PTZOptics Studio 4K

Product Manual

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Studio 4K

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Studio 4K Quick Start Guide

Setting up your PTZOptics camera is fast and easy with the setup cards below. Each card provides clear, step-by-step instructions to help you connect, configure, and power your camera in minutes. Simply follow the cards in order to get your camera up and running.

POWER

STREAMING

NETWORKING

PRESETS

Part Number

PTxxx-STUDIO-4K-xx-G3

Color	Optical Lens Zoom Level	Part Number
Gray	12X	PT12X-STUDIO-4K-GY-G3
Gray	20X	PT20X-STUDIO-4K-GY-G3
White	12X	PT12X-STUDIO-4K-WH-G3
White	20X	PT20X-STUDIO-4K-WH-G3

Packing List

- Studio 4K Camera
- AC Power Supply
- USB C-A Cable
- Quick Start Guide
- IR Remote
- 2 AAA Batteries
- Lens Cap

Features

Hive Linked: The Studio 4K is Hive Linked. After a quick initial connection to the PTZOptics Hive, users can connect the Studio 4K camera through a web browser from anywhere in the world.

Video Templates: Select the best performance IP video streams for your project with easily selectable video templates for NDI and IP streaming.

White Balance Modes: Adjusts 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 various types of lighting, such as sunlight, shade, tungsten, and fluorescent, so that the white in your image remains true and other colors are displayed accurately.

Exposure Modes: The camera offers several exposure modes to help you determine the correct combination of aperture, shutter speed, and gain to achieve the perfect exposure. Different modes include manual (where you control everything), auto (the camera decides), SAE (where you control the shutter speed and the camera handles the rest), AAE (where you control the aperture and the camera handles the rest), Bright where you set a target brightness level and the camera adjusts all settings to achieve that brightness, and One Push lets the camera automatically adjusts exposure settings based on a single button press. The user can adjust Gain. To perform a one push exposure adjustment, click the icon next to the exposure mode dropdown with OnePush selected.

On-Camera Firmware Updates: You can update the camera’s firmware directly from the camera itself. Firmware is the low-level software that controls the camera's hardware. 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: Adapt to different shooting situations quickly using your own custom profiles. For example, you might have one profile for indoor shooting, another for outdoor shooting, and another for low-light conditions. A profile can save settings such as white balance, exposure, and frame rate, among others.

Simple Network Discovery: Trouble-free discovery of any connected PTZOptics camera on your network. PTZOptics cameras can be found by entering http://ptzoptics.local into any web browser. You can then change your camera’s IP address or set a custom camera ID. For example, you could set your camera’s ID to “mycamera.local”. Enter that into a web browser, and you’re there.

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: Data transmission over a network. In multicast, data is sent simultaneously to multiple recipients. In unicast, data is sent from a single sender to a single receiver. Depending on your network setup and the requirements of your video stream. Choose what works for you.

12X & 20X, Optical Zoom Models: 8 million pixel ultra-high resolution 4K telephoto lens in 12X and 20X optical zoom.

4K Ultra HD: The next-generation UHD CMOS sensor is for shooting high-quality 4K video at 60FPS, with the flexibility to adjust numerous other resolutions and frame rates.

HDMI 2.0: HDMI 2.0, can directly output 4K uncompressed digital video.

Low Light: CMOS image sensor with ultra-high SNR can reduce image noise in low light.

3D Noise Reduction: Produces a clean, clear image even in low light with a signal-to-noise ratio as high as 55db.

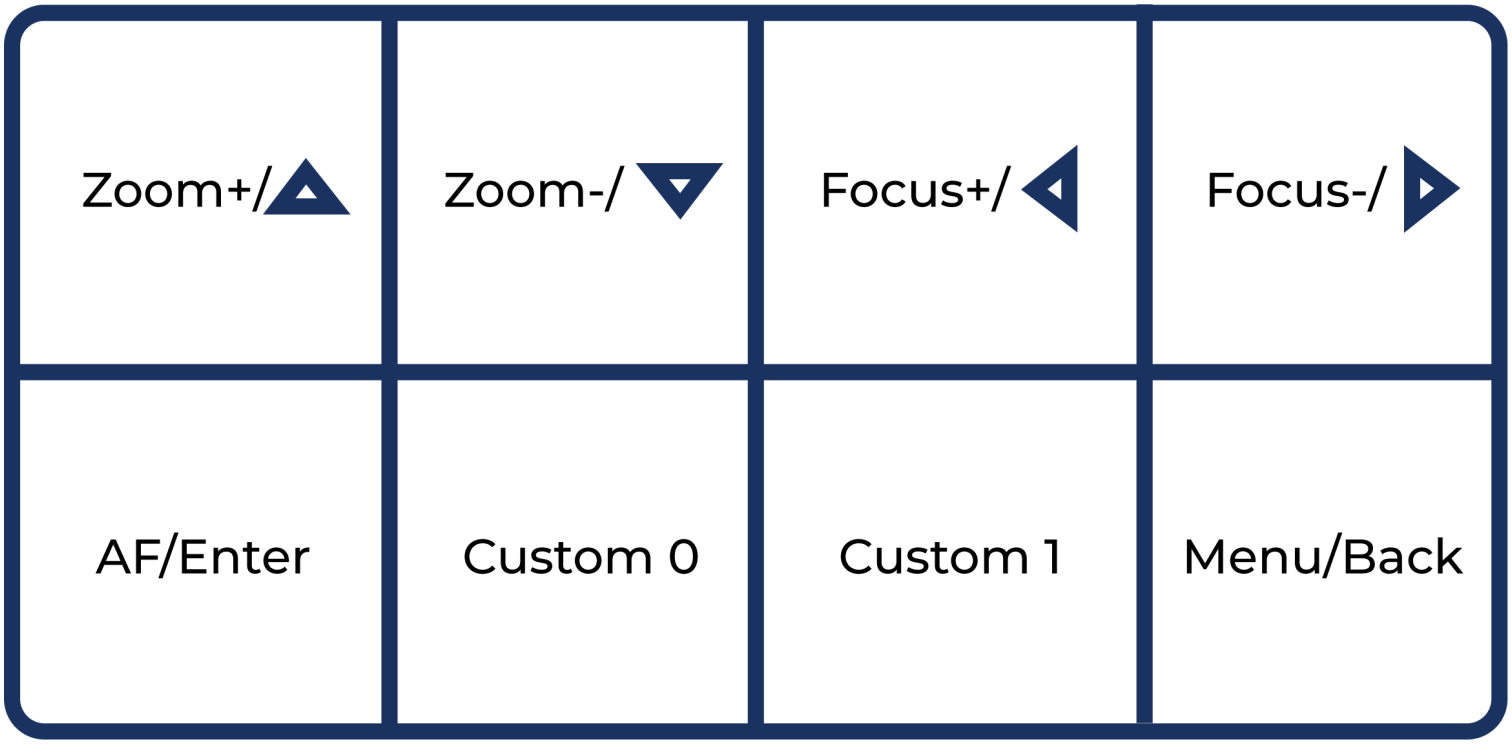
Multiple Interfaces: Simultaneous Output Combinations: HDMI 2.0 or 3G-SDI, plus IP Video [RTMP(S), SRT, RTSP, RTP] and either USB 3.0 or NDI HX 3 as outputs.

Multiple Control Options: Controllable via IR remote, network connection, and the USB port.

Tally Light: Features a built-in tally light that shines GREEN to indicate when the camera is in preview mode. The light shines RED when the camera is on-air. The tally light illuminates when used with NDI-compatible video mixing software.

Super Zoom: SuperZoom takes advantage of the extra pixels available in our 4K PTZ cameras to deliver enhanced zoom capabilities when operating in 1080p mode. SuperZoom effectively doubles the optical zoom capabilities of our 4K cameras, allowing for more detailed image cropping.

Quick Keys



1. Zoom the camera IN. (When in the menu, directional key UP.)

2. Zoom the camera OUT. (When in the menu, directional key DOWN.)

3. Focus IN. (When in the menu, directional key LEFT.)

4. Focus OUT. (When in the menu, directional key RIGHT.)

5. The Auto-Focus button. (When in the menu, acts as the ENTER key.)

6. Press to call preset zero or hold to set preset zero.

7. Press to call preset one or hold to set preset one.

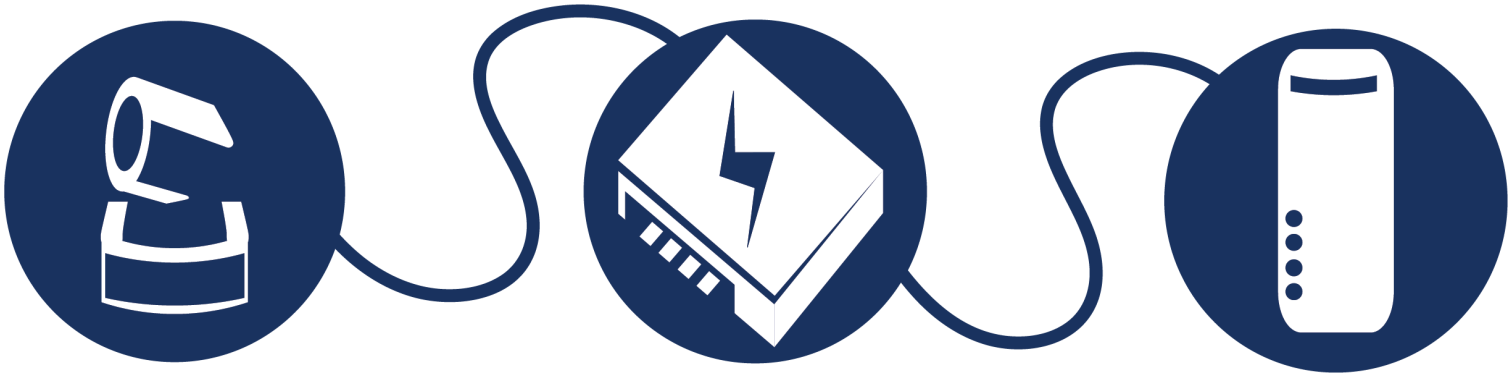
8. Press to bring up the on-screen menu. (When in the menu press to go BACK.)

Power

The **Studio 4K** can be powered using the included **power supply** or **Power over Ethernet**. Please make sure all connections are secure when using either method.

When the camera is turned on, it will perform a short startup sequence going through its full range of motion.

> **NOTE**
>
> Power over Ethernet, or PoE, provides power and network connection. To power your camera over Ethernet, you will need a PoE source that supports PoE (802.3at). We recommend connecting your camera to the switch for peak performance using Cat 6 cabling or better. See the example of a power over Ethernet connection below.



Camera **Power Over Ethernet Switch** **Computer**

Camera Startup

PTZOptics cameras perform a short startup sequence going through their full range of motion when powered on. **(Stationary cameras or box cameras will also perform a startup sequence, going through their full zoom range.)**

When the sequence is complete, the camera will stop and return to preset 0, as long as you've previously set preset 0, or the Home position.

Device Powering Options

Product	Power Supply	Power Consumption	Power Over Ethernet Type
Move 4K	JEITA type (DC IN 12V)	Max 2.0A	PoE+ (802.3at)
Move SE	JEITA type (DC IN 12V)	Max 2.0A	PoE (802.3af)
Link 4K	JEITA type (DC IN 12V)	Max 2.0A	PoE+ (802.3at)
Studio Pro	JEITA type (DC IN 12V)	Max 2.0A	PoE (802.3af)
Studio 4K	JEITA type (DC IN 12V)	Max 2.0A	PoE (802.3at)
Studio SE	JEITA type (DC IN 12V)	Max 2.0A	PoE (802.3at)
SimplTrack3	JEITA type (DC IN 12V)	Max 1.0A	PoE (802.3af)
PT-SUPERJOY-G1	JEITA type (DC IN 12V)	Max 0.5A	PoE (802.3af)
PT-JOY-G4	JEITA type (DC IN 12V)	Max 0.5A	PoE (802.3af)

Connections

Studio 4K Connection List

1. Standby LED
2. RS-485 Interface
3. Power LED
4. Line Output
5. LAN NDI
6. HDMI
7. 3G-SDI
8. USB Service Port
9. USB 3.0
10. DC 12V Power
11. Line Input

Serial Connection Guide

Serial refers to the RS-232 and RS-485 connections from the camera to a joystick controller using the same connection.

RS-232 Overview

This uses an 8 Pin Mini-Din connector.

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

Initial Connection

Camera	Windows DB-9	Connection Direction
1. DTR	CD	Camera DTR to Windows DTR & CD to none
2. DSR	RXD	Windows TDX to Camera DSR
3. TXD	TXD	Camera TDX to Windows RXD
4. GND	DTR	Camera GND to Windows GND

Camera	Windows DB-9	Connection Direction
5. RXD	GND	Two way from Camera RXD to Windows TDX
6. Unused	DSR	None
7. Unused	Unused	None
8. Unused	Unused	None
9. Unused	Unused	None

Daisy Chain Control Connection

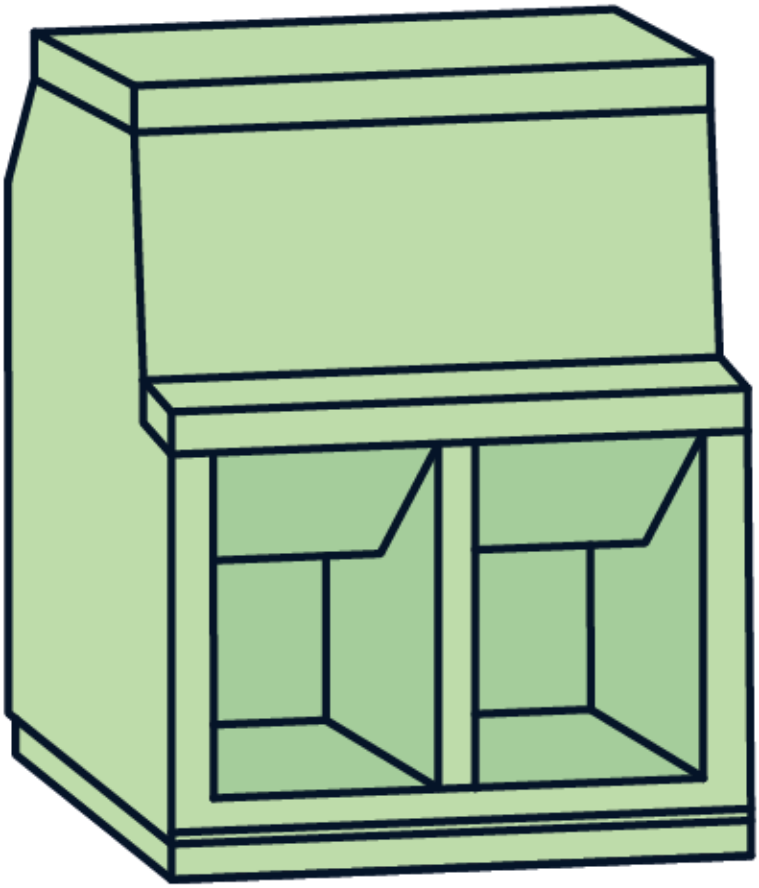
Camera	Mini DIN	Connection Direction
1. DTR	DTR	Camera DTR to Windows DSR & CD to none
2. DSR	DSR	Windows DTR to Camera DSR
3. TXD	TXD	Camera TDX to Windows RXD
4. GND	GND	Two way from Camera GND to Windows GND
5. RXD	RXD	Windows TDX to Camera RXD
6. Unused	Unused	None
7. Unused	Unused	None
8. Unused	Unused	None

RS-232 Parameters

- **Baud Rate:** 2400, 4800, 9600 or 38400 bps
- **Start Bit:** 1 bit
- **Data Bit:** 8 bits
- **Stop Bit:** 1 bit

- **Parity Bit:** None

RS-485 Overview



The left phoenix connector port is Positive (+)The right phoenix connector port is Negative (-).

The camera can be controlled via RS-485, Half-duplex mode, with support for VISCA, Pelco-D, or Pelco-P protocol.

RS-485 Parameters

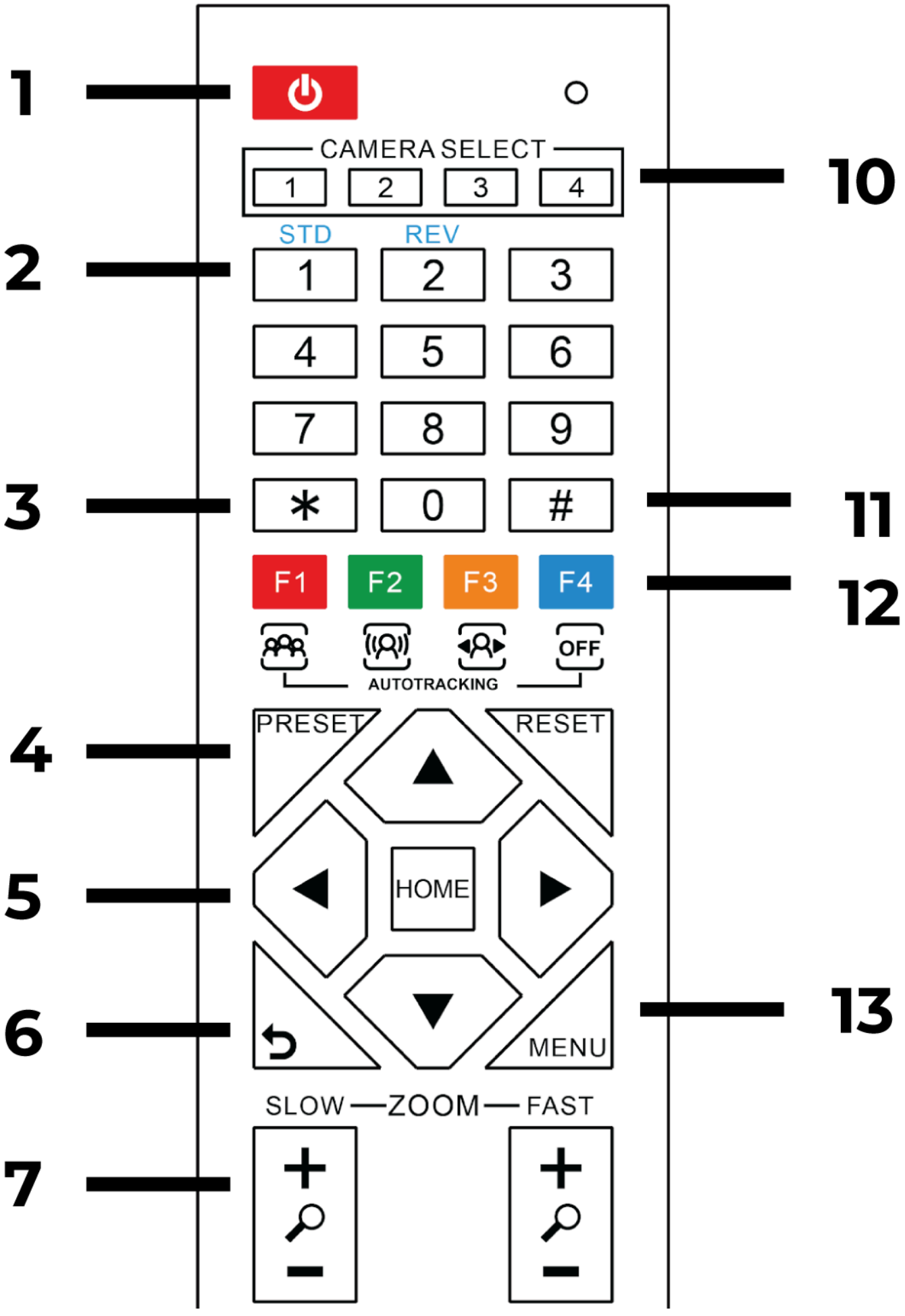
- **Baud rate:** 2400/4800/9600/38400;
- **Starting position:** 1 bit
- **Data bit:** 8 bits
- **Stop bit:** 1 bit

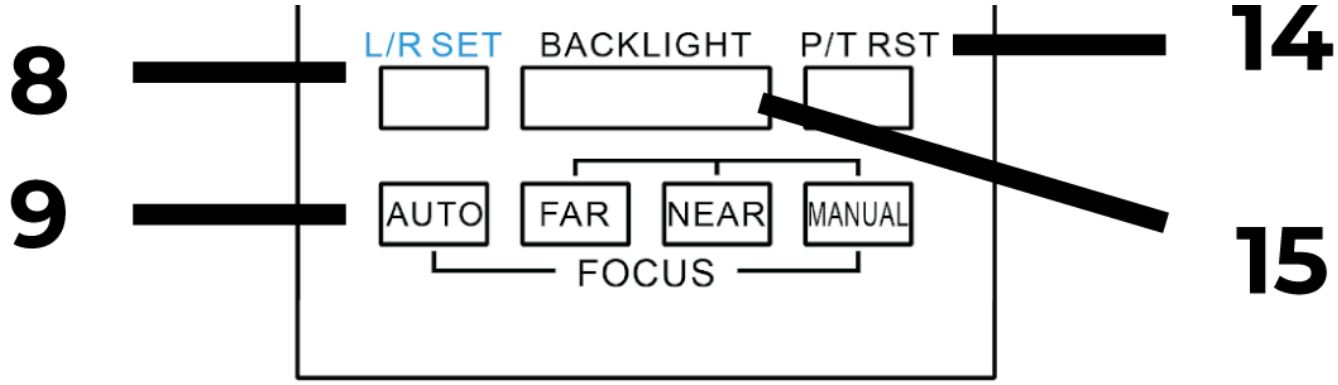
- **Check digit:** None

> **NOTE**
>
> To utilize an RS-485 connection, you will need an unterminated two-conductor cable

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

IR Remote


1
2
3
4
5
6
7
10
11
12
13
CAMERA SELECT
1
2
3
4
STD
REV
1
2
3
4
5
6
7
8
9
*
0
#
F1
F2
F3
F4
OFF
AUTOTRACKING
PRESET
RESET
HOME
MENU
SLOW
ZOOM
FAST



PTZOptics IR Remote Button Descriptions

1. **Standby Button** Press this button to enter standby mode. Press it again to enter normal mode.

> **INFO**
>
> 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. **Star Sign Button** Used predominantly when calling shortcuts.

4. **Set / Clear Presets** To Set a Preset (save a camera position and image settings), 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 factory default 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** Pressing **[AUTO]** tells the camera to focus the image on the center object. Pressing **[Manual]** switches the camera to manual focus mode. Press **[FAR]** to focus on a far object. Press **[NEAR]** to focus on a near object.

10. **Camera Select Buttons** Press **1**, **2**, **3**, or **4** to select the corresponding camera. Cameras must be set to the corresponding IR address to be controlled by the remote. to do this, press **[*]** + **[#]** + **[F1]** for Camera 1, **[F2]** for Camera 2, **[F3]** for Camera 3, and **[F4]** for Camera 4.

11. # **Button** For multiple functions. Typically used when calling shortcuts.

12. **Multi-Function Buttons**

    Function 1: Auto-Tracking Control

    - **[F1]**: Enable video-based auto-framing (Non-functional)
    - **[F2]**: Enable audio-based auto-tracking (Non-functional)
    - **[F3]**: Enable video-based auto-tracking
    - **[F4]**: Disable auto-tracking

    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.

13. **Menu Button** Press **[MENU]** to open the camera's On Screen Menu (OSD). Press **[MENU]** again to close the OSD.

14. **P / T RST Button** Perform camera self-calibrate pan and tilt movement.

15. **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.

> **NOTE**
>
> Although this remote can be used to control both PTZOptics Pan Tilt Zoom cameras and PTZOptics Studio Cams, the **P / T RST Button** will not self-calibrate Studio Cams.

OSD

Main Menu

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

Opening the On-Screen Display, provides the list of sub-menus seen below.

1. Exposure
2. Color
3. Image
4. P / T / Z
5. Noise Reduction
6. Setup
7. Information
8. Restore Default
9. Privacy Mode

Exposure

The following functions adjust the exposure settings.

Mode	
Options	Auto, Manual, SAE, AAE, Bright
Default	Auto

Exposure Modes Explained

- **Auto:** The camera automatically adjusts Iris, Shutter, and Gain to achieve optimal exposure.
- **Manual:** The user manually sets Iris, Shutter, Gain, and Dynamic Range Control (DRC) for precise exposure control.

- **SAE (Shutter Automatic Exposure):** The user manually sets Shutter, Gain Limit, Meter Region, and DRC while the camera automatically adjusts Iris for optimal exposure.
- **AAE (Aperture Automatic Exposure):** The user manually sets Iris, Gain Limit, Anti-Flicker, Meter Region, and Dynamic Range Control (DRC) while the camera automatically adjusts Shutter for optimal exposure.
- **Bright :** The user manually sets Bright (Brightness) Gain Limit, Anti-Flicker, Meter Region, and Dynamic Range Control (DRC) while the camera automatically adjusts Iris and Shutter for optimal exposure in low-light conditions.

Additional Exposure Settings

Exp-CompMode	
Options	On, Off
Default	On
Note	Effective only in Full Auto mode

Exp-Comp	
Options	-7 ~ +7
Default	-1
Note	*This option is only available while ExpCompMode is On*

Gain Limit	
Options	0 ~ 15
Default	3
Note	*This option is only available in Full Auto, AAE, Bright mode*

Meter	
Options	**Average** (Calculates entire image.), **Center** (Calculates from the center of the image.), **Top** (Calculates the top of the image.), **Smart** (Calculates the entire image and finds the best location.)
Default	Average
Note	*Effective only in Full Auto, AAE, Bright mode*

Backlight	
Options	On, Off
Default	Off
Note	*This option is only available in Full Auto mode*

DRC	
Options	0 ~ 8
Default	2

Anti-Flicker	
Options	Off, 50Hz, 60Hz
Default	60Hz
Note	*Effective only in Full Auto, AAE, Bright mode*

Iris / Shutter / Gain	
Options	Varies by mode

Iris / Shutter / Gain	
Note	*Effective only in Manual, SAE, AAE mode*

Shutter	
Options	1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000
Note	*Effective only in Manual, SAE mode*

Color

The following functions adjust the color settings.

WB Mode	
Options	Auto, Indoor, Outdoor, One Push, Manual, VAR
Default	Auto

AWB Sen	
Options	Low, Middle, High
Default	Low
Note	*This option is only available in auto white balance mode and One Push*

AWB Auto White Balance Sensitivity: Low, Middle, or High (Only available in auto white balance mode and One Push)

R Gain	
Options	0 ~ 255

R Gain	
Note	*This option is only available in Manual mode*

B Gain	
Options	0 ~ 255
Note	*This option is only available in Manual mode*

Color Temp	
Options	2500K ~ 8000K
Note	*This option is only available in VAR mode*

RG Tuning	
Options	-10 ~ +10
Default	0
Note	*This option is only available in Auto, One Push, VAR mode*

BG Tuning	
Options	-10 ~ +10
Default	0
Note	*This option is only available in Auto, One Push, VAR mode*

Saturation	
Options	20% - 200%

Saturation	
Default	100%

Hue	
Options	0 ~ 14
Default	7

Image

The following functions adjust the image quality.

Luminance	
Options	0 ~ 14
Default	7

Contrast	
Options	0 ~ 14
Default	7

Sharpness	
Options	Auto, 0 ~ 11
Default	4

B&W Mode	
Options	On, Off

B&W Mode	
Default	Off

Flip-H / Flip-V	
Options	On, Off
Default	Off

Gamma	
Options	Default, .45, .5, .56, .63, EXT
Default	.45

Image Style	
Options	Default, Norm, Clarity
Default	Default

P / T / Z

The following functions adjust the Pan, Tilt, and Zoom settings.

D-Zoom Limit	
Options	Off, 2x, 4x, 8x, 16x, Super
Default	Off

Display Info	
Options	On, Off

Display Info	
Default	On

Image Freeze	
Options	On, Off
Default	Off

Pre Zoom Speed	
Options	0 ~ 7
Default	5

Noise Reduction

The following functions adjust the noise reduction settings.

2D NR	
Options	Auto, 1 ~ 5
Default	Auto

3D NR	
Options	Auto, 1 ~ 8
Default	Auto

Setup

The following functions adjust the camera setup settings.

Language	
Options	English, Chinese
Default	English

Video Setting (Opens the Video Settings Sub Menu)	
Sub Menu Options	VO Switch, DVI Mode, Format Mode, Video Format
VO Switch	Switch the video output between HDMI or SDI.
DVI Mode	Turn DVI Mode On or Off.
Format Mode	Choose OSD, 50Hz, or 60Hz.

Video Setting (Opens the Video Settings Sub Menu)	
Video Format	• 4KP29.97 (HDMI) • 4KP30 (HDMI) • 4KP50 (HDMI) • 4KP59.94 (HDMI) • 4KP60 (HDMI) • 1080P25 (HDMI+SDI) • 1080P29.97 (HDMI+SDI) • 1080P30 (HDMI+SDI) • 1080I50 (HDMI) • 1080P50 (HDMI+SDI) • 1080I59.94 (HDMI) • 1080P59.94 (HDMI+SDI) • 1080I60 (HDMI) • 1080P60 (HDMI+SDI) • 720P29.97 (HDMI+SDI) • 720P30 (HDMI+SDI) • 720P50 (HDMI+SDI) • 720P59.94 (HDMI+SDI) • 720P60 (HDMI+SDI)

Audio Setting (Opens the Audio Settings Sub Menu)	
Sub Menu Options	Audio Source, Input Volume, Line Out Volume
Audio Source	Choose between Mic, Line In (3.5mm), or Disable.
Input Volume	Adjust the input volume from 0dB to 24dB in increments of 3.
Line Out Volume	Adjust the line out volume from 0dB to 12dB in increments of 1.5dB.

Focus Setting (Opens the Focus Settings Sub Menu)	
Sub Menu Options	ToF Focus, AF-Sense, AF-Zone, AF Limit, Focus Lock
ToF Focus	Enable or Disable the Time of Flight focusing system.
AF-Sense	Adjust the autofocus sensitivity to Low, Normal, or High.
AF-Zone	Select the autofocus zone: Center, Top, Bottom, or Front.
AF Limit	Set the autofocus limit distance in meters, or choose Off or Infinite.
Focus Lock	Lock or Unlock the focus settings.

Communication Setting

The following functions adjust the communication settings.

Protocol	
Options	VISCA, PELCO-D, PELCO-P
Default	VISCA

V_Addres	
Options	1 ~ 7
Default	1

V-AddrFix	
Options	Off, On
Default	Off

Net Mode	
Options	Serial, Parallel
Default	Serial

Baudrate	
Options	2400, 4800, 9600, 38400
Default	9600

P_D_Address	
Options	0 ~ 254
Default	1

P_P_Address	
Options	0 ~ 31
Default	1

Other Setting

The following functions adjust other camera settings.

OSD Flip	
Options	Off, On

OSD Flip	
Default	Off

OSD TimeOut	
Options	Off, 5s, 10s, 15s, 20s, 30s
Default	Off
Note	*Sets the amount of time the OSD menu remains on screen before automatically turning off. If set to **"Off"**, OSD will remain on screen until manually turned off.*

LDC	
Options	Off, On
Default	Off
Note	*Slightly Adjust and compensate for lens any lens distortion*

Keypad	
Options	Active, Lock
Default	Active
Note	*Active: Side keypad is functional. Lock: Side keypad is disabled.*

Custom 0 func	
Custom Options	Preset 0 ~ Preset 9, Home, Focus Near, Focus Far, Iris Open, Iris Close, Zoom Wide, Zoom Tele, Auto

Custom 0 func	
	Focus, Exposure Lock, Privacy Mode, Image Freeze
Default	Preset 0
Note	*Custom buttons can be found on the side of the camera body. These buttons can be programmed to perform specific functions for quick access.*

Custom 1 func	
Custom Options	Preset 0 ~ Preset 9, Home, Focus Near, Focus Far, Iris Open, Iris Close, Zoom Wide, Zoom Tele, Auto Focus, Exposure Lock, Privacy Mode, Image Freeze
Default	Preset 1
Note	*Custom buttons can be found on the side of the camera body. These buttons can be programmed to perform specific functions for quick access.*

Information

This menu displays the camera information.

Version	
Displays the firmware version number	e.g. 8.1.88

Model	
Displays the camera model version	e.g. P11.HI

Date	
Displays the date	e.g. 2025-01-09

AF Version	
Displays the Auto Focus firmware version number	e.g. 14.4.55

Video Format	
Displays the current video format	e.g. 1080P60

Restore Default

This menu is reserved for resetting all camera settings to factory default values.

Restore Default	
Yes	Resets all camera settings to factory default values.
No	Exits the menu without making any changes.

> **NOTE**
>
> Press the [Enter] button to confirm. All camera parameters will return to default, including IR remote & VISCA Addresses.

Privacy Mode

This menu allows you to enable or disable Privacy Mode.

Privacy Mode	
Options	Press **[Enter]** to turn on privacy mode. Press **[Enter]** again to turn it off.
Default	Off

IMPORTANT

Privacy Mode can be enabled from the Privacy Mode menu, or by pressing the IR Remote's Privacy Mode button to turn the camera head down and back, and disable the video feed.

To disable Privacy Mode press the Privacy Mode button again.

Networking

Discovering Your Network

Windows

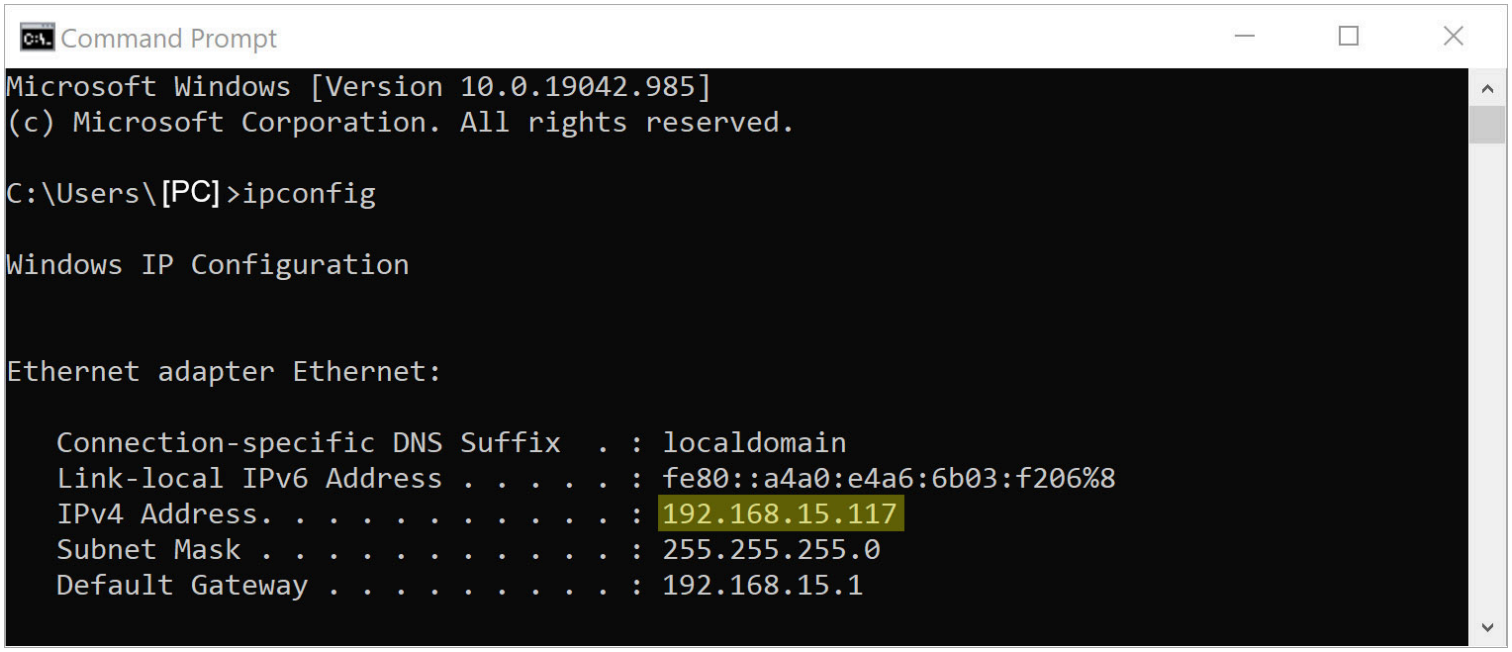
1. Open the Start menu and type “CMD” into the search bar.

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 below, the PC’s local address is “192.168.15.117”, making the network range “192.168.15.xxx”.

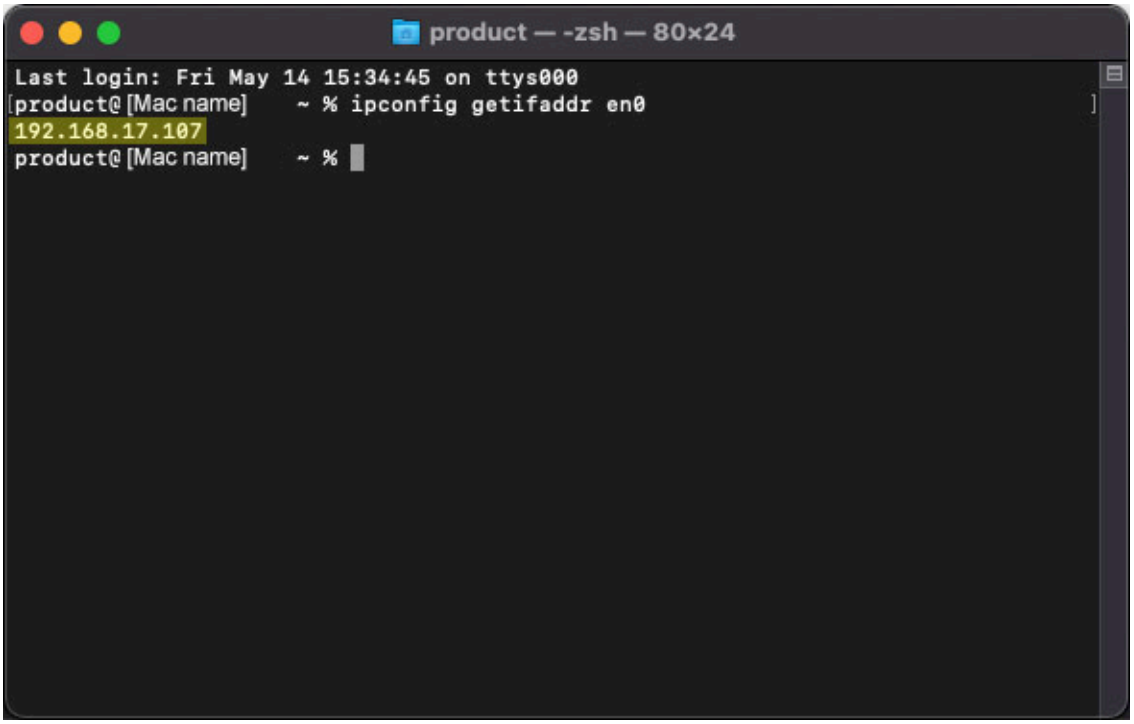


Mac

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.



Finding the Camera’s IP Address

Method 1: Use a Internet browser and type in “http:// ptzoptics.local/” to reach the camera’s web interface. You will be prompted to set up a username and password. Once logged in, click on the Network Settings tab to make adjustments to the camera’s network settings.

Method 2: Run an HDMI cable from the camera to a display. 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.

> **TIP**
>
> Assign a unique Device ID to each camera from the Web UI’s Device Info tab. This will allow you to reach each camera’s web interface without needing to memorize an IP address. For example, “http://cameraOne.local” and “http://cameraTwo.local”.

Network Joystick Connection

PTZOptics carries two joysticks, the **PT-SUPERJOY-G1**, and the **PT-JOY-G4**, that can be used to control a camera via a network connection.

Steps

1. Ensure the camera and the PTZOptics IP joystick are connected to the same network.

2. Press the **[SETUP]** button on your joystick, and select option one (1) “Network Device” for IP.

3. Fill in the Network Device field to connect the camera. The fields are as follows:

    - **Channel**: (For SuperJoy users enter 1 ~ 9 in the **Group** field) Joystick Camera Address [CAM ID] Options include 1 - 255.
    - **Protocol Select**
        - **PT-JOY-G4 Protocol Options**:
          VISCA (UDP), VISCA (TCP), Sony VISCA (UDP), ONVIF.
        - **PT-SUPERJOY-G1 Protocol Options**:
          VISCA (UDP), VISCA (TCP), Sony VISCA (UDP), ONVIF. NDI, & Panasonic Control
    - **IP**: Enter the Camera IP Address Here
    - **Ctrl Port**: Enter the camera control port.

4. Once the above fields are filled, press the **[ENTER]** button to save the camera to the controller.

Control Port Numbers

- **UDP** 1259
- **TCP** 5678
- **Sony VISCA Protocol** 52381

> **TIP**
>
> One way to find the camera's control port number is to go to its web user interface.
>
> Type the camera's IP address into a web browser and log in using your credentials.
>
> Click the Control tab, then click the Ports tab below. Here, you can see the available control protocols.

Resetting the Camera's IP Address Using the IR Remote

Press the following buttons in the order shown below:

[*] > **[#]** > **[MANUAL]**

This will resets IP information to default.

> **NOTE**
>
> The default mode is DHCP.

Use one of the following codes with the IR remote to assign a specific IP address to your camera.

Input Sequence	IP Address
[#] > [*] > [#] > [1]	192.168.100.81
[#] > [*] > [#] > [2]	192.168.100.82
[#] > [*] > [#] > [3]	192.168.100.83
[#] > [*] > [#] > [4]	192.168.100.84
[#] > [*] > [#] > [5]	192.168.100.85
[#] > [*] > [#] > [6]	192.168.100.86
[#] > [*] > [#] > [7]	192.168.100.87
[#] > [*] > [#] > [8]	192.168.100.88
[#] > [*] > [#] > [9]	192.168.100.89
[#] > [*] > [#] > [0]	192.168.100.80

Video

Choosing a Resolution & Frame Rate

We recommend setting the resolution and frame rate before getting started. To do this, turn the yellow System Select dial on the back of the camera to the desired setting.

Dial Position	HDMI	Dial Position	SDI
0	1080p 60	0	1080p 60
1	1080p 50	1	1080p 50
2	1080i 60	2	1080i 60
3	1080i 50	3	1080i 50
4	1080p 30	4	1080p 30
5	720p 60	5	720p 60
6	1080p 29.97	6	1080p 29.97
7	1080i 59.94	7	1080i 59.94
8	1080p 59.94	8	1080p 59.94
9	720p 59.94	9	720p 59.94
A	2160p 29.97	A	1080p 29.97
B	2160p 59.94	B	1080p 59.94
C	2160p 25	C	1080p 25

Dial Position	HDMI	Dial Position	SDI
D	2160p 30	D	1080p 30
E	2160p 50	E	1080p 50
F	2160p 60	F	1080p 60

Streaming

NDI® HX3 Connection

The NDI HX3 connection allows you to connect and control the camera through any NDI compatible hardware or software on a Local Area Network. Once the camera is setup on a LAN, you can utilize the NDI HX3 connection.

NDI Setup

1. Download and install the latest NDI Tools from NDI Tools
2. This camera's NDI settings can be configured from the camera's web interface in the NDI settings tab.
3. Select the camera within the NDI compatible device. The NDI feed will utilize the camera's device-friendly name.

> **INFO**
>
> Vizrt NDI®, NDI 4, 5, 6. NDI HX, NDI HX2, and NDI HX3 are all registered trademarks by Vizrt. Please note that your NDI License key is non-transferable.

RTMP Streaming

The camera can send two RTMP(S) streams. To use your camera with an RTMP stream, you will need a Stream URL & Stream Key, from a CDN or from the social network to which you want to stream.

Steps

1. Once you have the Stream URL & Stream Key, log into Web UI.
2. Navigate to the Streaming Settings page. In the RTMP(S) Settings section, enter the Stream URL & Stream Key you received from the CDN or social network.
3. Ensure you turn your RTMP stream **"On"** by enabling the appropriate stream, and click the **Apply** button.

RTSP Streaming

The camera is able to send an RTSP stream for viewing video through a LAN.

Using VLC or another RTSP enabled video program, type the following string into your network streaming section:

- **Stream 1 (HD)**:
  - rtsp://[IP ADDRESS]:554/1
- **Stream 2 (SD)**:
  - rtsp://[IP ADDRESS]:554/2

If you do not know the IP address of your camera, refer to the Finding the Camera's IP Address section.

Presets

Setting & Calling Presets

Steps

Step 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.

Step 2. 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 can be found in the On-Screen Display section of this menu. To set the camera's image settings to their defaults, use the Restore Default menu in the on-screen display, or set them to default in the camera's Web UI.

> **NOTE**
>
> Saving a preset saves the camera position as well as all the image settings it had at that exact time.
>
> When zooming the camera, all image settings will stay set to their last applied saved values unless the camera is in automatic modes such as auto-exposure.

Step 3. Preset Zero: With all the image settings defaulted, the first preset to establish is Preset Zero. This preset, will essentially serve as the 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 satisfied with the look/style of the image.

3. Press [PRESET] then [0] using the IR Remote.

4. Preset zero is now saved.

Step 4. Standard Presets: These presets can be assigned to any number between 1 and 254.

1. Begin by calling preset zero.

> **TIP**
>
> Its recommended to take a screenshot of preset zero to help color match new presets or camera shots from different cameras.
>
> Its also helpful to pull the camera's video feed into live streaming software such as Vmix or OBS for viewing and comparision. To properly compare image quality, ensure you are using the same monitor or screen.

2. Move the camera into the position intended to save as a preset.

3. Compare the new preset position with preset zero to ensure they match. Most of the time they will not be an exact match, because different areas have different lighting that requires different settings.

4. Make adjustments to the image settings to color match with preset zero.

Step 5. Save the Preset:

Keep the Studio 4K family on the current firmware and use the changelog to verify what changed before you update.

UPDATE PATH

Firmware Instructions

Follow the step-by-step upgrade flow for the Studio 4K web interface.

Open instructions

RELEASE HISTORY

Firmware Changelog

Open the shared markdown release notes file for Studio 4K and Studio SE.

View changelog

Latest Firmware Files

Studio 4K/SE 12X Firmware

Download firmware image

Studio 4K/SE 20X Firmware

Download firmware image

Instructions

Upgrading Your G3 Camera's Firmware

Steps

- **1.** Login to your camera's web interface by typing in its IP address or .local address. For example http://ptzoptics.local

> **IMPORTANT**
>
> If this is your first time logging in, you will be prompted to create a username and password.

- **2.** Once logged in, go to the **System Settings** page.
- **3.** Click on the **Check Firmware** button. If your firmware is not up to date, you will receive a pop-up notification that says, "Your firmware is out of date!". If it is up to date, the pop-up will read, **"Your firmware is up to date!"
- **4.** If you received the, **"Your firmware is out of date!"** notification, click the **Apply** button.
- **5.** You may be prompted to download multiple files. Click **"Allow"** to download the firmware and changelog files.
- **6.** You may be prompted to approve the download. Click the **Keep** button on the changelog to approve the download.
- **7.** Click the arrow to reveal the Advanced section of System Settings.
- **8.** Click the **Select File** button.
- **9.** Navigate to the Download folder and select the *.img firmware file.
- **10.** Click the **Apply** button to upload the firmware to the camera.
- **11.** A notification will popup informing you the firmware has been uploaded and will take a few minutes to complete. It may take some time for the notification to pop up, so do not attempt to reboot the camera or

exit the page.

- **10.** After 3 ~ 6 minutes, the firmware upgrade process will be complete. Reload the web interface to reveal the new features.
- **11.** Once logged in, press Shift + Ctrl + R to refresh the Web UI without cookies / cache.
- **12.** Navigate to the Device Information Page under Camera Config. The Firmware Version field will show the latest SOC version.

Studio 4K Release Notes

Updates on new features, fixes, and known issues for the Studio 4K and Studio SE families.

Current Firmware Files

Studio 4K/SE 12X Firmware

Download firmware image

Studio 4K/SE 20X Firmware

Download firmware image

09/16/2025

Studio 4K/SE 12X - v8.2.29 | Studio 4K/SE 20X - v8.2.24

New Features and Bug Fixes

- EPTZ: Added EPTZ (cropping) support to the SuperZoom (BETA) function located in Control > Mode > ZoomModes. The camera can now digitally zoom in and navigate around the image sensor, enabling electronic pan, tilt, zoom, and preset set/recall functionality.

> **NOTE**
>
> SuperZoom & EPTZ are only available on the Studio 4K. A reboot is required to enable SuperZoom.

- Image Settings: Added One Push Exposure functionality. When triggered, the camera automatically calibrates exposure settings (shutter speed and gain) based on current lighting conditions, then locks them for manual control, similar to One Push White Balance. Added Bright Mode to the Exposure Mode settings.
- Camera Features & Security: Added Focus Calibration to the Web UI under System Settings > Advanced. Added VISCA command support for Privacy Mode: `0x81, 0x01, 0x3F, 0x0A, 0x12, 0x0p, 0xFF` where `p: on=01 off=00`. Added VISCA command support for Camera Restart: `0x81, 0x01, 0x3F, 0x0B, 0x01, 0xAA, 0xFF`. Added the ability to disable IR remote input to enhance security, located in System Settings > IR Remote Channel Selection.

- Audio/Video Interface: Reorganized the Audio section of the Web UI to improve user experience and accessibility.
- Streaming & Protocols: Resolved issue where HX3 enabled mode did not restrict certain setting required by the NDIHX3 certification process. Stream 1 Encode Protocols now allow only H.264 and H.265 when HX3 is On; MJPEG is unselectable.
- PTZ & Control: Fixed issue where Iris control via ONVIF was inverted. Open now correctly opens the iris and Close closes it. Resolved issue with Pelco D/P protocol presets so presets can now be both saved and recalled using Pelco commands. Fixed IR remote shortcut `* > * > [F3]`, which now correctly toggles between SDI and HDMI outputs.

Known Issues

- Enabling NDI HX3 leaves the camera's refresh rate at its last value. If that isn't `50 Hz` or `60 Hz`, the stream may not function as HX3.

> **NOTE**
>
> Please ensure the refresh rate matches the intended NDI HX3 profile needed.

05/01/2025

Studio 4K/SE 12X - v8.2.08 **Studio 4K/SE 20X - v8.2.08**

New Features and Bug Fixes

- Added NDI HX3 streaming profiles, High (`1080p50/60`) and Ultra (`4K50/60`), for both H.264 and H.265 in the Audio settings.

01/28/2025

Studio 4K/SE 12X - v8.1.90 **Studio 4K/SE 20X - v8.1.90**

New Features and Bug Fixes

- Resolved an issue where specific resolutions and frame rates over HDMI would not output video, including `720P59.94`, `720P29.97`, `1080i59.94`, and `1080P29.97`.

- Fixed an issue where `1080P59.94` over HDMI incorrectly outputted as `1080P29.97`.
- Fixed an issue where logging in as a Guest user and pressing the Home button would force a logout.
- Fixed an issue where preset recall did not retain Image, Exposure, and Color settings.

Known Issues

- When using Focus Control in NDI Studio Monitor, the camera continues to focus without receiving a stop command.
- When using serial PELCO-D or PELCO-P protocols, the camera is unable to recall presets beyond Preset 1.

12/27/2024

Studio 4K/SE 12X - v8.1.82 **Studio 4K/SE 20X - v8.1.83**

New Features and Bug Fixes

- Initial camera firmware.

Technical Specs

Camera & Lens

Feature	Specification
Resolution & Frame Rate HDMI, NDI, & USB	• **3840x2160p** - 60/59.94/50/30/29.97/25 • **1920x1080p** - 60/59.94/50/30/29.97/25 • **1920x1080i** - 60/59.94/50 • **1280x720p** - 60/59.94
Resolution & Frame Rate SDI	• **1920x1080p** - 60/59.94/50/30/29.97/25 • **1920x1080i** - 60/59.94/50 • **1280x720p** - 60/59.94/50
Lens	**(12X)** Sony 1/2.8" CMOS
	(20X) Sony 1/2.8" CMOS
Image Sensor	**(12X)** 8.46MP, Effective Pixels: 8.29
	(12X) 8.46MP, Effective Pixels: 8.29
Optical Lens Focal Length (Zoom)	**(12X)** f = 4.1mm ~ 49.2mm, F1.8 ~ F2.68
	(20X) f = 4.7mm ~ 94mm, F1.6 ~ F3.6
Optical Lens Field of View Horizontal & Vertical	**(12X) Horizontal**..... 6.9° ~ 72.5°, **(12X) Vertical**..... 3.9° ~ 44.8°
	(20X)Horizontal..... 3.5° ~ 60.7°, **(20X) Vertical**..... 1.9° ~ 34.1°
Display Field of View	**(12X)** 80.2°
	(20X) 67.8°

Feature	Specification
Min Lux	0.5 Lux @ (F1.8, AGC ON)
Shutter	1/30s ~ 1/10000s
Presets	255 Presets
Preset Accuracy	0.1^{o}
Image Flip, Mirror, and Freeze	Supported
Scanning Mode	Progressive and Interlaced

Physical Specifications

Feature	Specification
Material	Aluminum, Plastic
Color	Gray or White
Dimensions(L x W x H)	**(12X & 20X)** 5.7” L x 2.99” W x 3.09” H, 145 mm L x 76 mm W x 78.5mm H
Weight	**(12X)** 1.5 lbs 0.68kg
	(20X) 1.4 lbs 0.64kg
Working Environment	Indoor
Humidity Range	10% - 80%
Operating Temperature	14°F ~ 104°F (-10°C ~ 40°C)
Storage Temperature	-40°F ~ 140°F (-40°C ~ 60°C)

Connections

Feature	Specification
RJ45	10/100/1000M Adaptive Ethernet Port
HDMI	Version 2.0
3G-SDI	BNC Type, 800mVP-p, 75Ω, Along to SMPTE 424M,standard
USB 3.0	Type C
UVC Version Supported:	UVC 1.0
Compression Standards	YUY2 YUY2: Max resolution: 1920x1080p@30
	MJPEG: Max resolution: 3840x2160p@30
	H.264 AVC & SVC: Max resolution: 3840x2160p@30
	H.265: Max resolution: 3840x2160p@30 (RSTP/NDI HX2 only)
Audio Interface	3.5mm Line level Input & Output
RS485 Input Output	2-pin Phoenix port RS485 Input / Output, Max distance: 3,937ft / 1200m, **Protocol**: VISCA / Pelco-D / Pelco-P
IR	4x IR Addresses, Max distance 30ft / 9m
Power Supply	JEITA type (DC IN 12V) / PoE (802.3at)
Current Consumption	Max 2.0A

IP Video Specifications

Feature	Specification
Video Compression	H.264 / H.265 / MJPEG / YUY2 (H265 HEVC via RTSP/NDI HX2 only)
Video Stream	First Stream, Second Stream
First Stream Resolutions	3840x2160, 2560x1440, 1920x1080, 1280x720, 1024x576, 960x540, 640x360
Second Stream Resolutions	1920x1080, 1280x720, 1024x576, 960x540, 640x360
Video Bitrate	**First Stream:** 32kbps ~ 81920kbps, **Second Stream:** 32kbps ~ 20480kbps
Bitrate Type	Constant Bit Rate (CBR), Variable Bit Rate (VBR)
Frame Rate	50Hz: 1 ~ 50 fps. 60Hz: 1 ~ 60 fps
Audio Compression	AAC
Audio Bit Rate	96kbps, 128kbps
Supported Protocols	TCP/IP, UDP, HTTP, RTSP, RTMP/RTMPS, ONVIF, SRT,Multicast, etc.

Compliance

The Studio 4K is an NDAA Compliant camera.

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


HEVC Advance™
Covered by patents at patentlist.accessadvance.com