PTZOptics Rise 4K

Product Manual

Rise 4K

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To Get Started, Choose Your Connection Method

There are several ways to configure and operate your Rise 4K camera. Choose the method that works best for your setup.

CONNECT VIA NETWORK

CONNECT VIA SDI

CONNECT VIA HDMI

CONNECT VIA USB

Connect via Network

Network Guide ← Back to Get Started

This guide covers the most common setup: **Power over Ethernet + Network Video + Horizon Web UI Control**. If this matches your needs, follow the steps below and you'll have a working camera in about 5 minutes.

WHAT YOU NEED

- **PoE++ (802.3bt)** switch or injector
- **Ethernet cable** (Cat5e or better)
- A **computer or device** on the same network

Step 1: Connect Power and Network

Choose one of the following power methods:

Option A: 12V DC Power Supply

1. Connect the included 12V DC power supply to the camera's **DC input**.
2. Plug the power supply into a standard wall outlet.

Option B: Power over Ethernet PoE++ (802.3bt)

1. Connect an Ethernet cable from a **PoE++ (802.3bt)** switch or **PoE++ (802.3bt)** injector to the camera's **LAN port**.
2. The camera will power on automatically.

> ⚠ **REQUIREMENT**
> Ensure your switch or injector supports **PoE++ (802.3bt)**, not just PoE (802.3af).

EEE: ENERGY-EFFICIENT ETHERNET

Please ensure your PoE switch or injector is ***NOT*** configured for EEE: Energy-Efficient Ethernet Mode or Power Saving Mode. These features may limit the power available to the camera, leading to unstable operation or insufficient power delivery.

Step 2: Wait for Startup Sequence

When powered, the **Rise 4K** camera performs a startup sequence:

1 **Self-calibration:** During startup, the camera moves through its full range of motion while both the **green (Standby)** and **blue (Power)** LEDs are on. When self-calibration is complete, the camera returns to Preset 0

2 **Ready:** Once the camera stops moving and the **green LED** turns off, your camera is ready to use.

Step 3: Find the Camera on Your Network

The **Rise 4K** camera supports mDNS, so you can reach it by hostname without knowing the IP address.

1. Open a web browser on any device connected to the same network.
2. Type the following address and press Enter:

```
http://ptzoptics.local/
```

3. This will take you to the **Horizon Web UI** where you will be prompted to set up a password on your first login.
   - Default Username: **admin**
   - Create a strong password.

MULTIPLE CAMERAS?

Give each camera a unique **Device ID** from the **Horizon Web UI Device Info** tab. Then reach each camera by its ID: `http://camera-one.local`, `http://camera-two.local`, etc.

Step 4: Control the Camera

Use the following options to quickly verify control of the camera.

Option A: Network Control (Recommended)

If the **Rise 4K** camera is connected to your network, you can control it from the **Horizon Web UI**.

1. Open a browser and go to `http://ptzoptics.local/`
2. Log in with username **admin** and set a password.
3. Use the **Horizon Web UI** for full PTZ control, image settings, and preset management.

Option B: IR Remote (Simplest)

Use the included IR remote to pan, tilt, zoom, and save presets. Point the remote at the camera's front sensor.

Button	Action
⬆⬇⬅➡ Arrow keys	Pan left/right and tilt up/down
Tele / Wide	Zoom in and out
Home	Return to Home Position
[PRESET] + [Number]	Save a preset

Step 5: Save Your First Preset

Using the Web Interface

1. Move the camera to your desired position.
2. Click **Set** in the Preset Control section.
3. Enter a preset number and press **Enter**.

> ℹ WHAT PRESETS SAVE
> A preset saves both the camera position **and** all image settings. Calling a preset restores both.

Using a PTZ Joystick (e.g., SuperJoy)

1. Move the camera to your desired position.
2. Press the **Preset** button on the joystick.
3. Enter the preset number and confirm.

> ℹ WHAT PRESETS SAVE
> A preset saves both the camera position **and** all image settings. Calling a preset restores both.

Using the IR Remote

Press **[PRESET]** then a number (e.g., **[1]**) to save. To recall, press the number again. For more information on using the IR remote, see the Using the IR Remote section.

You're Finished!

Your **Rise 4K** is now connected, streaming video over the network, and controllable from the web interface. You can:

- **Save more presets** for different positions
- **Adjust image settings** for your lighting conditions
- **Enable auto-tracking** from the Automation panel
- **Configure streaming** (RTSP, RTMP, NDI|HX) from the Audio & Video settings

> ⚠ **MORE INFORMATION ON CAMERA CONTROL**
> This camera can be controlled using various methods and joystick controllers. To learn more about camera control, see Control Options.

Need a Different Setup?

If your setup doesn't use PoE + Network video, choose the guide that matches your needs:

Connect via HDMI

For connecting to a monitor, capture card, or recording device in the same room.

Open HDMI Guide →

Connect via SDI

For long cable runs (up to 100m) in professional/broadcast environments.

Open SDI Guide →

Connect via USB

For plug-and-play webcam use with Zoom, Teams, OBS, or vMix.

Open USB Guide →

Control Options

For integrating with RS232 or RS485 control systems, joysticks, or automation.

Open Control Guide →

Next Steps

- Adjust image settings for your lighting conditions
- Configure streaming protocols if you also need network video output

← Back to Get Started

Connect Via SDI

SDI Guide ← Back to Get Started

This guide covers setting up **Rise 4K** with a **3G-SDI video output** or a **12G-SDI video output**.

WHAT YOU NEED

- **3G SDI cable (75-ohm BNC) or 12G SDI cable (75-ohm BNC)**
- **12V DC power supply** (included) or **PoE++ (802.3bt)** switch or injector
- A **video switcher, capture card, or monitor** with SDI input
- Optional: Ethernet cable for network control

⚠ 4K REQUIRES COMPATIBLE EQUIPMENT

Although **3G-SDI** and **12G-SDI** use the same BNC connector, your entire signal path must support **12G-SDI** to output or receive **4K video**. If any device in the chain only supports **3G-SDI**, your workflow will be limited to HD resolutions or may not work at all.

Understanding 3G-SDI and 12G-SDI

Both **3G-SDI** and **12G-SDI** use the same locking **BNC connector** and are designed for reliable, professional video transmission. The primary difference between them is the amount of video data they can carry.

- **3G-SDI** supports video resolutions up to **1080p at 60 fps**, making it an excellent choice for HD productions and compatibility with a wide range of professional broadcast equipment.
- **12G-SDI** supports video resolutions up to **4K at 60 fps** over a single BNC cable, making it ideal for higher-resolution production workflows.

If your production is limited to **1080p**, either connection can deliver excellent image quality. Choose **12G-SDI** when you need to capture or distribute **4K video** and your switcher, monitor, recorder, or capture device supports 12G-SDI.

3G-SDI vs 12G-SDI Comparison

Feature	3G-SDI	12G-SDI
Signal Type	3G-SDI (Level-A or Level-B)	12G-SDI (Level-A)
Maximum Resolution	1080p60	4K60
Connector	BNC	BNC
Approximate Data Rate	2.97 Gbps	11.88 Gbps
Embedded Audio	▯ Yes	▯ Yes
Typical Cable Length	Longer: 200–330 ft (60–100 m)	Shorter: 100–165 ft (30–50 m)
Best For	HD workflows	4K workflows

Step 1: Connect SDI

Connect the 3G-SDI or 12G-SDI Cable

1. Connect a **75-ohm 3G-SDI cable (BNC) or a 12G-SDI cable (BNC)** from the camera's **SDI output** to your video switcher, capture card, or monitor's **SDI input**.

> ▯ **USE PROPER SDI CABLES**
> Standard composite or component BNC cables will not carry an SDI signal reliably. Use a 3G **75-ohm-rated cable** or a 12G **75-ohm-rated cable**.

> ▯ **CAN I USE 12G-SDI FOR HD VIDEO?**
> Yes. A **12G-SDI** connection can also carry lower-resolution video formats, including **1080p** and **720p**. If your production equipment supports 12G-SDI, you can use the same connection for both HD and 4K workflows.

Step 2: Connect Power and Network

Choose one of the following power methods:

Option A: 12V DC Power Supply

1. Connect the included 12V DC power supply to the camera's **DC input**.

2. Plug the power supply into a standard wall outlet.

Option B: Power over Ethernet

Power over Ethernet PoE++ (802.3bt)

1. Connect an Ethernet cable from a **PoE++ (802.3bt)** switch or **PoE++ (802.3bt)** injector to the camera's **LAN port**.
2. The camera will power on automatically.

> ⚠ **REQUIREMENT**
> Ensure your switch or injector supports **PoE++ (802.3bt)**, not just PoE (802.3af).

Step 3: Wait for Startup Sequence

When powered, the **Rise 4K** camera performs a startup sequence:

> 1⃣ **Self-calibration:** During startup, the camera moves through its full range of motion while both the **green (Standby)** and **blue (Power)** LEDs are on. When self-calibration is complete, the camera returns to Preset 0

> 2⃣ **Ready:** Once the camera stops moving and the **green LED** turns off, your camera is ready to use.

Step 4: Control the Camera

Use the following options to quickly verify control of the camera.

Option A: Network Control (Recommended)

If the **Rise 4K** camera is connected to your network, you can control it from the **Horizon Web UI**.

1. Open a browser and go to `http://ptzoptics.local/`
2. Log in with username **admin** and set a password.
3. Use the **Horizon Web UI** for full PTZ control, image settings, and preset management.

Option B: IR Remote (Simplest)

Use the included IR remote to pan, tilt, zoom, and save presets. Point the remote at the camera's front sensor.

Button	Action
⬆⬇⬅➡ Arrow keys	Pan left/right and tilt up/down
Tele / Wide	Zoom in and out
Home	Return to Home Position
[PRESET] + [Number]	Save a preset

Step 5: Save Your First Preset

Using the Web Interface

1. Move the camera to your desired position.
2. Click **Set** in the Preset Control section.
3. Enter a preset number and press **Enter**.

> ℹ WHAT PRESETS SAVE
> A preset saves both the camera position **and** all image settings. Calling a preset restores both.

Using a PTZ Joystick (e.g., SuperJoy)

1. Move the camera to your desired position.
2. Press the **Preset** button on the joystick.
3. Enter the preset number and confirm.

> ℹ WHAT PRESETS SAVE
> A preset saves both the camera position **and** all image settings. Calling a preset restores both.

Using the IR Remote

Press **[PRESET]** then a number (e.g., **[1]**) to save. To recall, press the number again. For more information on using the IR remote, see the Using the IR Remote section.

SDI Specifications

3G-SDI and 12G-SDI Specifications

Feature	Specification
Max Resolution	**1080p @ 60fps** (1920 × 1080)
Max Cable Length	~200–328 ft (60–100 m) with quality cable
Audio	Yes. This camera supports embedded audio over SDI.
Connectors	BNC (locking)
Signal Type	3G-SDI (Level-A or Level-B)

> ⚠ **NO 4K OVER 3G-SDI**
> This camera's 3G-SDI output is limited to 1080p.

12G-SDI Specifications

Feature	Specification
Max Resolution	**4K @ 60fps** (3840 × 2160)
Max Cable Length	~100–164 ft (30–50 m) with quality cable
Audio	Yes. This camera supports embedded audio over SDI.
Connectors	BNC (locking)
Signal Type	12G-SDI (Level-A)

> ⚠ **MORE INFORMATION ON CAMERA CONTROL**
> This camera can be controlled using various methods and joystick controllers. To learn more about camera control, see Control Options.

Next Steps

- Adjust image settings for your lighting conditions
- Configure streaming protocols if you also need network video output

← Back to Get Started

Connect Via HDMI

HDMI Guide ← Back to Get Started

This guide covers setting up **Rise 4K** using an **HDMI video output**. Use this if you're connecting to a monitor, capture card, or recording device in the same room.

WHAT YOU NEED

- **HDMI cable**
- **12V DC power supply** (included) or **PoE++ (802.3bt)** switch or injector
- A **monitor, TV, or capture card** with HDMI input
- Optional: Ethernet cable for network control

Step 1: Connect the HDMI Cable

1. Connect an HDMI cable from the camera's **HDMI output** to your monitor, TV, or capture card's **HDMI input**.

> ⚠ **HDMI INPUT VS OUTPUT**
> Many computers have HDMI **outputs** only, not inputs. If your computer lacks an HDMI input, use a capture card.

Step 2: Connect Power and Network

Choose one of the following power methods:

Option A: 12V DC Power Supply

1. Connect the included 12V DC power supply to the camera's **DC input**.
2. Plug the power supply into a standard wall outlet.

Option B: Power over Ethernet PoE++ (802.3bt)

1. Connect an Ethernet cable from a **PoE++ (802.3bt)** switch or **PoE++ (802.3bt)** injector to the camera's **LAN port**.
2. The camera will power on automatically.

> ⚠ **REQUIREMENT**

> Ensure your switch or injector supports **PoE++ (802.3bt)**, not just PoE (802.3af).

Step 3: Wait for Startup Sequence

When powered, the **Rise 4K** camera performs a startup sequence:

> 1⃣ **Self-calibration:** During startup, the camera moves through its full range of motion while both the **green (Standby)** and **blue (Power)** LEDs are on. When self-calibration is complete, the camera returns to Preset 0

> 2⃣ **Ready:** Once the camera stops moving and the **green LED** turns off, your camera is ready to use.

Step 4: Control the Camera

Use the following options to quickly verify control of the camera.

Option A: Network Control (Recommended)

If the **Rise 4K** camera is connected to your network, you can control it from the **Horizon Web UI**.

1. Open a browser and go to `http://ptzoptics.local/`
2. Log in with username **admin** and set a password.
3. Use the **Horizon Web UI** for full PTZ control, image settings, and preset management.

Option B: IR Remote (Simplest)

Use the included IR remote to pan, tilt, zoom, and save presets. Point the remote at the camera's front sensor.

Button	Action
⬆⬇⬅➡ Arrow keys	Pan left/right and tilt up/down
Tele / Wide	Zoom in and out
Home	Return to Home Position
[PRESET] + [Number]	Save a preset

Step 5: Save Your First Preset

Using the Web Interface

1. Move the camera to your desired position.
2. Click **Set** in the Preset Control section.
3. Enter a preset number and press **Enter**.

> ℹ **WHAT PRESETS SAVE**
> A preset saves both the camera position **and** all image settings. Calling a preset restores both.

Using a PTZ Joystick (e.g., SuperJoy)

1. Move the camera to your desired position.
2. Press the **Preset** button on the joystick.
3. Enter the preset number and confirm.

> ℹ **WHAT PRESETS SAVE**
> A preset saves both the camera position **and** all image settings. Calling a preset restores both.

Using the IR Remote

Press **[PRESET]** then a number (e.g., **[1]**) to save. To recall, press the number again. For more information on using the IR remote, see the Using the IR Remote section.

HDMI Specifications

Feature	Specification
Max Resolution	**4K @ 60fps** (3840 × 2160)
Max Cable Length	~49 ft (15 m) without extenders
Audio	▯ Yes — embeds audio from the 3.5mm input
4K Requirements	Capture device must support 4K over HDMI; 4K requires more processing power than 1080p

> ⚠ **MORE INFORMATION ON CAMERA CONTROL**

> This camera can be controlled using various methods and joystick controllers. To learn more about camera control, see Control Options.

Next Steps

- Adjust image settings for your lighting conditions
- Configure streaming protocols if you also need network video output

← Back to Get Started

Connect Via USB

USB Guide ← Back to Get Started

This guide covers setting up the **Rise 4K camera** with USB video. Use this for plug-and-play webcam workflows in Zoom, Teams, OBS, or vMix.

WHAT YOU NEED

- **USB cable**
- **12V DC power supply** (included) or **PoE++ (802.3bt)** switch/injector
- **Computer** with USB input

Step 1: Connect the USB

1. Connect a USB cable from the camera's USB output to your computer.
2. Power on the camera using DC power or PoE++ (802.3bt).

> ⚠ **USB DOES NOT POWER THE CAMERA**
> USB carries data only. The **Rise 4K** still requires DC power or PoE++ (802.3bt).

Step 2: Wait for Startup Sequence

When powered, the **Rise 4K** camera performs a startup sequence:

1 **Self-calibration:** During startup, the camera moves through its full range of motion while both the **green (Standby)** and **blue (Power)** LEDs are on. When self-calibration is complete, the camera returns to Preset 0

2 **Ready:** Once the camera stops moving and the **green LED** turns off, your camera is ready to use.

Step 3: Select the Camera in Your App

In your app's video settings, choose the **Rise 4K** as the video device.

- Zoom: Settings > Video
- Teams: Settings > Devices

- OBS: Add Source > Video Capture Device
- vMix: Add Input > Camera

Step 4: Verify Video and Control

1. Confirm you see live video in your application.
2. Use the web interface at `http://ptzoptics.local/` for PTZ control and image settings.
3. The easiest way to verify PTZ control via USB is to use the camera's IR remote. Press the arrow buttons to pan and tilt, and the zoom buttons to zoom in and out. For more information, see Using the IR Remote.

Test Presets Using the IR Remote

Press **[PRESET]** then a number (for example, **[1]**) to save. To recall: press the number again. For more information, see Using the IR Remote.

Step 5: Next Steps

- Adjust image settings for your lighting conditions
- Configure streaming protocols if you also need network video output

← Back to Get Started

Broadcast Advanced Connections

Genlock and Timecode: Explained

Before learning about Genlock and Timecode individually, it's helpful to understand that they solve **two different problems**. Although they're often used together in professional productions, one does **not** replace the other.

Genlock vs Timecode

Imagine four people standing in a row.

Genlock: Everyone Claps Together

Without Genlock, each person claps whenever they want.

```
□
    □
        □
 □
```

With Genlock, everyone claps at exactly the same moment.

```
□□□□
□□□□
□□□□
```

It synchronizes **when** each camera captures a video frame, allowing multiple cameras to stay perfectly in sync during live production.

Timecode: Everyone Numbers Their Claps

Now imagine each clap is assigned a number.

Without Timecode, we do not have labels for the claps, so we cannot tell which clap happened first.

With Timecode, every clap is labeled with a timestamp, so we can tell which clap happened first.

```
Camera 2
Clap #100
Clap #101
Clap #102
```

Rather than synchronizing when frames are captured, Timecode gives every recorded frame a common timestamp. This allows editing software to automatically align footage from multiple cameras and recording devices.

Do You Need One or Both?

That depends on your production.

If you're...	You typically need...
Streaming or recording with a single camera	Neither
Recording multiple cameras for editing later	Timecode
Running a live broadcast with multiple cameras	Genlock
Producing professional live broadcasts that will also be edited later	Both

About Genlock

Genlock (Generator Lock) synchronizes the timing of multiple video devices so they all begin each video frame at the same moment.

Instead of each camera running on its own internal clock, connected devices lock to a shared reference signal. This helps enable cleaner switching between cameras and better compatibility with professional production systems.

Genlock is commonly used in **Broadcast Studios** and **Live Event Production**.

When to Use Genlock

Common examples include:

- Multiple cameras are connected to a professional video switcher.
- Your production equipment requires a common reference signal.
- You are producing live broadcasts where seamless camera switching is important.

WHAT YOU NEED

- Video Reference Generator (house sync generator) or compatible reference source
  - Professional productions often use a dedicated video reference generator, such as a Blackmagic Design Sync Generator or an AJA GEN10, to distribute a common synchronization signal to multiple cameras and production devices.
- 75 ohm BNC coaxial cable
- Other production equipment configured to use the same reference signal.

Genlock Connection Setup

1. Connect the SYNC output of your house sync generator to the camera GENLOCK connector.
2. Configure all compatible cameras and production equipment to use the same reference source.
3. Verify synchronization before recording or going live.

IMPORTANT

Genlock carries only a timing reference. It does not carry video, audio, or control signals.

Best Practices

- Use a single master sync generator for all compatible devices.
- Use quality 75 ohm BNC cables.
- Ensure every device is configured for the same video format (for example, 2160p59.94 or 1080p60).
- Verify synchronization before beginning production.

Genlock Specifications

Feature	Specification
Connector	BNC
Direction	Input only

Feature	Specification
Signal Level	1.0 Vp-p
Cable Type / Impedance	75 ohm coaxial (broadcast video cable)

About Timecode

Timecode is a continuously increasing timestamp assigned to every recorded video frame.

When multiple cameras and recording devices receive the same timecode, each frame shares a common timestamp. This makes footage synchronization much easier during editing and post-production.

Unlike Genlock, Timecode does not synchronize video timing. It provides a shared reference that editing software uses to align recordings.

When to Use Timecode

Timecode is recommended whenever footage from multiple devices needs to be synchronized later.

Common examples include:

- Multi-camera productions
- Interviews
- Broadcast production
- Live events
- Productions using external audio recorders

WHAT YOU NEED

- External LTC (Linear Timecode) generator or compatible LTC source
- 75 ohm BNC coaxial cable
- Recording devices configured to use the same timecode source

Timecode Connection Setup

1. Connect the LTC output of your timecode generator to the camera TIME CODE connector.

2. Configure all compatible cameras and recording devices to use the same timecode source.
3. Verify that every device is receiving matching timecode before recording.

> **IMPORTANT**
> **Timecode** carries timing information only. It does not carry video, audio, or control signals.

Best Practices

- Use one LTC generator for every camera and audio recorder.
- Verify matching timecode before recording.
- If using portable timecode generators, jam-sync every device before production begins.
- Avoid disconnecting the timecode source during recording.

Timecode Specifications

Feature	Specification
Connector	BNC
Direction	Input only
Signal Type	LTC (Linear Timecode)
Cable Type / Impedance	75 ohm coaxial (broadcast video cable)

About SFP+ Fiber Output

The PTZOptics **Rise 4K** camera includes an **SFP+** (Enhanced Small Form-factor Pluggable Plus) port that allows you to transmit a **4K 12G-SDI video signal** over fiber optic cable. While traditional SDI connections use coaxial cable, an SFP+ fiber connection extends the distance you can send uncompressed video while providing greater immunity to electrical interference.

> **WHAT YOU NEED**
> - Compatible SFP+ transceiver module
> - LC duplex fiber cable

- Matching SFP+ transceiver (or compatible fiber receiver) on the other end

Fiber Connection Setup

Before you begin ensure your camera is powered on and connected to your network via Ethernet.

When powered, the **Rise 4K** camera performs a startup sequence:

1. **Self-calibration:** During startup, the camera moves through its full range of motion while both the **green (Standby)** and **blue (Power)** LEDs are on. When self-calibration is complete, the camera returns to Preset 0

2. **Ready:** Once the camera stops moving and the **green LED** turns off, your camera is ready to use.

Rise 4K includes a built-in SFP+ cage, which accepts a compatible SFP+ transceiver module.

1. Install your compatible transceiver

2. Then connect an LC duplex fiber optic cable between the camera and a compatible receiving device.

3. On the receiving device end install a compatible SFP+ transceiver to connect to your video switcher or fiber receiver.

REQUIREMENTS

The receiving device must also have a compatible SFP+ transceiver or use a fiber receiver that converts the optical signal back to 12G-SDI.

Fiber Connection Diagram

```
Camera
┌──────────────────────────────┐
│ [ SFP+ Port ]                │
└──────────────┬───────────────┘
               │
      SFP+ Transceiver
               │
      LC Fiber Cable
               │
```

```
      SFP+ Transceiver
             |
   Video Switcher / Fiber Receiver
```

SFP+ Specifications

Feature	Specification
Video Format	12G-SDI over Fiber
Fiber Type	Single-mode (SMF)
Maximum Data Rate	Approximately 11Gbps
Connector Type	LC Duplex
Transmission Distance	Up to 10km (6.2 miles) with single-mode fiber
Stream Carry	Uncompressed 4K Video, Embedded Audio, Timecode, Closed Captions, Ancillary (ANC) Data

Adjusting Image Settings

Let's make sure the image looks great. This page covers the essential image settings you'll use in almost every setup: exposure, white balance, and focus. We'll start with the defaults and work from there.

> **TIP**
> Before adjusting image settings, make sure the lighting in your space is set up the way you want it. The easiest lighting to work with is **flat lighting**, evenly dispersed light throughout the scene. Adjusting image settings before your lighting is finalized will likely require re-adjusting later.

Understanding the Resolution Dial

The **Resolution Dial** on the rear of the camera determines the video format output over HDMI and SDI. Use the table below to select the dial position that matches the resolution and frame rate required by your production. Ensure you are using the desired **output**, **resolution**, and **frame rate** before proceeding.

> **NOTE**
> The camera will use the last resolution, frame rate, and output you've selected. If you made your last resolution, frame rate, and video output selection using the resolution dial, the camera will use those settings. If the last resolution, frame rate, and output selection you made was from the camera's OSD or its web interface, the camera will use those settings.

> **WARNING**
> After making an adjustment to the resolution dial, you need to restart the camera for the changes to take effect!

HDMI/12G-SDI	HDMI Format	3G-SDI	SDI Format
0	1080p 60	**0**	1080p 60
1	1080p 50	**1**	1080p 50
2	1080i 60	**2**	1080i 60

HDMI/12G-SDI	HDMI Format	3G-SDI	SDI Format
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
D	2160p 30	**D**	1080p 30
E	2160p 50	**E**	1080p 50
F	2160p 60	**F**	1080p 60

Starting from Defaults

We recommend resetting all image settings to their factory defaults before making adjustments. This gives you a clean baseline to work from.

Using the On-Screen Display (OSD)

1. Press **[Menu]** on the IR remote to open the OSD.
2. Navigate to **Restore Defaults** using the arrow keys.
3. Press **[Enter]** to confirm.

Using the Horizon Web UI

1. Log in to the **Horizon Web UI**.
2. Navigate to **Camera Settings > Advanced** tab.
3. Click the **Default** button to revert all advanced settings to factory defaults.

You can also reset individual setting groups (Exposure, Color, Focus) from their respective tabs by clicking the **Default** button on each tab.

> **Optional: Establish Preset 0: (For Advanced Users to Meet Support Requests)**

Auto Focus vs Manual Focus

Auto Focus (Default)

Auto Focus is enabled by default and works well in most situations. The camera continuously adjusts focus to keep the subject sharp as you pan, tilt, and zoom.

- **AF Zone**: Determines where the camera looks for focus. Options include **Center** (default), **Top**, **Bottom**, and **Front**.
- **AF Sensitivity**: Controls how quickly autofocus responds. Options are **Low**, **Normal** (default), and **High**.

> **TIP**
>
> For most setups, the **Center** zone and **Normal** sensitivity work well. If the camera is hunting for focus in a low-contrast scene, try switching to **Manual** focus.

Manual Focus

Switch to **Manual** focus when you want to lock in a specific focus point and prevent the camera from adjusting automatically.

1. In the web interface, go to **Camera Settings > Focus** tab.
2. Change **Focus Mode** from **Auto** to **Manual**.
3. Use the **Focus slider** to adjust focus until the image is sharp.

The SNAP Button

The **SNAP** button performs a one-shot autofocus. The camera runs autofocus to find the sharpest focus point, then returns to manual mode. This is useful when you want to quickly lock focus without staying in full Auto Focus mode.

Focus Limit

If the camera keeps trying to focus on objects very close to the lens (like a table edge or podium), you can set a **Focus Limit** to prevent it from focusing closer than a certain distance.

1. Go to **Camera Settings > Focus** tab.
2. Enable the **Focus Limit** checkbox.
3. Set the **Nearest Pos** to the minimum distance you want the camera to focus on (e.g., 2 meters).

The ND Filter

The built-in **Neutral Density (ND) filter** reduces the amount of light entering the camera without changing color or image quality. This allows you to maintain proper exposure in bright environments while using camera settings that produce more natural-looking video.

For example, when filming outdoors in bright sunlight, an ND filter can help prevent overexposure without requiring an excessively fast shutter speed.

Choosing the Right ND Filter

> **TUNING**
>
> - If your image appears too bright even after adjusting the camera's exposure settings, increase the ND filter strength. If the image becomes too dark, select a lower setting or turn the ND filter off.
> - Higher ND filter settings reduce more light entering the camera. This makes them better suited for brighter environments.

1. Open the **On-Screen Display (OSD)** menu.
2. Navigate to the **SETUP Menu** then **Focus Settings**.
3. Select **ND Filter**.
4. Choose one of the available settings that provides the desired exposure:

Setting	Best For
Off	Indoor environments or low-light conditions
1/4	Bright indoor lighting or lightly overcast outdoor conditions
1/16	Bright outdoor conditions
1/64	Very bright sunlight

5. Exit the menu and verify the image exposure.

Exposure Basics

Exposure controls how bright or dark the image appears. The **Rise 4K** offers several exposure modes, but for most setups, you'll want to start with **Auto**.

Exposure Modes

Mode	When to Use
Auto	Default. The camera automatically adjusts Iris, Shutter, and Gain. Best for most setups.
Manual	Full control over Iris, Shutter, and Gain. Use when you need precise, consistent exposure.
SAE (Shutter-Priority Auto Exposure)	You set the shutter, and the camera adjusts the iris. Useful when you need to control motion blur.
AAE (Aperture-Priority Auto Exposure)	You set the iris, and the camera adjusts the shutter. Useful when you need to control the depth of field.
Bright	Optimized for low-light conditions. The camera prioritizes brightness.
OnePush	Press a button to let the camera set exposure based on the current scene, then lock it.

Quick Exposure Adjustments

If Auto exposure is close but not quite right, try these adjustments without switching to Manual mode:

- **Exp-Comp (Exposure Compensation)**: Adjusts the overall brightness up or down. Range: **-7 to +7**. Default is **-3**. Turn it up if the image is too dark, down if it's too bright.
- **Backlight**: Enables backlight compensation for scenes with a bright background (like a window behind the subject). Toggle **On** to brighten the foreground.
- **Gain Limit**: Sets the maximum gain the camera will apply in low light. Range: **0-15**. Default is **5**. Lower values reduce noise but may result in a darker image.
- **Anti-Flicker**: Reduces flicker caused by artificial lighting. Set to **50Hz** or **60Hz** to match your local power frequency. If you see banding or flickering in the image, try changing this setting. We recommend turning this feature off if shooting in sunlight.

Meter Region

The **Meter Region** determines which area of the frame the camera uses to calculate exposure:

- **Average** (default): Evaluates the entire image. Good for evenly lit scenes.
- **Center**: Prioritizes the center of the frame. Good when your subject is centered.
- **Top**: Prioritizes the top of the frame. Useful when the subject is in the upper portion.
- **Smart**: Analyzes the entire image and finds the best location for exposure calculation. We recommend turning this feature off if shooting in sunlight.

White Balance Basics

White balance ensures colors look natural under different lighting conditions. The wrong white balance can make your image look too warm (Red) or too cool (Blue).

White Balance Modes

Mode	When to Use
Auto	Default. The camera adjusts white balance automatically. Best for most setups.
Indoor	Optimized for indoor lighting (~3200K). Use under tungsten or warm LED lights.

Mode	When to Use
Outdoor	Optimized for outdoor lighting (~5600K). Use in daylight or mixed outdoor/indoor scenes.
OnePush	Point the camera at a white surface, then press the OnePush button. The camera locks white balance based on what it sees.
Manual	Full control over Red Gain and Blue Gain. Use when you need precise color matching between cameras.
VAR	Set a specific color temperature (2500K-8000K) along with Red/Blue gain adjustments.

Quick White Balance Tips

- If the image looks **too red/warm**, try switching from **Auto** to **Outdoor**, or lower the **Red Gain** in Manual mode.
- If the image looks **too blue/cool**, try switching from **Auto** to **Indoor**, or lower the **Blue Gain** in Manual mode.
- For the most accurate white balance, use **OnePush**: point the camera at a white card or white wall that's lit the same way as your subject, then trigger OnePush.

Fine-Tuning the Image

Once exposure and white balance are dialed in, you can fine-tune the image with these settings:

Image Tab Settings

Setting	Range	Default	What It Does
Luminance	0-14	8	Overall brightness of the image.
Saturation	20%-200%	90%	Color intensity. Increase for more vivid colors, decrease for a more muted look.
Contrast	0-14	9	Difference between light and dark areas. Higher contrast makes shadows deeper and highlights brighter.

Setting	Range	Default	What It Does
Sharpness	Auto, 0-11	9	Edge definition. Too high can introduce artifacts; too low can look soft.
Hue	0-14	8	Shifts the overall color hue. Usually best left at default.

Noise Reduction

In low-light situations, you may notice grain or noise in the image. **3D Noise Reduction** helps smooth this out:

- Range: **Off, 1-8, Auto**
- Default: **7**
- Higher values apply stronger noise reduction but can make the image look softer or introduce motion artifacts.
- **Auto** lets the camera adjust dynamically based on lighting conditions.

Matching Multiple Cameras with Color View

If you're using multiple cameras in the same space, you'll want their images to match so switching between them doesn't create a jarring change in exposure or color. The **Color View** workspace in Horizon gives you professional-grade analysis tools to match cameras precisely, not just by eye.

Step 1: Set All Cameras to the Same Baseline

Before you start matching, ensure all cameras are starting from the same settings:

1. Set all cameras to the same **Exposure Mode** (start with **Auto**).
2. Set all cameras to the same **White Balance Mode** (start with **Indoor** or **Outdoor**, depending on your lighting).
3. Set all image settings (Luminance, Saturation, Contrast, Sharpness, Hue) to their **factory defaults**.
4. Zoom all cameras out to the maximum and point them at the center of the scene.

> **TIP**
> Place a white or neutral grey card in the center of the frame under your key lighting. This gives you a consistent reference point across all cameras.

Step 2: Open Color View in Horizon

1. For each camera, open the Horizon web interface in a browser tab.
2. Switch to the **Color View** workspace for each camera by clicking the **Color** tab at the top of the dashboard (between Basic and Studio).
3. Arrange the browser windows side by side so you can see all cameras at once.

Step 3: Match Color Using the Waveform

1. On each camera's Color View, select the **Waveform** analyzer from the dropdown.

2. Look at the waveform for each camera. The waveform displays luminance (brightness) across the frame:

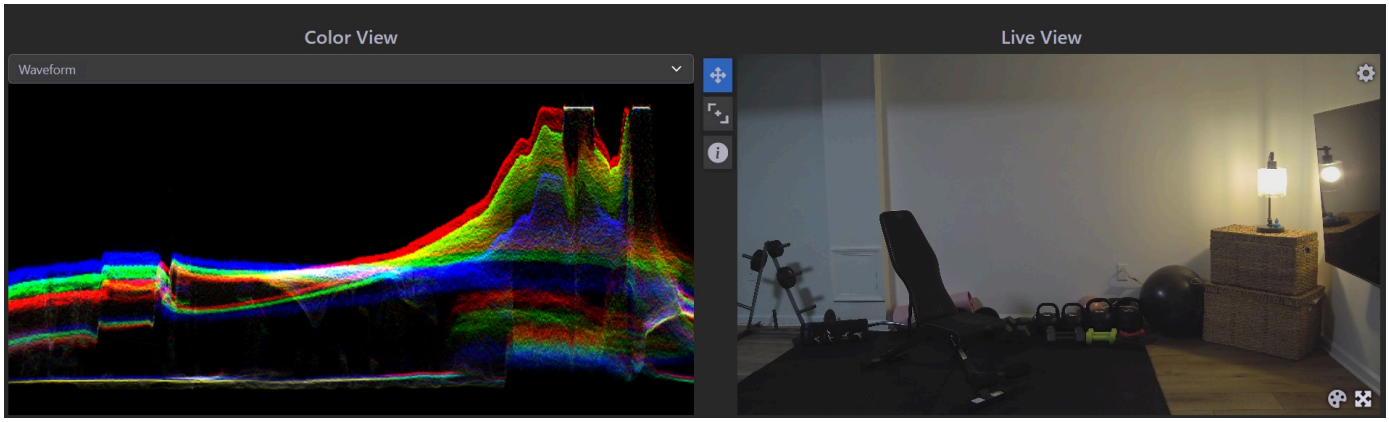
- **0%** = pure black
- **50-70%** = well-exposed skin tones/subjects
- **100%** = peak white (clipping)

3. Compare the **red**, **green**, and **blue** waveform traces. The goal is to bring them as close together as possible, particularly in areas that should appear neutral while keeping the signal below 100% to prevent clipping.

- Begin by adjusting **Luminance** and **Exposure Mode** to control the waveform's overall height.

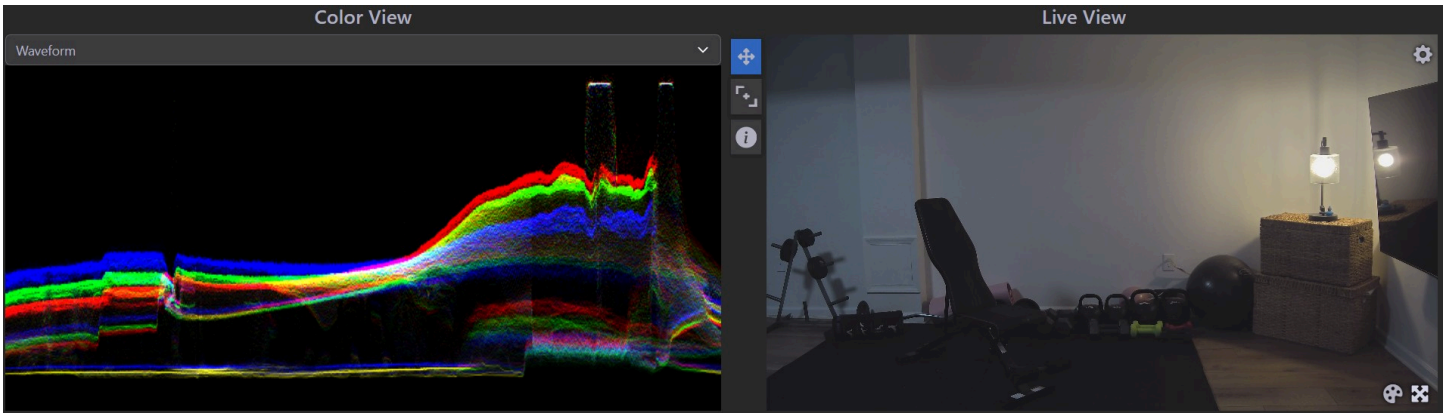
- The example below shows a small exercise podcast space, with the waveform monitor on the left and the video preview on the right. The image, exposure, and color settings are all using their default automatic modes.

- The waveform traces overlap closely on the left side of the image. On the right, however, the warm lamp causes the signal to exceed 100%, indicating clipping in this area.



- To correct the image, we changed **Exposure Mode** to **AAE** (Aperture Auto Exposure) and changed the white balance mode to **Manual**.

- We then decreased **Red Gain**, increased **Blue Gain**, slightly increased **Luminance**, and reduced **Contrast**.
- In the corrected image below, the **red**, **green**, and **blue** traces are more closely balanced, and the exposure is more consistent across the frame. Most importantly, the lamp is no longer clipping, resulting in a more neutral and evenly exposed image.



4. Aim for the waveforms to look as similar as possible between cameras.

Step 4: Fine-Tune and Save

1. Use the **Before Settings Snapshot** analyzer mode on each camera to compare your adjusted signal against the original defaults.
2. Make final adjustments to **Saturation**, **Contrast**, and **Sharpness** to taste, watching the analyzers for consistency.
3. Click **Apply** at the bottom of the Color Settings panel to commit the changes.
4. Optionally, click the **Save Changes** (download) icon at the top of the Color Settings panel to export the settings as a profile file. You can later use the **Upload** button to import that profile to other cameras.

> **TIP**
>
> Once you've dialed in a perfect look on your primary camera, click **Save Changes** (download icon) to export its profile. Then use the **Upload** button on the other cameras to import that profile as a starting point; you'll only need minor tweaks to finish matching.

Other Analyzers in Color View

The Horizon Web UI's Color View also includes the following analyzers to help you match cameras:

Analyzer	Use It To Match...	What to Look For
RGB Parade	White balance/color channels	R, G, B waveforms at similar levels for neutral scenes
Vectorscope	Saturation and hue accuracy	Traces overlapping in the same positions on the scope

To learn more about these tools check out our Knowledgebase article on Color Balancing

Control Options

This guide covers setting up the **Rise 4K** camera with **external control systems** via Network, RS232, or RS485 connections.

Network Joystick Controller Setup

PTZOptics joysticks can control the **Rise 4K** over the network using **VISCA over IP**, giving you physical joystick control without serial cables.

WHAT YOU NEED

- A PTZOptics joystick (PT-SUPERJOY-G1 or PT-JOY-G4)
- Camera and joystick on the same network
- Camera's IP address

Steps

1. **Connect the joystick** to your network via Ethernet.
2. **Power on the joystick** and wait for it to boot.
3. **Configure the joystick** with the camera's connection details:
   - Enter the camera's **IP address**.
   - Set the port to **5678** (TCP) or **1259** (UDP).
   - Set the protocol to **VISCA over IP**.
4. **Test control:** Use the joystick to pan, tilt, and zoom the camera.

TIP

For multi-camera setups, assign each camera a unique address and configure the joystick to switch between them. The SuperJoy supports managing multiple cameras from a single interface.

IMPORTANT

Control connections can be made while the camera is powered on, but we recommend making all connections **before** powering on for proper detection.

Serial Joystick Control

This camera supports **RS232** and **RS485** serial control for direct, wired connection to PTZ joysticks, control systems, and automation platforms.

About Serial Control: RS232 vs RS485

Both **RS232** and **RS485** provide direct, wired control of a camera without requiring a network connection. They commonly support the same control protocols, such as VISCA, Pelco-D, and Pelco-P. The choice between them comes down to three factors: **distance, number of cameras, and installation environment.**

- **RS232** is the simpler option for small installations. It's primarily designed for a **point-to-point connection** between one controller and one camera, although PTZ cameras support daisy-chaining multiple cameras using their RS232 input and output ports. It works well when the controller is located near the camera, typically within about 98 ft (30 m). Because RS232 uses single-ended signaling, it is more susceptible to electrical noise over longer cable runs. For short distances, however, it provides reliable, straightforward control and remains a common option for single-camera systems.

- **RS485** is the better choice when you need to cover longer distances or control multiple cameras. It uses differential signaling, which transmits data as the voltage difference between two wires instead of referencing a single wire to ground. This makes RS485 much more resistant to electrical noise and interference, making it well suited for large venues, houses of worship, campus buildings, and industrial environments. RS485 supports cable runs of up to 3,937 ft (1,200 m) and allows **multi-drop configurations**, where multiple cameras share the same communication bus. Each camera is assigned a unique address, allowing a single controller to communicate with each device over the same pair of wires.

> **TIP**
>
> Tip: For most modern installations, **VISCA over IP** or **Network-based Control** offers greater flexibility and eliminates many of the distance limitations of serial control. RS232 and RS485 remain valuable when working with legacy control systems, dedicated hardware controllers, or installations where network control isn't available.

RS232 Joystick Controller Setup

RS232 provides a direct, point-to-point wired connection between your controller and the camera. No network configuration is needed.

WHAT YOU NEED

- **RS232 cable** with **8-pin Mini DIN** connectors
- A **controller or joystick** that supports VISCA, Pelco-D, or Pelco-P
- **12V DC power supply** (included) or **PoE++ (802.3bt)** (RS232 does not provide power)

Step 1: Connect the RS232 Cable

1. Connect an RS232 cable (8-pin Mini DIN) from your controller's **RS232 output** to the camera's **RS232 Input** port.
2. For daisy-chaining multiple cameras: connect the camera's **RS232 Output** to the next camera's **RS232 Input**.

WARNING

RS232 pinouts vary between manufacturers. If your controller's pinout differs from the camera's, you may need a **null modem adapter** or a **custom cable**. See the RS232 Pin-Out Reference below for the **Rise 4K**'s pin assignments.

Step 2: Power the Camera

Power the camera using one of the following methods:

- **12V DC**: Connect the included 12V DC adapter to the camera's DC input.
- **PoE++ (802.3bt)**: Connect the camera's LAN port to a PoE++ (802.3bt).

Step 3: Configure Your Controller

1. Set your controller to match the camera's protocol: **VISCA** (default), **Pelco-D**, or **Pelco-P**.
2. Set the baud rate to match the camera (default: **9600**).
3. Assign each camera a unique address (default: **1**).

TIP

To change the camera's protocol from the IR remote, press **[Menu]**, navigate to **Communication Setup**, and select your protocol.

Step 4: Test Control

Use your controller to pan, tilt, and zoom the camera. If the camera doesn't respond:

- Verify the RS232 cable is connected to the correct port (**Input**, not Output).
- Verify the protocol and baud rate match between controller and camera.
- Verify each camera in a daisy chain has a **unique address**.

RS485 Joystick Controller Setup

RS485 supports long-distance cable runs and multi-drop configurations where multiple cameras share a single communication bus.

> **WHAT YOU NEED**
> - **Twisted-pair cable** (Cat5e, Cat6, or dedicated RS485 cable) with **Phoenix connector** (terminal block)
> - A **controller, joystick, or automation system** that supports VISCA, Pelco-D, or Pelco-P
> - **12V DC power supply** (included) or **PoE++ (802.3bt)** (RS485 does not provide power)

Step 1: Connect the RS485 Cable

1. Connect the **positive (red)** wire to the camera's **positive** Phoenix connector port (on the left).
2. Connect the **negative (black)** wire to the camera's **negative** Phoenix connector port (on the right).
3. Connect the positive and negative wires to the matching ports on your joystick controller.
4. For multi-drop: daisy-chain from the first camera's RS485 output to the next camera's RS485 input.

Step 2: Power the Camera

Power the camera using one of the following methods:

- **12V DC**: Connect the included 12V DC adapter to the camera's DC input.
- **PoE++ (802.3bt)**: Connect the camera's LAN port to a PoE++ (802.3bt).

Step 3: Configure Your Controller

1. Set your controller to match the camera's protocol: **VISCA** (default), **Pelco-D**, or **Pelco-P**.
2. Set the baud rate to match the camera (default: **9600**).
3. Assign each camera a **unique address**.

Step 4: Test Control

Use your controller to pan, tilt, and zoom each camera. If a camera doesn't respond:

- Verify the twisted-pair cable is connected with the correct **polarity** (+ and -).

- Verify the protocol and baud rate match.
- Verify each camera has a **unique address**.

Reference

RS232 Pin-Out Reference

The **Rise 4K** uses **8-pin Mini DIN** connectors for RS232. Pin assignments are as follows:

RS232 Input Port (from Controller)

Pin	Signal	Description
1	DTR	Data Terminal Ready
2	DSR	Data Set Ready
3	TXD	Transmit Data
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	IR Out	Infrared Output
8	NC	No Connection

RS232 Output Port (to Next Camera in Daisy Chain)

Pin	Signal	Description
1	DTR	Data Terminal Ready
2	DSR	Data Set Ready
3	TXD	Transmit Data

Pin	Signal	Description
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	IR Out	Infrared Output
8	NC	No Connection

> **NOTE**
>
> The RS232 Input and Output Mini DIN connectors use the same pin numbering and signal names for daisy-chain wiring.

RS232 Communication Parameters

Parameter	Value
Baud Rate	2400, 4800, 9600 (default), 38400
Start Bit	1
Data Bits	8
Stop Bit	1
Parity	None

RS485 Communication Parameters

Parameter	Value
Baud Rate	2400, 4800, 9600 (default), 38400

Parameter	Value
Start Bit	1
Data Bits	8
Stop Bit	1
Parity	None
Connector	2-pin Phoenix connector (terminal block)
Max Cable Length	~3,937 ft (1,200 m)

Control Protocol Reference

Protocol	Default	Address Range	Notes
VISCA	Yes (default)	1-7	Industry standard for PTZ cameras
Pelco-D	-	0-254	Common in security systems
Pelco-P	-	0-31	Older Pelco variant

Control Method Comparison

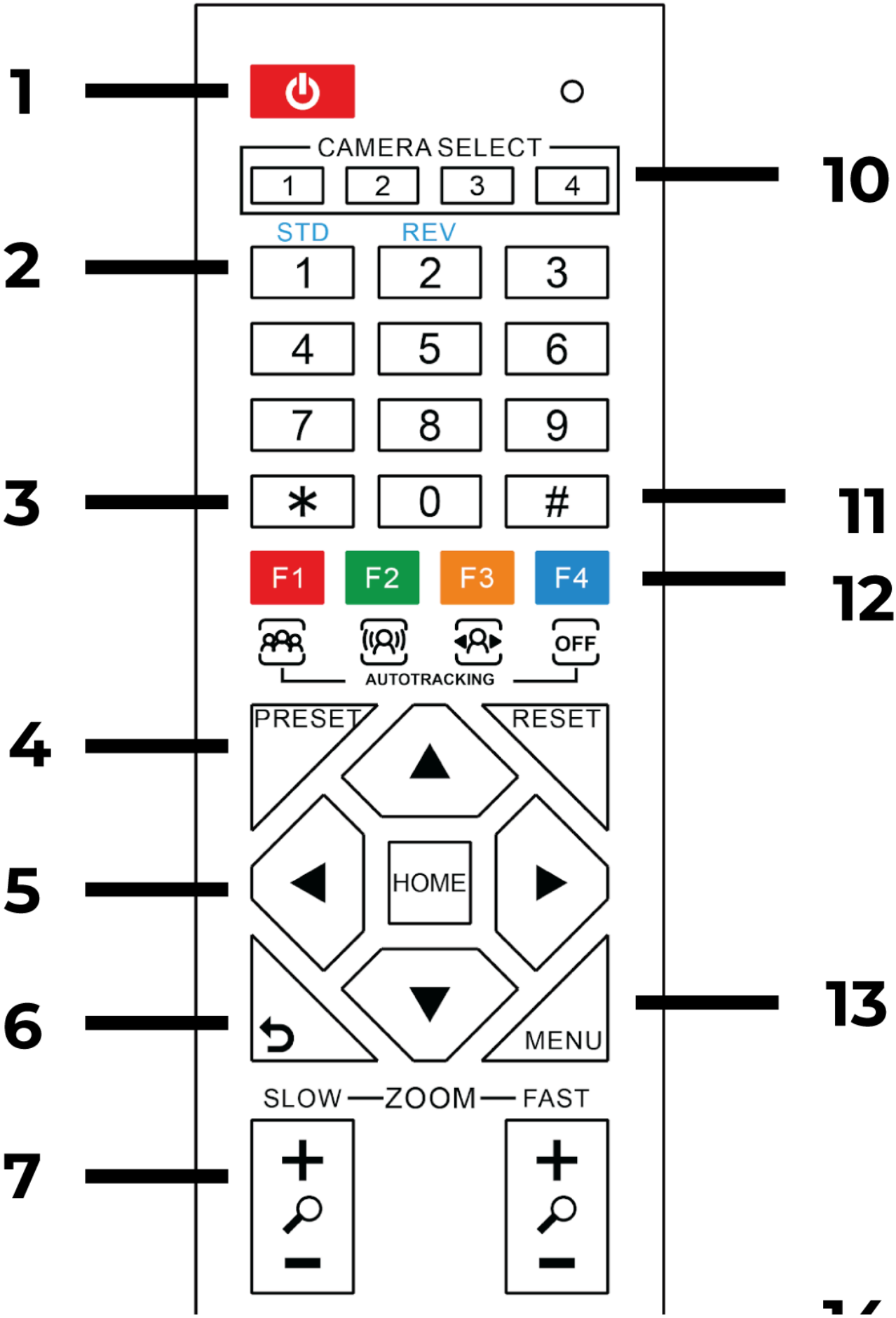
Feature	RS232	RS485
Max Distance	~98.5 ft (30 m)	~3,937 ft (1,200 m)
Connector	8-pin Mini DIN	2-pin Phoenix (terminal block)
Multi-Camera	Daisy-chain	Multi-drop bus
Signaling	Single-ended	Differential (noise-resistant)
Protocols	VISCA, Pelco-D, Pelco-P	VISCA, Pelco-D, Pelco-P

Feature	RS232	RS485
Provides Power	No	No

Joystick Compatibility

Joystick	Connection	Protocols
PT-SUPERJOY-G1	Network (VISCA over IP) or RS232	VISCA, ONVIF, NDI, Panasonic
PT-JOY-G4	Network (VISCA over IP) or RS232	VISCA, ONVIF, Sony VISCA

Using the IR Remote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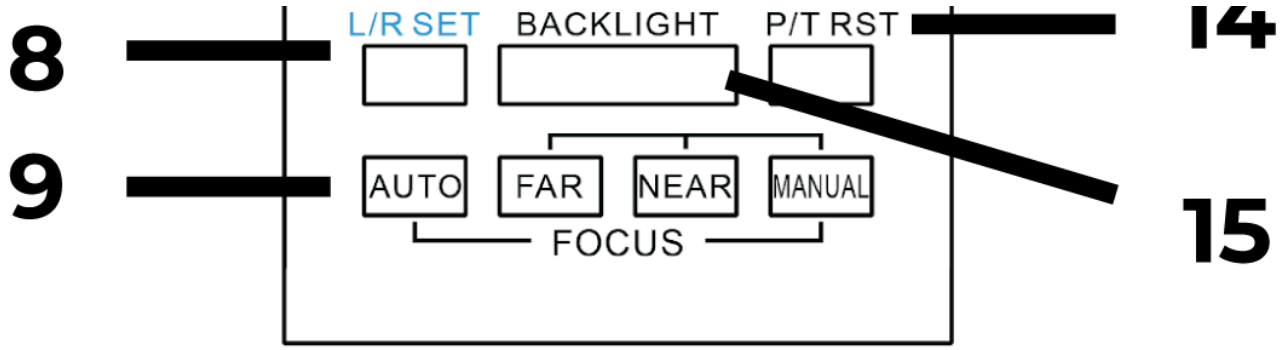
F3
F4
OFF
AUTOTRACKING
PRESET
RESET
HOME
MENU
SLOW
ZOOM
FAST



The PTZOptics **Rise 4K** includes an infrared (IR) remote control for direct camera operation without a computer or network connection. This page organizes the remote's functions by task so you can quickly find what you need, followed by a complete button reference at the bottom.

> **NOTE**
>
> Point the remote at the camera's front **IR sensor.** Your camera responds to **IR channel 1** by default. If you have multiple cameras in the same room, see Set Up Multiple Cameras below to assign different channels.

Reference

Button	Label	Function
1 `[STANDBY]`	Power/Standby	Toggles the camera between active and standby mode. In standby, the camera consumes minimal power but remains responsive to the remote
2 `[1]-[9], [0]`	Number Keys	Recall presets (press directly) or enter values for preset save/clear operations
3 `[*]`	Star	Command Modifier Key. Used in shortcut commands
4 `[PRESET]`	Set Preset	Press before a number key to save the current position as that preset
4 `[RESET]`	Clear Preset	Press before a number key to delete that preset. Press twice to clear all presets

Button	Label	Function
5 `[HOME]`	Home	Returns the camera to its default home position. The Home Position is not configurable.
5 `[Arrow-Keys]`	Pan/Tilt	Pan left/right, tilt up/down
6 `[RETURN]`	Return/Back	Used for OSD navigation. Pressing the Return button navigates back to the previous OSD menu
7 `[+]` & `[-]`	Zoom In/Out	Magnifies or widens the image. The slow zoom rocker is on the left side of the remote. The fast zoom rocker is on the right side.
8 `[L/R-SET]`	L/R Set	Modify the directional arrows' left/right orientation. Press **[L/R-SET] + [1] simultaneously**: Buttons function normally. Press **[L/R-SET] + [2] simultaneously**: Buttons function inverted
9 `[AUTO]`	Auto Focus	Enables continuous auto focus
9 `[MANUAL]`	Manual Focus	Switches to manual focus mode
9 `[FAR]`	Focus Far	Shifts focus to background (manual mode)
9 `[NEAR]`	Focus Near	Shifts focus to foreground (manual mode)
10 `[Camera-Select]`	Camera Select	Selects which camera (by IR channel) to control
11 `[#]`	Pound Sign	Second key in multi-button shortcut sequences
12 `[F1]`	Function 1	Used for shortcuts (Otherwise non-functional)
12 `[F2]`	Function 2	Used for shortcuts (Otherwise non-functional)
12 `[F3]`	Function 3	Enable video-based auto-tracking (non-functional on Studio 4K, Studio SE, or Studio Pro cameras)

Button	Label	Function
12 `[F4]`	Function 4	Disable video-based auto-tracking (non-functional on Studio 4K, Studio SE, or Studio Pro cameras)
13 `[MENU]`	Menu	Opens the On-Screen Display (OSD) menu on the video output
14 `[P/T-RST]`	Pan/Tilt Reset	Performs a pan/tilt self-calibration cycle
15 `[Backlight]`	Backlight	Toggles the camera's backlight compensation **On** or **Off**

Moving the Camera

Pan and Tilt

1. Press the **arrow keys** (up, down, left, right) to pan and tilt the camera.
2. The camera moves continuously while you hold a key and stops when you release it.

Zoom In and Out

1. Press **[Slow Zoom Rocker]** (Left-rocker) `[+]` or `[-]` to slowly zoom in or out.
2. Press **[Fast Zoom Rocker]** (Right-rocker) `[+]` or `[-]` to quickly zoom in or out.

Return to Home Position

1. Press **[HOME]** to return the camera to the camera's default home position. The Home Position is not configurable.

> **TIP**
>
> We recommend setting **Preset 0** as your baseline reference, a wide, centered view of the entire scene, so you always have a known starting point to return to.

Reset Pan/Tilt Position

1. Press **[P/T RST]** to perform a pan/tilt self-calibration. The camera moves through its full range of motion and returns to the home position.

> **NOTE**
> The P/T RST function is not available on PTZOptics Studio Cams (Studio 4K, Studio SE, Studio Pro). It works with all PTZ models.

Saving and Recalling Presets

Presets save the camera's position (pan, tilt, zoom) **and** all image settings at that moment. You can save up to **255 presets**.

Save a Preset

1. Move the camera to the desired position using the arrow keys and zoom buttons.
2. Press **[PRESET]**, then press the number key for the preset you want to save (e.g., **[1]**).
3. The preset is now saved.

Recall a Preset

1. Press the number key of the preset you want to recall (e.g., **[1]**).
2. The camera moves to the saved position and restores the saved image settings.

> **NOTE**
> Calling a preset restores **both** the camera position and all image settings that were active when the preset was saved.

Clear a Single Preset

1. Press **[RESET]**, then press the number key of the preset you want to clear (e.g., **[3]**).
2. That preset is deleted.

Clear All Presets

1. Press **[RESET]**, then press **[RESET]** again.
2. All saved presets are deleted.

> **WARNING**

Clearing all presets cannot be undone. Make sure you want to delete every preset before pressing **[RESET]** twice.

TIP

For a more detailed explanation of presets, see Preset Camera Positions.

Focusing the Camera

The remote provides both automatic and manual focus control.

Switching to Auto Focus

1. Press **[AUTO]** to enable auto focus. The camera continuously adjusts focus based on the scene.

Switching to Manual Focus

1. Press **[MANUAL]** to switch to manual focus mode.

Adjusting Focus Manually

1. Press **[FAR]** to shift focus farther away (background).
2. Press **[NEAR]** to shift focus closer (foreground).

TIP

In low-contrast scenes (plain backgrounds, low light), switching to manual focus and locking it in gives more stable results than leaving auto focus on.

How to Use Shortcut Commands

The remote supports multi-button shortcut sequences for advanced functions. Press the buttons **in order** as shown.

Command List

Shortcut	Sequence	What It Does
Display IP Address & Network Information	`[*]` → `[#]` → `[4]`	Shows the camera's current IP address, subnet mask, and gateway as an overlay on the video output (HDMI, SDI, or USB)
Enable DHCP	`[#]` → `[*]` → `[4]`	Enables DHCP on the camera (may change the camera's IP address and disconnect active sessions)
Fully Reset All Network Settings	`[*]` → `[#]` → `[MANUAL]`	Resets all network settings to factory defaults
Display Firmware Version & System Information	`[*]` → `[#]` → `[8]`	Displays the current firmware, ARM, SOC, Model, Firmware Version Date, Current Video Format, Optical Zoom Variant, and the camera's serial number on the video output.
Control Speed (Default: Low)	`[#]` → `[*]` → `[F1]`	Sets the IR Remote's control speed to Low (Not applicable for Studio 4K, Studio SE, or Studio Pro cameras)
Control Speed (Medium)	`[#]` → `[*]` → `[F2]`	Sets the IR Remote's control speed to Medium (Not applicable for Studio 4K, Studio SE, or Studio Pro cameras)
Control Speed (High)	`[#]` → `[*]` → `[F3]`	Sets the IR Remote's control speed to High (Not applicable for Studio 4K, Studio SE, or Studio Pro cameras)
Orientation	`[*]` → `[#]` → `[9]`	Quickly set mount mode (flip / normal)
OnePush White Balance Trigger	`[#]` → `[*]` → `[7]`	OnePush White Balance Trigger
Toggle HDMI / SDI Output	`[*]` → `[*]` → `[F3]`	Toggle between using the camera's HDMI and SDI output
Restore Default Settings	`[*]` → `[#]` → `[6]`	Quickly restore the camera's default **image** settings

Multi-Function Buttons: Auto-Tracking Controls

Shortcut	Sequence	What It Does
No function	[F1]	No function
No function	[F2]	No function
Enable Auto-Tracking	[F3]	Enable video-based auto-tracking
Disable Auto-Tracking	[F4]	Disable video-based auto-tracking

> **NOTE**
>
> Auto-tracking shortcuts are not applicable for Studio 4K, Studio SE, or Studio Pro cameras.

Setting the Camera's IP Address

Shortcut	Sequence	What It Does
Set IP Address	[#] → [*] → [#] → [1]	Sets the camera's IP address to 192.168.100.81
--	[#] → [*] → [#] → [2]	Sets the camera's IP address to 192.168.100.82
--	[#] → [*] → [#] → [3]	Sets the camera's IP address to 192.168.100.83
--	[#] → [*] → [#] → [4]	Sets the camera's IP address to 192.168.100.84
--	[#] → [*] → [#] → [5]	Sets the camera's IP address to 192.168.100.85
--	[#] → [*] → [#] → [6]	Sets the camera's IP address to 192.168.100.86
--	[#] → [*] → [#] → [7]	Sets the camera's IP address to 192.168.100.87
--	[#] → [*] → [#] → [8]	Sets the camera's IP address to 192.168.100.88
--	[#] → [*] → [#] → [9]	Sets the camera's IP address to 192.168.100.89
--	[#] → [*] → [#] → [0]	Sets the camera's IP address to 192.168.100.80

Setting Up Multiple Cameras

When multiple PTZOptics cameras are in the same room, each camera needs a unique **IR address** so the remote controls only the intended camera.

Assign an IR Address to a Camera

1. Point the remote at the camera you want to configure.
2. To assign an IR address, press `[*]` → `[#]` → `[F1]` for Camera 1, `[F2]` for Camera 2, `[F3]` for Camera 3, and `[F4]` for Camera 4.
3. Press **[Camera Select 1]**, **[Camera Select 2]**, **[Camera Select 3]** or **[Camera Select 4]** to cycle through IR channels. The camera responds to the selected channel.

> **NOTE**
>
> PTZOptics cameras respond to IR channel 1 by default out of the box. You only need to change channels if you have multiple cameras in range of the same remote.

IR Remote Specifications

Specification	Value
IR Channels	1–4 (default: 1)
Battery Type	2 AAA Batteries

The OSD Menu

Opening the On-Screen Display (OSD) Menu

Using the **IR Remote**, press the **[Menu]** button to display the OSD (On-Screen Display) 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 shown 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 Menu

The following settings can be adjusted from the Exposure menu:

Exposure 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 Priority Automatic Exposure):** The user manually sets Shutter, Gain Limit, Meter Region, and DRC while the camera automatically adjusts Iris for optimal exposure.
- **AAE (Aperture Priority 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.
- **OnePush :** 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.

> **NOTE**
>
> OnePush Exposure coming in a future firmware update.

Additional Exposure Settings

Exp-Comp	
Options	-7 ~ +7
Default	-3
Note	*Available only while ExpCompMode is On.*

Backlight	
Options	On, Off
Default	Off
Note	*Available only in Full Auto mode.*

Bright	
Options	0 ~ 14
Note	*Available only in AAE, Bright mode.*

Gain Limit	
Options	0 ~ 10
Default	5
Note	*Available only in Full Auto, and AAE modes.*

Anti-Flicker	
Options	Off, 50Hz, 60Hz
Default	60Hz
Note	*Available in all modes.*

Iris	
Options	F2.8, F3.1, F3.4, F3.7, F4.0, F4.4, F4.8, F5.2, F5.6, F6.2, F6.8, F7.3, F8.0, F9.6, F11.0, Close
Note	*Available only in Manual, AAE mode.*

Meter	
Options	Average, Center, Smart, Top
Default	Average
Note	*Available only in Full Auto, SAE, AAE,and Bright modes.*

Shutter	
Options	1/50, 1/75, 1/100, 1/120, 1/150, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000
Note	*Available only in Manual, SAE mode.*

Gain	
Options	0 ~ 10
Note	*Available only in Manual mode.*

DRC	
Options	0 ~ 8
Default	3

Color Menu

The following settings can be adjusted from the Color menu:

WB (White Balance) Mode	
Options	Auto, Indoor, Outdoor, One Push, Manual, VAR
Default	Auto

White Balance Modes Explained

- **Auto:** The camera automatically adjusts white balance based on the lighting conditions.
- **Indoor:** Optimized for indoor lighting conditions, typically around 3200K.
- **Outdoor:** Optimized for outdoor lighting conditions, typically around 5600K.

- **Manual:** The user manually sets Red Gain and Blue Gain for precise white balance control.
- **One Push:** The camera automatically adjusts white balance based on a single button press. Users can manually adjust red and blue gain. To perform a one push white balance adjustment, click the icon next to the WB Mode dropdown with One Push selected.
- **VAR:** The user manually sets Color Temperature, Red Gain, and Blue Gain for precise white balance control.

Additional Color Settings

R Gain	
Options	0 ~ 255
Default	-2
Note	*Available only in Manual modes.*

B Gain	
Options	0 ~ 255
Default	3
Note	*Available only in Manual modes.*

Color Temp	
Options	2000K ~ 15000K
Note	*Available only in VAR mode.*

RG Tuning	
Options	-10 ~ +10
Note	*Available only in Auto, One Push, and VAR mode.*

BG Tuning	
Options	-10 ~ +10
Note	*Available only in Auto, One Push, and VAR mode.*

Saturation	
Options	60% ~ 200%
Default	100%

Hue	
Options	0 ~ 14
Default	8

Image Menu

The following settings can be adjusted from the Image menu:

Luminance	
Options	0 ~ 14
Default	8

Contrast	
Options	0 ~ 14
Default	9

Sharpness	
Options	Auto, 0 ~ 11

Sharpness	
Default	9

Flip-H	
Options	On, Off
Default	Off

Flip-V	
Options	On, Off
Default	Off

B&W Mode	
Options	On, Off
Default	Off

Style	
Options	Default, Norm, Bright, EXT, PC
Default	Default

P / T / Z (Pan Tilt Zoom) Menu

The following settings can be adjusted from the P / T / Z menu:

Zoom Mode	
Options	Digital, Optical, SuperZoom
Default	Optical

Zoom Mode	
Note	***SuperZoom*** *effectively doubles the camera's optical zoom while halving the resolution. For example, a 20X 4K camera using SuperZoom becomes a 40X 1080p camera. Panning, Tilting, or Zooming the camera in while using SuperZoom does not cause resolution degradation beyond the initial halving cost.* ***Digital Zoom*** *differs in that it degrades resolution progressively as you digitally zoom in.*

Digital Zoom	
Options	Off, 2x, 4x, 8x, 16x
Default	Off

SpeedByZoom	
Options	On, Off
Default	On

L/R Set	
Options	STD, REV
Default	STD

Image Freeze	
Options	On, Off
Default	Off

Call Preset Speed	
Options	1 ~ 24
Default	12

Preset Zoom Speed	
Options	0 ~ 7
Default	5

PT Speed	
Normal Mode	Pan & Tilt increments 1–127
Note	*Provides 127 speed increments for pan and tilt movement. This mode offers simple, easy-to-select speed adjustments suitable for most applications.*

Preset Speed Mode	
Options	Global, Ind.
Default	Global
Note	*Global mode applies the selected preset speed to all presets, while Ind. mode allows individual preset speed settings.*

Noise Reduction Menu

Adjusts the levels of digital noise reduction.

NR3D (3D Noise Reduction)	
Options	0 ~ 9

NR3D (3D Noise Reduction)	
Default	6

Setup Menu

The following settings can be adjusted from the Setup menu:

Language	
Options	English, Chinese
Default	English

Video Settings	
Options	SDI-12 Out, Video Format, HDMI Adaptation, HDMI Color Format
SDI-12 Out	SFP, BNC
Note	*Choose BNC for output directly from the camera's 12G-SDI port. Choose SFP for output via the SFP module.*
Video Format	HDMI, SDI
HDMI Adaptation	Define HDMI adaptation mode. Options include: On, Off
HDMI Color Format	Define HDMI color format. Options include: RGB, YUV

Audio Settings	
Options	Line, Mic, XLR

Audio Settings	
Note	*Choose the appropriate audio input source for the camera.*

USB	
Options	Off, On
Default	Off
Note	*Determine whether the USB port is enabled or disabled for embedding audio.*

AF (Auto-Focus) Sensitivity	
Options	High, Normal, Low
Default	Normal

AF (Auto-Focus) Zone	
Options	Front, Top, Center, Bottom
Default	Center

Auto Focus Limit	
Options	Off, On
Default	Off
Options	Far Limit, Near Limit
Note	*Set the far and near focus limits when Auto Focus Limit is enabled. Limits options are can be adjusted in the following increments: INF (infinite), 1m, 1.5m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 20m*

Focus Limit	
Options	Off, On
On Settings	**Furthest Pos:** Define the farthest focus position Options include: INF, 1m ~ 20m. **Nearest Pos:** Define the nearest focus position Options include: INF, 1m ~ 20m

ND-Mode (ND Filter)	
Options	Off, 1/4, 1/16, 1/64
Best For	**Off:** Indoor environments or low-light conditions **1/4:** Bright indoor lighting or lightly overcast outdoor conditions **1/16:** Bright outdoor conditions **1/64:** Very bright sunlight
Navigation	OSD Menu > Setup Menu > Focus Settings > ND Filter

Night Mode	
Options	Off, On
Description	*Enables or disables infrared (IR) night-vision mode for low-light scenes.*

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

VISCA Address	
Options	1 ~ 7

VISCA Address	
Default	1

VISCA AddrFix	
Options	Off, On
Default	Off

Net Mode	
Options	Serial, Parallel
Default	Serial

Baudrate	
Options	2400, 4800, 9600, 38400
Default	9600

Pelco D Address	
Options	0 ~ 254
Default	1

Pelco P Address	
Options	0 ~ 31
Default	1

Tracking Settings

Tracking Enable	
Options	On, Off

Tracking Mode	
Options	Presenter, Zone, Auto Frame
Note	***Presenter Mode*** *tracks the largest moving object in the camera's field of view.* ***Zone Mode*** *establishes up to 4 tracking zones for tracking and requires that they overlap. These zones are established just like a preset.* ***Auto Frame Mode*** *automatically frames the largest moving object in the camera's field of view.*

Figure Size	
Options	Full, Half Body, Close Up, Custom
Note	***Full*** *frames the entire body of the tracked object.* ***Half Body*** *frames the tracked object from the waist up.* ***Close Up*** *frames the tracked object from the chest up.* ***Custom*** *allows users to define a custom frame size for tracking.*

Tracking Overlay	
Options	On, Off
Note	*When toggled on, the overlay highlights the tracked object with a box. When toggled off, the overlay is not displayed.*

Delay Time	
Options	0 ~ 60 seconds

Delay Time	
Note	*This setting determines the delay before the camera returns to its original position after tracking has been lost. For example, if the camera loses track of the object, it waits for the specified delay time before returning to its original position.*

Motion Sync

Motion Sync	
Options	Off, On
Default	Off
Note	*While toggled on users can access the **Max Speed** setting for motion sync through this menu. This is the speed used for Sync while calling presets. Range: 0 ~ 7*

Other Settings

Preset Tour	
Options	On, Off
Note	*When toggled on, the camera automatically cycles through all presets in order.*

OSD Flip	
Options	On, Off
Note	*When toggled on, the OSD is flipped upside down.*

OSD Timeout	
Options	Off, 2.5min
Note	*When enabled, the OSD automatically disappears after 2.5 minutes of inactivity.*

LDC (Lens Distortion Correction)	
Options	On, Off
Note	*When toggled on, the camera corrects lens distortion by slightly cropping image edges. This is useful for wide-angle lenses where edge distortion can occur. Toggle off to maximize field of view, with the tradeoff of slightly more visible edge distortion.*

Tally Brightness	
Options	Off, Low, Medium, High
Default	Medium

OIS Switch	
Description	Optical Image Stabilization Switch
Options	On, Off
Note	*When toggled on, the camera stabilizes the image to reduce shake and vibration.*

Display Info	
Options	On, Off

Display Info	
Note	*When toggled on, the camera displays information such as current preset, zoom level, and other settings on the video output for status monitoring.*

Preset Image	
Options	On, Off
Note	*When toggled on, the camera displays a preset image on the video output when the camera is idle, such as a logo or other information.*

Information Menu

The information menu displays the following:

Information	
Version	Displays the current firmware version of the camera.
Model	Displays the model number of the camera.
Date	Displays the current date.
AF Version	Displays the current auto-focus version of the camera.
ARM Version	Displays the current ARM version of the camera.
Video Format	Displays the current video format of the camera.

Restore Default

This menu is used to restore the camera's factory default settings.

Restore Default	
Options	Reset, Cancel
Default	Reset
To Reset	*Press the **[Enter]** button to Confirm. Restoring the default settings will return all camera parameters to factory defaults. Press the **[Back]** button to Cancel.*

Preset Camera Positions

Setting and Calling Presets

Presets let you save commonly used camera shots and recall them when needed. On supported PTZOptics cameras, each preset stores the camera's pan, tilt, and zoom position along with the image settings active when the preset is saved.

> ⚙ **Automatic Modes Remain Active:** If auto exposure, auto white balance, or auto focus is enabled, the camera may continue adjusting the corresponding settings after the preset is recalled. These settings will need to be disabled manually before saving a preset if you want the preset to retain specific settings.

Before You Begin

Set the room lighting to the conditions you expect to use during production. Changing the lighting after creating your presets may affect exposure, white balance, and the consistency between shots.

> 💡 **TIP**
>
> Evenly distributed lighting is generally easier to work with because it reduces large differences in brightness and color across the room.

Starting from the camera's default image settings can provide a useful baseline, but it is not required. If the camera is already producing the desired image, you can use the current settings as your starting point.

Step 1: Save Your First Preset

Using the Horizon Web UI (Recommended)

1. Open the **Horizon Web UI** and locate the live preview and PTZ controls.
2. Zoom out to a wide view of the room.
3. Pan and tilt the camera toward the center of the primary shooting area.
4. Adjust the exposure, white balance, focus, and other image settings until you are satisfied with the image.

5. Locate the **Preset Control** section and select Set.
6. Type `1` as the preset number and press Enter on your keyboard to confirm the selection.
7. Select **Call**, enter `1`, and confirm that the camera returns to the expected position and image settings.

Using the IR Remote

If you do not have access to the **Horizon Web UI**, you can establish Preset 1 with the IR remote:

1. Use the arrow and zoom buttons to create a wide, centered view of the primary shooting area.
2. Adjust the camera's image settings through the on-screen display as needed.
3. Press **[PRESET]**, followed by **[1]**, to save the position and image settings.
4. Press **[HOME]** to recall **Preset 1** and confirm that the camera returns to the expected position and image settings.

> **MATCH THE IMAGE, NOT NECESSARILY THE SETTINGS**
>
> Different areas of a room may require different exposure or color settings. The settings do not need to be identical across every preset. The resulting images should look consistent when switching between shots.
>
> For easier comparison, monitor every shot on the same display. You can also capture a reference image of Preset 0 or compare the shots in production software such as OBS or vMix.

> **WARNING**
>
> Saving a preset to an occupied number replaces the previously stored shot.

Step 2: Calling Presets

Using the Horizon Web UI

1. Locate the **Preset Control** section.
2. Select **Call**.
3. Enter the preset number and confirm the selection.

Using the IR Remote

Press the desired number button to recall **Presets 0–9**.

Using a PTZ Controller

Select the preset number and use the controller's preset-call command. The exact procedure varies by controller, so refer to the controller's documentation for the correct button sequence.

> **NOTE**
>
> The **Horizon Web UI** and compatible PTZ controllers can access preset numbers beyond the ten presets available directly from the IR remote.

> **Automatic Modes and Preset Interaction:**
>
> If **Image Presets are disabled**, when the camera recalls the start location, stop location, or target-lost preset, it will only move to the saved position. The camera will continue using the current image settings and will not recall any image parameters from the preset.
>
> If **Image Presets are enabled**, when one of those presets is recalled, the camera will restore both the saved camera position and the image settings stored with that preset.

Clearing Presets

Clearing Presets with the Horizon Web UI

Click the **Pencil** icon in the bottom right corner of the **Preset Control** section to open the **Edit Presets** dialog. From there, you can click the **Trash** icon next to a preset to clear it.

Clearing Presets with the IR Remote

Clearing an Individual Preset

1. Press `[RESET]`. **2.** Press the number of the preset you want to clear.

Clear All Presets

1. Press `[RESET]`. **2.** Press `[RESET]` again.

> **WARNING**
>
> Clearing all presets cannot be undone. Confirm that you no longer need any of the saved camera positions before clearing them.

Networking

The PTZOptics **Rise 4K** camera connects to your network over a single Ethernet cable, giving you access to the **Horizon Web UI**, video streaming, and remote control. This page covers the most common networking and streaming tasks, followed by protocol decision guidance and reference tables.

> **IMPORTANT**
>
> If you connected the camera to your network via Ethernet and powered it on, the camera will automatically request an IP address from your network's DHCP server. This process typically takes **10-30 seconds**.

Find Your Camera on the Network

Before you can configure streaming or control the camera remotely, you need to find it on your network. Choose the method that works best for your situation.

Method 1: Use the Camera's Hostname (Easiest)

The PTZOptics **Rise 4K** camera supports **mDNS** (multicast DNS), so you can reach it by hostname without knowing the IP address.

1. Open a web browser on any device connected to the same network.
2. Type the following address and press Enter:

```
http://ptzoptics.local/
```

3. This will take you to the **Horizon Web UI**, where you will be prompted to set up a password on your first login.
   - Default Username: **admin**
   - Create a strong password.

> **TIP**

> If you have multiple cameras on the same network, give each camera a unique **Device ID** from the **Horizon Web UI Device Info** tab. Then reach each camera by its ID: `http://camera-one.local`, `http://camera-two.local`, etc.

Method 2: Display the IP on Your Video Output

If the hostname method doesn't work, use the IR remote to display the camera's IP address directly on the connected display.

1. Make sure the camera is connected to a display via HDMI, SDI, or USB.
2. Press the following buttons on the IR remote **in order**:

```
[*]  →  [#]  →  [4]
```

3. The camera's IP address will appear as an overlay on the video feed.

Method 3: Find Your Network Range Manually

If you need to scan for the camera's IP, first determine your computer's local network range.

Windows:

1. Open the Start menu, type **CMD**, and open the Command Prompt.
2. Type `ipconfig` and press Enter.
3. Locate the **IPv4 Address** under your active network adapter (e.g., `192.168.15.117`).
4. Your network range is `192.168.15.xxx`. The camera will have a similar address in that range.

Mac:

1. Open **Terminal** (Applications → Utilities → Terminal).
2. Type `ipconfig getifaddr en0` and press Enter.
3. The result is your computer's local IP address. The camera will have a similar address in the same range.

Access the Horizon Web UI

Once you have the camera's IP address:

1. Open a web browser and enter: `http://<camera-ip-address>`
2. Open the **Horizon Web UI** and log in with username **admin**. Set a strong password on first login.

> **WARNING**
>
> Set a strong password to secure your camera, especially if it's accessible on a shared network.

How to set a Static IP Address

Certain setups, such as permanent installations, require setting a static IP so the camera is always reachable at the same address.

1. Log into the camera's **Horizon Web UI**.
2. Navigate to **Network Settings** (or **Device Settings > Network** in Horizon).
3. Change the **IP Configuration Type** from **DHCP** to **Static**.
4. Enter the following:
   - **IP Address**: The static IP you want to assign (e.g., `192.168.1.100`)
   - **Subnet Mask**: Typically `255.255.255.0`
   - **Gateway**: Your router's IP address (e.g., `192.168.1.1`)
   - **DNS Server**: Your network's DNS server (often the same as the gateway)
5. Click **Apply** to save.

> **TIP**
>
> Make sure the static IP you choose is **outside** your DHCP server's address pool to avoid IP conflicts. Check your router's DHCP settings to see which addresses are being handed out automatically. If you need further assistance, contact your network administrator.

Streaming

NDI

RTMP

RTSP

SRT

Which Streaming Protocol Should I Use?

The **Rise 4K** supports several streaming protocols, each designed for a different workflow. The right choice depends on **where the video is going** and **what you're doing with it**.

- **NDI HX** is the right choice if you're working in a **live production environment** with NDI-compatible software such as vMix, OBS (with the NDI plugin), or a NewTek TriCaster. NDI sources are automatically discoverable on the network, making cameras easy to add to your production. NDI HX delivers low-latency, high-quality video that's ideal for live switching and monitoring. The trade-off is that it requires NDI-compatible software on the receiving end and is best suited for a reliable local network.
- **SRT** is an excellent choice when streaming over the public internet because it automatically recovers from packet loss and network fluctuations while maintaining low latency. For many remote production workflows, it provides a more reliable connection than traditional RTMP.
- **RTMP (and RTMPS)** is the right choice if you're streaming **directly to an online platform** such as **YouTube**, **Twitch**, or **Facebook Live**. The camera handles the video encoding and transmission; you simply enter the platform's server URL and stream key. RTMPS adds encryption for secure delivery. Because RTMP is a push protocol, the camera initiates the connection to the streaming service, making it ideal for direct platform streaming but less suited for local production workflows.
- **RTSP** is the right choice if you're **bringing a camera feed into local software** such as **OBS**, **vMix**, **VLC**, or a recording server. RTSP is a pull protocol, meaning your software connects to the camera and requests the stream. It provides efficient, low-latency video for monitoring and recording and is widely supported by professional video software. RTSP is primarily designed for local network use and typically requires additional infrastructure or conversion before being streamed over the public internet.

In many professional workflows, cameras use **multiple streaming protocols simultaneously**. For example, you might use **NDI HX** for live production switching, **RTSP** for local recording or monitoring, and **RTMP** to stream

directly to YouTube, all from the same camera at the same time, provided the camera supports simultaneous streaming.

Set Up NDI HX Streaming

NDI HX is designed for **live production workflows** where you need low-latency, high-quality video that's automatically discoverable by NDI-compatible software (vMix, OBS with NDI plugin, NewTek TriCaster, etc.).

What You Need

- NDI Tools or NDI-compatible software installed on the receiving device(s)
- Camera and receiving device on the same network

Steps

1. **Download and install NDI Tools** on the computer that will receive the stream. NDI Tools is available for free from ndi.video/tools.
2. **Configure NDI settings** on the camera:
   - Log in to the camera's web interface.
   - Navigate to the **NDI settings** tab.
   - Set the **NDI name** (this is how the camera will appear in NDI software).
   - Optionally set an **NDI group** for organizing multiple sources.
   - Configure encoding settings as needed.
   - Click **Apply**.
3. **Select the camera** within your NDI-compatible software. The camera should appear as an available NDI source automatically.

> **NOTE**
> NDI HX is optimized for low-latency production use. The actual resolution and quality depend on your network bandwidth and NDI encoding settings.

> **TIP**
> The **Rise 4K** can stream to **multiple destinations simultaneously**. You can use NDI for live production while also pushing an RTMP stream to a streaming platform.

Set Up SRT Streaming

SRT (Secure Reliable Transport) is designed to deliver high-quality, low-latency video over unpredictable networks such as the public internet. Unlike RTMP, SRT automatically compensates for packet loss and network jitter while encrypting the video stream with AES encryption.

SRT is commonly used to send video between remote production sites, studios, cloud production platforms, and broadcast facilities.

WHAT YOU NEED

- A receiving device or software that supports **SRT** (OBS Studio, vMix, Haivision, FFmpeg, cloud production platforms, etc.)
- The IP address or hostname of the receiving device
- The receiving port number
- *(Optional)* An SRT passphrase if encryption is enabled

Steps

1. Configure your receiving software or server to accept an incoming **SRT** stream.
2. Log in to the camera's web interface.
3. Navigate to the **Streaming** settings.
4. Select **SRT** as the streaming protocol.
5. Enter the destination IP address or hostname.
6. Enter the destination port number.
7. If required, enable encryption and enter the shared passphrase.
8. Click **Apply** to begin streaming.

SRT IS NOT AUTOMATICALLY DISCOVERABLE

Unlike **NDI HX**, SRT requires you to manually specify the destination address and port. Before starting the stream, ensure the receiving device is reachable over the network and is configured to accept incoming SRT connections.

Set Up RTMP(S) Streaming

PTZOptics **Rise 4K** supports **Push-Based** RTMP (Real-Time Messaging Protocol), where the camera sends its video stream directly to a destination like YouTube, Twitch, Facebook Live, or a custom RTMP server. RTMPS adds TLS encryption for secure delivery.

What You Need

- A streaming platform account (YouTube, Twitch, etc.) or custom RTMP server
- The platform's **stream URL** and **stream key**

Steps

1. Log in to the camera's web interface.
2. Navigate to **Audio & Video** or **Streaming** settings.
3. Select **RTMP** (or **RTMPS** for encrypted streaming).
4. Enter the **destination URL** provided by your streaming platform (e.g., `rtmp://a.rtmp.youtube.com/live2/`).
5. Enter your **stream key** from the platform's dashboard.
6. Click **Apply** to start streaming.

> **TIP**
> Use **RTMPS** instead of RTMP whenever your streaming platform supports it. RTMPS encrypts the stream in transit, protecting it from interception on untrusted networks.

> **NOTE**
> **Rise 4K** can push to multiple RTMP destinations simultaneously, or combine RTMP with other protocols like RTSP or NDI.

Set Up RTSP Viewing

What You Need

PTZOptics **Rise 4K** supports pull-based RTSP (Real-Time Streaming Protocol). Your software (OBS, vMix, VLC, a recording server, etc.) requests the stream from the camera. It's ideal for local recording, monitoring, and pulling video into production software.

Steps

1. Log in to the camera's web interface and verify that RTSP is enabled in the **Streaming** settings.
2. In your receiving software, add a new media source using the camera's RTSP URL:

```
rtsp://<camera-ip>/stream1
```

For example, if your camera's IP is `192.168.1.100`:

```
rtsp://192.168.1.100/stream1
```

3. The software will connect to the camera and begin receiving the video stream.

> **TIP**
> RTSP offers low latency and works well for local recording. If you need to stream over the internet or to a platform like YouTube, use RTMP instead.

Using ONVIF for VMS Integration

If you're integrating with a security system or Video Management System (VMS):

1. Ensure **ONVIF** is enabled in the camera's network settings.
2. In your ONVIF client, add the camera using its **IP address**, **port 80**, and admin credentials.
3. The camera will appear as an ONVIF PTZ device.

Reference

Control Port Numbers

Protocol	Port	Transport	Use Case
VISCA over IP (TCP)	5678	TCP	PTZ joysticks, control systems
VISCA over IP (UDP)	1259	UDP	Low-latency PTZ control
Sony VISCA over IP	52381	TCP/UDP	Sony-compatible control systems

Protocol	Port	Transport	Use Case
ONVIF	80	TCP	Security systems, VMS platforms
HTTP	80	TCP	Web interface, custom scripts
WebSockets	80/443	TCP	Real-time web applications

Streaming Protocol Comparison

Protocol	Direction	Best For	Latency	Encryption
NDI HX	Bidirectional (discoverable)	Live production on local networks	Very Low	No (local network)
SRT	Push (camera → receiver)	Reliable internet streaming and remote production	Low	Yes (AES)
RTMP	Push (camera → platform)	Direct-to-platform streaming (YouTube, Twitch)	Medium	No
RTMPS	Push (camera → platform)	Secure direct-to-platform streaming	Medium	Yes (TLS)
RTSP	Pull (software ← camera)	Local recording, monitoring, OBS/vMix input	Low	No

Network Specifications

Feature	Specification
Ethernet	10/100/1000 Mbps (Gigabit)
Max Cable Length	Up to 328 ft (100 m) with Cat5e/Cat6
PoE	PoE++ (802.3bt) required *(or 802.3at if that's what this specific camera requires)*

Feature	Specification
IP Configuration	DHCP (default) or Static
mDNS	Supported (Default local device address: ptzoptics.local)
Streaming Protocols	SRT, RTSP, RTMP/RTMPS, NDI HX
Control Protocols	VISCA over IP, ONVIF, HTTP, WebSockets, Sony VISCA
Max Streaming Resolution	Up to 4K (3840 × 2160), depending on network bandwidth
Multi-Destination Streaming	Yes, stream to multiple protocols simultaneously

Technical Specs

Model Information

Feature	Value
Official SKU	`PT20X-RISE-4K-BK`
Model Name	`Rise 4K`

Connections

1. System Select (Resolution Dial)
2. Kensington lock
3. Line out
4. Line in
5. RS422 out (RJ45)
6. RS422 in (RJ45)
7. RS232 in (RJ45)
8. Dual XLR inputs (with 48V Phantom Power)
9. 12G-SDI output
10. Time code
11. Genlock

12. SFP+ fiber port (12G-SDI extension)
13. Restore button
14. MicroSD card slot
15. USB 3.0 Type-C
16. HDMI 2.0 output
17. 3G-SDI output
18. LAN (RJ45, 10/100/1000M) with PoE++
19. DC 12V power

Video Formats

Feature	Specification
Resolutions & Frame Rates HDMI / 12G-SDI	`4KP60`, `4KP59.94`, `4KP50`, `4KP30`, `4KP29.97`, `4KP25`, `4KP24`, `4KP23.98`, `1080P60`, `1080P59.94`, `1080P50`, `1080P30`, `1080P29.97`, `1080P25`, `1080P24`, `1080P23.98`, `1080I60`, `1080I50`, `1080I59.94`, `720P60`, `720P59.94`
Resolutions & Frame Rates 3G-SDI	`1080P60`, `1080P59.94`, `1080P50`, `1080P30`, `1080P29.97`, `1080P25`, `1080P24`, `1080P23.98`, `1080I60`, `1080I50`, `1080I59.94`, `720P60`, `720P59.94`

Imaging System

Feature	Specification
Sensor	`1 inch`, `CMOS`, `Progressive Scan`, `Effective Pixels: 50 million`
Lens	`20x`, `f9.79mm to 186.5mm`, `F2.8 to F4.5`
Digital Zoom	`16x`
Horizontal FoV	`70°` to `4.1°`
Vertical FoV	`41.9°` to `2.3°`

Feature	Specification
Minimum Illumination	`0.5Lux @ (F2.8, AGC ON)`
Shutter	`1/30s` to `1/10000s`
ND (Neutral Density) Filter	`Built-in` (`OFF`, `1/4`, `1/16`, `1/64`)
Image stabilization	`OIS` (`Optical Image Stabilization`)
OIS (Optical Image Stabilization) Operating Range	`3Hz` to `8Hz`
White Balance	`Auto`, `Manual`, `Indoor`, `Outdoor`, `One Push`, `VAR`
Digital Noise Reduction	`3D Digital Noise Reduction`
SNR	`≥55dB`
Supported Features	- `Backlight Compensation` - `Horizontal Flip & Vertical Flip` - `Image Freeze`

Pan, Tilt, and Presets

Feature	Specification
Pan range	`±172°`
Tilt range	`-30°` to `+120°`
Pan Speed	`0.004°/S` to `180°/S`
Tilt Speed	`0.004°/S` to `180°/S`
Preset Positions Number	`255`
Preset Position Accuracy	`0.1°`

USB Specifications

Feature	Specification
Support Operating System	`Windows 7`, `Windows 8`, `Windows 10`, `Mac OS X`, `Linux`, `Android`
Color Space/Compression	`YUY2` / `H.264` / `MJPEG` / `H.265`
Video Format	`YUY2`: `Max 1080P@30fps`, `H.264 AVC`: `Max 2160P@60fps`, `H.265 HEVC`: `Max 2160P@60fps`, `MJPEG`: `Max 2160P@60fps`
UVC (USB Video Communication Protocol)	`UVC 1.1`, `Supports USB Embedded Audio`

Network Video and Audio

Feature	Specification
Video Compression	`H.265`/`H.264`/`MJPEG`
Video Stream	`First stream`, `Second stream`
First Stream Resolution	`3840x2160`, `1920x1080`, `1280x720`, `1024x576` etc.
Second Stream Resolution	`720x576`, `720x480`, `320x240` etc.
Bit Rate	`32kbps` to `102400kbps`
Bit Rate Control	`Variable bit rate`, `Fixed bit rate`
Frequency	`P50`: `1fps` to `50fps`, `P60`: `1fps` to `60fps`
Audio Compression	`AAC`
Audio Bit Rate	`96Kbps`, `128Kbps`

Protocols

Feature	Specification
Control Protocols	`HTTP(S)`, `ONVIF`, `VISCA/Pelco-D/Pelco-P`
Video Protocols	`NDI HX3`, `SRT`, `RTSP`, `RTMP(S)`
Other	`FreeD`

Video and Synchronization I/O

Feature	Specification
Video Outputs	1x `HDMI: 2.0`
	1x `12G-SDI: BNC type, 800mVp-p, 75Ω, Comply with SMPTE2082 standard`
	1x `3G-SDI: BNC type, 800mVp-p, 75Ω, Comply with SMPTE 424M standard`
Genlock	1x `BNC type , 1.0Vp-p , 75Ω , input only`
Timecode	1x `BNC type , 75Ω , input only`

Network, USB, and Storage I/O

Feature	Specification
Network	1x `RJ45: 10M/100M/1000M adaptive Ethernet`
USB	1x `USB3.0, Type-C`
SD Card	1 channel `MicroSD`

Audio I/O

Feature	Specification
Audio	1x `Line In, 3.5mm Audio Interface` ;

Feature	Specification
	1x `Line Out, 3.5mm Audio Interface` ;
	2x `XLR Inputs (Optional 48V Phantom Power)`

Serial Control I/O

Feature	Specification
Control Options	1x `RS232 In: RJ45, VISCA/Pelco-D/Pelco-P protocol`
	1x `RS485/422: RJ45, VISCA/Pelco-D/Pelco-Protocol`
	1x `RS422 out: RJ45, VISCA/Pelco-D/Pelco-Protocol`

Power

Feature	Specification
Power	`JEITA type (DC IN 12V)`
Power Over Ethernet	`PoE++ (IEEE 802.3bt)`
Input Current	`5A (maximum)`

General Specifications

Feature	Specification
Installation	`Normal` and `Inverted`
Tally Light	3x `(Bi-color, Red and Green)`

Environmental and Physical Specifications

Feature	Specification
Working Temperature	`0°C to 40°C`
Storage Temperature	`-40°C to 60°C`
Dimension	`205mm x 237mm x 272mm (8.07" × 9.33" × 10.71")`
Net weight	`4.8KG (10.58 lbs)`

Certifications

- CE-EMC
- CE-LVD
- FCC
- REACH
- RoHS
- UKCA
- NDI HX3 (Pending Certification)

Compliance

- The Rise 4K is **NDAA Compliant**.
- Covered by one or more claims of the HEVC patents listed at patentlist.accessadvance.com