically focusing on the color white. Different lighting conditions can change the color of white, which may alter other colors in the image. White balance modes can help correct for different types of light like sunlight, shade, tungsten, fluorescent, etc. so that the white in your image remains true and other colors are displayed correctly.



Exposure Modes: This refers to the different methods the camera uses to decide the correct combination of aperture, shutter speed, and ISO to achieve the perfect exposure. Different modes could include manual (where you control everything), auto (the camera decides), or other modes that allow control over one aspect (like shutter priority, where you control the shutter speed and the camera adjusts the other settings)

- **Additional Updates**



On-Camera Firmware Updates: This feature allows you to update the camera's firmware directly from the camera itself. Firmware is the low-level software that controls the hardware of your camera. Being able to update it directly on the camera simplifies the process and ensures you can easily have the latest features and bug fixes.



Profiles: PTZOptics cameras now feature multiple profiles that allow you to quickly set up your camera for different shooting situations. For example, you might have one profile for indoor shooting, another for outdoor shooting, and another for low light situations. Each profile would have different settings for things like white balance, exposure, frame rate, etc.

- **Networking**



Simple Network Discovery: This is a feature that allows the camera to be easily discovered and connected to a network. PTZOptics cameras can now be found by simply entering <http://ptzoptics.local/> into any web-browser. The IP address can then easily be changed through the user interface.



NTP for NDI sync: Network Time Protocol (NTP) is a networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks. This can be used to ensure that the timestamps on the Network Device Interface (NDI) streams from your cameras are accurate and synchronized, ensuring that your video streams are in sync with each other and with any other networked devices.



Multicast/Unicast: This feature refers to the method of data transmission over a network. In multicast, data is sent to multiple recipients at the same time. In unicast, data is sent from one sender to one receiver. Depending on your network setup and the requirements of your video stream, you might want to use one or the other.

Technical Specifications

Camera & Lens	
Resolution & Frame Rate	HDMI & USB Type C: 1080P@60 / 50 / 30, 1080i@60 / 50, 720P@60 / 50
Sensor	1/2.8", CMOS, Effective Pixels 2.07M
Scanning Mode	Progressive
Lens	12X Optical Zoom f=3.5mm ~ 42.3mm, F1.8 ~ F2.8
Digital Zoom	16X Digital Zoom
Horizontal Field of View	6.9° ~ 72.5°
Vertical Field of View	3.9° ~ 44.8°
Minimum Illumination	0.5 Lux @ (F1.8, AGC ON)
Shutter	1/30s ~ 1/190s
White Balance	Auto, Indoor, Outdoor, One Push, Manual, VAR
Backlight Compensation	Supported
Digital Noise Reduction	3D & 2D Digital Noise Reduction
Video Signal Noise Reduction	≥55dB
Horizontal & Vertical Flip	Supported
Image Freeze	Supported
Number of Presets	255

USB Specifications	
Operating System	Windows 7 / 8.1 / 10 / 11 / Mac OS, Linux, Android
Color System/Compression	YUY2 / MJPEG / H.264
Video Format	<ul style="list-style-type: none"> ▪ YUY2: Max resolution: 1920x1080p@30 ▪ MJPEG: Max resolution: 1920x1080p@60 ▪ H.264 AVC: Max resolution: 1920x1080p@30 ▪ H.265: Max resolution: 1920x1080p@30
USB Audio	Supported
UVC PTZ	Supported
UVC Version	UVC 1.1 ~ 1.5
UVC Control	Supported
IP Video Specifications	
Video Compression	H.264 / HEVC/H.265* / MJPEG
Video Stream	First Stream, Second Stream
First Stream Resolution	1920x1080, 1280x720, 640x480, 640x360
Second Stream Resolution	1280x720, 1024x576, 720x576(50Hz support), 720x480(60Hz support), 720x408, 640x360, 480x270, 320x240, 320x180
Video Bit Rate	First Stream: 32Kbps ~ 102400Kbps Second Stream: 32kbps ~ 20480kbps
Bit Rate Control	Constant Bit Rate (CBR), Variable Bit Rate (VBR)
Frame Rate	50Hz: 1fps ~ 50fps 60Hz: 1fps ~ 60fps
Audio Compression	AAC
Audio Bit Rate	96Kbps, 128Kbps, 256Kbps
Support Protocols	TCP/IP, HTTP, RTSP, RTMP, ONVIF, DHCP, and Multicast.

Input & Output Interface	
HD Output	<ul style="list-style-type: none"> 1x RJ45: 10/100/1000M Adaptive Ethernet Port 1x HDMI: Version 1.4b 1x USB 2.0: Type A (Supplies phantom power to LED panel) 1x USB 3.0: Type C (Supplies video)
Audio Interface	<ul style="list-style-type: none"> 1x 3.5mm Line level Input
IR	4x IR Addresses, Max distance 30ft / gm
Horizontal & Vertical Image Flip Switch	
Power Jack	JEITA Type (DC IN 12V)
Physical Parameter	
Input Voltage	DC 12V / PoE(802.3af)
Current Consumption	12V 1.0A(Max) / 5V 1.5A (Max)
Operating Temperature	14F ~ 104F (-10°C ~ 40°C)
Storage Temperature	-40°F ~ 140°F (-40°C ~ 60°C)
Humidity Range	10% - 80%
Power Consumption	Max 6W
Size in. (W x D x H)	3.03" W x 5.55" D x 4.21" H
Size mm. (W x D x H)	77mm W x 141mm D x 107mm H
Camera Weight	1.74 lbs 0.7 kg

Powering the LED Panel Light

The Studio Pro is able to power and charge the LED Panel Light when connected to the included power supply or via a power over ethernet (PoE) connection. When connected via USB, the camera does not receive enough power to also charge the LED light. Please make sure to fully charge your LED Panel Light before powering the Studio Pro via USB.

Dimensions



Connection Guide

1. To start your camera, please connect the power adapter to the DC-12V power connector port on the back of the camera, ensuring all connections are correct and secure.
2. The power indicator on the front panel of the camera will illuminate.



1. Color Temp Dial

2. Dimmer Dial

3. LED USB C Port

4. LED Power Button

5. Cold Shoe Tilt Mount

6. HDMI

7. USB 2.0 5V Power

8. USB 3.0 Type C (Video)

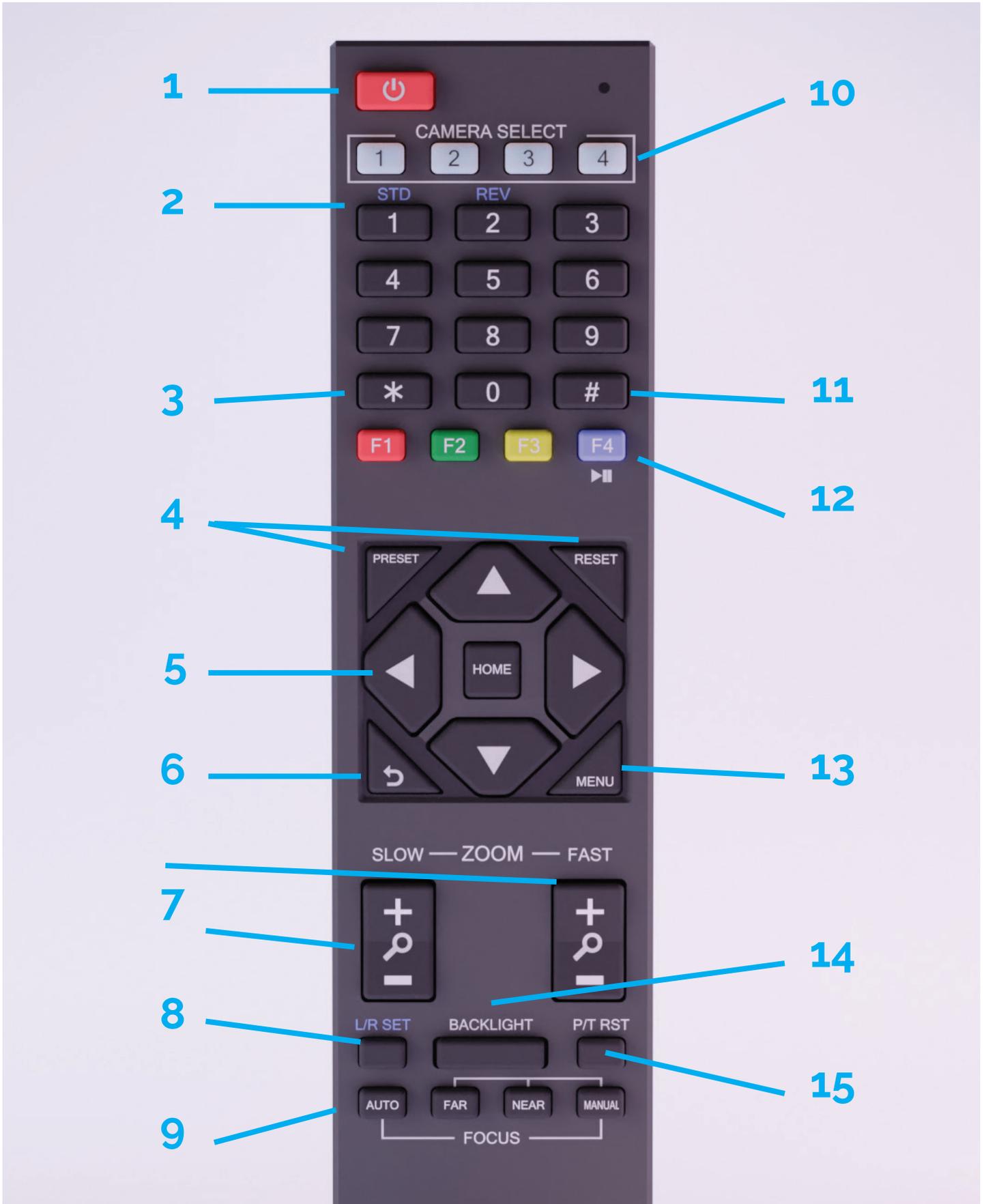
**9. Horizontal & Vertical
Screen Flip Switch**

10. Mic Line In

11. LAN (POE)

12. DC 12V Power

IR Remote Controller Guide



To control multiple IR PTZOptics cameras, this camera uses the same IR remote included with our Pan Tilt Zoom models. However, being a fixed camera lens, this camera cannot pan or tilt.

1. Standby Button

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

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

2. Number Keys

Press to set or call preset camera position or input a number.

3. * Button

Used predominantly when calling shortcuts.

4. Set / Clear Presets

To Set a Preset: save a camera position, press [PRESET] + any number zero through nine.

To Clear a Preset: erase a camera position, press [RESET] + any number zero through nine. To erase all presets, press [*] + [#] + [RESET]

5. Pan / Tilt Control Buttons

Press the [LEFT or RIGHT] arrow to pan. Press the [UP or DOWN] arrow to tilt. Press the [HOME] button to return the camera to the front facing home position.

6. Return Button

Press the [RETURN] button to go back to a previous menu within the on screen display (OSD)

7. Zoom Buttons

Press [+] to zoom in (Slow and fast speed)

Press [-] to zoom out (Slow and fast speed)

8. L / R Set Buttons

Set the Left & Right directional buttons for the remote. *Press the following buttons simultaneously.*

Press [L/R SET] + [1]: Buttons function normally

Press [L/R SET] + [2]: Buttons function inverted

9. Focus Buttons

Adjust camera focus.

[AUTO]: focuses the image on the center object.

[Manual]: Manually control focus. Press [FAR] to focus on a far object. Press [NEAR] to focus on a near object.

10. Camera Select Buttons

Press a number to select the corresponding camera you want to operate.

11. # Button

For multiple functions. Typically used when calling shortcuts

12. Multiple Function Buttons.

You can use this remote to control the auto-tracking functions of PTZOptics cameras that support auto-tracking, but these functions will not function for the Studio Pro Camera.

Function 1: Auto Tracking Control

- **[F1]:** Enable video-based auto-framing **(Studio Pro nonfunctional)**
- **[F2]:** Enable audio-based auto-tracking **(Studio Pro nonfunctional)**
- **[F3]:** Enable video-based auto-tracking **(Studio Pro nonfunctional)**
- **[F4]:** Disable auto-tracking **(Studio Pro nonfunctional)**
- **[F4]:** When the IR remote is on the same IR channel as the Studio Pro, pressing the [F4] button will pause the video feed. Pressing the [F4] button again will play the video feed.

Function 2: For setting camera IR address.

Press these 3 keys one after another to set the camera IR address as follows:

- [*] > [#] > [F1]: Address 1
- [*] > [#] > [F2]: Address 2
- [*] > [#] > [F3]: Address 3
- [*] > [#] > [F4]: Address 4

Function 4: Image Freeze

- **[#] > [*] > [F4]:** Freeze the video feed. Repeat to unfreeze. **(Studio Pro nonfunctional. This feature is only available for PTZOptics cameras that support auto-tracking)**

13. Menu Button

Press to enter the camera's On Screen Menu (OSD)

- [MENU]: Open or close the On Screen Display menu

14. Backlight Button

Use to enable or disable backlight compensation.

Note: Only effective in auto exposure mode.

Note: If there is light behind the subject, they may appear darker. In this case, use Backlight Compensation to enhance image.

15. P / T RST Button

Perform camera self-calibrate pan and tilt movement. (PTZ Cameras Only)

Shortcut Functions

[*] > [#] > [1]: Display OSD menu in English

[*] > [#] > [3]: Display OSD menu in Chinese

[*] > [#] > [4]: Show IP address

[*] > [#] > [6]: Quickly restore the default settings

[*] > [#] > [8]: Show the camera version

[*] > [#] > [9]: Quickly set mount mode (flip / normal)

[#] > [*] > [7]: OnePush White Balance Trigger (Camera must be in OnePush White Balance)

[*] > [#] > [AUTO] Performs the "Startup Dance" on repeat

Resetting the IP address of your camera from the remote:

[*] > [#] > [MANUAL]: Resets IP information to default

[#] > [*] > [4]: Enable Dynamic IP address

[#] > [*] > [#] > [1]: Sets IP address to	192.168.100.81
[#] > [*] > [#] > [2]: Sets IP address to	192.168.100.82
[#] > [*] > [#] > [3]: Sets IP address to	192.168.100.83
[#] > [*] > [#] > [4]: Sets IP address to	192.168.100.84
[#] > [*] > [#] > [5]: Sets IP address to	192.168.100.85
[#] > [*] > [#] > [6]: Sets IP address to	192.168.100.86
[#] > [*] > [#] > [7]: Sets IP address to	192.168.100.87
[#] > [*] > [#] > [8]: Sets IP address to	192.168.100.88
[#] > [*] > [#] > [9]: Sets IP address to	192.168.100.89
[#] > [*] > [#] > [0]: Sets IP address to	192.168.100.80

On-Screen Display

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 using the included IR remote.

Press the [Menu] button to display the OSD Menu. Use the arrow buttons to navigate the OSD menu, the [Home] button to make selections, and the [Return] button to go back a sub menu.

	Menu
	Exposure
	Color
	Image
	Focus
	Noise Reduction
	Setting
	Information
	Restore Default
	[Home] Select
	[Menu] Exit

Exposure

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

	Exposure
Mode	Auto
Exp-CompMode	On
ExpComp	-1
Gain Limit	5
Meter	Average
Backlight	Off
DRC	1
Anti-Flicker	60Hz
[Menu] Back	

(Exposure) Mode: Auto, Manual, SAE, AAE, Bright

ExpCompMode: On, Off (Effective only in Auto mode).

Exp-Comp: -7 ~ +7 (Effective only when ExpCompMode is On).

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

Bright: 0 ~ 23 (Effective only in Bright mode).

Gain Limit: 0 ~ 15 (Effective only in Auto, SAE, AAE, & Bright mode).

Anti-Flicker: Off, 50Hz, 60Hz (Effective only in Full Auto, AAE, Bright mode).

Iris: 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 (Effective only in Manual, AAE mode).

Meter: Average, Center, Smart, Top. (Available only in Full Auto, SAE, AAE, & Bright)

Shutter: 1/30, 1/40, 1/50, 1/60, 1/70, 1/80, 1/90, 1/100, 1/110, 1/120, 1/130, 1/140, 1/150, 1/160, 1/170, 1/180, 1/190 (Effective only in Manual, SAE mode).

Gain: 0 ~15 (Effective only in Manual mode).

DRC Strength: Dynamic Range Control 0 ~ 8

Color

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

Color	
WB Mode	Auto
AWB Sens	Low
RG Tuning	0
BG Tuning	-3
Saturation	90%
Hue	5
[Menu] Back	

WB Mode: Auto, Indoor, Outdoor, One Push, Manual, VAR

AWB Sens: Auto White Balance Sensitivity Low, Middle, & High

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

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

Color Temp: 2500K ~ 8000K (Effective only in VAR mode).

RG Tuning: -10 ~ +10 (Effective only in Auto, One Push, VAR mode).

BG Tuning: -10 ~ +10 (Effective only in Auto, One Push, VAR mode).

Saturation: Camera Saturation value. Options include: 20% - 200%

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

Image

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

Image	
Luminance	5
Contrast	6
Sharpness	8
B&W-Mode	Off
Flip-H	Off
Flip-V	Off
Gamma	EXT
Style	Default
[Menu] Back	

Luminance: Brightness value. Options include: 0 ~ 14

Contrast: Contrast value. Options include: 0 ~ 14

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

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

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

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

Gamma: Default, EXT, 0.56, 0.63

Style: Default, Face, Jewelry

Focus

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

Focus	
TOF Focus	Off
AF-Sense	Normal
Auto Focus	On
AF-Zone	Middle
Focus Lock	Unlock
Focus Limit	Off
Furthest Pos	INF
Nearest Pos	1m
[Menu] Back	

TOF (Time of Flight): On, Off. Measures distance between camera and subject based on light signal travel time.

AF-Sense: High, Normal, Low

Auto Focus: On, Off, One Push

AF-Zone: Determine what area the camera focus targets. Front, Top, Middle, Bottom

Focus Lock: Lock, Unlock

Focus Limit: On, Off

Furthest Pos: INF, 1M - 20m (Only available when focus limit is on)

Nearest Pos: INF, 1M - 20m (Only available when focus limit is on)

Noise Reduction

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

Noise Reduction	
2D NR	4
3D NR	6
[Menu] Back	

2D NR: Auto, Close, 1 - 5

3D NR: Auto, Close, 1 - 8

Setting

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

Setup	
Language	English
Guard Position	Preset 0 Priority
Video Format	1080p60
Audio Enable	On
Audio PC Mono	On
[Menu] Back	

Language: Options include: English, Chinese

Guard Position: Preset 0 Priority, Zoom Stop Save

Video Format: 1080p60, 1080p50, 1080p30, 720p60, 720p50

Audio Enable: On, Off

Audio PC Mono: On, Off

Information

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

Information

Version	9.0.38
Model	P7.HI
Date	2023-06-09
AF Version	14.4.39
IP	192.***.**
Gateway	192.***.**
Netmask	255.255.255.0
Serial Number	*****
Return	

Version: Firmware version

Model: Model Number

Date: Date

AF Verison

IP: IP address for the camera

Gateway

Netmask

Serial Number

Restore Default

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

Restore Default

Yes
No
Return

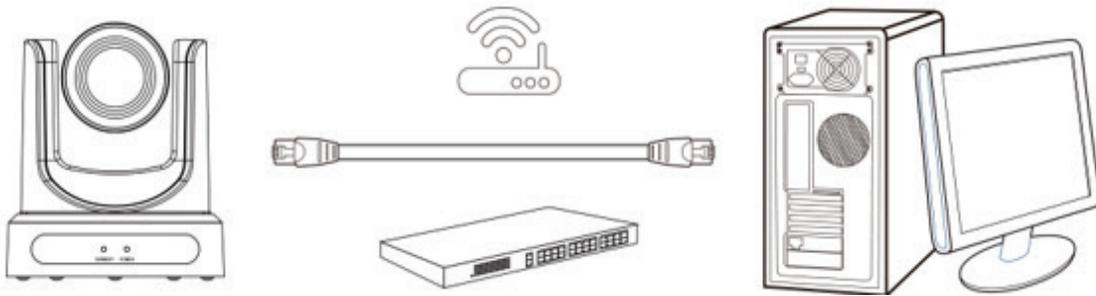
Network Connection

Operating Environment

- Operating System: Windows 7 / 8.1 / 10 / 11, Mac OS X, Linux, Android
- Network Protocol: TCP/IP
- Client PC: P4 / 128M RAM / 40G HDD / supported scaled graphics card, support for DirectX 8.0+.

Equipment Installation

1. To connect your camera to your network, run a CAT 5 or CAT 6 cable from the camera directly into a network switch.
2. Turn on power.
3. If successful, the orange network light will illuminate and the green light will start flashing.



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

Finding the camera's IP Address

The camera will automatically acquire an IP address when connected to the network. If the network cannot assign an IP address, the camera will default to "192.168.100.88". If you don't know the camera IP, please do one of the following:

Method 1: Use a Internet browser and type in "http://ptzoptics.local/" to reach the camera's web interface. The username and password are both "admin" by default. The Network Settings page will allow you to make adjustments to the camera's network settings.

Method 2: Use the IR remote shortcut [*] > [#] > [4] to display the camera's IP address.

Note: If you are setting up multiple cameras, it's recommended to do so one at a time. Assign a unique Device ID to each camera from the Device Info page. This will allow you to reach each camera's web interface without needing to memorize an IP address.

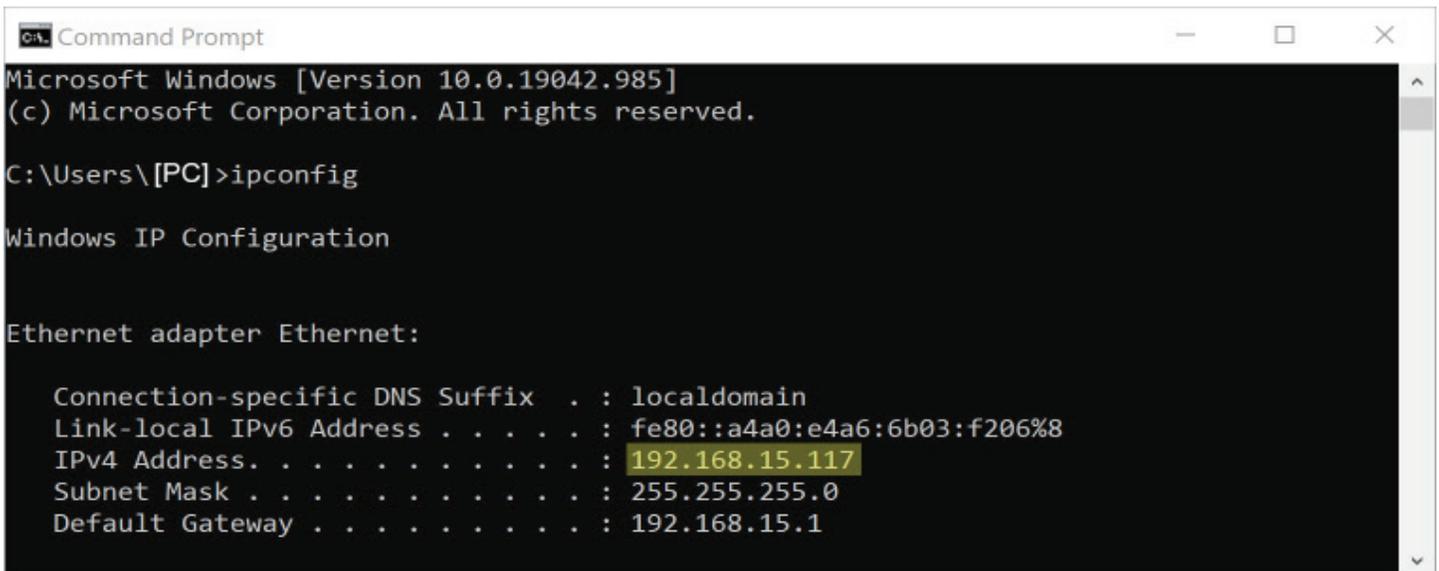
For example, "http://camera1.local/" and "http://camera2.local/".

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.
5. In the example above, the PC's local address is "192.168.15.117", making the network range "192.168.15.xxx".



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

C:\Users\[PC]>ipconfig

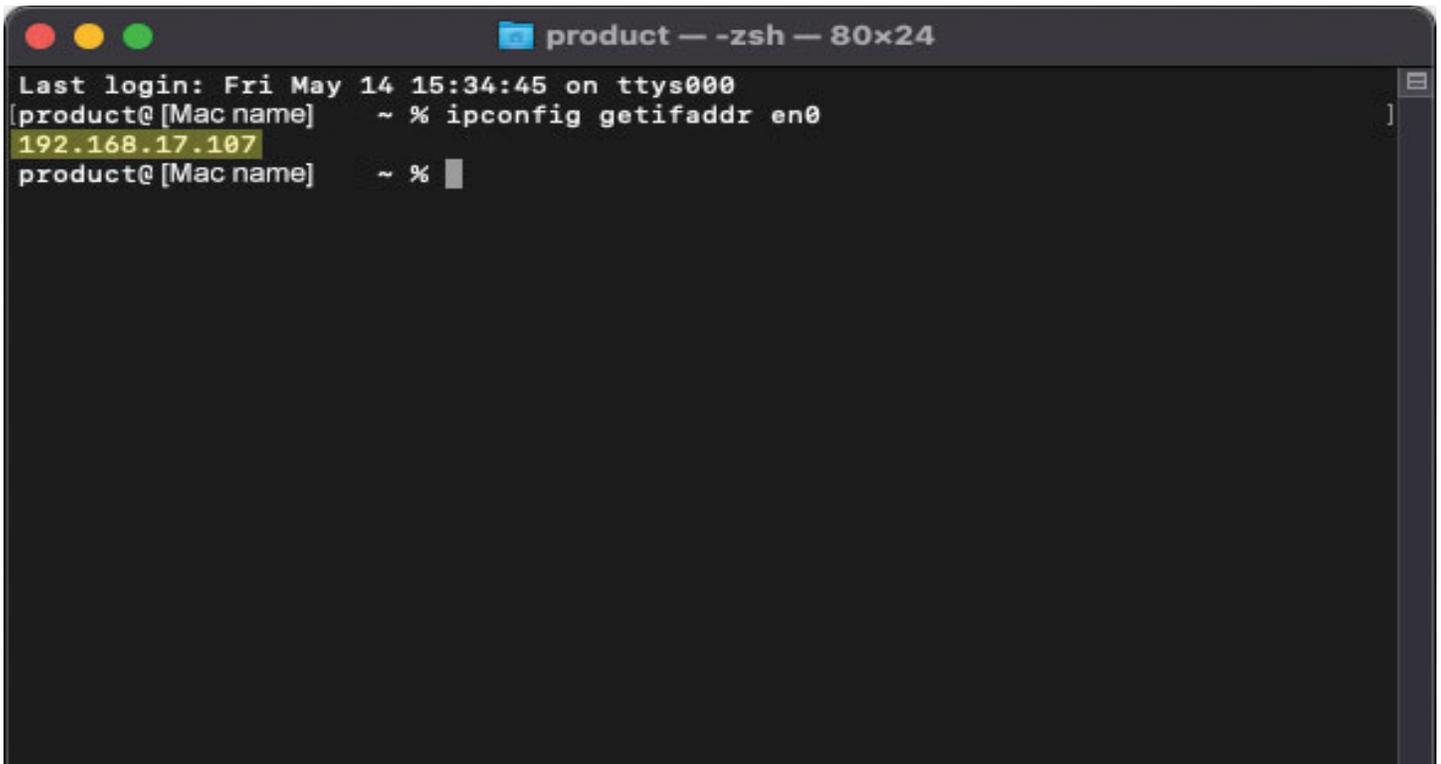
Windows IP Configuration

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
```

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.xxx".

NDI®|HX 3 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.

NDI®|HX 3 Setup

1. Download and install the latest NDI®|HX Tools from <https://www.ndi.tv/tools>.
2. Configure your camera settings from the NDI Config tab in the camera's web interface.
3. Select your camera within the NDI®|HX compatible device.
4. Select your camera. The NDI feed will utilize the camera's device friendly name.

NewTek® NDI®, NDI® 4 & NDI®|HX are all registered trademarks by NewTek®. Please note that your NDI License key is non-transferrable.

Setting & Calling Presets

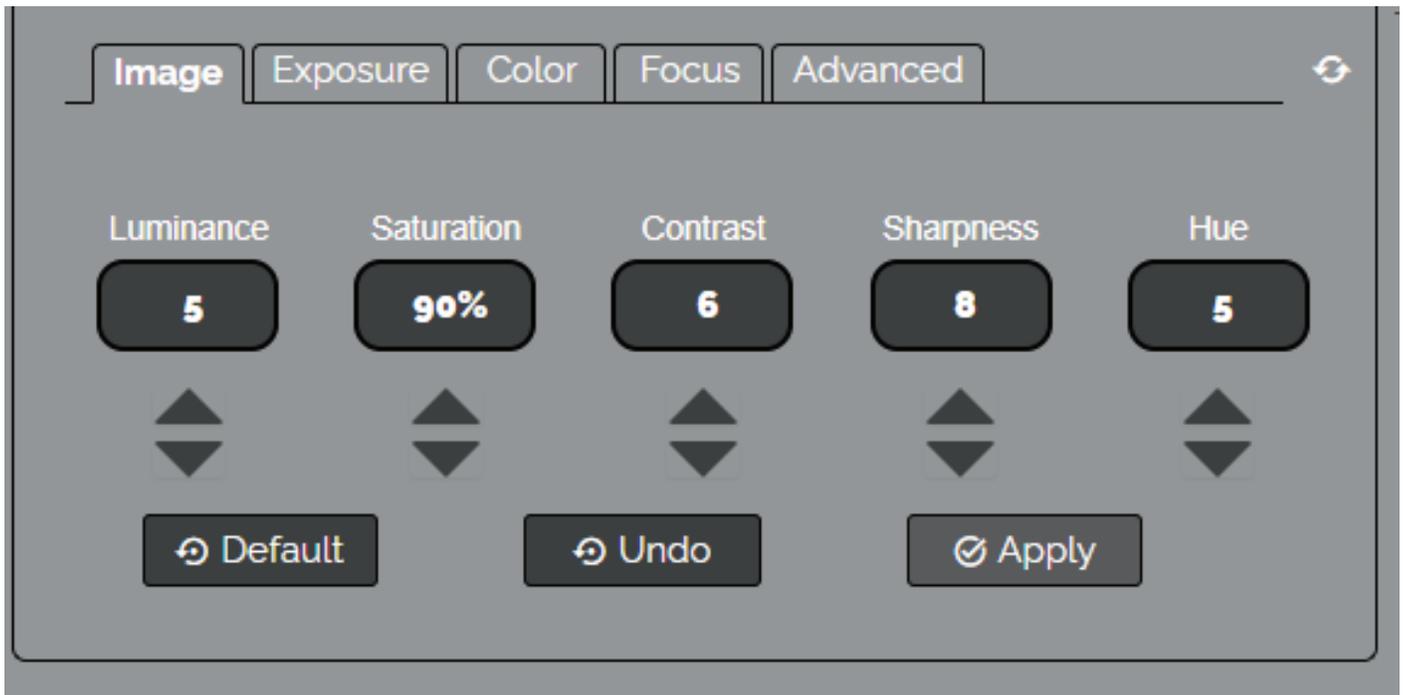
The PTZOptics **Move 4K**, the **Move SE**, **Link 4K**, and **Studio Pro** cameras all utilize the same newly upgraded camera presets system, and in this section, we will explain how to get the most out of presets and how to properly use them.

If you have already attempted setting presets and noticed the image settings changing when moving the camera or switching between presets, please read through the instructions below.

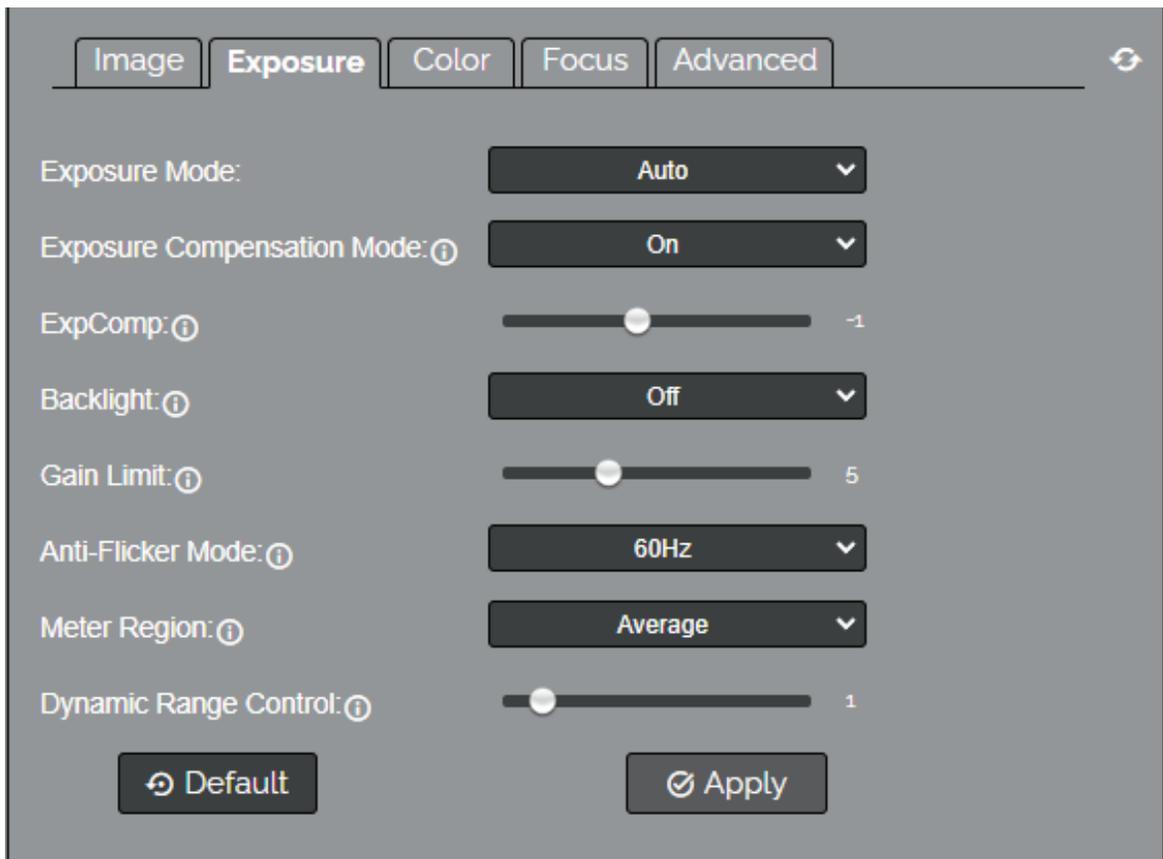
- 1. Lighting:** Before adjusting the camera's settings and saving presets, it is extremely important that you are satisfied with the lighting in the area you plan to operate the camera. (**Tip:** The easiest lighting to work with, is often referred to as "flat lighting", meaning the lighting is as evenly dispersed as possible throughout the scene.)
- 2. Web UI:** Once you have determined that the lighting setup is complete, type the camera's IP address into your web browser to open up the camera's web UI. If you are not familiar with how to do this, please see the Web UI section on page 29.
- 3. Default:** We recommend setting all of the camera's image settings, exposure settings, color settings, and focus settings to default before setting up presets. The default settings are shown on page 25 through 27.

(**Note:** When you save a preset, not only are you saving the position the camera is in, but you are also saving all the image settings it had at that exact time. When panning, tilting, and zooming the camera, all image settings will stay set to their last applied/saved values.)

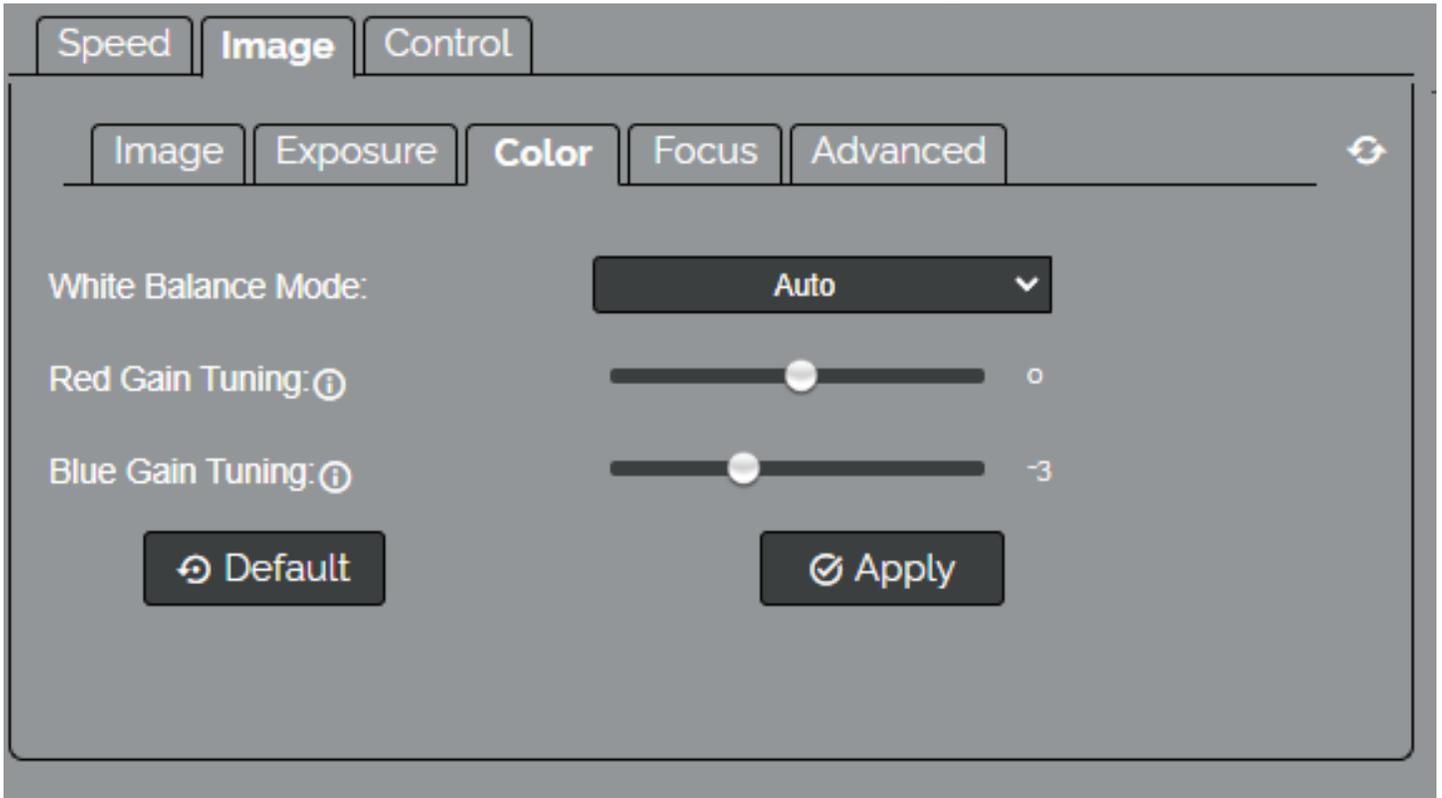
Image Tab Default Settings



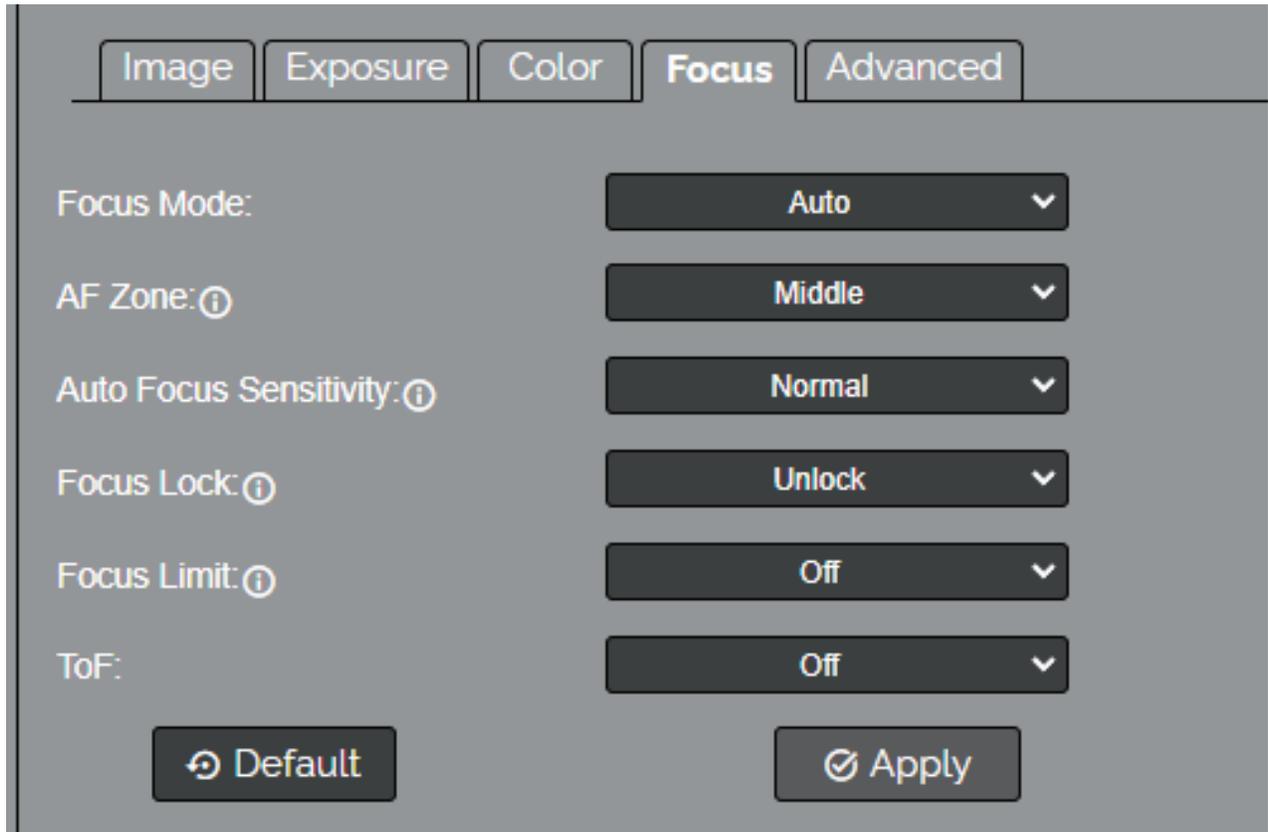
Exposure Tab Default Settings



Color Tab Default Settings



Focus Tab Default Settings



Advanced Tab Default Settings

Speed **Image** Control

Image Exposure Color Focus **Advanced**

Image Orientation: Off ▼

B&W Mode: ⓘ Off ▼

2D Noise Reduction: ⓘ 4 ▼

3D Noise Reduction: ⓘ 6 ▼

↻ Default ↻ Undo ↻ Apply

4. Preset Zero: With all the image settings defaulted, the first preset you need to establish is Preset Zero. This preset, will essentially serve as your baseline reference point. Follow the steps below to establish preset zero.

1. Zoom the camera all the way out and point it at the center-most location in the scene.
2. Adjust any of the camera's image settings until you are happy with the look/style of the image. Image settings include any setting in one of the four images shown on the previous page.
3. Move your cursor over to the preset control area on the right-hand side of the window. Click the drop down tab and select the number "0". Now click "Set".

(Note: A preset will save all of the camera's image settings and their values, when you click set.)

4. Preset zero is now saved.

5. Standard Presets: These presets can be assigned to any number between 1 and 254.

1. Begin by calling preset zero.

(Tip: We recommend taking a screenshot of preset zero to help color match new presets or camera shots from different cameras. It can also be very helpful to pull the camera's video feed into live streaming software such as Vmix or OBS for viewing and comparison. To properly compare image quality, ensure you are using the same monitor or screen.)

2. Move the camera into the position you would like to have saved as a preset.
3. Compare the new preset position with preset zero to ensure they match. Most of the time they will not match, because you are taking the same image settings into a new area with different lighting that requires different settings. Here is where you will need to make adjustments to the image settings to color match with preset zero.
4. Use the drop down tab to select the preset number you wish to save. Then click set.



Achieving the Bokeh Effect with the Studio Pro

The bokeh effect is a popular and aesthetically pleasing photographic technique that creates a soft, out-of-focus background while keeping the main subject sharp and in focus. In this guide, we'll show you how to use the PTZ Optics Studio Pro camera to achieve a stunning bokeh effect and captivate your audience.

Step 1: Lighting

The most straightforward lighting to work with is often called "flat lighting," meaning the lighting is evenly dispersed throughout the scene. We recommend establishing your lighting as close to flat as possible before proceeding.

Step 2: Connection

While the LAN output is viable, for the best resolutions and frame rates, it is recommended that you use the HDMI output to send the video signal from your Studio Pro to your encoding device or computer.

Step 3: Default

We recommend setting all of the camera's exposure, color, image, and focus settings to default before proceeding.

Step 4: Subject & Background

Determine exactly where you want the subject to be in the camera shot. Create as much separation as possible between the subject and the background for the best results. The greater the distance between the subject and the background, the more blur you will be able to create.

With the subject in place, zoom the camera in to the desired level.

Step 5: Iris & Shutter Speed

Enter the camera's on-screen menu and select the exposure settings. and switch the exposure to manual mode.

Turn the iris to the lowest setting, F1.8. The lower the F-stop number, the more light your camera will bring in, thus increasing the blur in the background.

Next, adjust the Shutter setting to 1/30 using the arrow keys.

Lastly, feel free to adjust the gain settings. Higher numbers will increase the blur. You want to keep the image bright but not too bright though, because increasing the settings too far can cause the brighter colors to blowout.

If the image is too bright and washed out, we recommend bumping the F-stop and shutter speed up by small increments until you are content with the quality and brightness of the image, keeping in mind again that the brighter you can get the image, the more blur you will have. This can be a bit of a balancing act and is really up to your preference.

Step 6: Focus Menu

Return to the main menu and scroll down to select the Focus Menu. Please copy the settings in the image below and exit the menu. Please see the Studio Pro manual linked [here](#) for a detailed explanation of this menu.

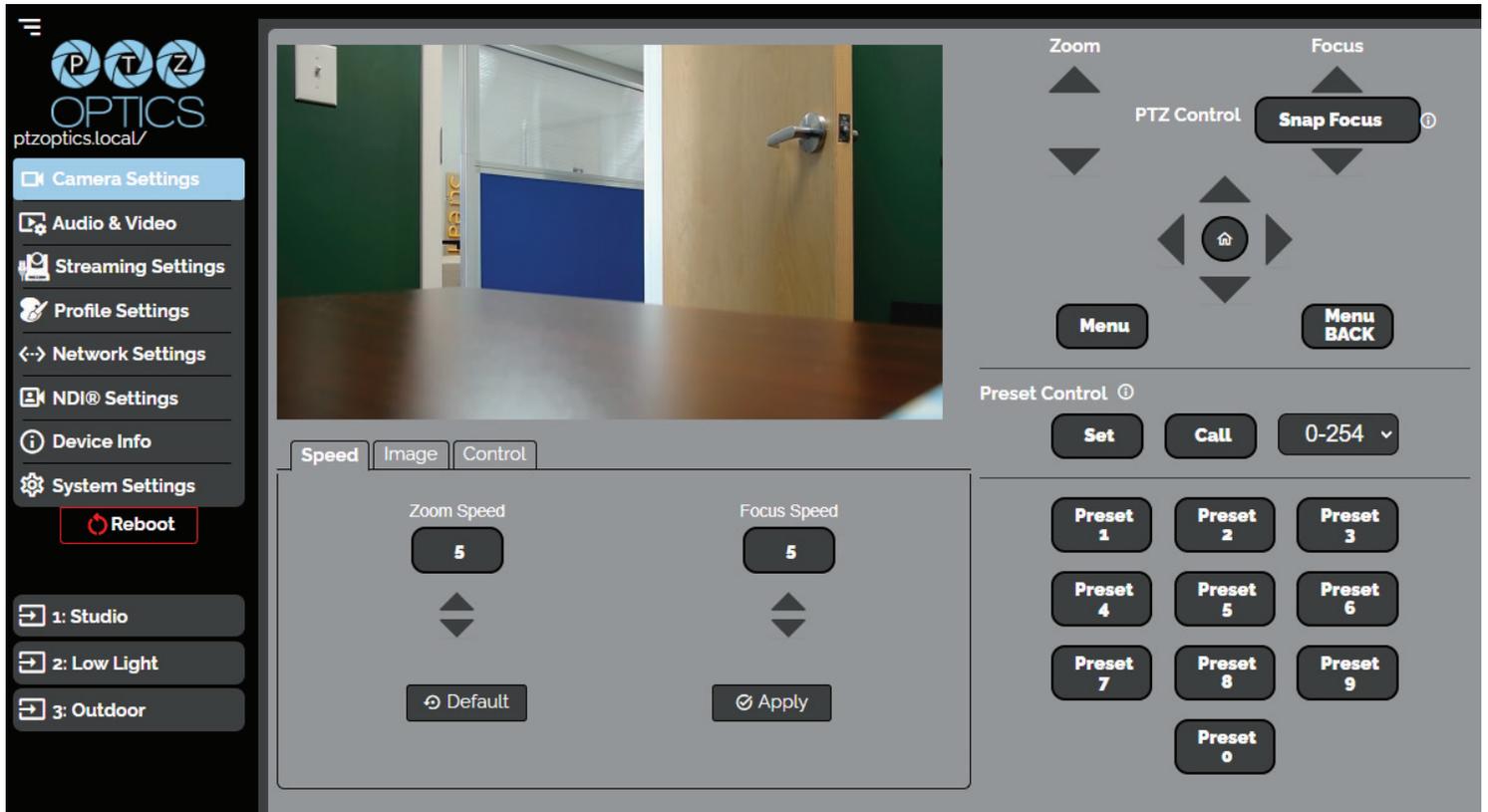
FOCUS	
TOF Focus	Off
AF-Sense	Normal
Auto Focus	Off
AS-Zone	Front
Focus Lock	Unlock
Focus Limit	Off
Return	

Exit this menu and use the Near Focus button on the bottom of the IR remote, to bring the subject into focus. If you've created enough space between the subject and the background, the subject will be in focus and the background will be blurred.

Step 7:

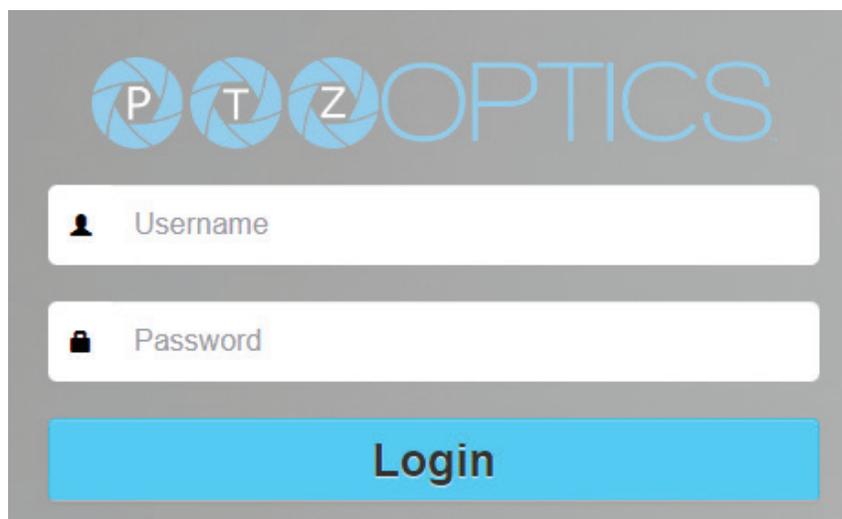
If you would like to save the bokeh setup you've created, simply set it as a camera preset. To do this, press the [Preset] button on your IR remote, followed by the number you would like to assign it to.

Web UI



Accessing the Camera

1. Enter “<http://ptzoptics.local/>” or the camera’s IP address into a web browser.
2. Enter the username and password into the login fields. Both the username and password are “admin” by default. You can change the login credentials on the System Settings page.



Navigation Panel

The **Navigation Panel** allows you to select the various control options for the camera. It can be collapsed to make more room within the user interface.

You can load preconfigured profiles into the camera by selecting the desired profile from the Navigation Panel.



- **Logo:** You can change the photo in the Navigation Panel using Logo Upload from the Profile Settings page.
- **Camera Name:** You can change the camera's name from the Device Info page. The ".local/" appendage will always be on the end to give an easy reminder on how to return to this Web UI.
- **Reboot Button:** The Reboot button will reboot your camera. It can be easily accessed from any page while the Navigation Panel is maximized.
- **Quick Profile:** You can quickly change between pre-configured camera settings using the Profiles saved to the Navigation Panel.

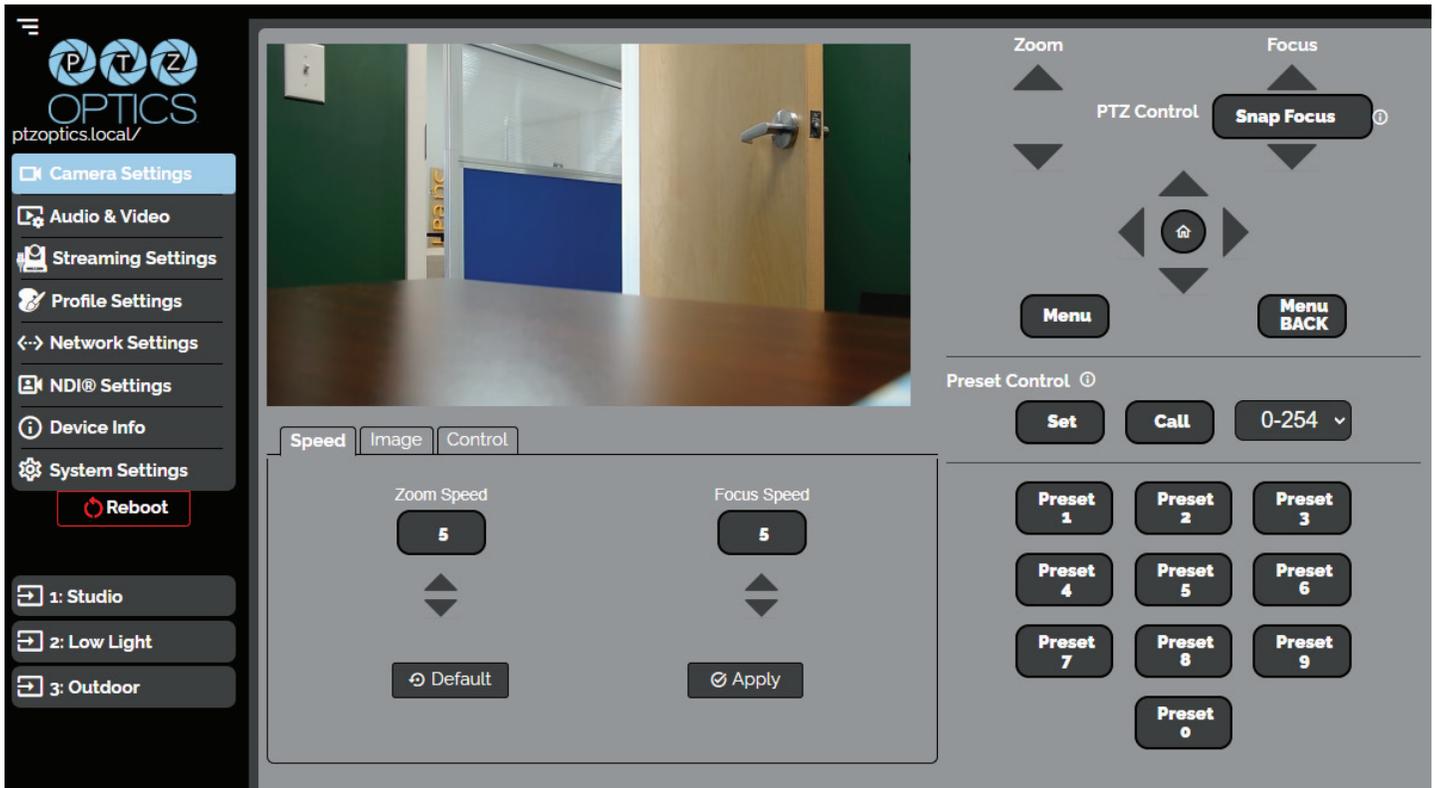
Camera Settings

The **Camera Settings** page gives you access to the **Camera's Video Feed, PTZ Control, OSD Menu, Preset Control, Speed Settings, Image Settings & Control Settings.**

All settings in the **Image** tab are also available in the camera's menu. The settings are offered in the Web UI so you don't have to open the Menu while the camera is in use.

- The PTZ Control section lets you Pan, Tilt, Zoom, and Focus the camera. **(The Studio Pro cannot pan or tilt.)**
- The Menu and Menu Back buttons allow you to navigate the Menu when needed.
- The Preset Control section allows you to save and call up to 255 presets.
 - The Preset 0 - 9 buttons allow you to quickly call the first 10 presets

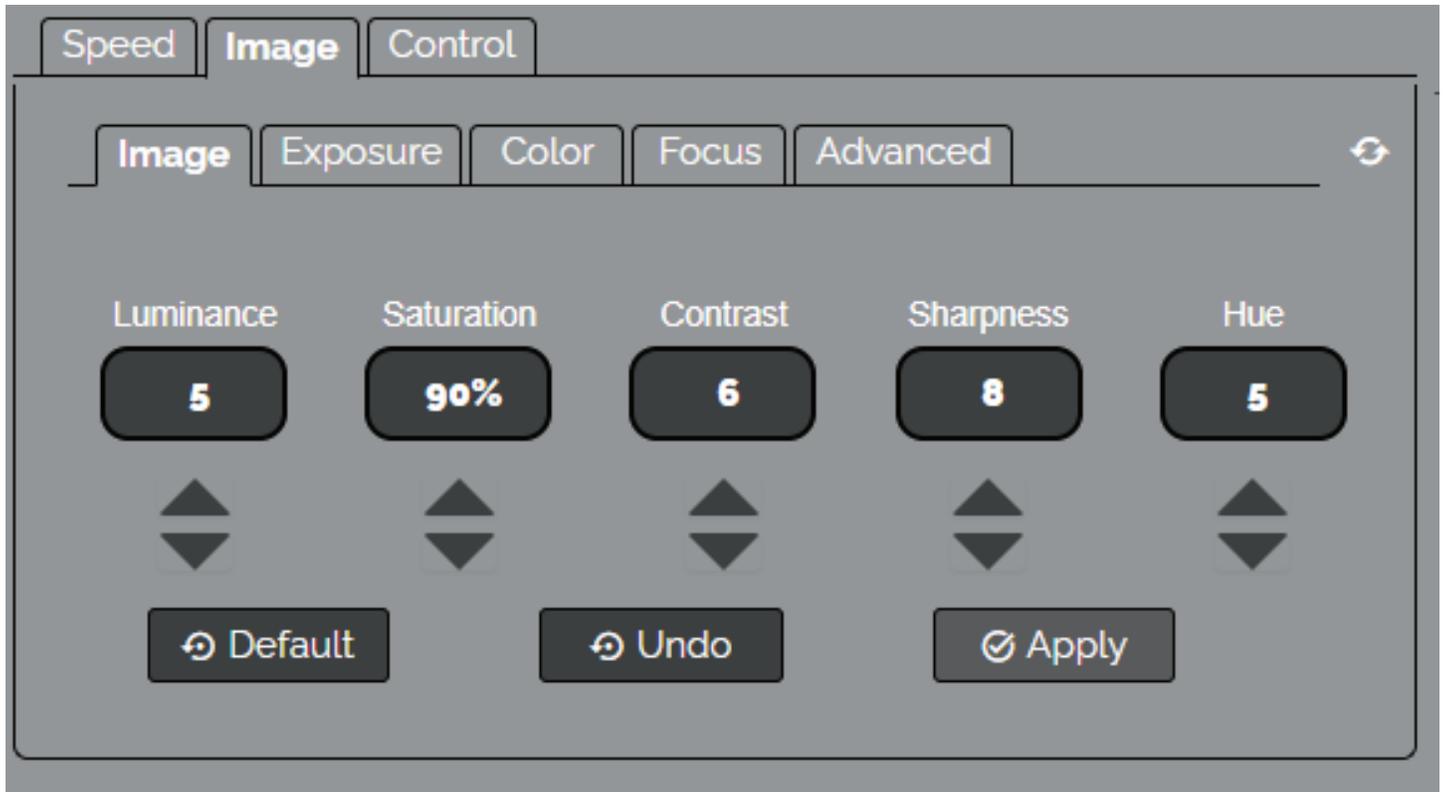
The **Speed** tab within Camera Settings page allows you to adjust the speed at which the camera will **Zoom** and **Focus** while in the Web UI.



- You must click the "Apply" button to save the current Speed settings to the camera.
- The "Default" button will revert the Speed settings to factory default, as shown in the image above

Image

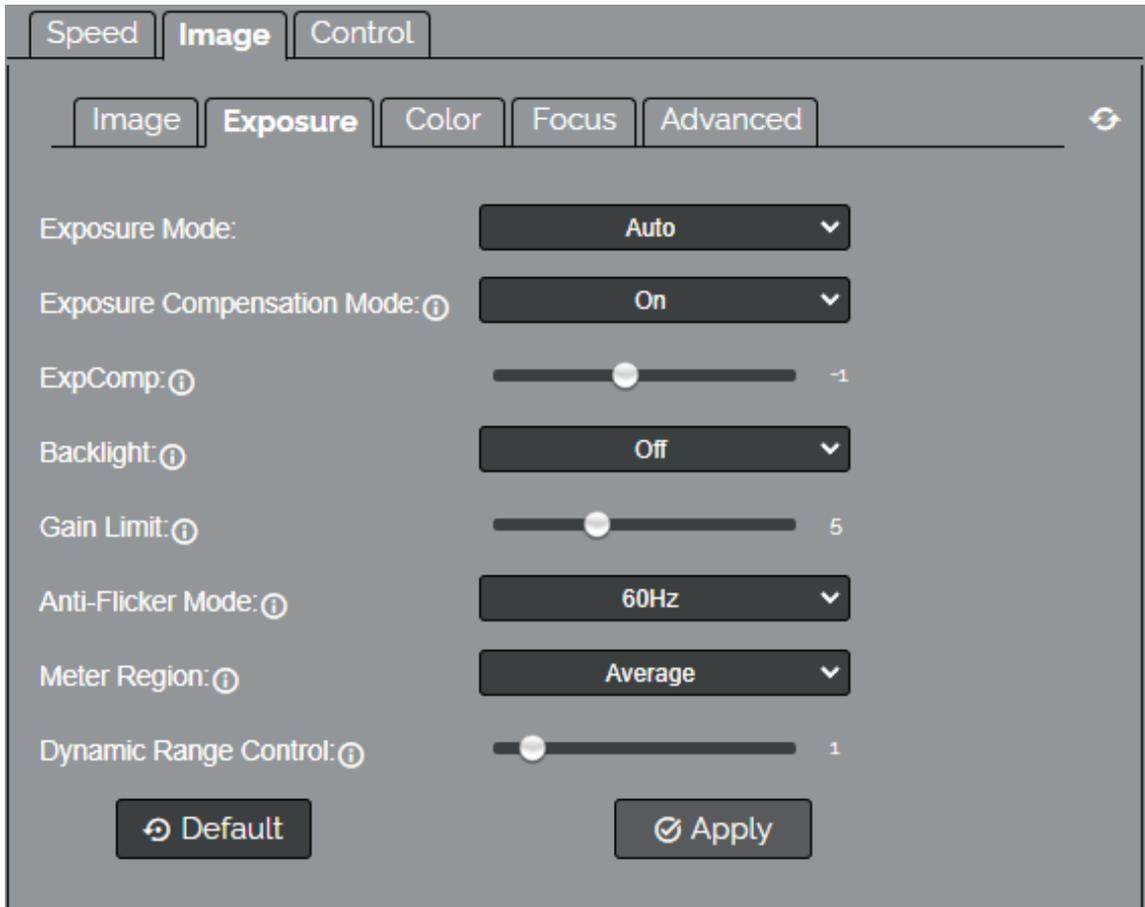
The **Image > Image** tab within the Camera Settings page allows you to adjust the camera's **Luminance, Saturation, Contrast, Sharpness, and Hue**.



- You must hit the “Apply” button for these changes to take effect.
- The “Default” button will revert the Image settings to factory default.
- The “Undo” button will revert the Image settings to the last saved settings.

Exposure

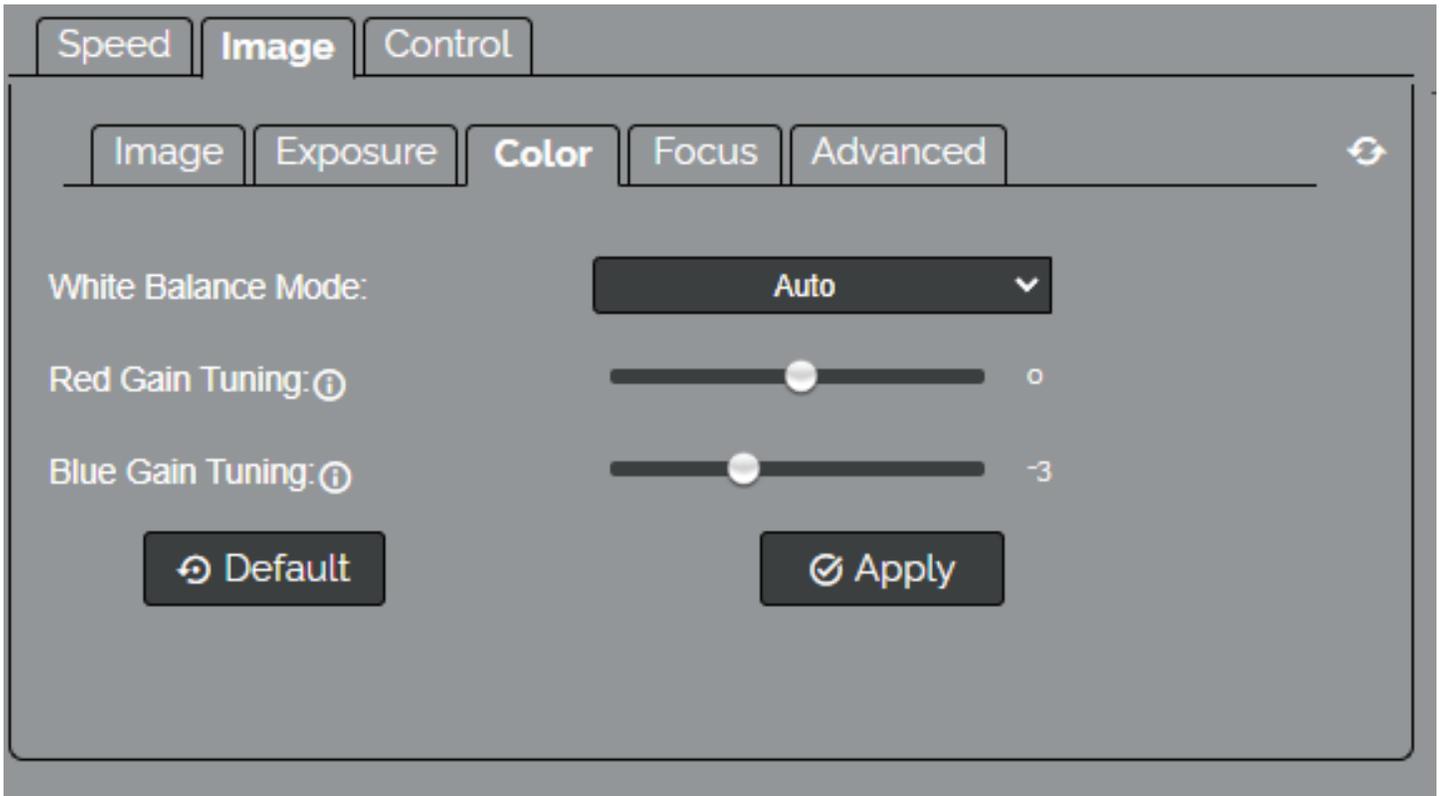
The **Advanced Image > Exposure** tab within the Camera Settings page allows you to fine-tune the camera's Exposure settings to ensure image clarity as well as ensure the images from multiple cameras match.



- You must click the "Apply" button to save the Exposure settings to the camera.
- The "Default" button will revert the Exposure settings to factory default, as shown in the image above.

Color

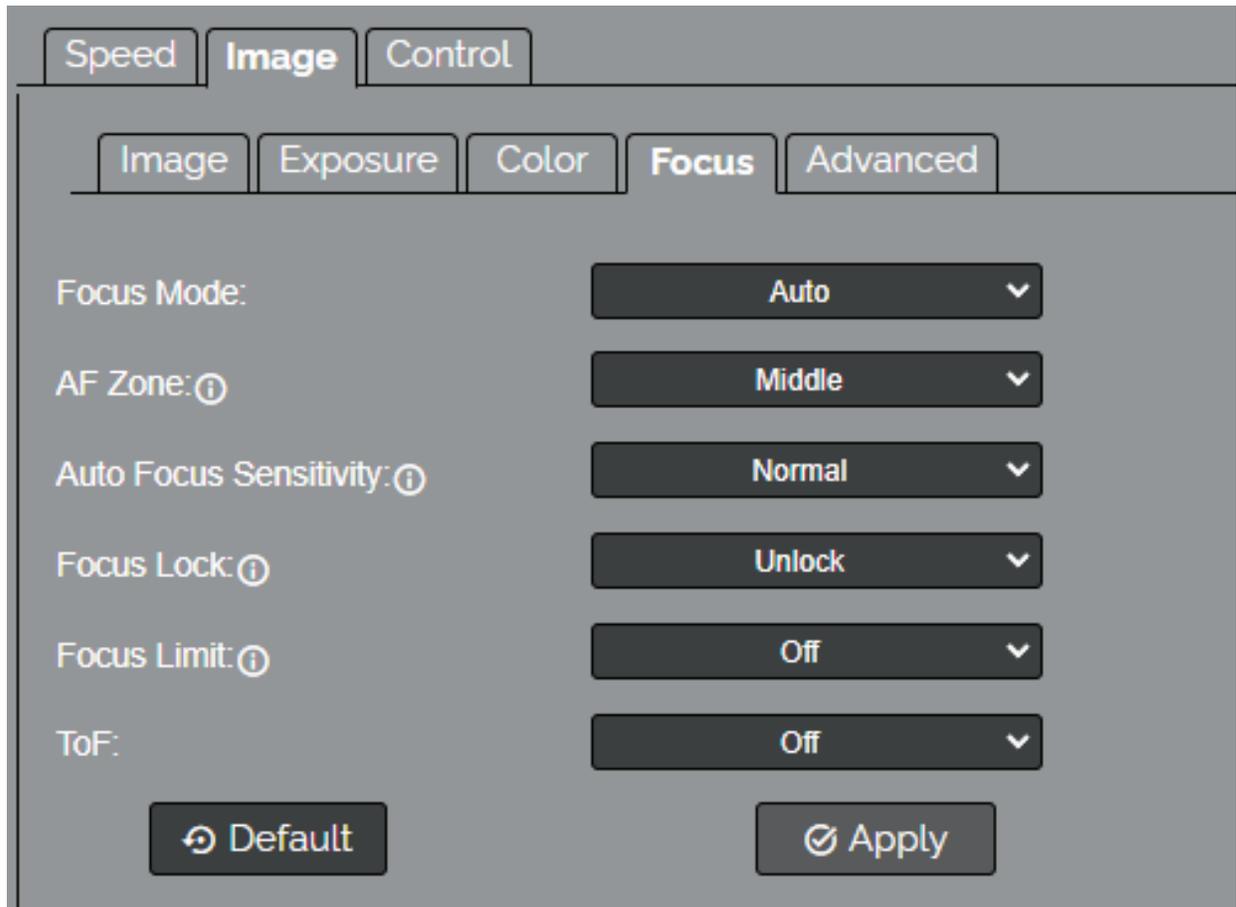
The **Advanced Image > Color** tab within the Camera Settings page allows you to fine tune the camera's white balance and color tint settings to adjust for lighting, as well as ensure images from multiple cameras match.



- You must click the “Apply” button to save the Color settings to the camera.
- The “Default” button will revert the Color settings to factory default, as shown in the image above

Focus

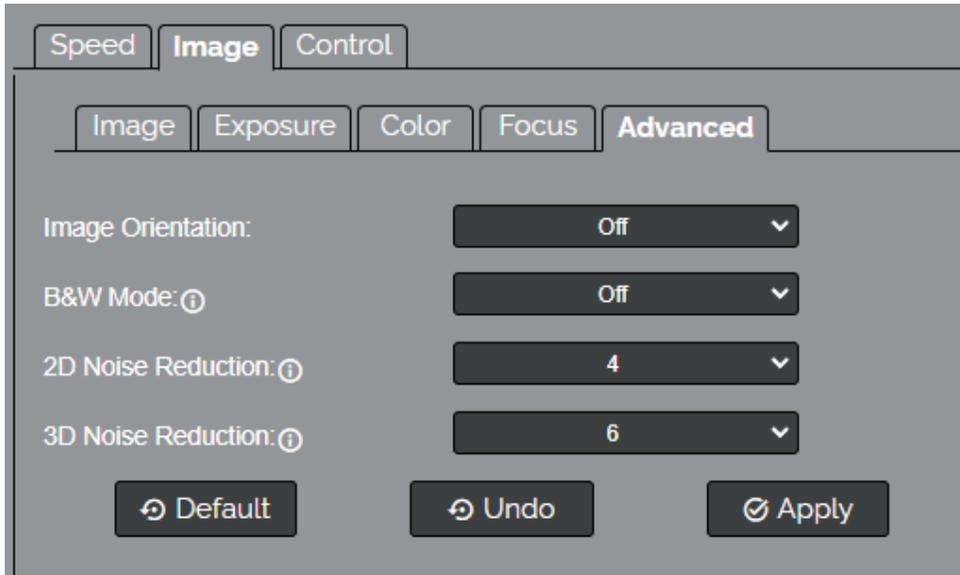
The **Advanced Image > Focus** tab within the Camera Settings page allows you to adjust the various focus settings, including **Auto Focus**, **Auto Focus Zone**, **Auto Focus Sensitivity**, **Focus Lock** and **Focus Limit**.



- You must click the “Apply” button to save the Focus settings to the camera.
- The “Default” button will revert the Focus settings to factory default, as shown in the image above.

Advanced

The **Advanced** tab within the Camera Settings page allows you to adjust additional camera features, such as **image orientation**, **black and white mode**, **2D noise reduction**, and **3D noise reduction**.



- **Image Orientation:** Choose to flip the image, mirror the image, or flip and mirror the image.
- **B&W Mode:** Toggle Black and White mode on or off.
- **2D Noise Reduction:** Adjust the amount of 2D image smoothing.
- **3D Noise Reduction:** Adjust the amount of 3D image smoothing.
- You must click the "Apply" button to save the Mode to the camera.
- The "Undo" button will revert the Mode settings to the last saved settings.

Control Ports

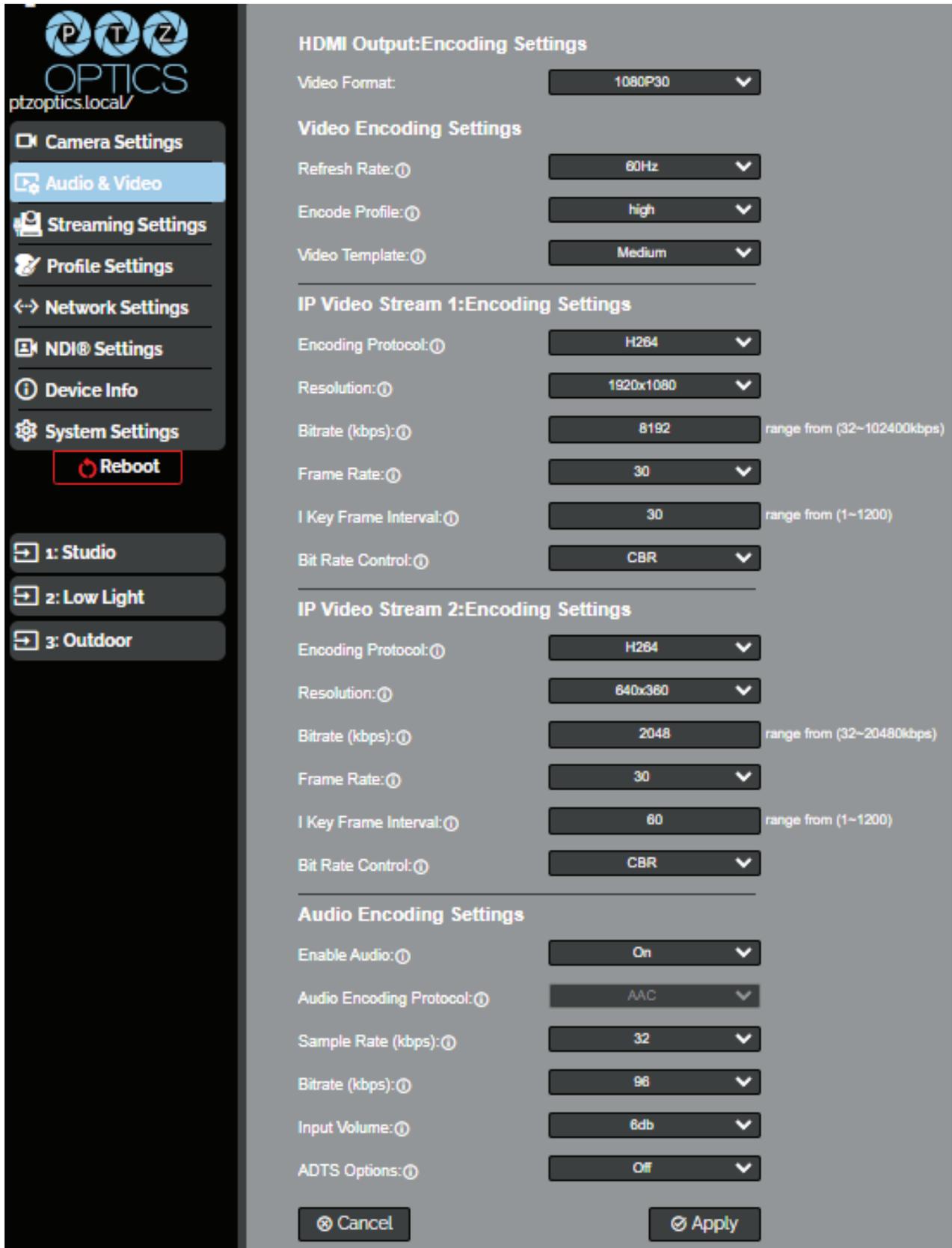
The **Control > Ports** tab on the Camera Settings page allows you to change the camera's **TCP**, **UDP** & **HTTP** control ports. The **Sony UDP** Port can not be changed.

Speed	Image	Control
Ports		
TCP Port: ⓘ	5678	
UDP Port: ⓘ	1259	
HTTP Port: ⓘ	80	
Sony UDP Port: ⓘ	52381	
⊗ Cancel	⌂ Apply	

- You must click the "Apply" button to save the Ports to the camera.
- The "Cancel" button will revert the Ports settings to the last saved settings.

Audio Video Settings

The Audio & Video Settings page accesses the **Video Encoding Settings, IP Video Stream 1 / Stream 2 Encoding Settings & Audio Encoding Settings** sections of the network video feeds.



The screenshot shows the PTZ Optics web interface. On the left is a navigation sidebar with the following menu items: Camera Settings, Audio & Video (highlighted), Streaming Settings, Profile Settings, Network Settings, NDI® Settings, Device Info, System Settings, and a Reboot button. Below the menu are three camera profile buttons: 1: Studio, 2: Low Light, and 3: Outdoor. The main content area is titled 'HDMI Output:Encoding Settings' and contains the following sections:

- HDMI Output:Encoding Settings**
 - Video Format: 1080P30
- Video Encoding Settings**
 - Refresh Rate: 60Hz
 - Encode Profile: high
 - Video Template: Medium
- IP Video Stream 1:Encoding Settings**
 - Encoding Protocol: H264
 - Resolution: 1920x1080
 - Bitrate (kbps): 8192 (range from (32~102400kbps))
 - Frame Rate: 30
 - I Key Frame Interval: 30 (range from (1~1200))
 - Bit Rate Control: CBR
- IP Video Stream 2:Encoding Settings**
 - Encoding Protocol: H264
 - Resolution: 640x360
 - Bitrate (kbps): 2048 (range from (32~20480kbps))
 - Frame Rate: 30
 - I Key Frame Interval: 60 (range from (1~1200))
 - Bit Rate Control: CBR
- Audio Encoding Settings**
 - Enable Audio: On
 - Audio Encoding Protocol: AAC
 - Sample Rate (kbps): 32
 - Bitrate (kbps): 96
 - Input Volume: 6db
 - ADTS Options: Off

At the bottom of the settings area are 'Cancel' and 'Apply' buttons.

HDMI Output: Encoding Settings

- **Video Format:** Adjusts resolution and frame rate. 1080p60, 1080p50, 1080p30, 720p60, 720p50

Video: Encoding Settings

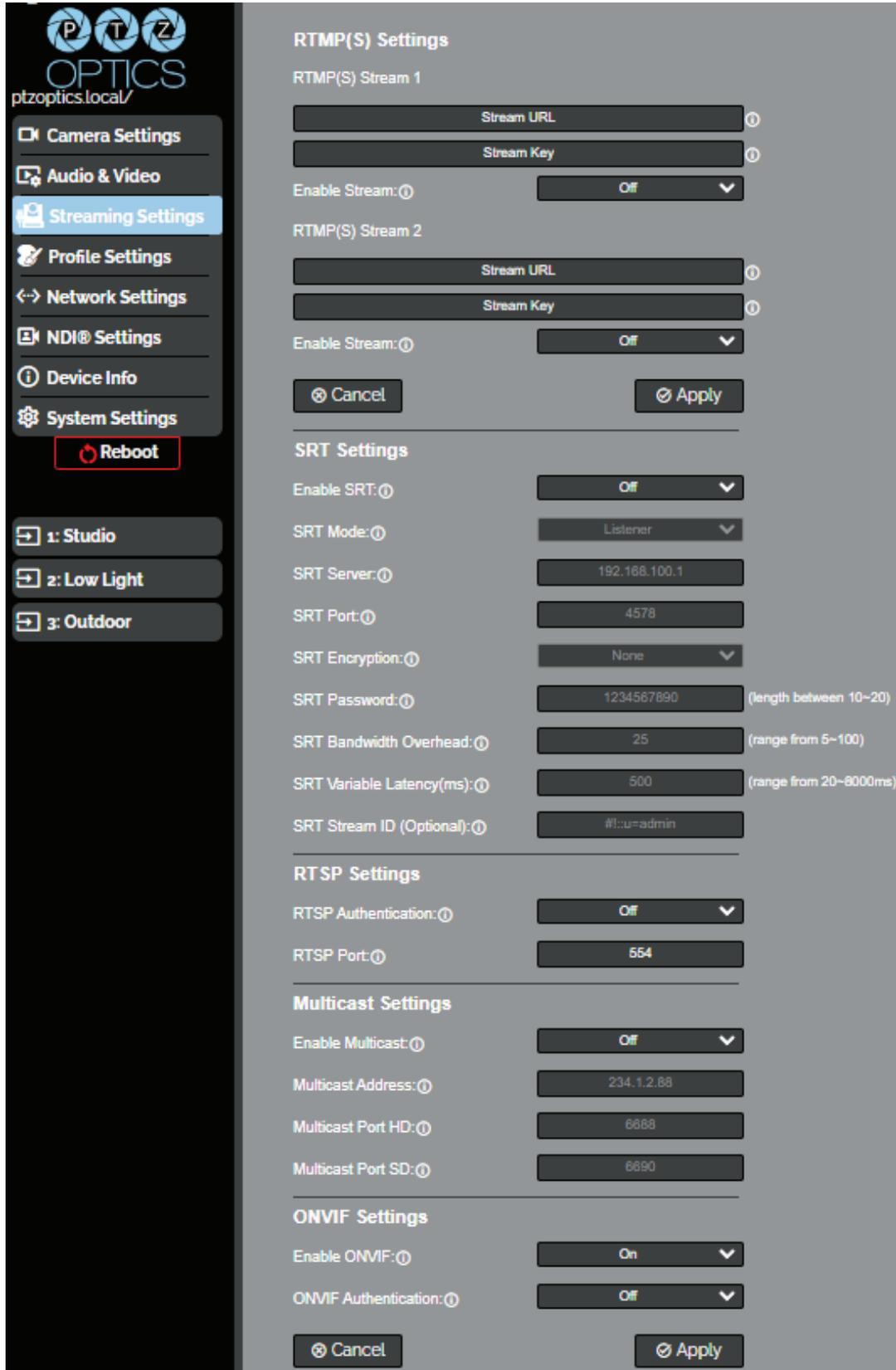
- **Refresh Rate:** Frequency adjustment for displays. Select the refresh rate for your region.
 - **Options include:** 50Hz, 60Hz
- **Encode Protocol:** The Encoding Profile defines the compression method and color reproduction of the IP Stream.
 - **Options include: Baselin, Main, High**
- **Video Template:** Select Off, High, Medium, Low, NDI|HX3: H.264, 1080@50, NDI|HX3: H.264, 1080@60, NDI|HX3: H.265, 1080@50, NDI|HX3: H.265, 1080@60

IP Video Stream 1 & 2: Encoding Settings

- **Encoding Protocol:** Define the compression method for the stream.
 - Options include: H264, H265, MJPEG
- **Resolution:** Define the resolution of the stream.
 - Stream 1 options include: 1920x1080, 1280x720, 1024x576, 960x540, 630x480, 640x360
 - Stream 2 option includes: 720x408, 640x480, 640x360, 480x320, & 320x240
- **Bitrate (kbps):** Define the bit rate of the stream in kilobits. The higher the value, the higher the video quality at the cost of higher bandwidth.
 - Stream 1 Range: 32 ~ 102400kbps
 - Stream 2 Range: 32 ~ 20480kbps
- **Frame Rate:** Define the Frame Rate of the stream.
 - Range: 1 ~ 60
- **I Key Frame Interval:** Define the I-Key Frame Interval of the stream.
 - Options include: 1 ~ 1200
- **Bit Rate Control:** Select whether the Bit Rate fluctuates (VBR) or is static (CBR).
 - Options include: CBR, VBR
- **Audio Encoding Settings**
 - **Enable Audio:** Select whether Audio is included in the applicable video outputs.
 - Options include: On, Off
 - **Audio Encoding Protocol:** ACC
 - **Sample Rate (kbps):** Define the number of samples per second the audio utilizes.
 - Options include: 32
 - **Bitrate (kbps):** Define the number of bits per second the audio utilizes in kilobits.
 - Options include: 96, 128
 - **Input Volume:** Define the Input Volume of the Audio Input.
 - Range: 0db ~ 30db
 - **ADTS Options:** Select whether Audio Data includes timestamps. On or Off.

Streaming Settings

The **Streaming Settings** page accesses the **RTMP(S) Settings**, **SRT Settings**, **RTSP Settings**, **Multicast Settings** & **ONVIF Settings** sections.



The screenshot shows the PTZ Optics web interface with the 'Streaming Settings' page selected in the left sidebar. The sidebar includes options for Camera Settings, Audio & Video, Streaming Settings (highlighted), Profile Settings, Network Settings, NDI Settings, Device Info, System Settings, and a Reboot button. Below these are three camera profiles: 1: Studio, 2: Low Light, and 3: Outdoor.

The main content area is divided into several sections:

- RTMP(S) Settings:**
 - RTMP(S) Stream 1:** Stream URL, Stream Key, and Enable Stream (set to Off).
 - RTMP(S) Stream 2:** Stream URL, Stream Key, and Enable Stream (set to Off).
 - Buttons: Cancel, Apply
- SRT Settings:**
 - Enable SRT: Off
 - SRT Mode: Listener
 - SRT Server: 192.168.100.1
 - SRT Port: 4578
 - SRT Encryption: None
 - SRT Password: 1234567890 (length between 10-20)
 - SRT Bandwidth Overhead: 25 (range from 5-100)
 - SRT Variable Latency(ms): 500 (range from 20-8000ms)
 - SRT Stream ID (Optional): #!..u=admin
- RTSP Settings:**
 - RTSP Authentication: Off
 - RTSP Port: 554
- Multicast Settings:**
 - Enable Multicast: Off
 - Multicast Address: 234.1.2.88
 - Multicast Port HD: 6688
 - Multicast Port SD: 6690
- ONVIF Settings:**
 - Enable ONVIF: On
 - ONVIF Authentication: Off

Buttons: Cancel, Apply

- **RTMP(S) Stream 1 & 2 Settings**
 - **RTMP(S) Stream URL:** Define the RTMP Address of the CDN you wish to stream to.
 - **RTMP(S) Stream Key:** Define the stream key of the CDN you wish to stream to.
 - **Enable Stream:** Toggle the RTMP stream on or off.
- **SRT Settings**
 - **SRT:** Toggle the SRT stream on or off.
 - **SRT Mode:** Define whether the SRT stream is pulled (Listener) from the camera, or whether the stream must be pushed (Caller) to a server.
 - **SRT Server:** Define the Server IP address. This is only used in Caller mode.
 - **SRT Port:** The SRT Port is how you reach the SRT video feed of your camera.
 - **SRT Encryption:** Toggle SRT Encryption on or off.
 - **SRT Password:** Define the SRT password when utilizing SRT Encryption
 - **SRT Bandwidth Overhead:** SRT Bandwidth is a percentage that you assign that helps determine the total bandwidth that the SRT stream will use up. This percentage should not exceed 50%, and is set to 25% by default.
 - **SRT Variable Latency(ms):** Define the maximum buffer size for maintaining SRT packets from the camera to the destination.
- **RTSP Settings**
 - **RTSP Authentication:** Toggle RTSP Authorization on or off.
 - **RTSP Port:** The RTSP Port is how you reach the RTSP video feed(s) of your camera.
- **Multicast Settings**
 - **Enable Multicast:** Toggle Multicast on or off.
WARNING! Only use this setting with a network configured for Multicast.
 - **Multicast Address:** Define the Multicast Address. Recommended format: 234.1.2.[camera IP address last octet]
 - **Multicast Port HD:** The Multicast Port HD is how you reach the HD stream through RTP Multicast.
 - **Multicast Port SD:** The Multicast Port SD is how you reach the SD stream through RTP Multicast.
- **ONVIF Settings**
 - **Enable ONVIF:** Toggle ONVIF control on or off.
 - **ONVIF Authentication:** Toggle ONVIF Authentication on or off.

Profile Settings

The **Profile Settings** page gives you access to the **Logo Upload**, **Profile Configuration**, **Quick Profiles**, **Custom CSS & Tutorial Mode** sections.

The screenshot shows the 'Profile Settings' page with a dark sidebar on the left and a main content area on the right. The sidebar contains a menu with options: Camera Settings, Audio & Video, Streaming Settings, Profile Settings (highlighted), Network Settings, MIDI Control, Device Info, System Settings, and a Reboot button. Below the menu are three profile selection buttons: 1: Studio, 2: Low Light, and 3: Outdoor. The main content area is divided into several sections: Logo Upload (with a file selection button and an Apply button), Profile Menu (with fields for Profile Name and Call Preset, and checkboxes for Select All, Image Settings, Audio Encoding Settings, Video Output Settings, and Include on Quick Profile Select), Profile Upload (with a file selection button and an Apply button), Quick Profile Select (with three rows for Studio, Low Light, and Outdoor, each having Download and Remove buttons), Custom CSS (with a Color Mode dropdown set to Dark and color selectors for Highlight, Font, Background, Middleground, Foreground, and Button, plus Download and Apply buttons), CSS Upload (with a file selection button and an Apply button), and Tutorial Mode (with a Show Tutorial Mode checkbox).

- **Logo Upload**
 - **Upload File:** Browse your PC for an image file you'd like to upload to the camera's web interface. The resolution of this logo should be 2500x1000 and PNG or JPG type file.
- **Profile Menu**
 - **Profile Name:** Give your Profile a unique name so you can easily remember it.
 - **Call Preset:** Select a preset to be called when the Profile is loaded. This field is optional.
 - **Select All:** Select all of the below options in the Profile Menu section.
 - **Image Settings:** Select whether the Image Settings on the Camera Settings page are stored in the Profile.
 - **Audio Encoding Settings:** Select whether the Audio Settings on the Audio & Video Settings page are stored in the Profile. This will require a camera reboot when loaded.
 - **Video Output Settings:** Select whether the Video Settings on the Audio & Video Settings page are stored in the Profile. This will require a camera reboot when loaded.
 - **Device Settings:** Select whether the Device Name is stored in the Profile. This will require a camera reboot when loaded.
 - **Include on Quick Profile Select:** Select whether the Profile is displayed in the Quick Profile Select section on the Navigation Panel.
 - **Download:** Download the profile from the Profile Menu section.
 - **Save:** Save the configured Profile. The Include on Quick Profile Select checkbox needs to be checked in order to save the Profile to the camera.
- **Profile Upload**
 - **Upload File:** Upload a saved Profile from your computer to the camera.
- **Quick Profile Select**
 - **Download Button:** Download the selected Profile to your computer.
 - **Remove Button:** Remove the selected Profile from the camera.
- **Custom CSS**
 - **Color Mode:** Select the color mode of the Web UI. Custom allows you to define your own colors.
 - **Highlight Color Selector:** Define the color that buttons glow while hovering over or pressing the buttons.
 - **Font Color Selector:** Define the font color.
 - **Background Color Selector:** Customize the background color of the Web UI.
 - **Middle ground Color Selector:** Customize the middle ground color of the Web UI.
 - **Foreground Color Selector:** Customize the foreground color of the Web UI.
 - **Button Color Selector:** Customize the button background and text field color of the Web UI. The colors can be defined by using the eyedropper tool, decimal code, HSL code, or hex code.
- **CSS Upload**
 - **Upload File:** Upload a saved Custom CSS file from your computer to the camera.
 - **Download Button:** Download the currently selected CSS Color Mode
- **Tutorial Mode**
 - **Show Tutorial Mode:** While checked, the Information Symbols and associated text will be available, giving a description of each available setting.

Network Settings

The **Network Settings** page accesses the **LAN Settings** & **NTP Settings** sections.

LAN Settings

IP Configuration type: ⓘ	DHCP
IP address: ⓘ	192.168.15.237
Subnet mask: ⓘ	255.255.255.0
Gateway: ⓘ	192.168.15.1
DNS address: ⓘ	192.168.15.1
MAC address: ⓘ	DC:ED:84:A0:B1:AB
DHCP timeout:	30
Static fallback address:	192.168.100.88
Static fallback mask:	255.255.255.0

Cancel Apply

NTP Settings

NTP Time Sync: ⓘ	On
NTP time zone: ⓘ	(GMT-05:00) Eastern Time (L)
Server address: ⓘ	time.windows.com
Time Interval: ⓘ	64 (range from 1-86400)

Cancel Apply

1: Studio
2: Low Light
3: Outdoor

Tally Status
Brought to you by P T Z OPTICS

- **LAN Settings**

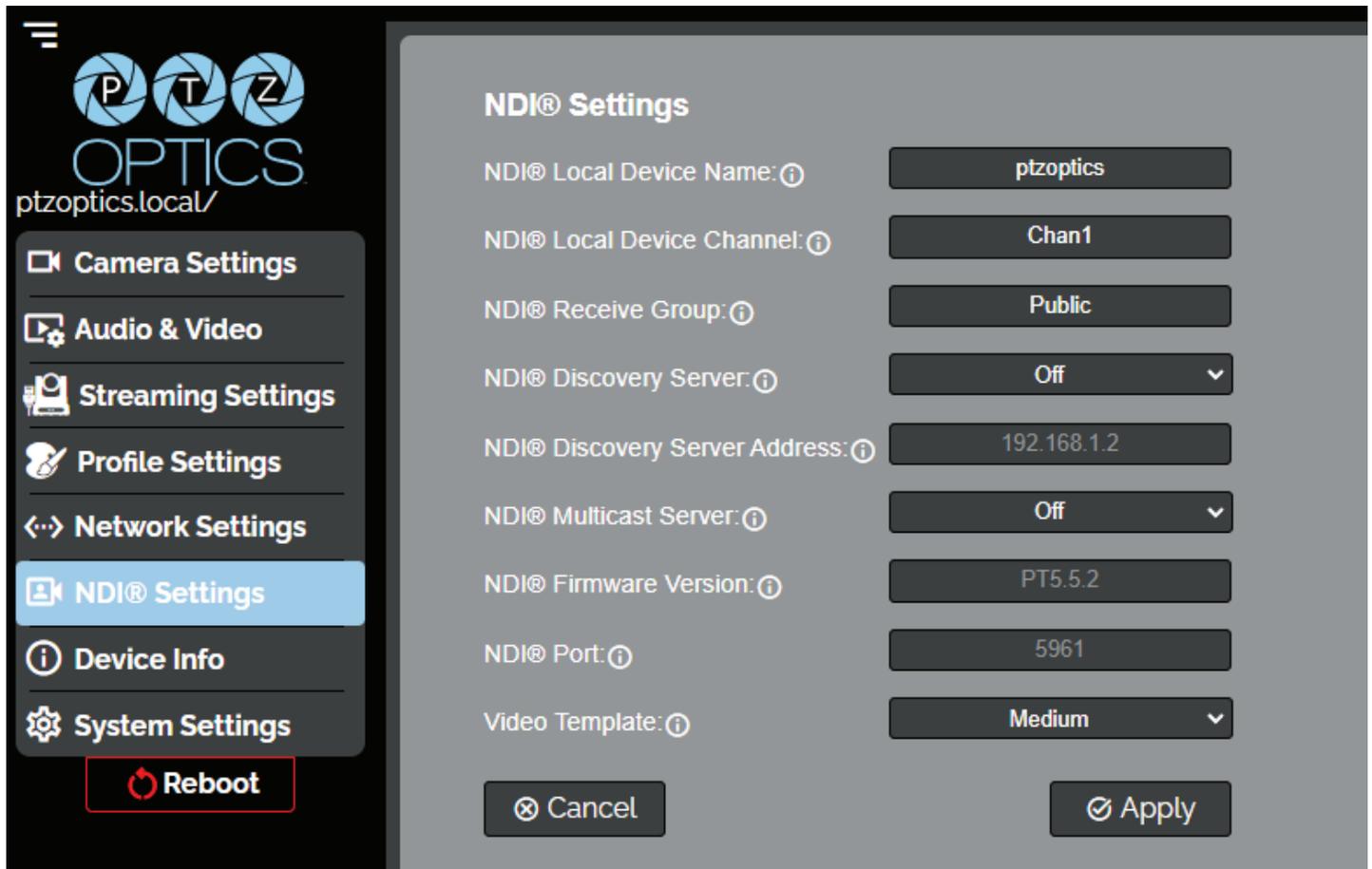
- **IP Configuration Type:** Select whether the camera automatically configured the network settings (DHCP) or whether you manually configure the network settings (Static).
- **IP Address:** The IP address is a unique address the network uses to connect and configure the camera.
- **Subnet Mask:** The Subnet Mask is a set of numbers that defines how large your network is.
- **Gateway:** The Gateway is the address associated with your router to connect to the internet.
- **DNS Address:** The DNS address is a unique IP address the camera will query when trying to reach a specific website.
- **MAC Address:** The MAC Address is a unique address the Ethernet port utilizes to communicate with the network. You cannot change this address.
- **DHCP Timeout:** DHCP Timeout is the amount of time the camera will try to acquire an IP address through DHCP. After 30 seconds, the camera will revert to the Static Fallback Address & Static Fallback Mask. You cannot change this timeout.
- **Static Fallback Address:** Static Fallback Address is the IP address the camera will revert to if one cannot be acquired automatically. You cannot change this address.
- **Static Fallback Mask:** Static Fallback Mask is the Subnet Mask the camera will revert to if one cannot be acquired automatically. You cannot change this subnet mask.

- **NTP Settings**

- **NTP Time Sync:** Toggle Network Time Protocol (NTP) on or off.
- **NTP Time Zone:** Select your time zone.
- **Server Address:** Define the NTP Server Address you wish to utilize.
- **Time Interval:** Define how frequently NTP queries the server (in seconds).

NDI Settings

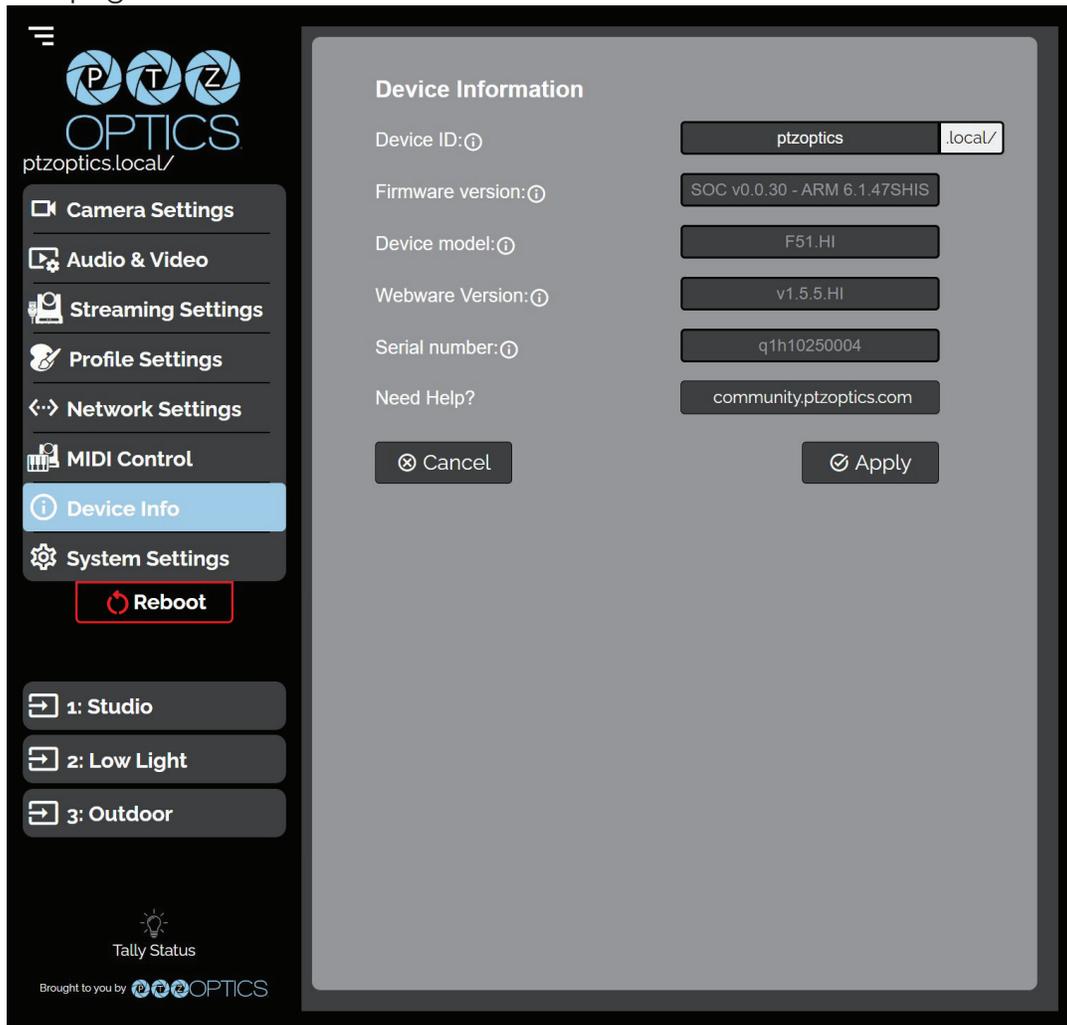
The **NDI Settings** page allows you to manage the NDI settings of the Studio Pro camera.



- **NDI Local Device Name:** The name you assign to your NDI device.
- **NDI local Device Channel:** The video feed you assign to your local device name.
- **NDI Receive Group:** Define which devices on a LAN group can see your NDI sources. Your camera and the computer's NDI receive group must match in order for you to view the NDI video feed. Your NDI device can be part of multiple groups.
- **NDI Discovery Server:** Can be toggled on or off. The NDI discovery server provides more reliable discovery and distribution of NDI sources across your LAN.
- **NDI Discovery Server Address:** Define the address of your discovery server.
- **NDI Multicast Server:** Can be toggled on or off. **(Network must first be configured to Multicast)** Allows a single NDI source to be viewed by multiple PCs more reliably.
- **NDI Firmware Version:** NDI firmware version currently running on the camera.
- **NDI Port:** Default 5961. How you reach the NDI feed of your camera.
- **Video Template:** Select Off, High, Medium, Low, NDI|HX3: H.264, 1080@50, NDI|HX3: H.264, 1080@60, NDI|HX3: H.265, 1080@50, NDI|HX3: H.265, 1080@60

Device Info

The **Device Info** page accesses the **Device Information Section**.

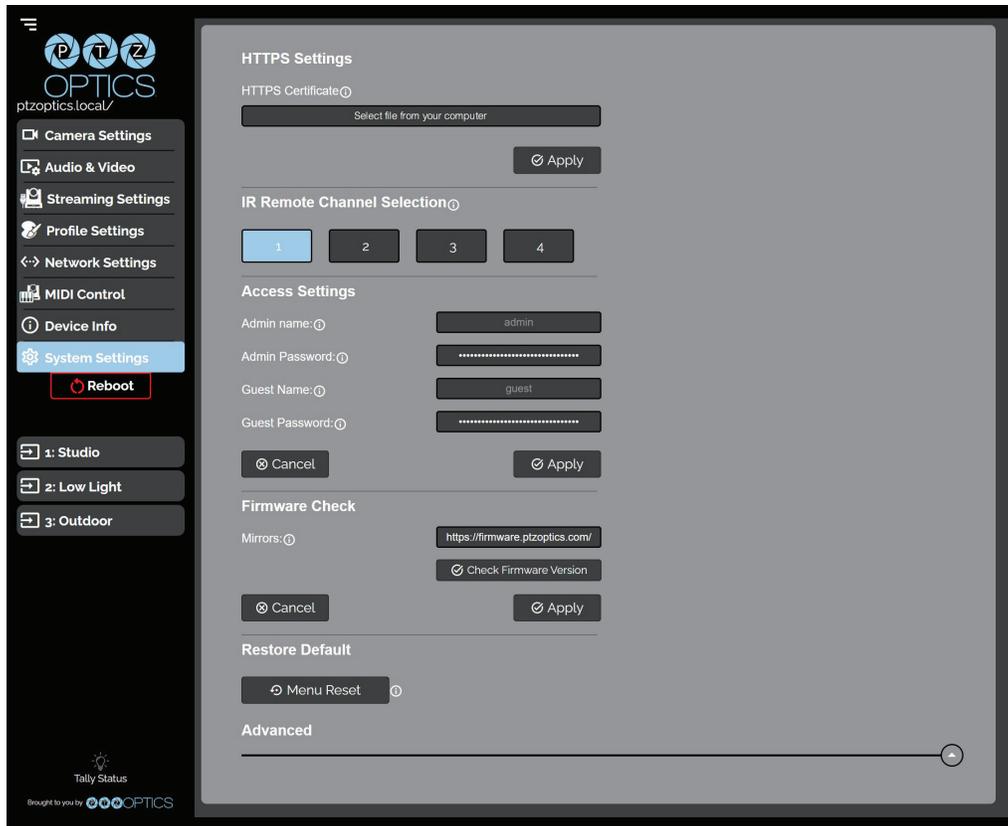


- **Device Information**

- **Device ID:** Define the camera's Device ID to clearly designate which camera you are interacting with. The Device ID is displayed at the top left of the Navigation Panel and anything that queries the camera's name.
- **Firmware Version:** The Firmware Version displays the firmware file currently running on the camera.
- **Device Model:** The Device Model is a field that PTZOptics uses to designate the camera.
- **Webware Version:** The Webware Version is the version of the web interface.
- **Serial Number:** The camera's serial number.
- **Need Help?** An easy to access URL to the PTZOptics Knowledge Base.

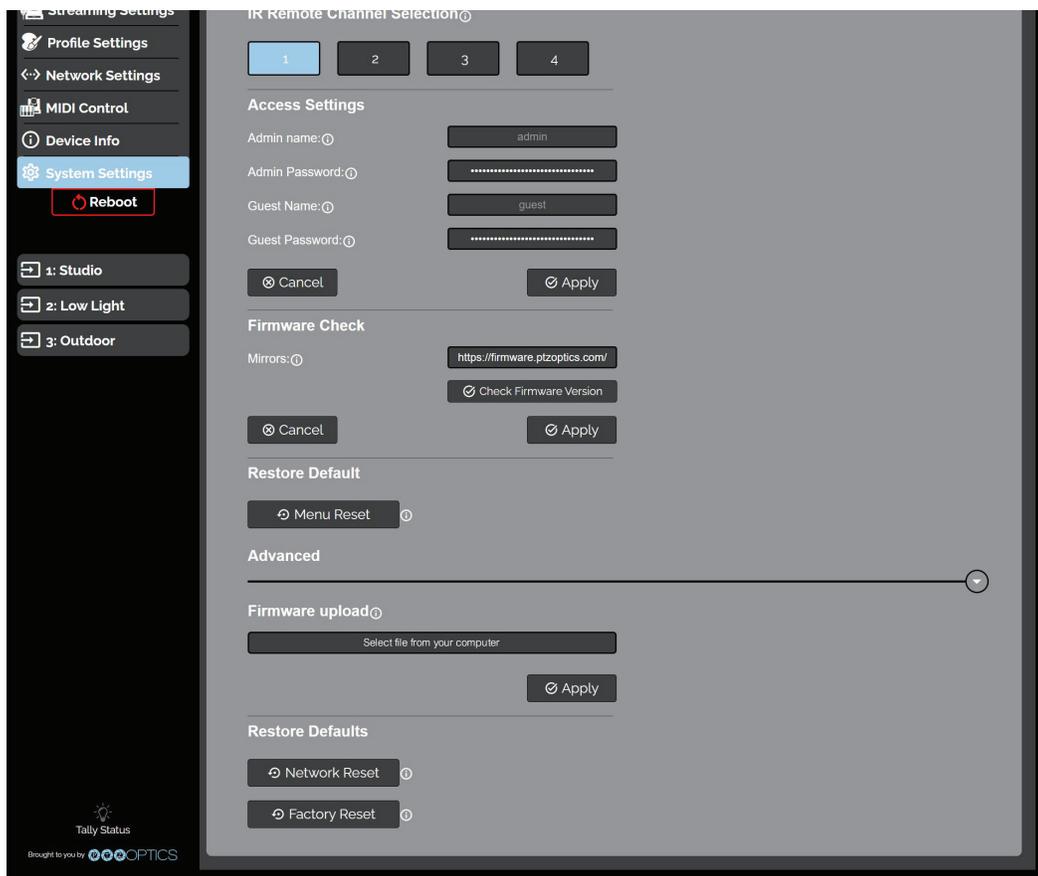
System Settings

The **System Settings** page gives access to the **HTTPS Settings**, **IR Remote Channel Selection**, **Access Settings**, **Firmware Check**, **Restore Default (Basic)**, **Firmware Upload & Restore Default (Advanced)** sections.



- **HTTPS Settings**
 - **HTTPS Certificate:** Upload a HTTPS Certificate from your computer.
 - **HTTP Port:** The HTTP Port is how you reach the web interface of your camera ([http://\[Camera IP\]:\[port\]/](http://[Camera IP]:[port]/))
- **IR Remote Channel Selection**
 - **1 – 4 Button:** Define the communication channel the camera utilizes with the remote control. This allows you to easily use multiple cameras with a single IR remote.
- **Access Settings**
 - **Admin Name:** Administrator username login. This username can not be changed.
 - **Admin Password:** Administrator password. If you desire to change the password, all letters, numbers, and specifically "!@#\$\$^()" can be used, up to 15 characters. Please note the circles in the field are encrypted and do not reflect the password saved on the camera.
 - **Guest Name:** Guest username login. This username can not be changed.
 - **Guest Password:** Guest password. If you desire to change the password, all letters, numbers, and specifically "!@#\$\$^()" can be used, up to 15 characters. Please note the circles in the field are encrypted and do not reflect the password saved on the camera.

- **Firmware Check**
 - **Mirrors:** Define a server address for acquiring the latest PTZOptics firmware files. By default, the camera will query PTZOptics at <https://firmware.ptzoptics.com/>
 - **Check Firmware Version:** Check to see if your camera is running the latest firmware from the Firmware Update Server.
- **Firmware Upload**
 - **File Upload (Advanced):** Select a firmware file from your PC to upload to the camera.
- **Restore Default**
 - **Menu Reset (Basic):** Reset the camera's non-network settings to factory default.
 - **Network Reset (Advanced):** Reset the camera's network settings to factory default.
 - **Factory Reset (Advanced):** Reset all of the camera's settings to factory default.



For more information you can scan the QR code below or visit ptzoptics.com/get-started.



PTZOptics Serial VISCA & VISCA over IP 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 by 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.

VISCA over IP control: z = 9

Serial VISCA control: z = Camera Address + 8

Part 2: PTZ Optics Command List

Command	Function	Command Packet	Comments
IF Clear	Broadcast	8x 01 00 01 FF	I/F Clear
CAM_Power	On	8x 01 04 00 02 FF	Power On/Off
	Off	8x 01 04 00 03 FF	
CAM_Zoom	Stop	8x 01 04 07 00 FF	
	Tele (Standard)	8x 01 04 07 02 FF	
	Wide (Standard)	8x 01 04 07 03 FF	
	Tele (Variable)	8x 01 04 07 2p FF	p = 0 (low) – 7 (high)
	Wide (Variable)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 p q r s FF	
CAM_ZoomFocus	Direct	8x 01 04 47 0p 0q	pqrs: Zoom Position
		0r 0s 0t 0u 0v 0w FF	tuvw: Focus Position
CAM_Focus	Stop	8x 01 04 08 00 FF	
	Far (Standard)	8x 01 04 08 02 FF	
	Near (Standard)	8x 01 04 08 03 FF	
	Far (Variable)	8x 01 04 08 2p FF	
	Near (Variable)	8x 01 04 08 3p FF	p = 0 (low) – 7 (high)
	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	
	Snap Focus	8x 01 04 38 04 FF	Focus image while maintaining manual focus mode.
	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_AFSensitivity	Hlgh	8x 01 04 58 01 FF	AF Sensitivity High / Normal / Low
	Normal	8x 01 04 58 02 FF	
	Low	8x 01 04 58 03 FF	

CAM_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
	OnePush Trigger	8x 01 04 10 05 FF	One Push White Balance Trigger
CAM_RGain	Reset	8x 01 04 03 00 FF	Default Bright position
	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_RTuning	Direct	8x 0A 01 12 pq FF	pq: Red / Blue Tuning position 0x00 (-10) ~ 0x14 (+10)
CAM_BTuning	Direct	8x 0A 01 13 pq FF	

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_DRC	Direct	8x 01 06 01 0E 0E 03 02 FF	p: 0(low) - 8(high)
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_Gain	Reset	8x 01 04 0C 00 FF	Gain Setting
	Up	8x 01 04 0C 02 FF	
	Down	8x 01 04 0C 03 FF	
	Direct	8x 01 04 0C 00 00 0p 0q FF	pq: Gain Position
	Gain Limit	8x 01 04 2C 0p FF	p: Gain Position
CAM_Bright	Reset	8x 01 04 0D 00 FF	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	pq: ExpComp position
CAM_NR(2D)Mode	Auto	8x 01 04 50 02 FF	ND2D Auto/Manual
	Manual	8x 01 04 50 03 FF	
CAM_NR(2D)Level	Direct	8x 01 04 53 0p FF	p: NR Setting (0: Off, level 1 to 5)
CAM_NR(3D)Level	Direct	8x 01 04 54 0p FF	p: NR Setting (0: Off, level 1 to 8)
CAM_WDRStrength	Reset	8x 01 04 21 00 FF	
	Up	8x 01 04 21 02 FF	
	Down	8x 01 04 21 03 FF	
	Direct	8x 01 04 51 00 00 0p 0q FF	pq: WDR Level Positon
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_ApertureMode (Sharpness)	Auto	8x 01 04 05 02 FF	
	Manual	8x 01 04 05 03 FF	
CAM_Aperture (sharpness)	Reset	8x 01 04 02 00 FF	Aperture Control
	Up	8x 01 04 02 02 FF	
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain
CAM_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_ImageFreeze	Freeze Image	8x 01 04 62 0p FF	p: 2 ON; p: 3 OFF
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 oh (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
LimitClear		8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	YYYY: Pan position, 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_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 oh (-14°) to Eh (+14°)
OSD_Control	Open / Close	8x 01 04 3F 02 5F FF	
	Close	8x 01 06 06 03 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_LensType	Type1	8x 0A 01 04 1B 00 FF	Corrects camera focus capabilities
	Type 2	8x 0A 01 04 1B 01 FF	p=1: Flashing, p=2: Light always on, p=3: normal
CAM_AFCalibration	Re-Calibrates Focus	8x 0A 01 03 12 FF	
CAM_TallyLight	Tally Light Control	8x 0A 02 02 0p 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 2A 11 14 pq FF	
CAM_UACStatus	Toggle USB Audio	8x 2a 02 a0 04 0p FF	p=2: On, p=3: Off
CAM_RTMPSet	Toggle RTMP	8x 0A 11 A8 pq FF	p: 1 Stream 1; p: 2 stream 2; q: 2 ON, q: 3 OFF
CAM_FocusRange	Focus Range	8x 0A 11 42 0p rs tv FF	p=0: Off p=1: On, rs: furthest position(0x00 ~ 0x0B), tv: nearest position(0x00 ~ 0x0B)
CAM_SettingSave	Save	8x 01 04 A5 10 FF	Save Current Setting
CAM_SettingReset	Reset	8x 01 04 A0 10 FF	Reset to Factory Settings
CAM_NetworkReset	Reset Network Parameters	8x 0A 01 AA FF	

Part 3: PTZOptics 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 48 FF	y0 50 02 FF	AutoFocus
		y0 50 03 FF	Manual Focus
CAM_FocusPosInq	8x 09 04 35 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
			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		y0 50 pq FF	pq: ColorTemperature position
CAM_RTuningInq	8x 09 04 12 FF	90 50 00 00 0p 0q FF	pq: 0x00 ~ 0x14
CAM_BTuningInq	8x 09 04 13 FF	90 50 00 00 0p 0q FF	pq: 0x00 ~ 0x14
CAM_AEModeInq	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_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_Noise2DModeInq	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_FlickerModeInq	8x 09 04 55 FF	y0 50 0p FF	p=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
SYS_MenuModeInq	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_MemoryInq	8x 09 04 3F FF	y0 50 0p FF	p: Memory number last operated
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 oh (60%) to Eh (200%)
CAM_PanTiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	WWW: 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	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 oh (-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

CAM_PTZMotionSyncInq	8x 09 11 13 FF	90 50 0p FF	p: MotionSync setting 0: Off, 1: On
	8x 09 11 14 FF	90 50 pq FF	pq: Max MotionSync speed 00 (185) ~ 09 (230)
CAM_RTMPInq	8x 09 11 53 FF	90 50 00 FF	Stream 1 OFF; Stream 2 OFF
		90 50 01 FF	Stream 1 ON; Stream 2 OFF
		90 50 02 FF	Stream 1 OFF; Stream 2 ON
		90 50 03 FF	Stream 1 ON; Stream 2 ON
VISCA over IP control: x = 1 Serial VISCA control: x = Camera Address + 8			

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 0t 0u 0v 0w 00 0x 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_OtherBlockIng	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_EnlargementBlockIng	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

VISCA over IP control: x = 1

Serial VISCA control: x = Camera Address + 8

Part 4: 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
Query Zoom Position Response	0xFF	Address	0x00	0x5D	Value High Byte	Value Low Byte	SUM

Part 5: Pelco-P 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

Maintenance and Troubleshooting

Camera Maintenance

1. If the camera will not be used for a long time, power off the camera.
2. Use a soft cloth or lotion-free tissue to clean the camera body.
3. 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.
- Do not operate close to powerful electromagnetic radiation, such as a TV or radio transmitter.

Troubleshooting

• **No image**

1. Check whether the power cord is connected, voltage is OK & power LED is lit.
2. Check whether the camera can “self-test” after startup.
You can also press [*] > [#] > [Auto Focus] on the IR remote to trigger the camera to perform the startup dance on repeat.
3. If using SDI or HDMI, check that the desired connection is selected to output video. You can select the desired connection from the OSD Menu or through the Web Interface.
4. Check that the video cable is connected to the destination device correctly.

• **Image is shaky or vibrating**

1. Check whether the camera is mounted solidly to 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. Any external vibration that is affecting the camera will be more apparent when zoomed in (tele).

• **Abnormal display of image**

1. Check the resolution dial on the back of the camera. Verify that the resolution and refresh rate is supported by your destination device.
2. If using SDI, check that the SDI level is set to the desired level.

• **Image settings are changing on their own**

1. The cameras have a feature called “Preset 2.0” where many of the Exposure, White Balance, and Image settings are saved with each preset. When a preset is called, the saved Exposure, White Balance, and Image settings are then loaded.

Control

- **IR Remote controller does not control the camera**
 1. Does one of the four “Camera Select” buttons at the top of the remote light up when you press any of the buttons?
 - If not, change the batteries in the remote.
 2. Check that the remote and camera are on the same IR channel. The “Camera Select” buttons will light up with the selected IR channel when a button is pressed. You can change the camera’s IR channel by accessing the System Settings of the web interface.
 3. Try removing other sources of IR interface (sunlight, fluorescent lighting, etc.)
- **IP communication does not control the camera**
 1. Verify that the camera and controlling device are on the same LAN with unique IP addresses.
 2. Verify that the controlling device is using the appropriate control port for the protocol.
 - o The default control ports are as follows: TCP: 5678, UDP: 1259, Sony UDP: 52381

If you need further assistance, please contact our support team at <https://community.ptzoptics.com/s/login/>