NewTek PTZ3,
NewTek PTZ3 UHD,
Vizrt PTZ3 PLUS &
Vizrt PTZ3 UHD PLUS
User Guide

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There are general best-practice solutions, these include setting the antivirus software to not scan the systems during operating hours and that the Vizrt components, as well as drives on which clips and data are stored, are excluded from their scans (as previously stated, these measures cannot be guaranteed).

Technical Support

For technical support and the latest news of upgrades, documentation, and related products, visit the Vizrt web site at www.vizrt.com.

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Section 1 INTRODUCTION AND SETUP

This section explains how to connect and configure your Vizrt PTZ3 PLUS/ PTZ3 PLUS UHD, and NewTek branded PTZ3/ PTZ3 UHD camera. It also explains how to update the device, and where you can find additional NDI software to extend your workflow. After completing this short section, you'll be all set to begin using your new camera.

1.1 OVERVIEW

Thank you for purchasing this Vizrt product. Vizrt is proud of its record of innovation and commitment to excellence in design, manufacture, and superb product support. For a list of features included in your Vizrt PTZ3 camera, please see Appendix A: Features.

Vizrt PTZ3 PLUS and UHD PLUS cameras offer superior video quality suitable for live productions and presentations. Featuring AI-driven talent tracking, expanded microphone options with phantom power, and seamless integration with augmented reality (AR) graphics systems, content creators can now effortlessly produce broadcast-grade content with advanced graphics. Utilizing a single Ethernet cable, your Vizrt PTZ3 camera supports transmission of video, audio, power, control, tally, and FreeD camera tracking data via NDI|HX, streamlining workflow and enhancing efficiency.

Vizrt PTZ3 cameras are the best way to acquire live video for input into modern production workflows. Working with the latest version of NDI this pan-tilt-zoom (PTZ) camera transmits full UHD video formats up to 2160p 60 (1080p 60 for non UHD model) directly to NDI-compatible receiving devices across the network. It is uniquely suited for IP-based live production and streaming, and other single, and multi-camera applications to include sports and event coverage, video conferencing, lecture capture, distance learning, media communications, and surveillance. You can also select NDI|HX3 as an option for better video with reduced latency, using a fraction of the bandwidth.

1.2 FIRMWARE UPDATE

It is imperative that the first step taken is to update your Vizrt PTZ3 camera (including all models), and instructions for that process are on the following pages.

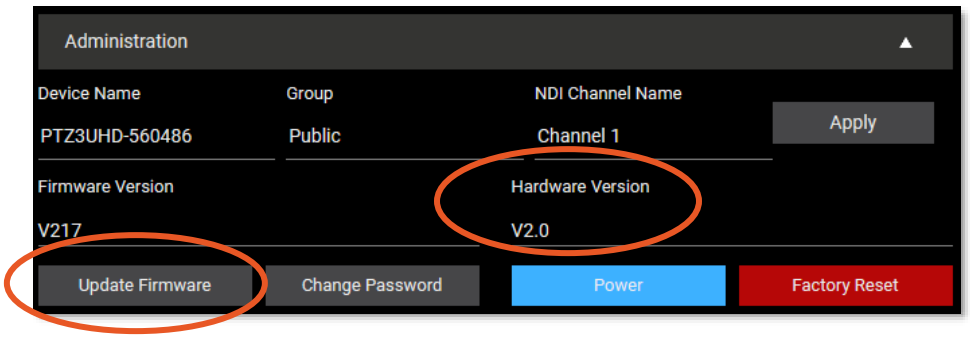
We encourage you to keep the firmware on your Vizrt PTZ3 camera up to date. The latest firmware may contain bug-fixes, provide improved performance, or even enable new features. The update process is not complicated – but it is especially important to verify what Hardware ARM (Advanced RISC Machine) Version you have prior to updating.

1.2.1 NEWTEK PTZ & PTZ UHD FIRMWARE UPDATE

Firmware update instructions are provided for NewTek cameras upon downloading the updates from www.vizrt.com.

1.2.2 WEB GUI UPDATE

For Vizrt PTZ3 PLUS & PTZ3 UHD PLUS cameras with V2 firmware update.



If your *Hardware Version* shows V2 in the Web GUI (in the Administration tab), proceed with the instructions below to update. (If the firmware version is missing, proceed to the version 1 update.)

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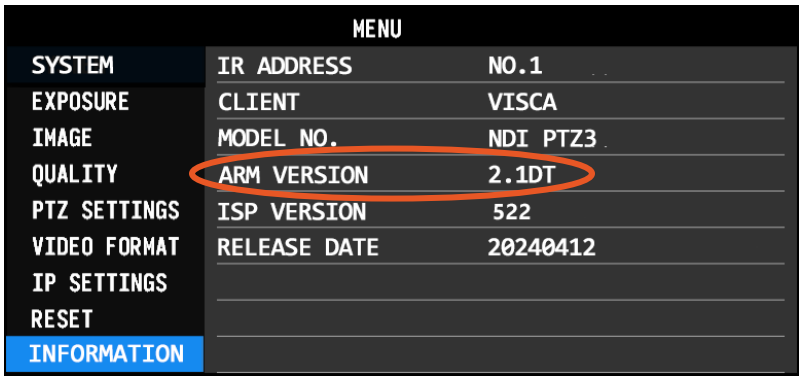


An alternative way to verify what firmware version you are running with on-screen display is via SDI or HDMI and can be found in OSD menu listed under: INFORMATION > ARM VERSION. If the ARM VERSION does not state V2.0D or above, please proceed to V1 ARM update.

For V2 update, first install the Web GUI ARM file and secondly the Web GUI ISP (Image Sensor Processor) File.

If for any reason the update fails, please perform the manual ARM update (version 1) using the USB-USB-C cable included in the box with Vizrt PTZ3 PLUS and PTZ3 UHD PLUS cameras.

1.2.3 V1 ARM UPDATE

If the Web GUI update failed.

If you have a Vizrt PTZ PLUS or PTZ3 UHD PLUS camera, the USB to Serial cable is in the camera box.

Follow with the Nations MCU Download Tool instructions:

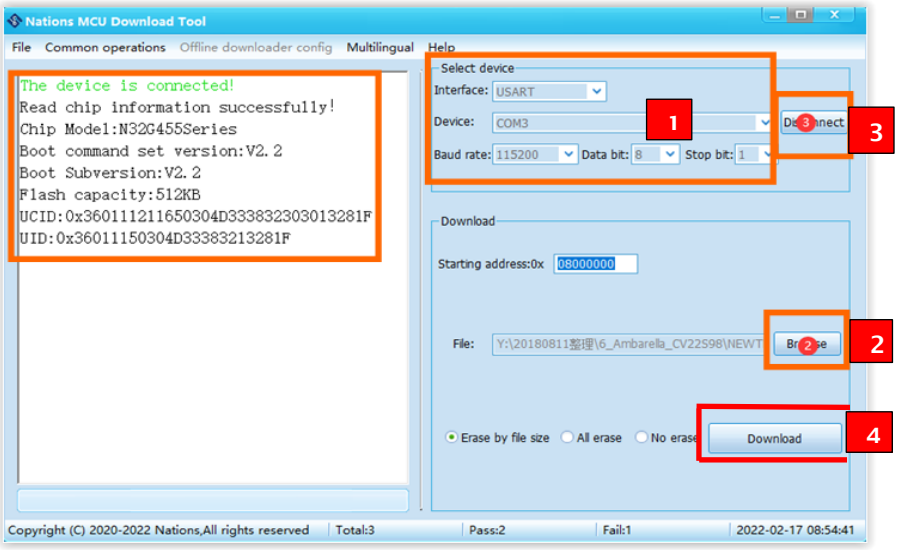
- Power off and unplug all cables from the camera, it should look like the image on the following page.

- On the underside of the camera, set the Dip Switches 1 and 2 to OFF.

- Connect the serial cable to the 'IN---R3232' port on your camera, and the USB-A end to your computer.

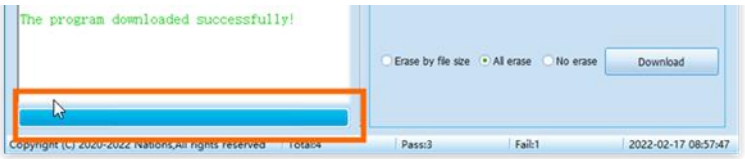
- Connect the include power supply to the DC12V power supply port. The camera will power on.

1. Select USART interface, then select the corresponding serial port number (you can check the specific choice of the serial port in the device manager) baud rate select 115200.



2. Click Browse to select the firmware to be upgraded.
3. Click Connect, after the device is connected the left margin will confirm the device is connected.
4. Click the "Download" button to start, you will see the progress bar displaying it is downloading.

- When the programming is complete, you will see the prompt in the bottom left corner.



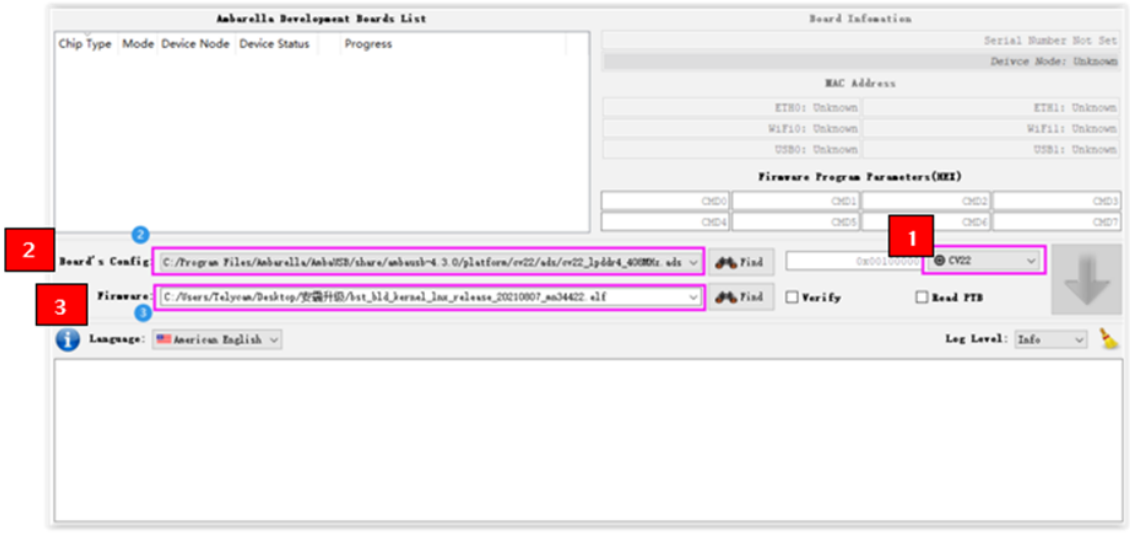
- Power off after the upgrading is finished, then set the Dip Switch SW1,2 back to ON position.
- Re-power on the camera, to run the camera with new ARM firmware.

1.2.4 AMBA ISP FIRMWARE

Vizrt PTZ3 PLUS/ PTZ3 PLUS recover for AMBA ISP firmware.

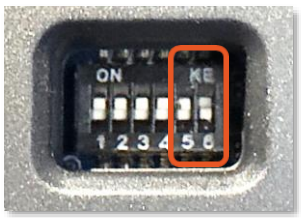
This is the second part to update your camera. Power off and unplug all cables from the camera, it should look like the image below.

Unzip the “Ambarella_AmbaUSB_v4.3.0” file and choose the appropriate upgrade tool based on your computer’s configuration. Once the “AmbaUSB” tool is installed, the following widow will appear.



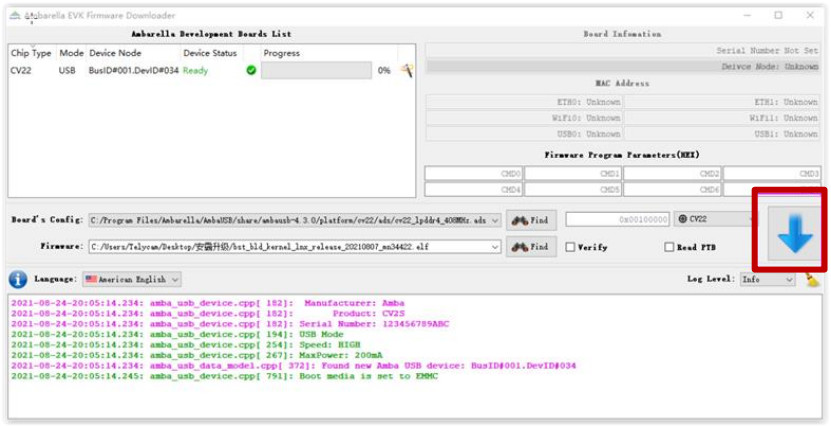
1. Select the pull-down menu and select CV22.
2. In the Board’s Config menu, select the correct path by clicking on the ‘Find’ button located to the right of that menu (binocular icon). The default path is:

   “C:/ProgramFiles/Ambarella/AmbaUSB/share/ambausb4.3.0/platform/cv22/ads/cv22_lpddr4_408MHz.ads”
3. Select the firmware in the drop-down menu by clicking the ‘Find’ button located to the right of that menu (binocular icon).



- Under your camera base, you will find the Dip Switch. Set switch 5 to be OFF and 6 to ON.
- Connect the included USB-C cable to your camera’s USB-C port, and the USB-A end to your computer.

- Connect the included power supply to the DC12V power supply port.
- Once you have connected the computer and powered on your camera, the “AmbaUSB” window will appear.



- Click the blue arrow and the upgrade will be start. Please be careful not to interrupt power to the camera during the update process.
- Once the Progress bar is at 100%, you have upgraded successfully.
- Set the Dip Switches 5 and 6 to OFF and reboot the camera. You are ready to go!

Please Note:

- Upon updating your camera, the network settings may revert back to factory default; please consult the main user manual for information on getting started, including fall back IP address.
- A quick way to verify your network settings is to connect a monitor to the HDMI port and use the included IR remote to navigate to the on screen menu, you can confirm the network configuration under Network Settings.
- Alternatively NDI Analysis from NDI can help find your network settings.

1.3 GETTING READY

Your Vizrt PTZ3 device uses the NDI|HX protocol for audio/video transmission, and more.

To download the latest version of NDI Tools (at no cost) to use your HX device, head over to ndi.video and install NDI Tools for Windows or Mac.

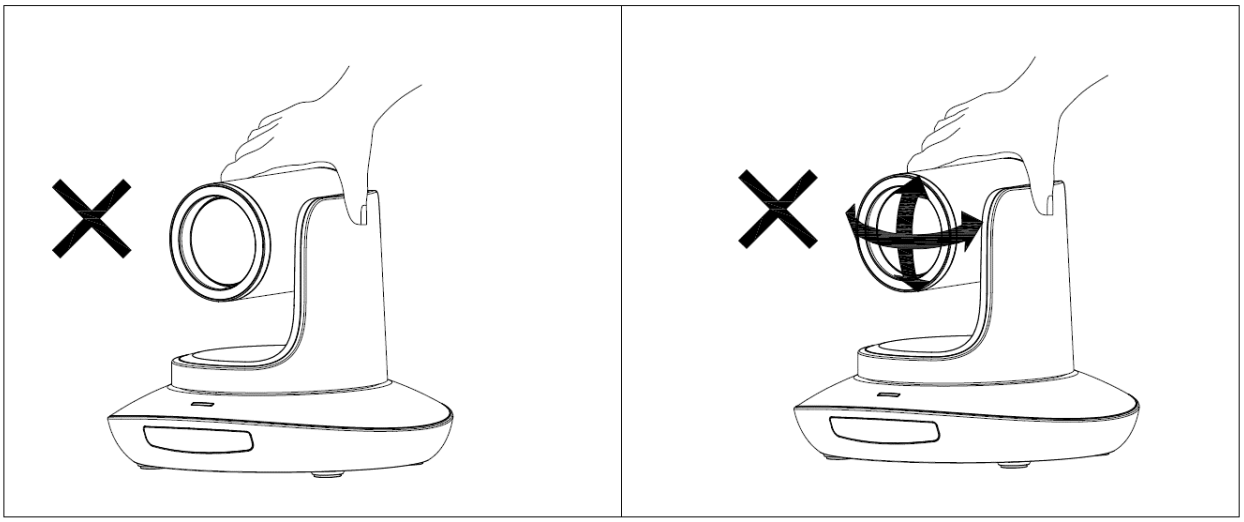
NDI Tools will provide an extremely useful array of additional NDI apps, including the NDI Studio Monitor application, which will not only display the output of your camera, but provide easy access to its settings, through its built-in PTZ controls.

NOTE: The End User License Agreement under which you use the NDI|HX driver specifies that "you may use up to five (5), and no more than five, copies on separate machines at one time."

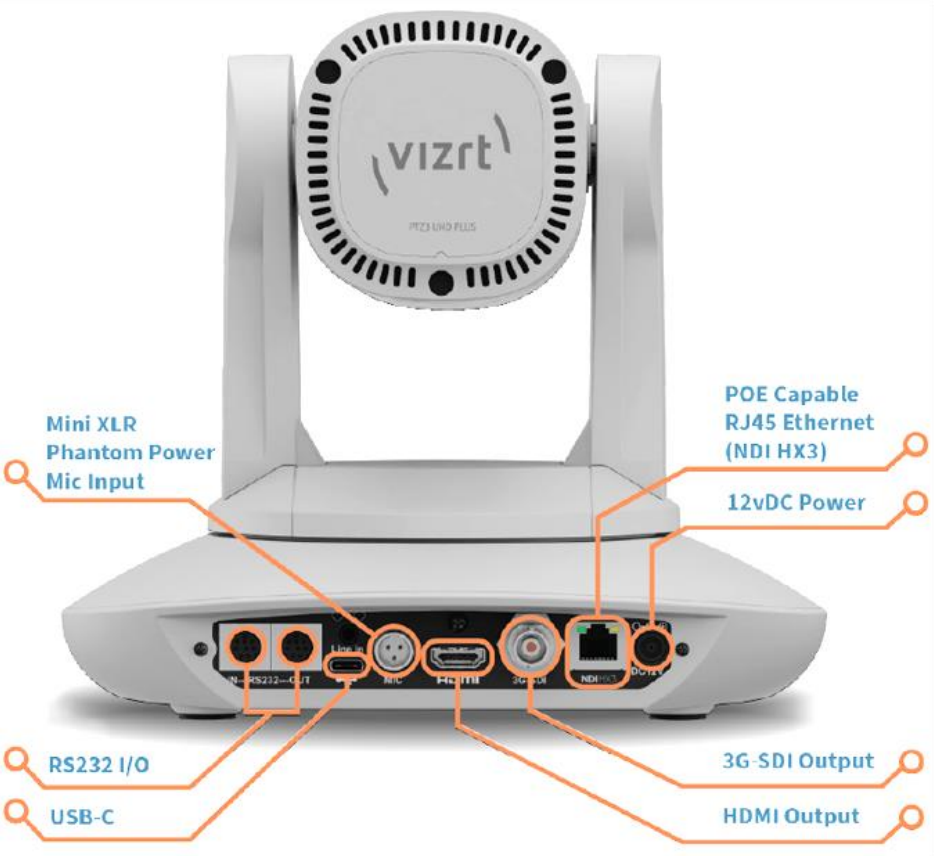
1.4 SAFETY GUIDES

1. Before operation, please fully read and follow all instruction in this manual. For your safety, always keep this manual with the camera.
2. The camera power input range is 100~240V AC (50~60Hz), ensure the power supply input within this range before powering on.
3. The camera power voltage is 12V DC, and the rated amperage is 3A. We suggest you use it with the original power supply adapter supplied by the factory.
4. Please keep the power, video, and control cable in a safe place. Protect all cables, especially their connections.
5. Operational environment: -10℃~50℃, humidity less than 80%. To avoid any danger, do not put anything inside the camera, and keep away from the corrosive liquids.
6. Avoid shock, vibration and moisture during transportation, storage, and installation.
7. Do not disassemble the camera. For any service, please contact authorized technicians.
8. Video and control cables should be individually shielded and should not be substituted with lesser quality cables. Do not direct the camera lens towards strong light, such as the sun or other intense light sources.
9. Use a dry soft cloth to clean the camera housing. Use only neutral non-abrasive cleaning agents. To avoid damage, never use strong or abrasive cleaning agents on the camera lens. Do not move the camera by holding the camera head. To avoid mechanical trouble, do not rotate the camera head by hand. NEVER MOVE THE CAMERA MANUALLY WHEN IT IS POWERED ON.
10. Place the camera with the base in only a horizontal or vertical orientation (such as on a desk, wall, or ceiling).

Note: The camera's video quality may be affected by the specific frequencies emitted by the electromagnetic filed of other devices. Never grasp the head of the camera (as shown in the drawing below) and never move the camera by hand when it is working, the mechanism may be destroyed.



1.5 VIZRT PTZ3 UHD PLUS CAMERA INTERFACE



1.6 PACKING LIST

To begin, let us review "what came in the box":

- Vizrt PTZ3 camera
- Power adapter
- Power cables (UK, EU, USA)
- Mini XLR to XLR adapter cable
- USB-C cable
- Remote control
- QC certification
- Reversible L wall mount bracket mount
- Fixed plate ceiling/shelf mount
- Mount fixings
- Welcome card with QR code to access product updates and user manual.

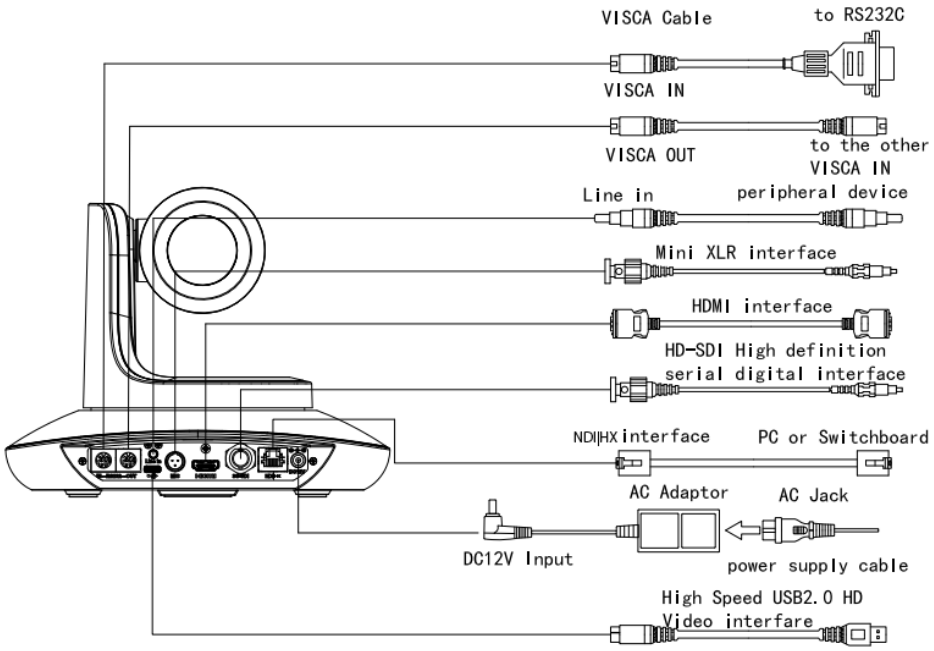
Vizrt PTZ3 PLUS and PTZ3 UHD PLUS Cameras also include:

- Secondary reversed faceplate for upside-down mounting
- Two-part USB to serial cable for firmware updates and recovery

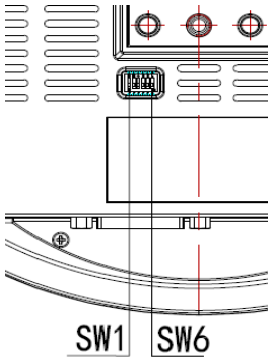
Note: NewTek PTZ3 and PTZ3 UHD customers who require this two-part cable should contact Vizrt support before updating firmware.

1.7 QUICK START GUIDE

1. Check all cable connections before you power on.



2. Dial Switch Setting (on the bottom of camera). The PTZ3 default setting is 1-6 On, On, On, On, On, Off.



Dial Switch (ARM)			
	SW-1	SW-2	Instruction
1	OFF	OFF	Updating mode
2	ON	OFF	Debugging mode
3	OFF	ON	Undefined
4	ON	ON	Working mode

Dial Switch			
	SW-3	SW-4	Instruction
1	OFF	OFF	reserve
2	ON	OFF	reserve
3	OFF	ON	reserve
4	ON	ON	reserve

Dial Switch (ISP)			
	SW-5	SW-6	Instruction
1	OFF	OFF	Working mode
2	ON	OFF	Working mode
3	OFF	ON	Updating mode
4	ON	ON	Updating mode

1.8 PRODUCT FEATURES

- Support for FreeD, a protocol to supply camera tracking data to external clients.
- AI-driven presenter tracking enabling operator autonomy (varies by model).
- Embedded FreeD camera positioning metadata over NDI|HX.
- Professional audio with phantom power to mini XLR.
- Adopts most advanced American ISP:
    - Vizrt PTZ3 UHD PLUS & NewTek PTZ3 UHD sensor – 1/1.8-inch, 9MP
    - Vizrt PTZ3 PLUS & NewTek PTZ3 sensor - 1/2.8-inch, 2.4MP
- Big optical lens: 30x optical zoom (varies by model), with 60-degree field of view.
- 2160p: 60 video over NDI|HX (1080p: 60 for non UHD model), support H.264 and H.265 encoding.
- Supports Line in and Mini XLR audio input for excellent sound quality.
- Supports NDI video transmission and control.
- NDI|HX, HDMI, 3G-SDI outputs for different applications.
- White Balance, Exposure, Focus, and Iris automatic or manual control.
- Supports PoE (Power over Ethernet): a single connected CAT5/6 cable can provide the transfer of video, control, and power needed by the camera.
- Special Focusing Algorithm: fast and precise focusing performance when zooming or moving.
- 128 presets supported, e.g., Exposure and White Balance parameters can be saved in presets (in manual mode).
- Standard Sony VISCA, IP VISCA, PELCO-P, PELCO-D control protocols; IP VISCA over both TCP and UDP.
- Daisy chaining is supported with a max of seven cameras connected in VISCA protocol.

1.9 WEB CONFIGURATION

Your Vizrt PTZ3 camera is quite easy to configure. In many installations, all you need to do is supply power, connect a video source and your network, and you're ready to go.

Sometimes though, you will want to access its settings, to configure login credentials, adjust color balance, and so on.

Note: As web browsers vary widely, you may occasionally find it necessary to delete cached files (sometimes referred to as the browser's "history", "cached images and files' or "cached web content") before the display refreshes to properly show some recent change. This can happen, for example, after a firmware update.

These settings are made available by means of a configuration webpage, which you can access from any suitable device (i.e., one with a web browser) on the same network.

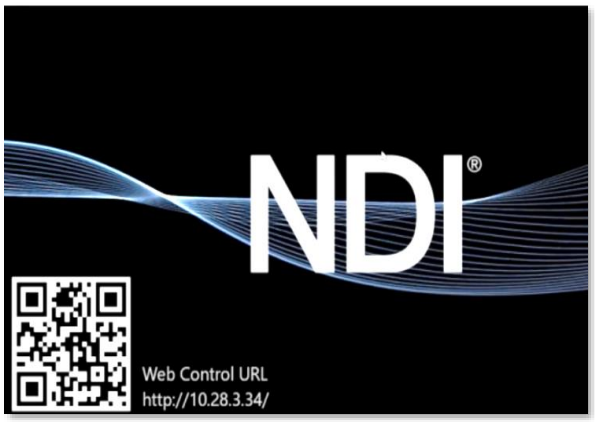
Some devices provide direct, easy access to Vizrt PTZ3's configuration webpage.

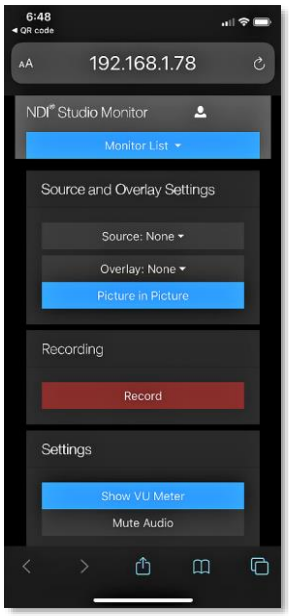
For example, when you select its NDI output as the source for a TriCaster® input, a convenient "Configure" button is shown. Simply click it to open Vizrt PTZ3's web control page.

1.9.1 STUDIO MONITOR

Operate camera controls, monitor video, manage login credentials, and configure audio, video, and network settings from any compatible networked device using the Web-based user interface or NDI Studio Monitor (NDI Video Monitor for OS X systems).

Once you have launched *NDI Studio Monitor* from your start menu, you can either use the URL provided or a QR code will populate providing an option for mobile management.





Locating Your Camera on the Network – Windows®

1. Having launched Studio Monitor, click the small menu gadget ('hamburger') at upper left to open the application menu. Among other things, this menu displays all NDI sources detected on your network.

2. Shortly, you should see a new main entry named NDI-PTZ3 UHD or NDI-PTZ3 (for non-UHD model), listed in the menu. Rolling the mouse pointer over this label shows the individual names for the NDI output channels of any NDI-PTZ3 cameras detected on the network.

Select the newly-listed channel for the camera you wish to configure. In a few moments, its NDI video output will appear in the Studio Monitor window.

Locating Your Camera on the Network – OS X®

The process is similar for OS X (Mac) users, but please note the slight name change to Video Monitor.

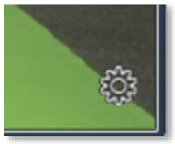
1. Having launched the *Video Monitor* application, use the File menu to locate a new main entry named NDI-PTZ3 UHD or NDI-PTZ3 for non-UHD model. Rolling the mouse pointer over this label shows the individual names for the NDI output channels of any PTZ3 cameras detected on the network.

2. The Video Monitor application's Settings menu shows an option near the bottom that lets you open the Device Webpage in your system web browser. Select this item and continue as follows.

3. Select the newly listed channel for the camera you wish to configure. In a few moments, its video output will appear in the Video Monitor window.

Hint: Detection of newly-connected NDI sources can take a few moments; in network settings with a great number of NDI sources available, a complete refresh of the source list can take a minute or even more.

PRESET BUTTONS



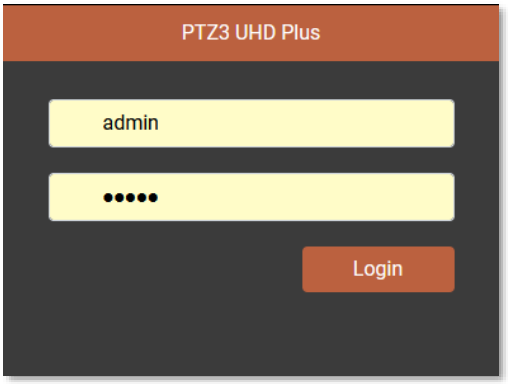
Once you have pulled up your NDI camera in *Studio Monitor (or Video Monitor)*, position, zoom and focus tools will appear on the right of the screen. You can save and recall camera positionings using the nine preset buttons.

For NDI sources (like PTZ3) that supply a configuration webpage, Studio Monitor displays a small configuration (gear) icon at lower right when you roll the mouse pointer over it window.

Click the gear to open Vizrt PTZ3's webpage, which will first ask for you to enter login credentials.

1.9.2 LOGGING IN

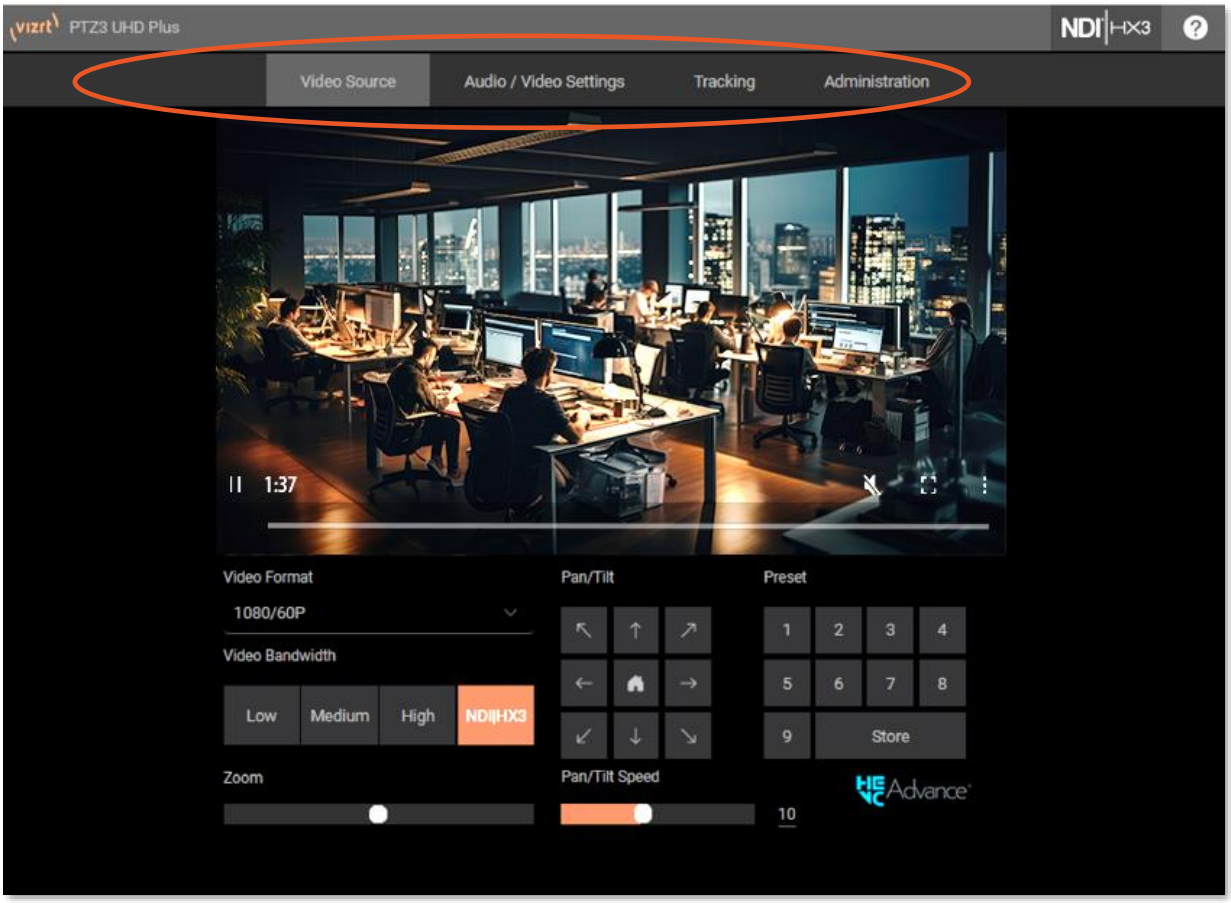
Enter the Username "admin" and the default Password "admin" to login to the camera. It is highly recommended that you change the camera's password to a strong password after first login.



1.10 VIDEO SOURCE

After logging in, your camera's options and controls are shown in your web browser.

Note: Video preview will not display video if you are using a VPN or NDI Bridge as it uses the WebRTC protocol and not NDI to display video in the browser.

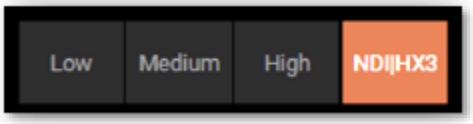


The first tab highlighted on this web page is labeled Video Source, here you will find the following options:

- *Video Format* drop down menu
- *Video Bandwidth* buttons
- Live *Pan, Tilt*, and *Zoom* controls
- *Preset* buttons

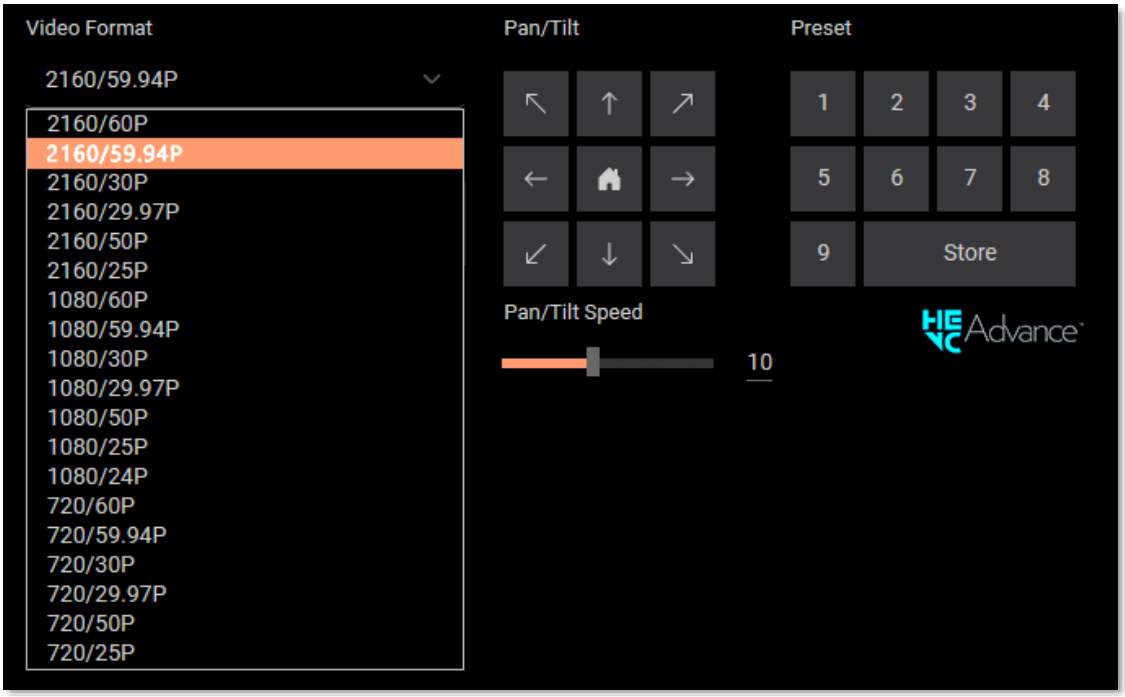
Hint: Studio Monitor provides an excellent alternative to almost all of the settings on this first tab.

1.10.1 VIDEO BANDWIDTH



Video Bandwidth controls allow you to select between *Low, Medium, High,* and *NDI|HX3* bandwidth options. The *NDI|HX3* button will enable better video with reduced latency. Choosing which option works best depends on your network throughput capabilities and other traffic.

1.10.2 PAN, TILT AND ZOOM

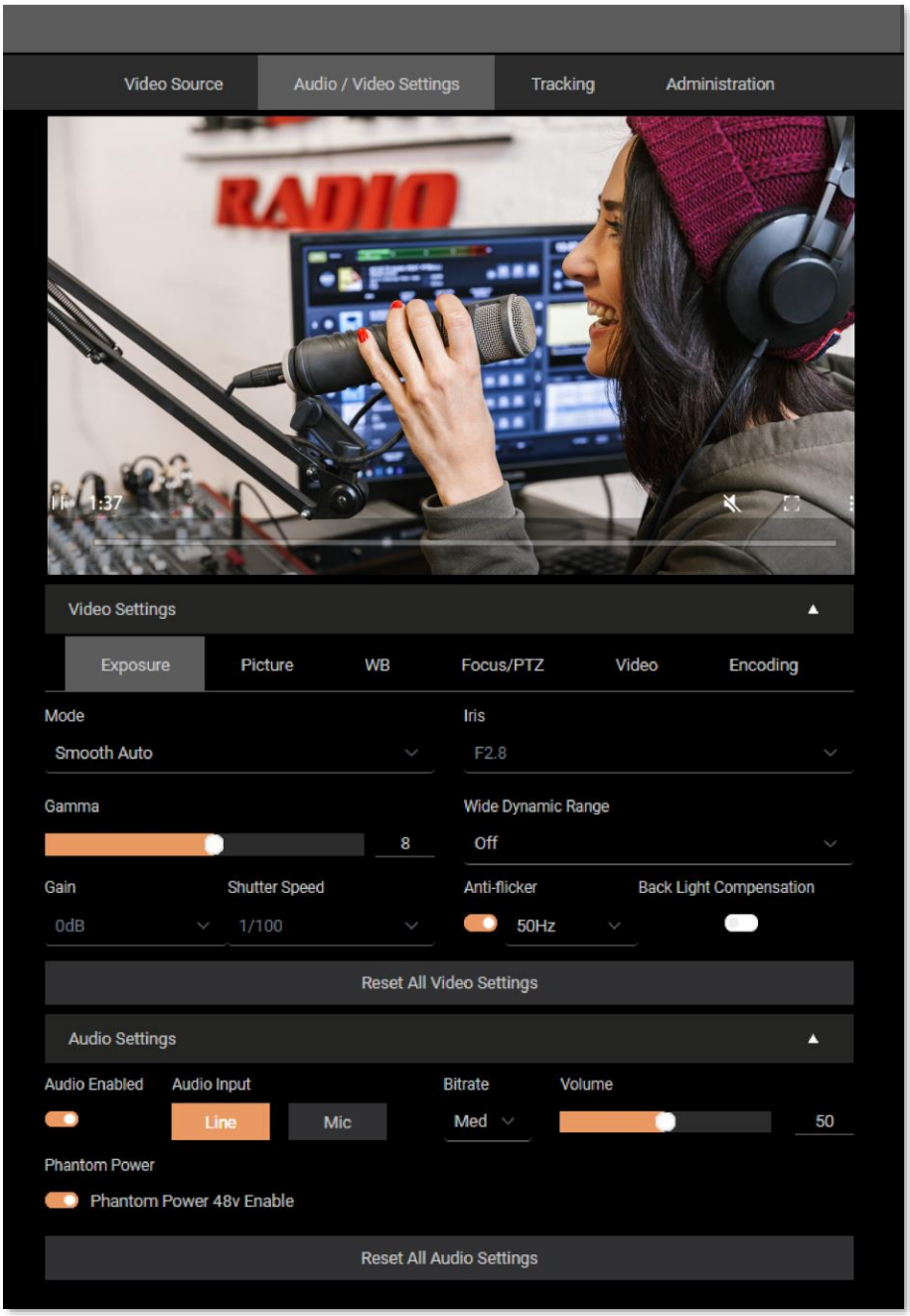


The *Video Format* pull down menu lists several video output formats for the camera. The *Pan/Tilt* controls and *Zoom* slider (hidden under the video format pull down menu in the screenshot above) work much as you would expect. Likewise, the neighboring preset buttons are easy to use. Drag the *Pan/Tilt Speed* slider to set the speed level of the camera *Pan/Tilt* function.

Simply click *Store* followed by a numbered *Preset* button to store the current PTZ3 position; click the numbered Preset button to send the camera to the stored position.

1.11 AUDIO/VIDEO SETTINGS

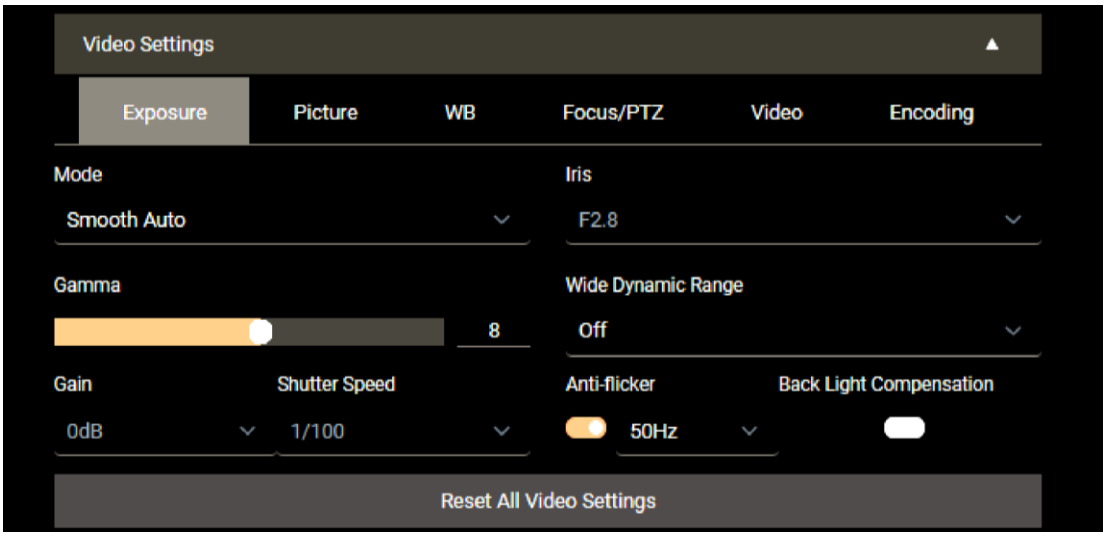
1.11.1 VIDEO



Click the second webpage tab to reveal more advanced *Audio/Video Settings*.

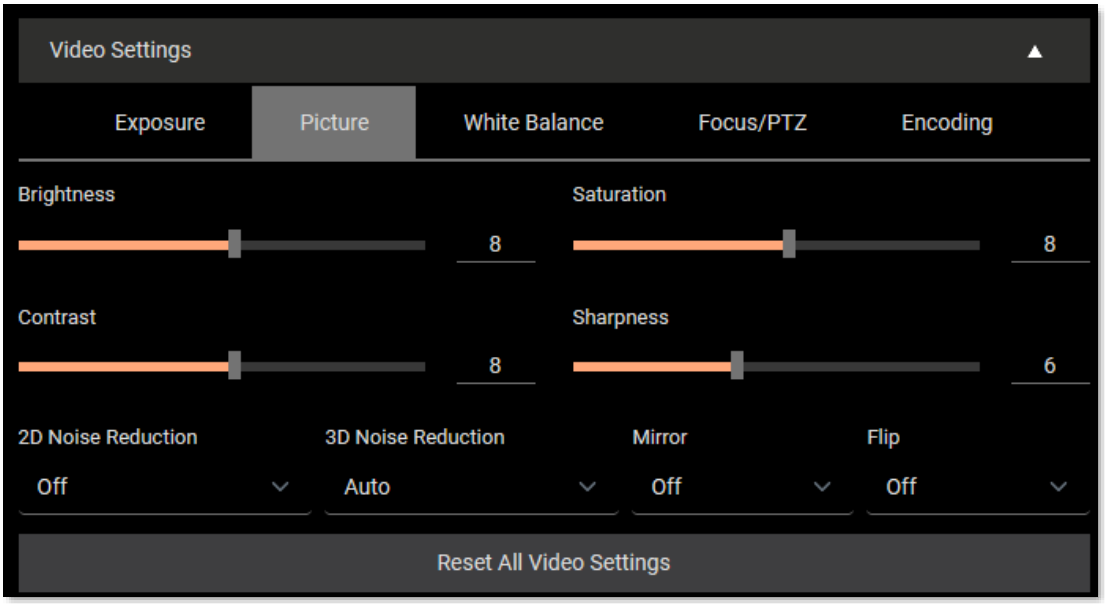
Expanding the *Video Settings* control group shows additional nested tabs with various *Exposure, Picture, White Balance*, *Focus/PTZ* options and *Encoding* options.

1.11.2 EXPOSURE



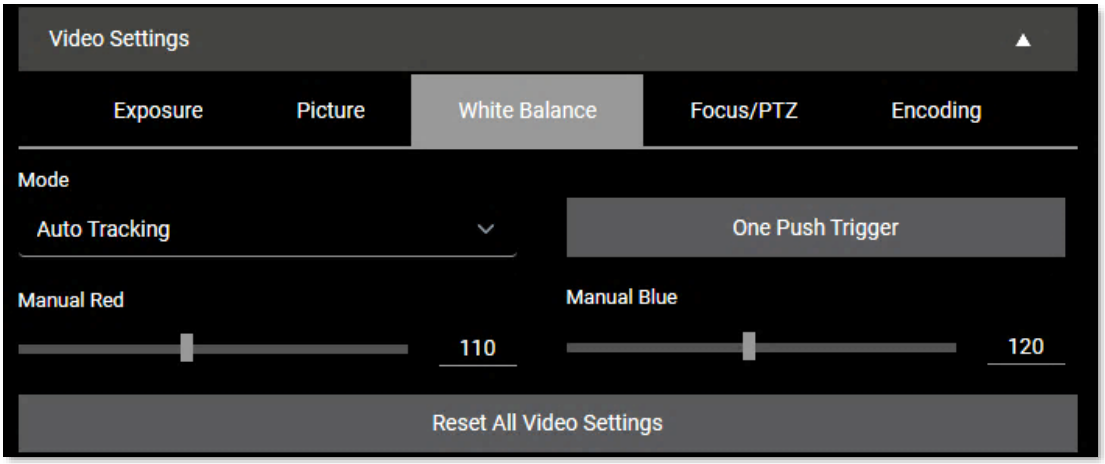
The Exposure tab allows you can set parameters such as the video *Mode, Iris, Gamma, WDR* (Wide Dynamic Range), *Gain, Shutter Speed, Anti-flicker and BLC* (Back Light Compensation).

1.11.3 PICTURE



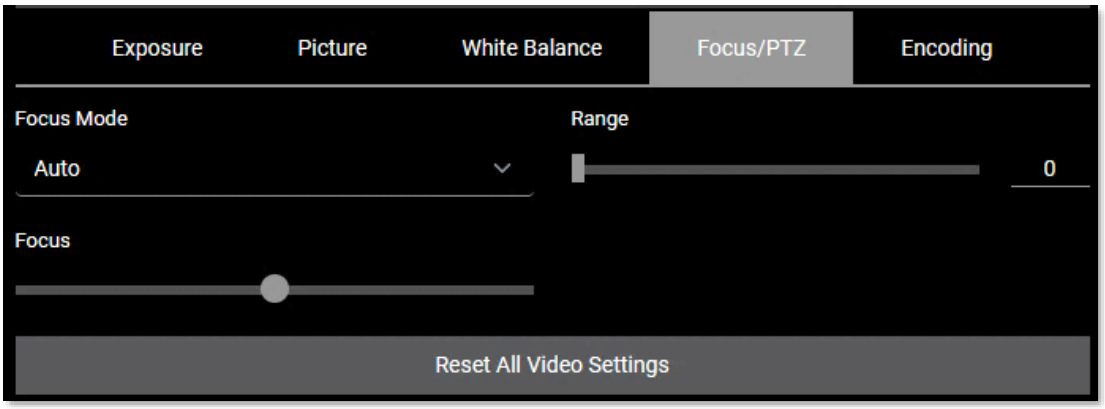
Under the *Picture* tab, you can set parameters such as *Brightness, Saturation, Contrast, Sharpness, 2D Noise Reduction, 3D Noise Reduction, Mirror,* and *Flip.*

1.11.4 WHITE BALANCE



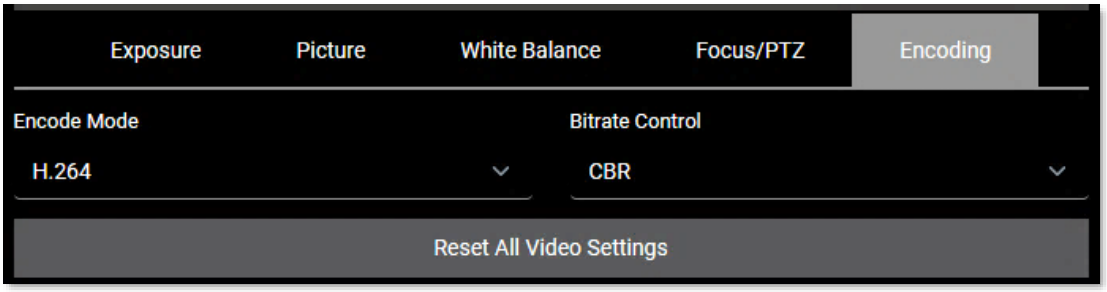
Under the *White Balance* tab, you can set parameters such as *Mode, Manual Red,* and *Manual Blue*. Press the *One Push Trigger* button to calibrate the white balance of the room.

1.11.5 FOCUS/PTZ



The *Focus/PTZ* tab offers *Auto* or *Manual* focus and the *Range* slider is a digital zoom.

1.11.6 ENCODING

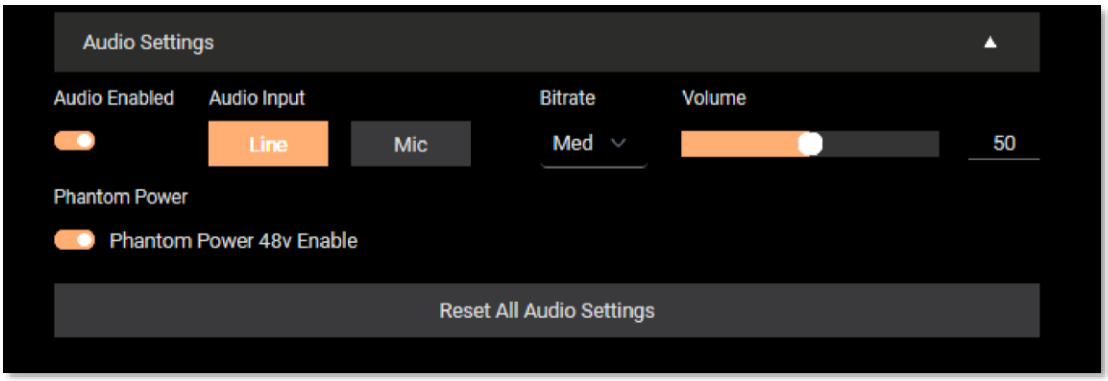


The *Encoding* tab allows you to set your *Encode Mode* to H.264 or HEVC and the ability to control the Bitrate with CBR or VBR.

Note: CBR stands for constant bitrate and is an encoding method that keeps the bitrate the same. VBR, by contrast, is a variable bitrate. When audio data is encoded by a codec, a fixed value is used.

1.12 AUDIO

Lower on the panel, you can expand the Audio Settings control group.



The *Audio Settings* group includes several options, starting with the switch at left allows you to completely disable audio output. Support for *Mic* and *Line* level *Audio Input*, *Bitrate* options from Low, Med to High, adjustable *Volume* slider.

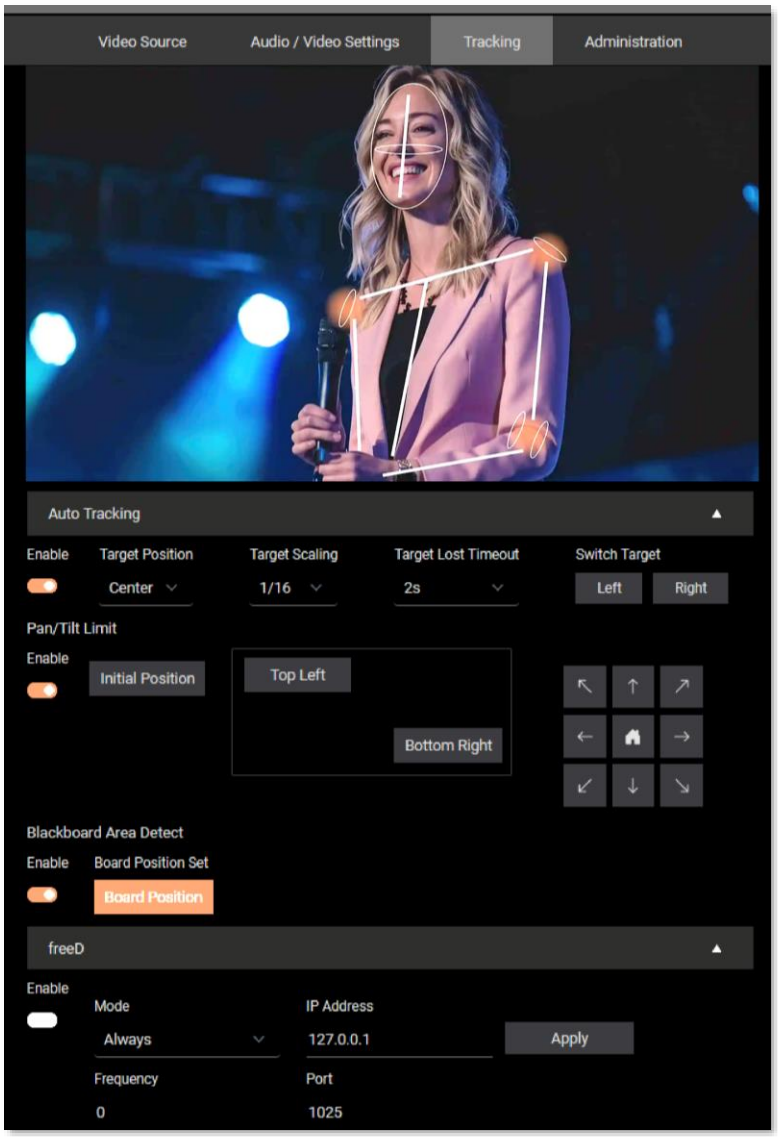
Vizrt PTZ3 PLUS and Vizrt PLTZ3 PLUS UHD cameras support *Phantom Power.* Phantom power delivers +48v to powered microphones and requires a two-step confirmation in the UI to avoid accidentally sending power to non-powered mics.

WARNING: Phantom Power must be used cautiously to prevent equipment damage. Ensure that Phantom Power is disabled for the Analog Input unless specifically required for a connected microphone. Activating Phantom Power while connecting the line output of an audio device to the analog input may result in irreparable damage to devices.

Hint: Use the Mini-XLR connection in addition to the standard line-in. When combined with NDI Audio Direct, the XLR audio connects to the NDI receivers and virtually any audio software providing an array of connectivity options.

1.13 TRACKING

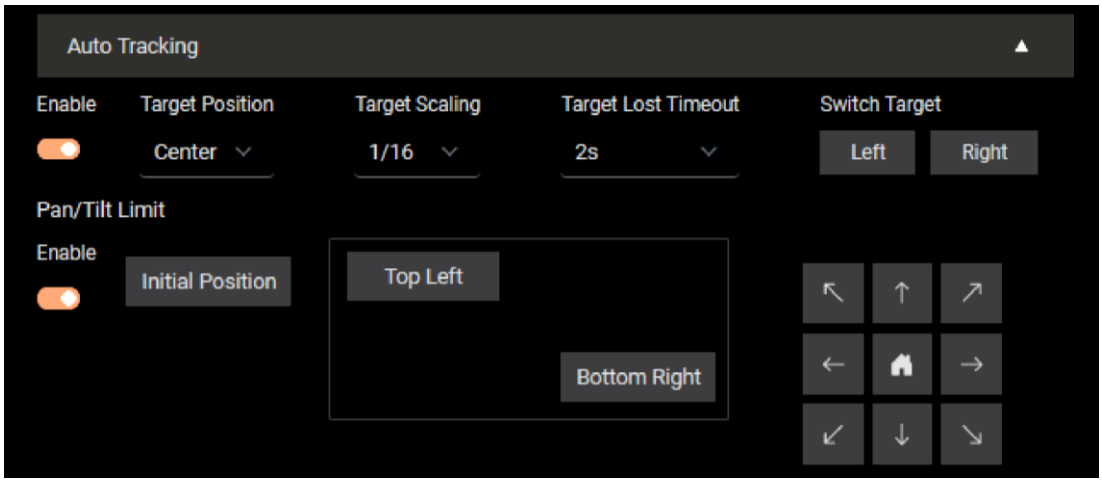
Both Vizrt PTZ3 PLUS and Vizrt PTZ3 UHD PLUS support all *Tracking* features which enable the camera to automatically pan, tilt and zoom the camera to keep a human 'target' in view without manual intervention by a camera operator. Setting in the Auto Tracking group control this behavior for optimal results.



Note: Tracking features supported in Vizrt PTZ3 Plus and Vizrt PTZ3 UHD Plus only.

The controls in this control group determine the behavior of the *Auto Tracking* feature – for example, how it handles cases when multiple persons are detected, or what the camera will do when the target steps out of the frame.

1.13.1 AUTO TRACKING



Auto Tracking supported in Vizrt PTZ3 PLUS & Vizrt PTZ3 UHD PLUS only

- **Enable** – When turned on, Auto Tracking locates persons in the frame and causes the camera to follow a designated individual to keep that person in view if possible.

Hint: Keep the target at least 2 meters away from the camera and enable the Pan/Tilt Limit for better head movement.

- **Target Position** – This setting allows you to determine whether Auto Tracking will endeavor to position the targeted individual in the Center of the video scene, or perhaps on the Left or Right.
- **Target Scaling** – Controls Zoom while Auto Track is operating. Use this to specify how much of the video scene you want the target to occupy, from 1/6th to 1/20th of the frame.
- **Target Lost Timeout** – If the target individual is lost from view for the period of time specified here, the camera automatically returns to the Initial Position; you can choose between .5 to 10 seconds.
- **Switch Target** – When multiple persons are detected in the scene, use this control to change which target Auto Tracking will follow. Click Left or Right to designate a target to the left or right of the current target.

1.13.2 PAN/TILT LIMIT

Of course, the camera's range of PTZ motion is quite large. At times you wish to restrict this in order to keep an important element in the scene. The controls in the Pan/Tilt Limit group allow you to set bounds to the range of motions that will be respected by the Auto Tracking feature.

Note: You will need to use manual left/right and up/down controls to set limits, so you must disable Auto Tracking while configuring these settings.

- **Enable** – The limits are actively enforced during Auto Tracking operation when this is on.

- **Initial Position** – Click this button to specify a 'home' position for the camera. If the target subject leaves the scene for a period exceeding the Target Lost Timeout value, the camera returns to this position.
- **Top Left/ Bottom Right** – To set these limits, disable Auto Tracking, and use camera navigation controls to go frame the scene at the top left extreme of camera motion you want to allow, and click Top Left. Set the Bottom Right limit in similar fashion.

1.13.3 BLACKBOARD AREA DETECT

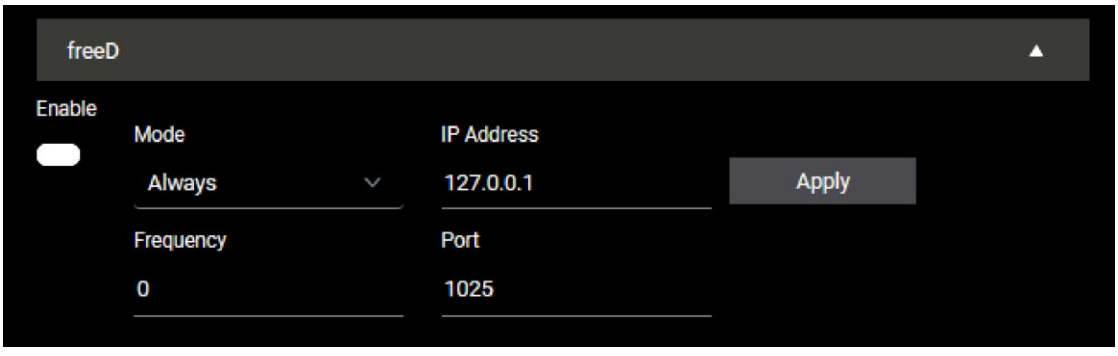
Blackboard Area Detect supported in Vizrt PTZ3 PLUS & Vizrt PTZ3 UHD PLUS only

At times you may wish tracking to ignore target movement within a certain zone, but smoothly resume following the target when the subject moves further. The Blackboard Area Detection feature fills this need.

For example, imagine a presenter pacing in front of a blackboard or large display. You want the background to be visible in the scene, and preferably static – for legibility. Slavishly tracking the subject pacing in that confined space would be distracting. However, when the presenter moves further (say, stepping over to a lectern), you might want tracking to resume, causing the camera to follow.

- **Enable** – Toggles the feature's influence on Auto Tracking operation on or off.
- **Board Position** – With Auto Tracking enabled, use the Target Scaling options to frame the background (e.g., blackboard, whiteboard, etc.) area, and click Board Position to define the area that will be ignored for Auto Tracking purposes. When the target moves outside this zone, tracking resumes naturally.

1.13.4 FREED



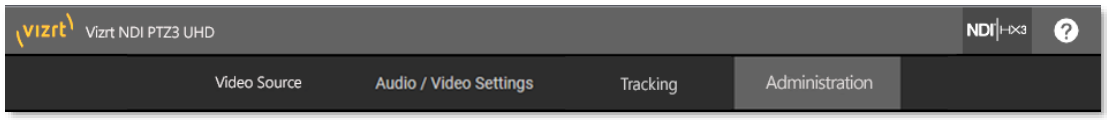
This feature is supported in all camera models and uses the popular FreeD protocol to supply camera tracking data to external clients that can then leverage that information for things like virtual set manipulation or augmented reality applications.

- **Enable** – Toggles FreeD output on or off.
  - By default, FreeD uses NDI|HX and manages this automatically. The toggle menu is provided solely for enabling UDP as an alternative transport stream for different applications.

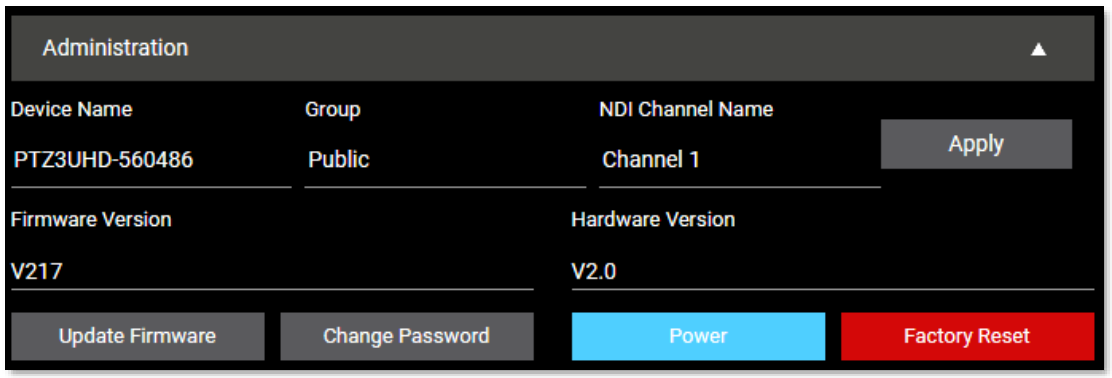
- **Mode** – The FreeD protocol supports two data streaming options:
  - **Always** – In this mode, FreeD data is sent periodically (via the specified IP Address and Port) to the receiver, according to the Interval value.
  - **On Demand** – In this mode, an external FreeD application identifies itself to the camera and controls data transfer; so IP Address and Port need not be manually specified.

- **IP Address** – Enter the IP Address to send data to when Mode is set to Always.
- **Frequency** – Enter the time between data transmissions when in Always mode.
- **Port** – Enter the network port number to send data to when Mode is set to Always.

1.14 ADMINISTRATION



The third tab on the configuration webpage is labeled *Administration*. Here you will find information and settings related to your camera, and its network connection.

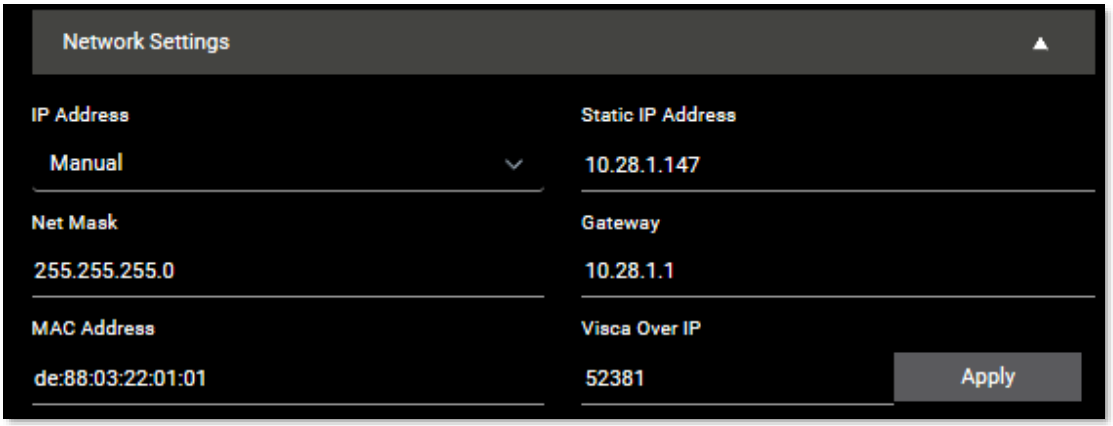


Note: It is imperative that your camera is updated, for more information please see 1.2 Firmware Update.

The uppermost section of this tab displays the *Device Name, Group*, and *NDI Channel Name* fields, which determine how your camera is identified on your NDI network. These names are editable, allowing you a convenient way to identify the output of specific cameras to other NDI-enabled devices and systems connected downstream.

The lower section of the Administration tab displays the *Firmware* and *Hardware Version* for your camera. Buttons just below allow you to update the installed firmware, change the default administration password, restart the camera (by clicking the *Power* button), or perform a factory reset if needed.

1.14.1 NETWORK SETTINGS



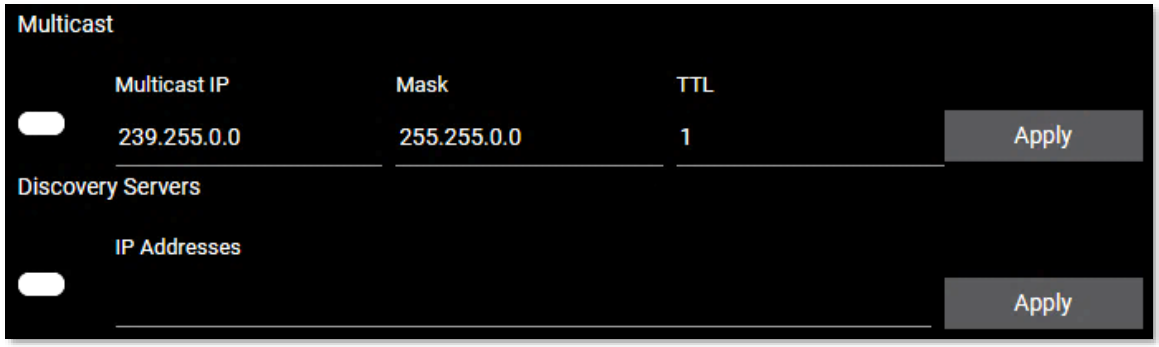
Controls in the Network Settings section will be familiar to anyone who has connected a computer or mobile device to a network, and thus require little explanation.

Typically, your network will be configured to automatically supply IP addresses to devices you connect to it by means of a DHCP server. Your camera's IP Address resolution method is set to Dynamic by default, to take advantage of this scheme. To assign a static IP address, change the *IP Address* setting to *Manual,* enter a new *IP Address*, and click *Apply* (changes will not take effect until *Apply* is clicked).

Visca Over IP offers the ability to send several different control commands over a network connection, without the need to add additional cabling. (To learn more, see 3.3 VISCA Over IP)

NOTE: Should the default IP Address mode (Dynamic) fail to provide a usable IP address within a minute or two of powering up – as when an active DHCP server is not found on the network – PTZ3 will automatically switch to Manual mode and attempt to connect using a static IP address. The default IP address is 192.168.100.168.

1.15 MULTICAST



Enable *Multicast* to transmit video using multicast, rather than the default unicast method. A suitable Multicast address is generated, but you can edit the result manually if you need to. To update the address, you can enter a new address and click *Apply*. *Please take time to consider the following information before enabling this feature.*

MULTICAST OR UNICAST?

Multicast can seem like a bandwidth-saving miracle. Unlike NDI's default mode (unicast), multicast does not require a unique stream from the source to each receiver. When using unicast, each connection to the sender reduces the bandwidth available by a similar amount.

By contrast, multicast connections do *not* add significantly to the bandwidth required as connections multiply. You could be forgiven for wondering why anyone would ever turn this option off - yet it is off by default. Why?

This is because multicast requires more careful network configuration. While you might not notice any issues in a simple network setting; a poorly configured environment can have a serious impact on more complex networks.

- Specifically, it is essential that IGMP snooping be enabled for each switch on the network. This lets the device listen to traffic between other hosts, switches, and routers, and identify receiving ports using various IP multicast streams.

- In addition, we strongly recommend that all network switches be of the 'managed' type (see the sidebar "Managed vs. Un-managed").

1.16 TALLY

Your camera unit provides 'tally' notification from NDI devices supporting it. The light located on the front of the pedestal base will light up in red or green to tell you when video output from the device is visible on the Program output or Preview, as listed in the following table.

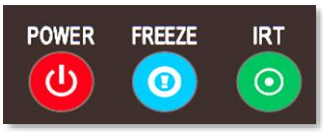
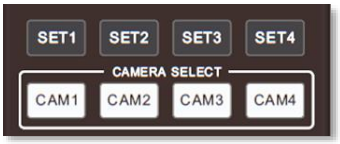
POWER	Indicates (tally state)
Green	On preview
Red	On program
Amber	On program and preview
Off	Not on output

Section 2 REMOTE CONTROL & OSD

Some of the more exotic settings and options available on your Vizrt PTZ3 camera are supported by means of the onscreen display and accessed via the included remote control. This section first describes the features of the latter, then provides a full list of options and settings in the 'OSD'.

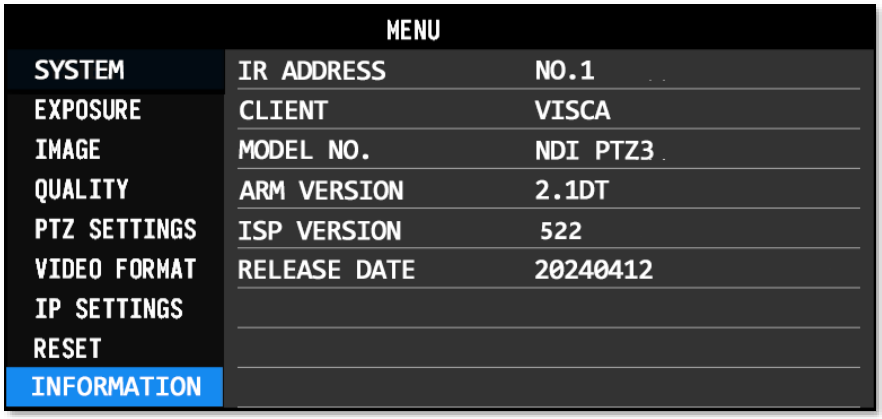
2.1 REMOTE CONTROL

The following table identifies the various controls and buttons on your Vizrt PTZ3 camera's remote control.

	**Power** Under normal working mode, short press POWER key, to enter standby mode. Press it again, the camera will self-configuration, then go back to HOME position. It will go to preset position if power on model has been set before. **FREEZE (Not Supported in OSD)** Short press FREEZE key to freeze/ unfreeze the image. **IRT (IR Transfer/IR Pass)** Open/close the IR pass function. Press the IRT key the camera will receive and Pass the IR remote control signal to the codec/terminal (via VISCA IN port).
	**SET1-SET4 Address Setting** Long press for 3 seconds until the key light ON **CAM1-CAM4 (Camera Selecting)** Short press to select the relative camera.
	**NUMBER KEY (1-9)** Set preset: long press (3 seconds) the number key to set preset. Run preset: Short press the number key to run preset. **CLR PRE (CLEAR PRESET)** CLR PRE+ number key: to clear the relative preset. Long press to clear all presets.

	**FOCUS KEYS (ON THE LEFT)** Manual focus, only valid in manual focus model. **ZOOM KEYS (ON THE RIGHT SIDE)** Set the zoom value. **NAVIGATE KEY: UP/DOWN/LEFT/RIGHT** Use navigate key to set the pan tilt and select menu when using the OSD. **OK /HOME KEY** Short press OK to make the camera go back to the HOME position; and confirm the selection when entering the OSD.
	**AF:** Auto Focus **MF:** Manual Focus **RESET:** Press for 3 seconds to reset camera to its defaults. **MENU:** Enter OSD menu.
	**LEARN+LIMIT L key:** Set the pan tilt left limit position. **LEARN+LIMIT R key:** Set the pan tilt right limit position. **LEARN+LMT CLR key:** Clear the limit position.
	**BLC OFF/BLC ON**：Not Available. **BRIGHT-/BRIGHT+:** Set image brightness, only valid under bright priority
	**Video Format Keys:** Long press 3 seconds to select different video formats.

2.2 OSD MENU



1. Press the MENU key on the IR remote controller, to enter the OSD menu as below:

2. After entering the main menu, use the navigate UP/DOWN key to select the main menu. Once selected, the main menu will change to blue background, and the right side will show all sub menu options.

3. Press the navigate RIGHT key to enter sub menu; use UP/DOWN key to select the sub menu options; use LEFT/RIGHT key to change parameters.

4. Press the MENU key again to return to previous menu. Press the MENU key continuously to exit the OSD menu.

OSD Menu Settings List.

SYSTEM	PROTOCOL	Optional item VISC / PLC.P / PLC.D	Default: VISCA
	ADDRESS	VISCA: 1~7 PLC.P /PLC.D: 1~255	Default: 1
	BAUDRATE	Optional item: 2400 / 4800 / 9600 / 115200	Default: 9600
	PROTOCOL LOCK	Once set, above protocol setting will be locked	Default: OFF
	RS485	RS485 ON / OFF	Default: ON
	VISCA PATH	Optional Item: OVER ALL / OVER IP / OVER COM	Default: OVER ALL
	语言/LANGUAGE	Optional Item: Chinese / English	Default: English

EXPOSURE	EXPOSURE MODE	SMOOTH AUTO/ MANUAL/ IRIS PRIOITY/ SHUTTER PRIORITY	Default: AUTO
	IRIS	Iris setting: CLOSE - F1.8, only valid under MANUAL and IRIS mode	Default: AUTO
	SHUTTER	Shutter speed: 1/30 - 1/10000, only valid under MANUAL mode	Default: AUTO
	GAIN	Gain setting: 0dB - 30dB, only valid under MANUAL mode	Default: AUTO
	EXPOSURE BRIGHT	Bright setting: 0 ~ 27, only valid under BRIGHT priority mode	Default: AUTO
	BRIGHT	0 ~ 15	Default: 8
	BLC	ON/OFF	Default: OFF

IMAGE	WHITE BALANCE MODE	Optional: ATW / MANUAL / AUTO / INDOOR / OUTDOOR / PUSH	Default: ATW
	RED GAIN	Red gain level: 0~255, only valid under manual white balance mode	Default: AUTO
	BLUE GAIN	Blue gain level: 0~255 , only valid under manual white balance mode	Default: AUTO
	FLICKER	Anti-Flicker setting: 50/60HZ, to reduce the video flicker	Default: 50HZ
	FOCUS MODE	Select focus mode	Default: AUTO

QUALITY	2D NOISE REDUCTION	2D noise reduction: the bigger value is, the less noise on image is, the lower resolution is.	Default: OFF
	3D NOISE REDUCTION	3D noise reduction: OFF /AUTO / 0~4, the bigger value is, the less motion noise on image is. High value will cause image smear.	Default: AUTO
	SHARPNESS	Sharpness setting: 0~15, the higher value is, edge of the image will be sharpened.	Default: 6
	CONTRAST	Set contrast level	Default: 8
	SATURATION	Set saturation	Default: 8
	GAMMA	Select gamma level	Default: 8
	AF SENSITIVITY	Optional: LOW / NORMAL / HIGH	Default: NORMAL

PTZ SETTINGS	SPEED BY ZOOM	Speed By Zoom: proportional speed, the bigger the zoom is, the slower the speed is.	Default: ON
	FLIP	Flip horizontal	Default: OFF
	MIRROR	Flip vertical	Default: OFF
	PT SPEED	Pan Tilt speed	Default: 18
	ZOOM SPEED	Zoom speed	Default: 5
	PRESET FREEZE	Open/Close Video Freeze when running pre sets.	Default: OFF
	PRESET PT SPEED	Preset head speed: 2~24	Default: 24
	PRESET ZOOM SPEED	Preset zoom speed: 1~7	Default: 5

VIDEO FORMAT **UHD Model**	2160p: 60, 59.94, 50, 30, 29.97, 25	After selecting the system, press OK to switch the system. If it is the currently selected system, it will not be activated.
	1080p: 60, 59.94, 50, 30, 29.97, 25, 24	
	720p: 60, 59.94, 50, 30, 29.97, 25	

VIDEO FORMAT **Non-UHD Model**	1080p: 60, 59.94, 50, 30, 29.97, 25, 24	After selecting the system, press OK to switch the system. If it is the currently selected system, it will not be activated.
	1080i: 59.94, 50	
	720p: 60, 59.94, 50, 30, 29.97, 25	

RESET	SYSTEM RESET	Reset communication parameter to default
	CAMERA RESET	Reset camera parameter to default
	PAN TILT RESET	Reset pan / tilt parameter to default
	ALL RESET	Reset all parameter to default

INFOMATION	IR ADDRESS	Camera IR control address
	CLIENT	Default client end protocol: VISCA
	MODEL NO.	Model number
	ARM VERSION	ARM firmware version
	ISP VERSION	Camera version
	RELEASE DATE	Software release date

IP SETTINGS	DHCP	ON / OFF	Using up / down / left / right navigation button to select item to set and using number button to set parameter. Press menu button to return.
	IP	192.168.001.188	
	MASK	255.255.255.000	
	GATEWAY	192.168.001.001	

Section 3 CAMERA SPECS

Video Format	NDI|HX	3840*2160p: 60, 59.94, 50, 30, 29.97, 25 1920*1080p: 60, 59.94, 50, 30, 29.97, 25, 24 1280*720p: 60, 59.94, 50, 30, 29.97, 25
	HDMI	3840*2160p: 60, 59.94, 50, 30, 29.97, 25 1920*1080p: 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 1920*1080i: 60, 59.94, 50 1280*720p: 60, 59.94, 50, 30, 29.97, 25
	SDI	1920*1080p: 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 1920*1080i: 60, 59.94, 50 1280*720p: 60, 59.94, 50, 30, 29.97, 25

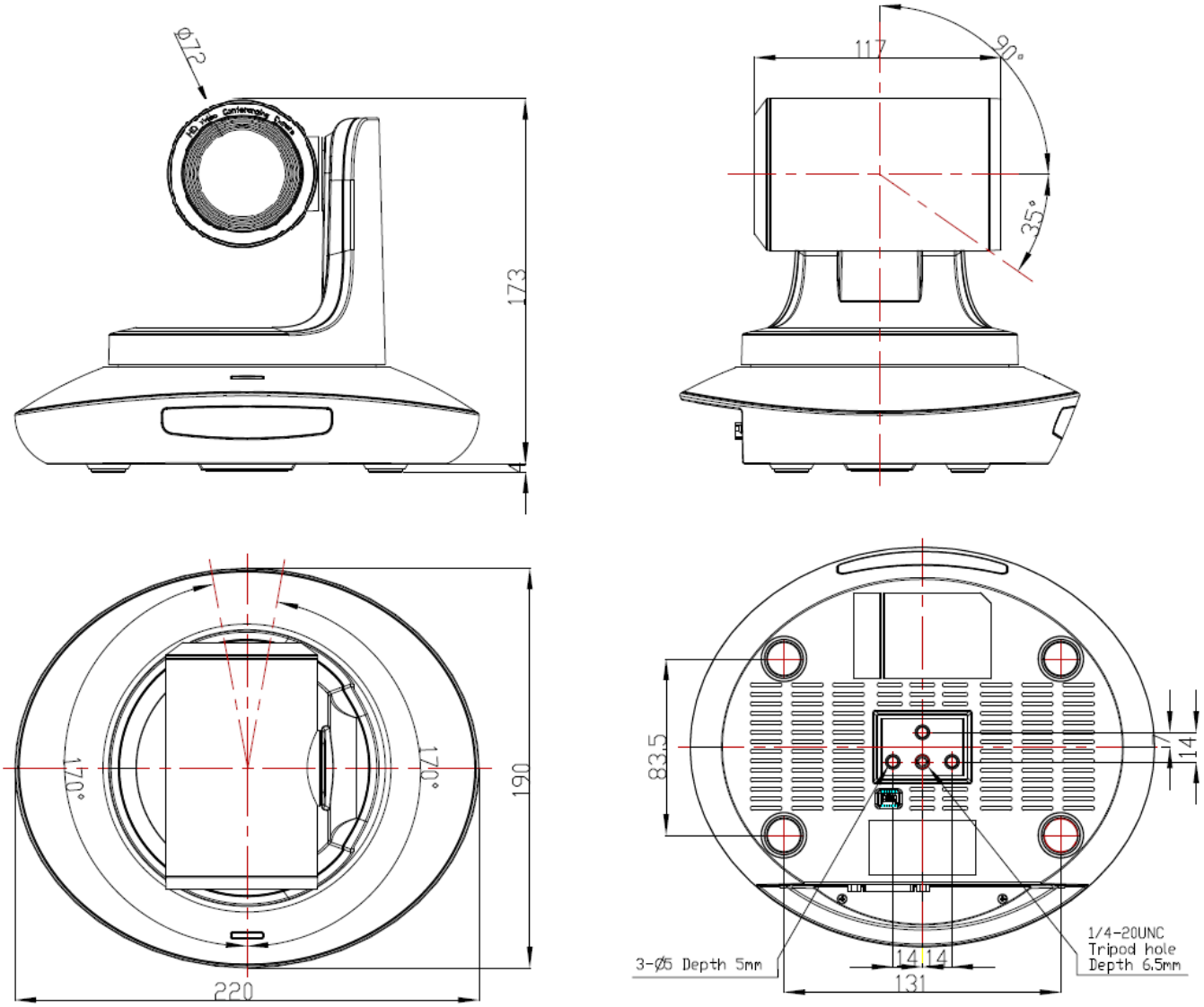
Video Format Non UHD Model	NDI|HX	1920*1080p: 60, 59.94, 50, 30, 29.97, 25, 24 1280*720p: 60, 59.94, 50, 30, 29.97, 25
	HDMI	1920*1080p: 60, 59.94, 50, 30, 29.97, 25, 24 1920*1080i: 60, 59.94, 50 1280*720p: 60, 59.94, 50, 30, 29.97, 25
	SDI	1920*1080p: 60, 59.94, 50, 30, 29.97, 25, 29.97, 24 1920*1080i: 60, 59.94, 50 1280*720p: 60, 59.94, 50, 30, 29.97, 25

Video Interface	HDMI, SDI, NDI|HX
Audio Interface	Line in, Mini XLR
Upgrade Interface	Type-C
Sensor	Vizrt PTZ3 UHD PLUS & NewTek PTZ3 UHD - Sony 1/1.8" CMOS Vizrt PTZ3 PLUS & NewTek PTZ3 – Panasonic 1/2.86" CMOS
Focal Length	UHD Model - 6.91mm~214.64mm --- Non UHD Model - 4.9~98mm
Iris	F1.5(Wide)~F3.0 (Tele)
View Angle	UHD Model - 60˚(Far) - 2˚(Near) --- Non UHD Model 60˚(Far) -3,2˚(Near)
Rotation Angle	Pan: -170˚ ~ +170˚; Tilt: -30˚ ~ +90˚
Rotation Speed	Pan: 0˚~120˚/s ; Tilt: 0˚~80˚/s
Preset:	Remote controller: 10; RS232: 128; Accuracy: 0.1˚
Control Port	RS232, RS485, NDI|HX (VISCA over IP)
Network Speed	1000M
Video encode	H.264 / HEVC
Bit Rate Control	Variable Bit Rate, Constant Bit Rate
Video Bit Rate	Low / Medium / High / NDI|HX3
Supported Protocol	NDI / NDI|HX
POE+	Supported
NDI	Supported
Daisy Chain	Support RS232 serial daisy chain
Minimum Lux	UHD Model - 0.5lux (50 IRE Max AGC,1/30,F1.8) --- Non UHD Model 0.7lux (50 IRE Max AGC, 1/30, F1.8)
White Balance	ATW / Manual / Auto/ Indoor / Outdoor / Push
Exposure	Auto / Manual / Iris / Bright
Focus	Auto / Manual
Iris	Auto / Manual
Electric Shutter	Auto / Manual

Gamma	Supported
WDR	Supported
BLC	Supported
2D Noise Reduction	Supported
3D Noise Reduction	Supported
Anti-Flicker	OFF / 50Hz / 60Hz
Pan Tilt Flip	Supported
Input Voltage	DC12V/POE+(IEEE802.3at)

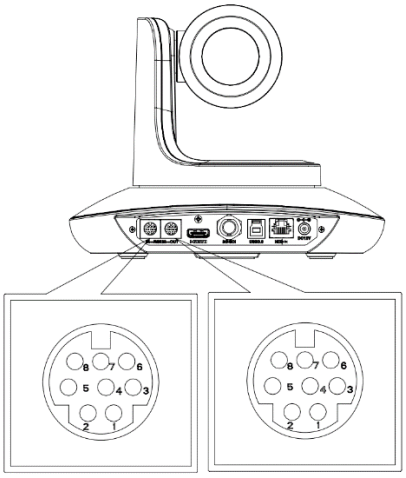
Dimension	UHD Model --- 8.66 x 7.48 x 7.61 in (220 x 190 x 193.5 mm) Non UHD Model --- 8.66 x 7.48 x 6.41 in (220 x 190 x 173 mm)
Net Weight	UHD Model 4.2lbs (1.9kg) --- Non UHD Model 2.97lbs (1.35 kg)
Working Temperature	-10℃~50℃
Working Humidity	20%~80%
Storage Temperature	-20℃~60℃
Storage Humidity	0~90%

3.1 CAMERA DIMENSION (MM)



3.2 VISCA

3.2.1 VISCA IN (RS232 PORT)



No.	V_IN	V_OUT
1	DTR	DTR
2	DSR	DSR
3	TXD	TXD
4	GND	GND
5	RXD	RXD
6	A	
7	IR OUT	
8	B	

VISCA IN	RS485
1	
2	
3	
4	
5	
6	A(+)
7	IR OUT
8	B(-)

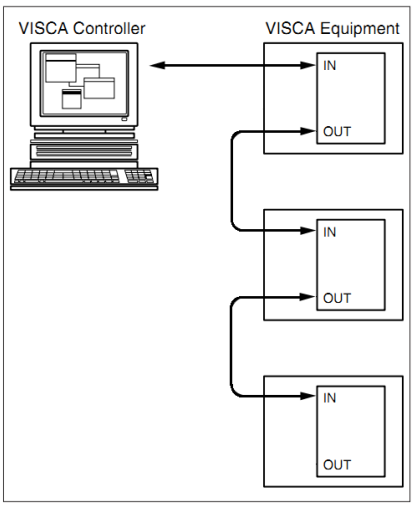
VISCA IN &Mini DIN Connection

Camera VISCA IN		Mini DIN	
1	DTR	1	DSR
2	DSR	2	DTR
3	TXD	5	RXD
4	GND	4	GND
5	RXD	3	TXD
6	A(+)	6	NC
7	IR OUT	7	NC
8	B(-)	8	NC

VISCA IN & DB9 Connection

Camera VISCA IN		Windows DB-9	
1	DTR	6	DSR
2	DSR	4	DTR
3	TXD	2	RXD
4	GND	5	GND
5	RXD	3	TXD
6	A(+)		
7	IR OUT		
8	B(-)		

3.2.2 VISCA Network Construction



3.2.3 SERIAL PORT CONFIGURATION

Parameter	Value	Parameter	Value
Baud rate	2400/4800/9600/115200	Stop Bit	1bit
Start Bit	1 bit	Check Bit	None
Date Bit	8 bit		

3.2.4 VISCA PROTOCOL

PART 1 - CAMERA RETURN COMMANDS

Ack/Completion Message		
	Command Packet	**Note**
ACK	z0 41 FF	Returned when the command is accepted
Completion	z0 51 FF	Returned when the command has been executed

Z = camera address+8

Error Messages		
	Command Packet	Note
Syntax Error	z0 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted
Command Not Executable	z0 61 41 FF	Returned when a command cannot be executed due to current conditions. For example, when commands controlling the focus manually are received during auto focus.

PART 2 – CAMERA CONTROL COMMANDS

Command Set	Command	Command Packet	Comments	Default
AddressSet	Broadcast	88 30 01 FF	Address setting	
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear	
CAM_Power	On	8x 01 04 00 02 FF	Power ON / OFF	2
	Off	8x 01 04 00 03 FF		
CAM_Zoom	Stop	8x 01 04 07 00 FF		
	Tele (Standard)	8x 01 04 07 02 FF		
	Wide (Standard)	8x 01 04 07 03 FF		
	Tele (Variable)	8x 01 04 07 2p FF	p=0(low)~7(high)	
	Wide (Variable)	8x 01 04 07 3p FF		
	Direct	8x 01 04 47 0p 0q 0r 0s FF	pqrs: Zoom Position (0(wide) ~0x4000(tele))	
	Direct with speed	8x 0A 04 47 0t 0p 0q 0r 0s FF	t: spd 0~7	

Command Set	Command	Command Packet	Comments	Default
			pqrs: Zoom Position (0(wide) ~0x4000(tele))	
Cam_Dzoom(2X)	ON	8x 01 04 06 02 FF		
	OFF	8x 01 04 06 03 FF		
	Combine Mode	81 01 04 36 00 FF	Combine with optical zoom control	
	Separate Mode	81 01 04 36 01 FF	Combine with optical zoom control	
	Stop	81 01 04 06 00 FF	Combine with optical zoom control	
	Tele (Variable)	81 01 04 06 2p FF	Combine with optical zoom control	
	Wide (Variable)	81 01 04 06 3p FF	Combine with optical zoom control	
	Direct	81 01 04 46 0p 0q 0r 0s FF	Combine with optical zoom control	
CAM_Focus	Stop	8x 01 04 08 00 FF		
	Far (Standard)	8x 01 04 08 02 FF		
	Near (Standard)	8x 01 04 08 03 FF		
	Far (Variable)	8x 01 04 08 2p FF	p=0 (Low) to 7 (High)	
	Near (Variable)	8x 01 04 08 3p FF	p=0 (Low) to 7 (High)	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	pqrs: Focus Position	
	Auto Focus	8x 01 04 38 02 FF		
	Manual Focus	8x 01 04 38 03 FF		
	One Push AF	8x 01 04 18 01 FF		
CAM_ZoomFocus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position (0(wide)~ 0x4000(tele)) tuvw: Focus Position	
CAM_WB	Auto	8x 01 04 35 00 FF		ATW
	Indoor	8x 01 04 35 01 FF		
	Outdoor	8x 01 04 35 02 FF		
	One Push	8x 01 04 35 03 FF		
	ATW	8x 01 04 35 04 FF		
	Manual	8x 01 04 35 05 FF		
	One Push Trigger	8x 01 04 10 05 FF		
CAM_Rgain	Reset	8x 01 04 03 00 FF	Manual Control of R Gain	Auto
	Up	8x 01 04 03 02 FF		
	Down	8x 01 04 03 03 FF		
	Direct	8x 01 04 43 00 00 0p 0q FF	pq: R Gain (0~0xFF)	
CAM_Bgain	Reset	8x 01 04 04 00 FF	Manual Control of B Gain	Auto
	Up	8x 01 04 04 02 FF		
	Down	8x 01 04 04 03 FF		
	Direct	8x 01 04 44 00 00 0p 0q FF	pq: B Gain (0-0xFF)	
CAM_AE	Full Auto	81 01 04 39 00 FF	Automatic Exposure mode	Auto

Command Set	Command	Command Packet	Comments	Default
CAM_AE	Manual	81 01 04 39 03 FF	Manual Control mode	
	Shutter Priority	81 01 04 39 0A FF	Shutter Priority Automatic Exposure mode	
	Iris Priority	81 01 04 39 0B FF	Iris Priority Automatic Exposure mode	
	Bright	8x 01 04 39 0D FF	Bright Mode (Manual control)	Auto
CAM_Shutter	Reset	8x 01 04 0A 00 FF	Shutter Setting	Auto
	Up	8x 01 04 0A 02 FF		
	Down	8x 01 04 0A 03 FF		
	Direct	8x 01 04 4A 00 00 0p 0q FF	pq: Shutter Position (0~0x15)	
CAM_Iris	Reset	8x 01 04 0B 00 FF	Iris Setting(0~0xD)	Auto
	Up	8x 01 04 0B 02 FF		
	Down	8x 01 04 0B 03 FF		
	Direct	8x 01 04 4B 00 00 0p 0q FF	pq: Iris Position (0~ 0x11)	
CAM_Gain	Reset	8x 01 04 0C 00 FF	Gain Setting (0~0x0E)	Auto
	Up	8x 01 04 0C 02 FF		
	Down	8x 01 04 0C 03 FF		
	Direct	8x 01 04 0C 00 00 0p 0q FF	pq: Gain Position (0~0x0E)	
	Direct	8x 01 04 0C 00 00 0p 0q FF	pq: Gain Position (0~0x0E)	
CAM_AEBright	Reset	8x 01 04 0D 00 FF	Bright Setting	11
	Up	8x 01 04 0D 02 FF		
	Down	8x 01 04 0D 03 FF		
	Direct	8x 01 04 4D 00 00 0p 0q FF	pq: Bright l Position (0~0x1B) AE_BRIGHT	
CAM_ImageBright	Direct	8x 01 04 A4 00 00 0p 0q FF	pq: Bright l Position (0~0x1B) AE_BRIGHT	8
CAM_WDR	On	8x 01 04 3D 02 FF	Exposure Compensation ON/OFF	3
	Off	8x 01 04 3D 03 FF		
	Direct	8x 01 04 D3 pq FF	pq: ExpComp Position (0~0x6)	
CAM_Back Light (BLC)	On	8x 01 04 33 02 FF	BackLight On	3
	Off	8x 01 04 33 03 FF	BackLight Off	
CAM_Sharpness	Reset	8x 01 04 02 00 FF	Aperture Control	6
	Up	8x 01 04 02 02 FF		
	Down	8x 01 04 02 03 FF		
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain (0~0x0F)	
CAM_Memory (preset)	Reset	8x 01 04 3F 00 pp FF	pp: Preset Number(=0 to 127) Corresponds to 0 to 9 on the Remote Commander	
	Set	8x 01 04 3F 01 pp FF		
	Recall	8x 01 04 3F 02 pp FF		
CAM_MemoryH (preset)	Reset	8x 01 04 3F 00 pp FF	pp: Preset Number(=0 to 255)	
	Set	8x 01 04 3F 01 pp FF		

Command Set	Command	Command Packet	Comments	Default
	Recall	8x 01 04 3F 02 pp FF	Corresponds to 0 to 9 on the Remote Commander	
Freeze	set	8x 01 04 62 0p FF	p: Freeze switch 3 = OFF 2 = ON	3
PresetFreezeSet	set	8x 01 04 76 0p FF	p: Preset Freeze switch 3 = OFF 2 = ON	3
PresetPTSpeedSet	set	8x 01 7E 01 0B 00 qq FF	qq:Preset speed 2~24 default:18	18
PresetZoomSpeed Set	set	8x 01 7E 01 2B 00 0q FF	0q:Preset zoom speed 0~7 default:5	5
PresetSpeedAdj	adj	8x 01 7E 01 1B 0p FF	p: direction adjustment 3 = down 2 = up	
CAM_LR_Reverse	On	8x 01 04 61 02 FF	Image Flip Horizontal ON/OFF	3
	Off	8x 01 04 61 03 FF		
CAM_Picture Flip	On	8x 01 04 66 02 FF	Image Flip Vertical ON/OFF	3
	Off	8x 01 04 66 03 FF		
CAM_RS485Ctl	On	8x 01 06 A5 02 FF		1
	Off	8x 01 06 A5 03 FF		
CAM Saturation	Saturation	8x 01 04 A1 00 00 0p 0q FF	pq: saturation level 0x00~0x0f	8
CAM Contrast	Contrast	8x 01 04 A2 00 00 0p 0q FF	pq: Contrast level 0x00~0x0f	8
CAM Speed By Zoom	On	8x 01 06 A0 02 FF		2
	Off	8x 01 06 A0 03 FF		
CAM_PT Speed	PT Speed	8x 01 04 C1 00 00 0p 0q FF	pq: PT speed 0x05~0x18	18
CAM_Zoom Speed	Zoom Speed	8x 01 04 D1 00 00 0p 0q FF	pq: Zoom speed 0x01~0x07	5
CAM_ZoomSpeed	Zoom Speed	8x 01 04 D1 00 00 0p 0q FF	pq :Zoom speed 0x01~0x07	5
CAM_IRaddress	IR address	8x 01 06 D8 0p FF	p:IR address 1~4	1
CAM_Gamma	Gamma set	81 01 04 5B 0p FF	P:Gamma NO. (0~4)	8
CAM_2D Noise Reduction	Direct	8x 01 04 A5 0p FF	p: 2D noise reduction switch 0 = OFF 1 = ON	0
CAM_3D Noise Reduction	Direct	8x 01 04 53 0p FF	p: 3D noise reduction switch 0 = OFF 1 = AUTO 2~5 = MANUAL LEVEL	1
VideoSystem Set (Telycam)		8x 01 06 35 00 pp FF	pp: Video format 1080P60 0x00 1080P50 0x01 1080I60 0x02 1080I50 0x03 1080P30 0x04 1080P25 0x05 720P60 0x06 720P50 0x07 720P30 0x08 720P25 0x09 1080P5994 0x0E 1080I5994 0x0F 1080P2997 0x10 720P5994 0x13 720P2997 0x14 1080P24 0x11 1080P2398 0x12 4K@30 0x15 4K@25 0x16 4K@60 0x17 4K@50 0x18 4K@59.94 0x19 4K@29.97 0x1A	0x04

Command Set	Command	Command Packet	Comments	Default
			4K@24 0x1F 4K@23.98 0x20	
VideoSystem Set (Sony)		81 01 04 24 72 0p 0q FF(HDMI) 81 01 04 24 73 0p 0q FF(SDI1/SFP+) 81 01 04 24 74 00 0m FF(Feature Size) (900 only)	pq: Video format 1080P60 0x2e 1080P50 0x2f 1080I60 0x01 1080I50 0x04 1080P30 0x06 1080P25 0x08 720P60 0x09 720P50 0x0c 720P30 0x0e 720P25 0x11 1080P5994 0x13 1080I5994 0x02 1080P2997 0x07 720P5994 0x0a 720P2997 0x0f 1080P24 0x2a 1080P2398 0x2b 4K@30 0x1D 4K@25 0x1E 4K@60 0x1F 4K@50 0x20 4K@59.94 0x21 4K@29.97 0x22 4K@24 0x1B 4K@23.98 0x1C m： 0 = 1920*1080P 1 = 1920*1080I 2 = 1280*720	0x06
SDIFeaturePosition Cst	Direct	8x 01 06 33 0p FF	p= 0：USER 1：LEFT UP 2：LEFT MIDDLE 3：LEFT DOWN 4：CENTER UP 5：CENTER 6：CENTER DOWN 7：RIGHT UP 8：RIGHT MIDDLE 9：RIGHT DOWN	CENTER (900 only)
SDIFeaturePosition	Direct	8x 01 06 32 00 00 0p 0q 0r 0s 0m 0n 0x 0y FF	pqrs : (x position) mnxy: (y position)	960/540 (900 only)
DHCP Control	DHCP off	8x 01 04 AE 00 FF	DHCP off	
	DHCP on	8x 01 04 AE 01 FF	DHCP on	ON
Mainstream	resolution	8x 01 04 C2 00 0p 0q 0r 0s 0m 0n 0x 0y FF	pqrs : Column(x size) mnxy: Line (y size) only support:(same as web defined) 3840*2160(for 4k model) 1920*1080 1280*720	1920*1080
	rate	8x 01 04 C2 01 0p 0q 0r 0s 0m 0n 0x 0y FF	pqrsmnxy: bitrate (1024~120000):(same as web defined)	16M
	Encode mode Sel	8x 01 04 C2 02 00 0q FF	0x00:h264 0x01:h265	H.264
	Frame Rate	8x 01 04 C2 03 0p 0q FF	主码流编码帧率设置 范围(15~60)	60

Command Set	Command	Command Packet	Comments	Default
	IDR Setting	8x 01 04 C2 04 0p 0q FF	I 帧间隔设定(5~120)	30
	Bitrate Control	8x 01 04 C2 05 0p 0q FF	0x00:CBR 0x01:VBR	CBR
Substream	resolution	8x 01 04 C3 00 0p 0q 0r 0s 0m 0n 0x 0y FF	pqrs : Column(x size) mnxy: Line (y size) only support: 1280*720、1024*576、640*360:(same as web defined)	640*360
	rate	8x 01 04 C3 01 0p 0q 0r 0s 0m 0n 0x 0y FF	pqrsmnxy: bitrate (1024~2048kbps):(same as web defined)	1M
	Encode mode Sel	8x 01 04 C3 02 00 0q FF	0x00:h264 0x01:h265	H.264
	Frame Rate	8x 01 04 C3 03 0p 0q FF	主码流编码帧率设置 范围(15~60)	60
	IDR Setting	8x 01 04 C3 04 0p 0q FF	I 帧间隔设定(5~120)	30
	Bitrate Control	8x 01 04 C3 05 0p 0q FF	0x00:CBR 0x01:VBR	CBR
Tally Brightness	Direct	8x 01 7E 01 0A 01 0p FF	p: 0: OFF 1: low 2:middle 3:high	2
Tally control	Tally on/off	8x 01 7E 01 0A 00 0p FF	p: 0: OFF(LED off) 1: (LED Green on) 2: (LED Red on) 3: (LED Green on)	0
IP address control	IP set	8x 01 04 AB 0p 0q 0r 0s 0m 0n 0x 0y FF	Set ip to: pq.rs.mn.xy	Auto
	Mask set	8x 01 04 AC 0p 0q 0r 0s 0m 0n 0x 0y FF	Set mask to: pq.rs.mn.xy	
	Gateway set	8x 01 04 AD 0p 0q 0r 0s 0m 0n 0x 0y FF	Set gateway to: pq.rs.mn.xy	
	DNS set	8x 01 04 AF 0p 0q 0r 0s 0m 0n 0x 0y FF	Set dns to : pq.rs.mn.xy	
SYS_Menu	Menu On	8x 01 06 06 02 FF	Turn on the menu	
	Menu Off	8x 01 06 06 03 FF	Turn off the menu	
	Menu Back	8x 01 06 06 10 FF	Menu step back	
	Menu OK	8x 01 7E 01 02 00 01 FF	Menu ok	
IR_Receive	On	8x 01 06 08 02 FF	IR (remote commander) receive ON/OFF	2
	Off	8x 01 06 08 03 FF		
	On/Off	8x 01 06 08 10 FF		
Pan_tilt Drive	Up	8x 01 06 01 VV WW 03 01 FF	VV: Pan speed 0x01 (low speed) to 0x18 (high speed) WW: Tilt speed 0x01 (low speed) to 0x14 (high speed) YYYY: Pan Position(TBD) ZZZZ: Tilt Position(TBD)	
	Down	8x 01 06 01 VV WW 03 02 FF		
	Left	8x 01 06 01 VV WW 01 03 FF		
	Right	8x 01 06 01 VV WW 02 03 FF		
	Up left	8x 01 06 01 VV WW 01 01 FF		
	Up right	8x 01 06 01 VV WW 02 01 FF		
	Down Left	8x 01 06 01 VV WW 01 02 FF		
	Down Right	8x 01 06 01 VV WW 02 02 FF		

Command Set	Command	Command Packet	Comments	Default
	Stop	8x 01 06 01 VV WW 03 03 FF		
	Absolute Position	8x 01 06 02 VV WW 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF		
	Relative Position	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF		
	Home	8x 01 06 04 FF		
	Reset	8x 01 06 05 FF		
Pan-tiltLimitSet	Set	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W:1 Up Right 0:Down Left YYYY: Pan Limit Position (TBD) ZZZZ: Tilt Limit Position (TBD)	
	Clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF		
CAM_AT_OnOff	Direct	8x 01 04 C8 0p FF	P: 0 = off 1 = on	0
CAM_AT_TargetChange	Target change	8x 01 04 CA 0p FF	P:0x02 right move P:0x03 left move	
CAM_TargetLocation	Target location	8x 01 04 CB 0p FF	P: 0:mid 1:left 2:right	0
CAM_TargetRatio	Target ratio	8x 01 04 CC 0p 0q FF	Pq:(6~20)Human is 1/pq in the pic	16
CAM_AT_ChangeTime	Direct	8x 01 04 CD 0p 0q FF	pq：t time=t*100ms（Target lost time detect）	20
CAM_AT_BlackBoardMode	Direct	8x 01 04 CE 0p FF	p：1=Enable 0=Disable	0
CAM_AT_LeftUp_Limit (preset#251)	Direct	8x 01 04 3F 0p 0F 0B FF	p：1=Set 2=Call 3=Clear	
CAM_AT_RightDown_Limit(preset#253)	Direct	8x 01 04 3F 0p 0F 0D FF	p：1=Set 2=Call 3=Clear	
CAM_AT_InitialPosition (preset#255)	Direct	8x 01 04 3F 0p 0F 0F FF	p：1=Set 2=Call 3=Clear	
CAM_AT_BlackBoard Position1(preset#252)	Direct	8x 01 04 3F 0p 0F 0C FF	p：1=Set 2=Call 3=Clear	
CAM_AT_BlackBoard Position2(preset#250)	Direct	8x 01 04 3F 0p 0F 0A FF	p：1=Set 2=Call 3=Clear	
CAM_AT_ZoomLock	Direct	8x 01 04 D6 00 0p FF	p：1=Enable 0=Disable	0
CAM_AT_TiltLock	Direct	8x 01 04 D6 01 0p FF	p：1=Enable 0=Disable	0
CAM_AT_LimitEnable	Direct	8x 01 04 D7 0p FF	p：1=Enable 0=Disable	0
CAM_GL_Vertical	Direct	8x 01 04 3E 0p 0q 0r 0s FF	pqrs: -200~200 int16	0 (900 only)
CAM_GL_Phase	Direct	8x 01 04 3B 0p 0q 0r 0s FF	pqrs: -206~49	0 (900 only)
CAM_GL_PhaseStep	Direct	8x 01 04 3C 0p FF	p: 1~10	0 (900 only)
CAM_GL_Status	Direct	8x 01 04 A8 0p FF	p: 0: 23.98 mcu to isp 1: 24 2: 25 3: 29.97	offline (read only)

Command Set	Command	Command Packet	Comments	Default
			4: 30 5: 50 6: 59.94 7: 60 F:offline	
CAM_AudioSet	Direct	8x 01 04 D8 0p 0q 0r 0s 0t 0u 0m 0n 0h 0i 0j FF	0p：0x01-ON 0x00-OFF 0q：0x01-line in rstu：samplerate mn： volume 0~100 h： encode mode 4：LPCM 5: ACC ij： bitrate*1000	0p： 0x00-OFF 0q：0x01-line in rstu：48k mn： 50 h：5 ij：96(K)
CAM_Phantom_power_Set	Direct	8x 01 04 D9 0p FF	p：2=Enable 3=Disable	3
CAM_SystemMode_Set	Direct	8x 01 06 34 0p FF	p：0=FULL NDI priority 1=Digital priority	1

PART 3 – CAMERA INQUIRY COMMANDS

Command type	command	return	note
CAM Power Inq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF	Off(Standby)
CAM Zoom Pos Inq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM DZoom On Off Inq	8x 09 04 06 FF	y0 50 0p FF	p 2: ON 3: OFF
CAM DZoom Mode Inq	8x 09 04 36 FF	y0 50 0p FF	p 0:combination mode 1:separate mode
CAM DZoom Posi Inq	8x 09 04 46 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM Speed By Zoom Inq	8x 09 06 A0 FF	y0 50 0p FF	p 2: ON 3: OFF
CAM_PT Speed Inq (IR)	8x 09 04 C1 FF	y0 50 pp FF	pp: 0x05~0x18
CAM Zoom Speed Inq (IR)	8x 09 04 D1 FF	y0 50 0p FF	p:0x00~0x07
CAM Focus Mode Inq	8x 09 04 38 FF	y0 50 02 FF	Auto Focus
		y0 50 03 FF	Manual Focus
CAM Focus Pos Inq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_2D_Inq	8x 09 04 A5 FF	y0 50 03 FF	(0~0x01) p: 0: off 1: on
CAM_3D_Inq	8x 09 04 53 FF	y0 50 03 FF	(0~0x05) p:0: off 1: auto 2~5: noise level
CAM_WB Mode Inq	8x 09 04 35 FF	y0 50 00 FF	Auto
		y0 50 01 FF	Indoor mode
		y0 50 02 FF	Outdoor mode
		y0 50 03 FF	OnePush mode
		y0 50 04 FF	ATW
		y0 50 05 FF	Manual
CAM RGain Inq	8x 09 04 43 FF	y0 50 00 00 0p 0q FF	pq: R Gain
CAM BGain Inq	8x 09 04 44 FF	y0 50 00 00 0p 0q FF	pq: B Gain
CAM Saturation Inq	8x 09 04 A1 FF	y0 50 00 00 0p 0q FF	pq: saturation

CAM Contrast Inq	8x 09 04 A2 FF	y0 50 00 00 0p 0q FF	pq: contrast
CAM_AE Mode Inq	8x 09 04 39 FF	y0 50 00 FF	Smooth Auto
		y0 50 03 FF	Manual
		y0 50 0A FF	Shutter priority
		y0 50 0B FF	Iris priority
CAM Flicker Mode Inq	8x 09 04 AA FF	y0 50 0p FF	p 0: OFF 1: 50HZ 2: 60HZ
CAM Shutter Pos Inq	8x 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: Shutter Position
CAM Iris Pos Inq	8x 09 04 4B FF	y0 50 00 00 0p 0q FF	pq: Iris Position
CAM Gain Posi Inq	8x 09 04 4C FF	y0 50 00 00 0p 0q FF	pq: Gain Position
CAM_WDR Mode Inq	8x 09 04 3D FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_WDR Pos Inq	8x 09 04 D3 FF	y0 50 0p FF	p: WDR Position
CAM Aperture Inq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM Preset Exist Inq	8x 09 04 3F pp FF	y0 50 0q FF	pp: Memory number q: 1=preset exist 0=preset not saved
SYS Menu Mode Inq	8x 09 06 06 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM LR Reverse Inq	8x 09 04 61 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM Picture Flip Inq	8x 09 04 66 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ID Inq	8x 09 04 22 FF	y0 50 0p 0q 0r 0s FF	pqrs: Camera ID
CAM_DHCP Inq	8x 09 04 AE FF	y0 50 pp FF	
CAM_IP Inq	8x 09 04 AB FF	y0 50 0p 0p 0q 0q 0r 0r 0s 0s FF	
CAM_MASK Inq	8x 09 04 AC FF	y0 50 0p 0p 0q 0q 0r 0r 0s 0s FF	
CAM_GATEWAY Inq	8x 09 04 AD FF	y0 50 0p 0p 0q 0q 0r 0r 0s 0s FF	
CAM Version Inq	8x 09 00 02 FF	y0 50 ab cd mn pq rs tu vw FF	
Video System Inq (Factory)	8x 09 06 23 FF	y0 50 pp FF	pp: Video format
Video System Inq (Sony)	8x 09 04 24 72 FF	y0 50 0p FF	pp: Video format
IR Transfer	8x 09 06 1A FF	y0 50 02 FF	On
		y0 50 03 FF	Off
IR Receive	8x 09 06 08 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
Pan-tilt Max Speed Inq	8x 09 06 11 FF	y0 50 ww zz FF	ww: Pan Max Speed zz: Tilt Max Speed
Pan-tilt Pos Inq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	wwww: Pan Position zzzz: Tilt Position

Note:【means the camera address ;【y】=【x + 8】Visca Pan Tilt Absolute Value

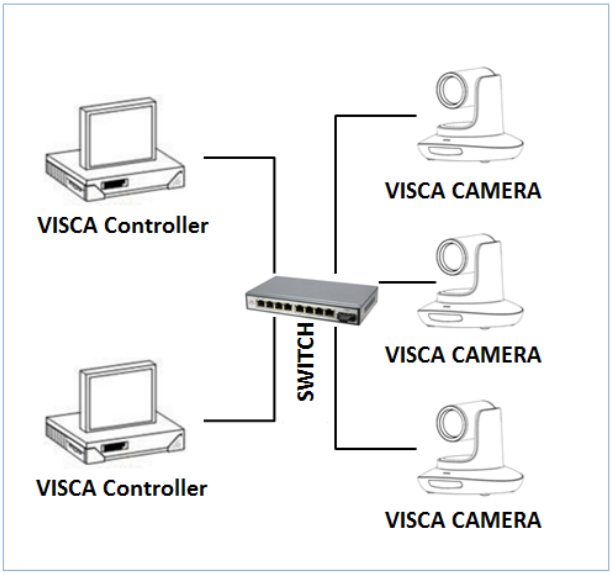
Pan Angle	VISCA Value	Tilt Angle	VISCA Value
-170	0xF670	-30	0xFE50
-135	0xF868	0	0x0000
-90	0xFAF0	30	0x01B0
-45	0xFD78	60	0x0360
0	0x0000	90	0x510
45	0x0288		
90	0x0510		
135	0x0798		
170	0x0990		

3.2.5 VISCA PAN TILT SPEED VALUE

Pan(Degree/Second)		Pan(Degree/Second))	
0	0.3	0	0.3
1	1	1	1
2	1.5	2	1.5
3	2.2	3	2.2
4	2.4	4	3.6
5	2.6	5	4.7
6	2.8	6	6
7	3.0	7	8
8	3.2	8	10
9	3.4	9	12
10	3.8	10	15
11	4.5	11	18
12	6	12	23
13	9	13	30
14	15	14	39
15	19	15	48
16	25	16	59
17	32	17	69
18	38	18	80
19	45		
20	58		
21	75		
22	88		
23	105		
24	120		

3.3 VISCA OVER IP

VISCA over IP means VISCA protocol transmit via IP, to reduce RS232/RS485 cable layout (the controller must support IP communication function).

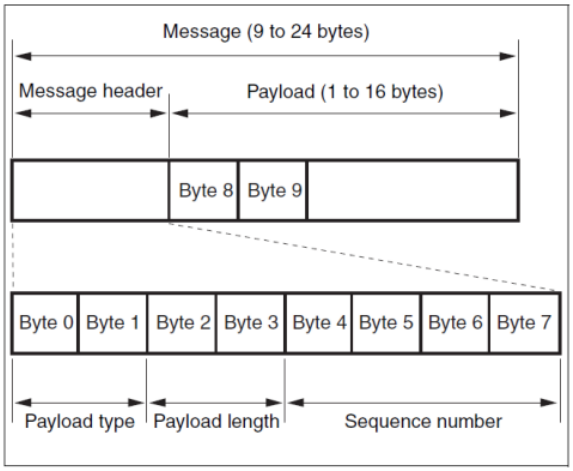


Communication port spec:

- Control port: RJ45 Gigabit LAN
- IP protocol: IPv4
- Transmit Protocol: UD
- IP address: set via web end or OSD menu
- Port address: 52381
- Confirm send/transmission control: depend on applied program
- Applied range: in the same segment, not suitable for bridge network
- Turn on camera: in the menu, set VISCA option to OVER IP

3.3.1 HOW TO USE VISCA OVER IP

VISCA Command - commands from controller to peripheral equipment, when peripheral equipment receives commands, then return ACK (acknowledgement). When commands are executed, will return complete message. For different commands, camera will return different message.



VISCA Inquiry - inquiry from controller to peripheral equipment when peripheral equipment receives this kind of command, it will return required message.

VISCA Reply - ACK (acknowledged), complete message, reply or error reply, it is sent from peripheral equipment to controller.

Command format: the following is message head and valid message format.

3.3.2 PAYLOAD TYPE

Name	Value (Byte 0)	Value (Byte1)	Value
VISCA command	0x01	0x00	Stores the VISCA command
VISCA inquiry	0x01	0x10	Stores the VISCA inquiry
VISCA reply	0x01	0x11	Stores the reply for the VISCA command and VISCA inquiry, or VISCA device setting command
VISCA device setting command	0x01	0x20	Stores the VISCA device setting command
Control command	0x02	0x00	Stores the control command
Control reply	0x02	0x01	Stores the reply for the control command

Payload length

Valid data length in Payload (1~16), is command length.

For example, when valid data length is 16 byte

Byte 2 : 0x00

Byte 3 : 0x10

Controller will save sequence number of each command, when one command sent the sequence number of the command will add 1, when the sequence number becomes the max value, it will change to 0 for next time. The peripheral equipment will save sequence number of each command and return the sequence number to the controller.

Payload

According to Payload type, the following data will be saved.

- VISCA command:
  Save VISCA command packet
- VISCA inquiry:
  Save VISCA message packet
- VISCA reply:
  Save VISCA return packet
- VISCA device setting command:
  Save VISCA equipment setting command packet.
- Control command:
  The following data is saved in control command payload
- Controlled reply
  The following data is saved in return command payload of control command.

Name	Value	Description
RESET	0x01	Resets the sequence number to 0. The value that was set as the sequence number is ignored
ERROR	0x0Fyy	yy=01:Abnormality in the sequence number
		yy=02:Abnormality in the message(message type)

Message	Value	Description
ACK	0x01	Reply for RESET

3.3.3 DELIVERY CONFIRMATION

VISCA over IP uses UDP as transmission communication protocol. UDP communication message transmission is not stable; it is necessary to confirm delivery and resend in application.

Generally, when controller sends a command to peripheral equipment, the controller will wait for the return message, then send the next command. It can detect and confirm if the peripheral equipment received the commands from return message's lag time. If controller shows it is overtime, it is regarded as error transmission.

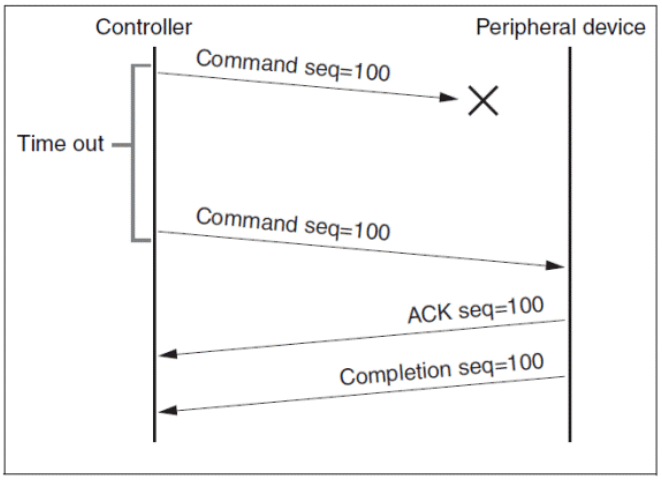
If controller shows it is overtime, resend the commands to check peripheral's status. Resent command sequence number is the same as last command, the following chart lists the received message and status after resending the commands.

Lost message	Received message for retransmission	Status after retransmission	Correspondence after retransmission
Command	ACK message	Command is performed by retransmission	Continue processing
Completion message for the command	ERROR (Abnormality in the sequence number)	Command has been performed If only the ACK message is lost, the completion message returns	If the result by the completion message is needed, retransmit by updating the sequence number
Completion message for the command	ERROR (Abnormality in the sequence number)	Command has been performed	If the result by the completion message is needed, retransmit by updating the sequence number
Inquiry	Reply message	Inquiry is performed by retransmission	Continue processing

Reply message for the inquiry	ERROR (Abnormality in the sequence number)	Inquiry has been performed	If the result by the reply message is needed, retransmit by updating the sequence number
Error message	Error message	Command is not performed. If the error cause eliminates, normal reply is return (ACK, reply message)	Eliminate the error cause. If normal reply returns, continue processing
Inquiry of the VISCA device setting command	Reply message of the VISCA device setting command	Inquiry has been performed by retransmission	Continue processing
Reply message of the VISCA device setting command	ERROR (Abnormality in the sequence number)	Inquiry has been performed	If the result by the reply message is needed, retransmit by updating the sequence number

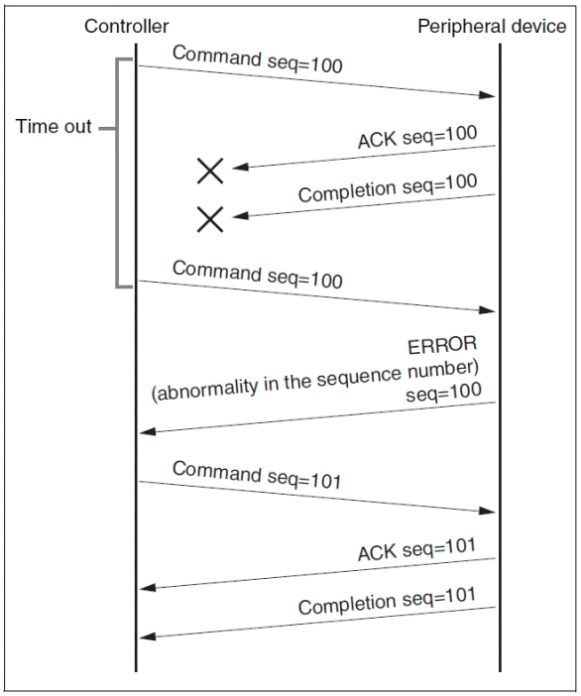
3.3.4 SEQUENCE CHART

Sequence chart when command lost



Note: Do not set IP address, sub net mask, gateway paramter in VISCA over IP command, otherwise it will cause network to break off. Due to change in these parameters, network will be in off status.

Sequence chart when returned message lost



3.4 PELCO

3.4.1 PELCO-D PROTOCOL COMMAND LIST

Function	Byte1	Byte2	Byte 3	Byte 4	Byte5	Byte6	Byte 7
Up	0xFF	Address	0x00	0x08	Pan Speed	Tilt Speed	SUM
Down	0xFF	Address	0x00	0x10	Pan Speed	Tilt Speed	SUM
Left	0xFF	Address	0x00	0x04	Pan Speed	Tilt Speed	SUM
Right	0xFF	Address	0x00	0x02	Pan Speed	Tilt Speed	SUM
Up left	0xFF	Address	0x00	0x0C	Pan Speed	Tilt Speed	SUM
Up right	0xFF	Address	0x00	0x0A	Pan Speed	Tilt Speed	SUM
Down Left	0xFF	Address	0x00	0x14	Pan Speed	Tilt Speed	SUM
Down Right	0xFF	Address	0x00	0x12	Pan Speed	Tilt Speed	SUM
Zoom In	0xFF	Address	0x00	0x20	0x00	0x00	SUM
Zoom Out	0xFF	Address	0x00	0x40	0x00	0x00	SUM
Focus Far	0xFF	Address	0x00	0x80	0x00	0x00	SUM
Focus Near	0xFF	Address	0x01	0x00	0x00	0x00	SUM
Set Preset	0xFF	Address	0x00	0x03	0x00	Preset ID	SUM
Stop	0xFF	Address	0x00	0x00	Pan Speed	Tilt Speed	SUM
Clear Preset	0Xff	Address	0x00	0x05	0x00	Preset ID	SUM
Call Preset	0Xff	Address	0x00	0x07	0x00	Preset ID	SUM
Query Pan Position	0Xff	Address	0x00	0x51	0x00	0x00	SUM
Query Pan Position Response	0Xff	Address	0x00	0x59	Value High Byte	Value Low Byte	SUM
Query Tilt Position	0Xff	Address	0x00	0x53	0x00	0x00	SUM
Query Tilt Position Response	0Xff	Address	0x00	0x5B	Value High Byte	Value Low Byte	SUM
Query Zoom Position	0Xff	Address	0x00	0x55	0x00	0x00	SUM
Query Zoom Position Response	0Xff	Address	0x00	0x5D	Value High Byte	Value Low Byte	SUM

3.4.2 PELCO-P COMMAND LIST

Function	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Up	0Xa0	Address	0x00	0x08	Pan Speed	Tilt Speed	0Xaf	XOR
Down	0Xa0	Address	0x00	0x10	Pan Speed	Tilt Speed	0Xaf	XOR
Left	0Xa0	Address	0x00	0x04	Pan Speed	Tilt Speed	0Xaf	XOR
Right	0Xa0	Address	0x00	0x02	Pan Speed	Tilt Speed	0Xaf	XOR
Up left	0Xa0	Address	0x00	0x0C	Pan Speed	Tilt Speed	0Xaf	XOR
Up right	0Xa0	Address	0x00	0x0A	Pan Speed	Tilt Speed	0Xaf	XOR
Down Left	0Xa0	Address	0x00	0x14	Pan Speed	Tilt Speed	0Xaf	XOR
Down Right	0Xa0	Address	0x00	0x12	Pan Speed	Tilt Speed	0Xaf	XOR
Zoom In	0Xa0	Address	0x00	0x20	0x00	0x00	0Xaf	XOR
Zoom Out	0Xa0	Address	0x00	0x40	0x00	0x00	0Xaf	XOR
Focus Far	0Xa0	Address	0x00	0x80	0x00	0x00	0Xaf	XOR
Focus Near	0Xa0	Address	0x01	0x00	0x00	0x00	0Xaf	XOR
Stop	0Xa0	Address	0x00	0x00	Pan Speed	Tilt Speed	0Xaf	XOR
Set Preset	0xA0	Address	0x00	0x03	0x00	Preset ID	0xAF	XOR
Clear Preset	0xA0	Address	0x00	0x05	0x00	Preset ID	0xAF	XOR
Call Preset	0xA0	Address	0x00	0x07	0x00	Preset ID	0xAF	XOR
Query Pan Position	0xA0	Address	0x00	0x51	0x00	0x00	0xAF	XOR
Query Pan Position Response	0xA0	Address	0x00	0x59	Value High Byte	Value Low Byte	0xAF	XOR
Query Tilt Position	0xA0	Address	0x00	0x53	0x00	0x00	0xAF	XOR
Query Tilt Position Response	0xA0	Address	0x00	0x5B	Value High Byte	Value Low Byte	0xAF	XOR
Query Zoom Position	0xA0	Address	0x00	0x55	0x00	0x00	0xAF	XOR
Query Zoom Position Response	0xA0	Address	0x00	0x5D	Value High Byte	Value Low Byte	0xAF	XOR

Section 4 ABOUT NDI

NDI is much more than simply 'video over IP'. As you begin using it, you'll increasingly discover its many advantages. Soon you'll realize you never want to go back to simple 'point A to point B' methods of video transport. This section provides a brief overview of NDI and the power it delivers to unleash your creativity and provide newfound production efficiency.

We live in a world in which virtually every computer system in the world is potentially connected to every other. Likewise, our countless mobile devices are connected too. These devices have high quality screens, fast processors, and cameras. It is no surprise, then, that efficient, economical, non-linear video transfer in IP space is augmenting and even superseding traditional linear connection methods (SDI, HDMI, etc.) and systems.

NDI (Network Device Interface) makes it easy to share high-quality video over a local Ethernet network. However, the NDI vision is vastly more exciting than any mere 'cable upgrade'. Production systems using IP to integrate data, video, and audio are transforming live video production in ways that would have seemed miraculous just a few years ago. You can think of NDI as turning your network into a 'video internet'.

4.1 A 'VIDEO INTERNET'

Like a webpage, each NDI source is instantly available to many viewers and devices. Wherever your network extends – throughout your office, broadcast studio, hospital, campus (etc.) – NDI is ready for immediate display, capture, replay, production, and more. NDI operates bi-directionally over a local area network, and supports many ultra-low latency, ultra-high quality video streams on shared connections. It is resolution and framerate independent, and natively supports tally, metadata, access management, and more.

NDI's superb performance over standard 1Gbit/s networks makes it possible to transition facilities to an incredibly versatile IP video production pipeline without negating existing investments in SDI infrastructure, or costly new high-speed network installations. NDI|HX is a high-efficiency NDI mode expressly designed to facilitate Wi-Fi and long distance connections.

4.2 NDI BENEFITS

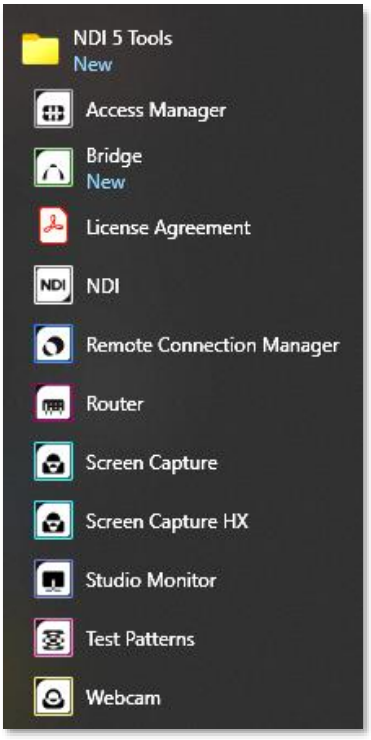
The NDI concept is simple: You supply a video source – in this case, an NDI stream from your Vizrt PTZ3 camera. At that point, anyone else on that network can see it and work with it just as if it were locally connected to their system (unless you deliberately limit access).

In this new world of IP video, you hardly need to think about capture cards, SDI, HDMI connections, a/v formats, etc. You also enjoy freedom from dependency on distribution amps, video matrix routers, and the like. There are many hundreds of software and hardware systems with native NDI input and output support – both commercial and open source. Now you can supply your video to these without running bulky cables over long distances.

More than simply replacing a cable, though, NDI enables multiple applications to access the same sources at the same time. For example, you might simultaneously send high-quality, low latency video to your video mixer system, while also streaming it and capturing it elsewhere on your network.

For a deeper introduction to the world of NDI, download and install the free NDI Tools from ndi.video.

4.3 NDI WEBCAM

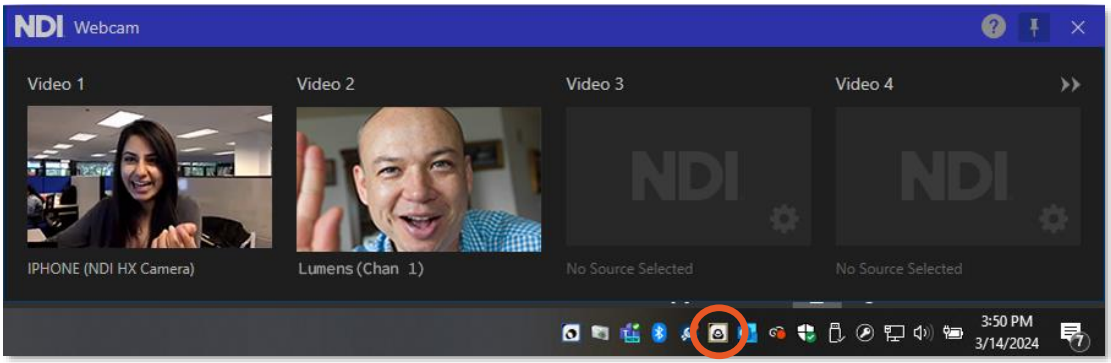


If you installed the NDI|HX driver for Windows, you were given the opportunity to install NDI *Webcam* at the same time. This is an especially useful application that allows you to make a designated NDI source available on the local network as a proxy 'webcam'.

In turn, this means that you can quickly and flexibly assign NDI sources from your network to supply video to applications like Zoom, Skype, Microsoft Teams, Google + Hangouts, GoToMeeting, and many more.

When running, NDI *Webcam* adds a small icon to the Windows task tray, and the first time Webcam is opened, click the notification to launch NDI Tools Help for Webcam Input.

Configuring (and using) Webcam Input is quite easy:

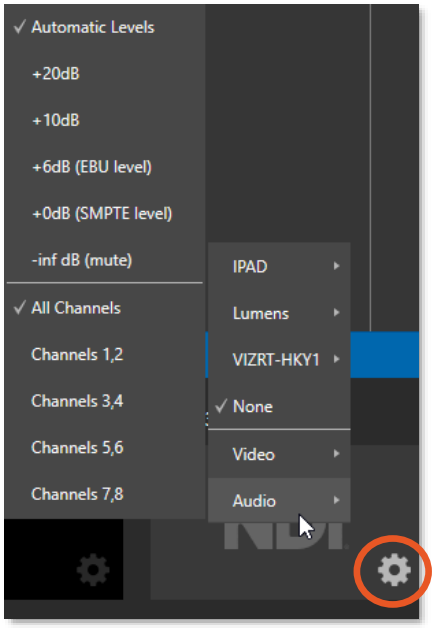


- Simply click the NDI Webcam icon in your system tray expand your options. By default, NDI Webcam will convert one NDI stream as a Webcam, but you can add more by clicking the arrows at the top right corner giving you four NDI sources to choose from your network.

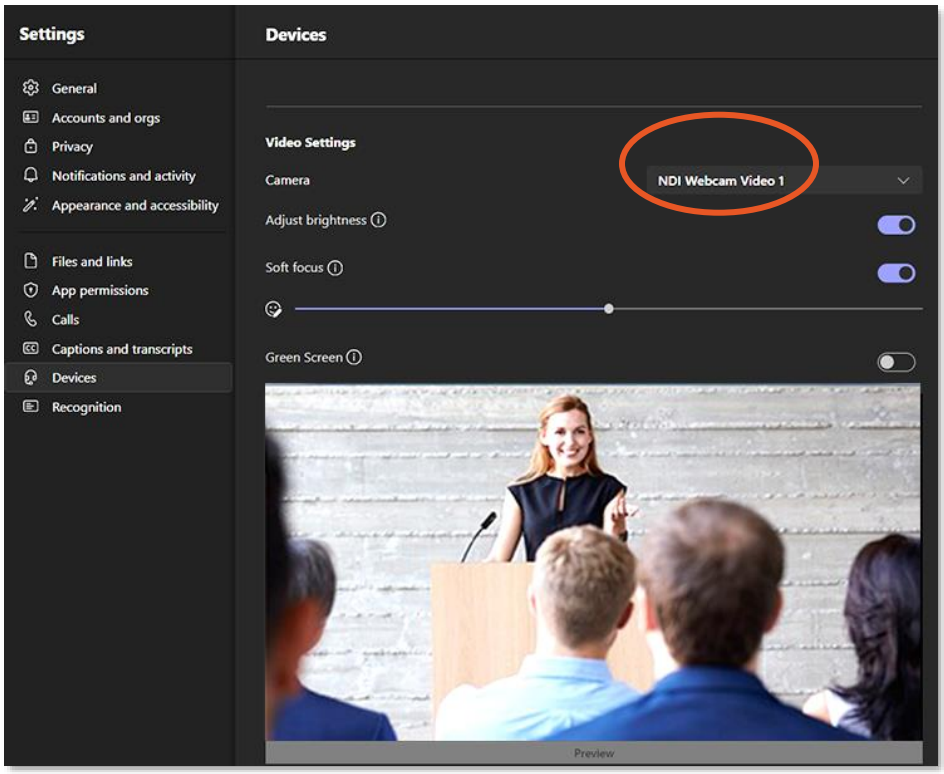
- To select an NDI source to use, click the gear icon. Under the input you wish to use. This will bring up a menu allowing you to choose any NDI video/audio signal on your network.

- The Settings menu item allows you to mute or adjust audio levels, determine which Channels you wish to send via NDI Webcam or select a Low Bandwidth mode, as you might do to make optimal use of your network when a lower resolution image will suffice.

Hint: Click on the Open Help icon located on the top right of the NDI Webcam sources, here you will find step by step instructions.



.



Once you have selected your sources, simply navigate to a conferencing application (we are using Microsoft Teams in this example). In the settings menu click on Devices, under Video settings you can now select one of the NDI Channels you wish to use. You can route the matching audio with that channel, or mix & match in the Microphone settings.

APPENDIX A: FEATURES

Features*	NewTek PTZ3	NewTek PTZ3 UHD	Vizrt PTZ3 PLUS	Vizrt PTZ3 UHD PLUS
FreeD-over-NDI|HX Support	Yes	Yes	Yes	Yes
USB Video Support	Yes	Yes	Yes	Yes
Presenter Tracking AI	No	No	Yes	Yes
Target Timeout	No	No	Yes	Yes
Presenter Target Scaling	No	No	Yes	Yes
Presenter Target Switching	No	No	Yes	Yes
Blackboard Detect	No	No	Yes	Yes
Phantom Power to Mini XLR	No	No	Yes	Yes

*Available with firmware update in selected models

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