



Complete Manual for the

# **IntelliSHOT**

Auto-Tracking Camera

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## Overview

This guide covers:

IntelliSHOT® auto-tracking camera:

- North America – 999-21100-000 (black); 999-21100-000W (white)
- Europe and UK – 999-21100-001 (black); 999-21100-001W (white)
- Australia and New Zealand – 999-21100-009 (black); 999-21100-009W (white)



## What's in this Guide

This guide covers

- Physical features
- Installation
- Initial set-up and system administration
- Performance/behavior configuration
- System maintenance
- Operation
- Telnet API reference
- Troubleshooting

For your convenience, the information you need to install this product is also available in the smaller, stand-alone **Installation Guide for the IntelliSHOT Auto-Tracking Camera**.

## Features

- Integrated camera and audio system, ideal for small to medium conference rooms
- IntelliFrame™ intelligent framing algorithm keeps participants in view reliably, without facial recognition
- 30x zoom, horizontal field of view of 70.2°
- Simultaneous HDMI, uncompressed USB 3.0 and H.264 IP streaming (RTSP or RTMP)
- Up to 1080p/30 video; up to 1080p/60 on HDMI output
- Integrated phased microphone array
- Audio line in and line out
- Universal Video Class (UVC) and Universal Audio Class (UAC) drivers supported in Windows®, macOS®, and Linux operating systems, compatible with most UC conferencing applications
- Integration-ready Telnet control
- Full administrative control via web interface; manage the camera remotely while monitoring the stream separately
- Presenter-friendly RF remote control

## A Quick Look at the Camera

This section covers the physical features of the camera.

### Front of the Camera

The camera is available in black or white.



**Camera and zoom lens** – Up to 30x zoom.

**Integrated microphone** – No external microphone needed in typical installations. Echo-canceling microphone picks up the voices of participants up to 10 ft. (3 m) away.

**Status lights** – The illuminated trim detail on the camera's face indicates the camera's current state. The status lights can be turned off in the administrative web interface.

**Pivoting head** – Manually tilt the head as needed.

**Note**

*By default, the camera's status lights are active during normal operation; however, they can be configured to remain off when the camera is powered up. The camera may be sending video even if the lights are off.*

## Connector Panel

The connectors are on the underside of the camera.



**PoE+** – RJ-45 connector. Connect to the network and to power via the Power and Data Out port of the mid-span PoE+ power injector. Provides power and network access for IP streaming and camera control via web interface or Telnet.

**USB 3.0** – USB Type B connector. Connect to a computer for use with soft conferencing applications. Provides uncompressed USB 3.0 stream.

**HDMI output** – HDMI video and audio output connector.

**IP button** – Press to display the camera's IP address on video outputs.

**Audio input** – Line level balanced audio for an external microphone or other audio source.

**Audio output** – Line level balanced audio output to amplified speaker or other audio infrastructure.



## Installation

This section covers:

- Selecting the location for the camera
- Verifying that the camera is ready to install
- Installing the mount
- Connection diagrams
- Mounting the camera

And a required safety note here:

### Note

*PoE type networks connected to this equipment are for intra-building use only and should not be connected to lines that run outside of the building in which this product is located.*

## Don't Void Your Warranty!

### Caution

*This product is for indoor use. Do not install it outdoors or in a humid environment without the appropriate protective enclosure. Do not allow it to come into contact with any liquid.*

*Do not install or operate this product if it has been dropped, damaged, or exposed to liquids. If any of these things happen, return it to Vaddio for safety and functional testing.*

## Before You Install the Camera

Prepare for a successful installation:

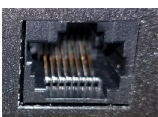
- Consider camera viewing angles, lighting conditions, line-of-sight obstructions, and in-wall obstructions where the camera is to be mounted.
- Ensure that the camera points away from the ceiling and lights. The camera will not perform well if it is pointed toward a light source such as a light fixture or window.
- Mounting the camera at eye level is best. If this is not feasible, mounting the camera above eye level typically produces a better experience than mounting it below eye level.
- If you make cables for this installation, check them for continuity.
- Be sure you can identify all cables correctly.
- Talk to the network administrator. If installing the camera in a non-DHCP network (one that does not automatically assign IP addresses), you will need to configure the camera with a static IP address as directed by the network administrator.

## Cabling Notes

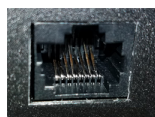
Use Cat-5e or better cable. Use shielded cabling if the cables will be coiled, run tightly with other cables, or routed near sources of electromagnetic interference such as power lines or fluorescent light fixtures. We recommend using high-quality connectors and a high-quality crimping tool.

### Caution

*Do not use pass-through RJ-45 connectors when making cables for this product. Poorly crimped connectors of this type can cause intermittent connections and degraded signal quality. They can also damage the connectors on the product, which will void your warranty.*



**Intact** – will make reliable contact with cable connector

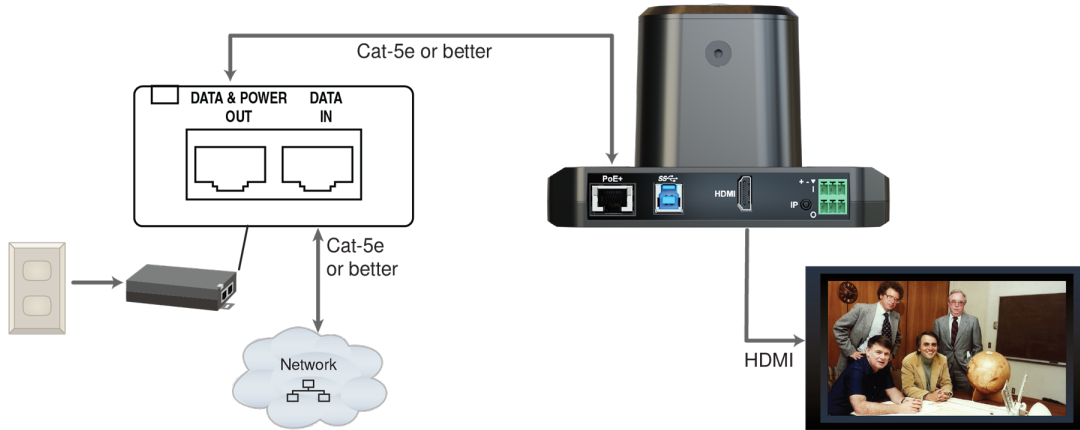


**Damaged** – Bent contact fingers will NOT make reliable contact with cable connector

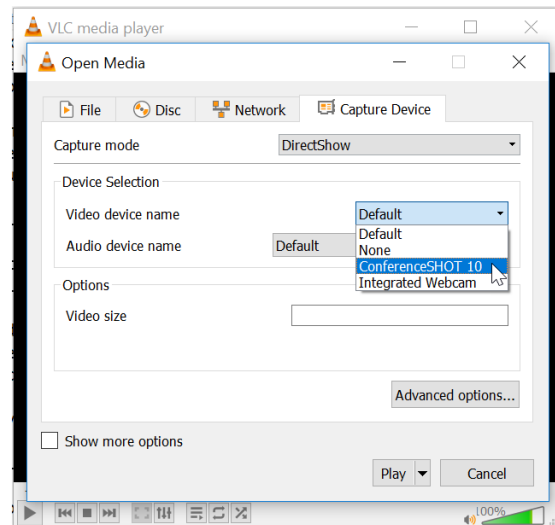
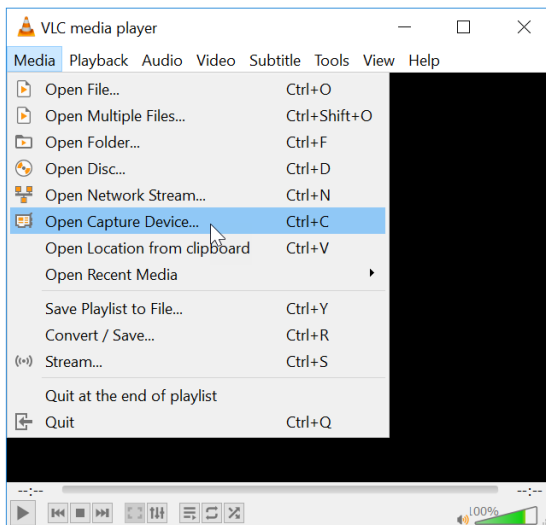
## Pre-Installation Functional Check

If you're installing the camera where it's hard to reach, you may want to verify functionality before you install it.

1. Connect the camera in its minimum functional configuration.



2. Connect power. The camera's status light turns white. If an HDMI display is connected, video is available.
3. *If not using an HDMI display:* Connect the camera's USB port to your computer, then open a media player and verify that you can select the camera as the USB video capture device. These screen shots show how to access a camera's USB stream using VLC Media Player. *In this example, the capture device is a different camera.*



If the camera turns on and sends video, continue with the installation.

## Getting the Camera's IP Address

You will need the camera's IP address if you do not use the Vaddio Device Controller or Vaddio Deployment Tool to access its web interface.

Briefly press the IP button on the connector panel. This displays the camera's IP address and MAC address on the video outputs. Press the button again to dismiss the information.

## If the Camera Is At 169.254.1.1

This is the camera's default IP address. This means one of these things:

- The camera's PoE+ power injector is not connected to the network,  
OR
- The network does not automatically assign IP addresses.

If the camera does not receive an IP address when connected to the network, you will need to configure the camera for the network after you have done the initial device set-up.

To communicate directly with the camera for initial device set-up and network configuration, you will need to connect a cable from your computer's network port to the DATA IN port on the PoE+ power injector.

## Status Lights

The lights in the camera's head indicate its current state.

- Purple – Initializing
- White – Active
- Red – Audio is muted
- Blinking red – Video is muted
- Yellow – Firmware update is in progress
- Blinking cyan – Remote pairing mode
- Blinking blue – Pairing error

### **Caution**

*Do not remove power or reset the camera while the status lights are yellow, showing a firmware update in progress. Interrupting a firmware update can make the camera unusable.*

### **Note**

*By default, the camera's status lights are active during normal operation; however, they can be configured to remain off when the camera is powered up. The camera may be sending video even if the lights are off.*

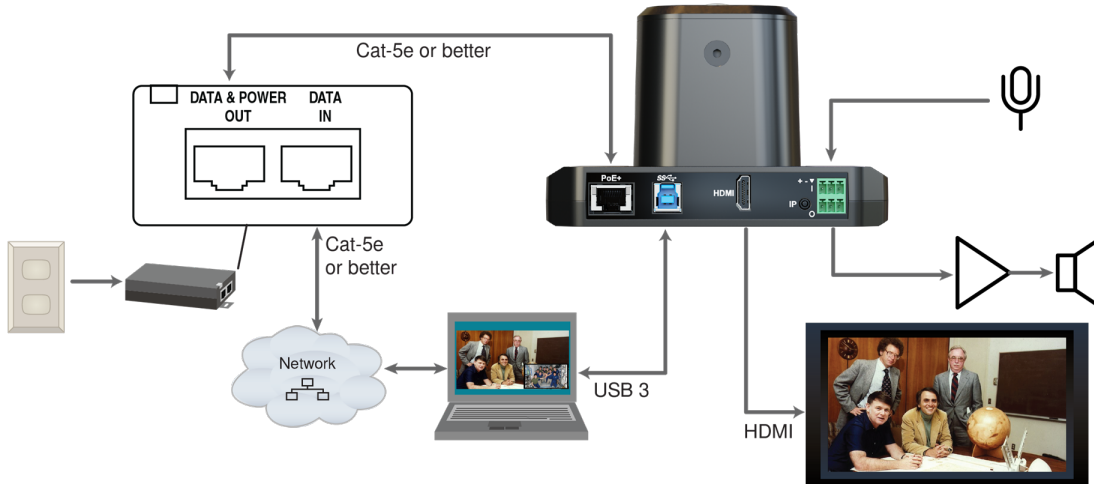
## Installing the Wall Mount

The camera is shipped with a wall mount. Other mounting options are available as well. Contact us if you don't have the camera mount you need.

You can install the camera wall mount to a display mount or directly to drywall. If you mount it to drywall, use wall anchors.

## Basic Connections

Here is an example of how the camera might be set up in a medium-size conference room. In this setup, a PC uses a unified communications conferencing application to manage the camera and connected microphones and speaker.



### Pro Tip

Label all cables at both ends.

## Installing the Camera and Connecting Power

### Caution

Check your cables. Connecting a cable to the wrong port or using the wrong pin-out can result in equipment damage and will void the warranty.

1. Connect all required cables to the camera.
2. Slide the camera into the mount.
3. Secure the cable cover to the mount.
4. Connect the mid-span power injector to mains power.



## About Inverted Installation

If you use an inverted mount, you will need to select the camera's Image Flip setting when configuring behavior and performance. Image Flip orients the video image correctly and sets the camera to respond appropriately to tilt commands. See [Additional Camera Settings](#) for more information.

## Initial Device Set-Up

Vaddio cameras have a web interface for initial device set-up, administrative control, and operation.

When any Vaddio product is shipped from the factory, the admin password is not set and the administrative controls are not available. You will need to access the web interface and set the admin password. Then you will be able to access to the system administration tasks to define how the device behaves as an element of your network. **This is also true after restoring factory defaults.**

Because this process is the same for all Vaddio cameras, screen shots in this section may show different products.

## Browser Support

We have tested this product with these web browsers:

- Chrome®
- Firefox®
- Microsoft® Edge and Internet Explorer®
- Safari®

We test using the browser version available from the vendor at that time. Other browsers (including older versions of the ones on this list) are likely to work also.

## Initial Device Set-up Process Overview

The details of initial device set-up and system administration differ somewhat, depending on which method you use.

- **Access the web interface from a Vaddio Device Controller** – The touch-panel automatically scans the subnet to locate Vaddio devices. Select the desired device and exit to the device's web interface to complete the initial device set-up.
- **Locate and set up the camera using the Vaddio Deployment Tool** – Available as a free download at <https://info.legrandav.com/VaddioDeploymentTool>. The tool scans the network for Vaddio devices, identifies all devices that are not set up, provides the controls to complete the initial device set-up, and provides links to each device's web interface.
- **Access the web interface directly** – The classic method. Discover the camera's IP address and browse to its web interface.

## Initial Device Set-Up Using the Vaddio Device Controller

The Vaddio Device Controller is a stand-alone tablet for working with Vaddio products.

**To complete the initial device set-up with the Vaddio Device Controller:**

1. Connect the touch-panel to the network on the same subnet as the products you need to work with – for example, connect both to the same PoE+ switch.
2. Go to the touch-panel's Configuration page (gear icon) and select Scan.
3. Locate the device you need to work with, and select Use.

If the Vaddio Device Controller does not find the camera, verify that the Vaddio Device Controller and camera are connected to the same subnet.

4. Select Exit to leave the Configuration page and open the device's web interface.

**Note**

*The first time you access a device at a specific IP address, the Vaddio Device Controller's screen may remain blank for 20 seconds or more.*

5. Set the admin password.

## Initial Device Set-Up Using the Vaddio Deployment Tool

The Vaddio Deployment Tool provides an option to do the initial device set-up for unprovisioned devices, and provides a shortcut to each device's web interface for system administration. This tool is available as a free download at <https://info.legrandav.com/VaddioDeploymentTool>.

### Note

Be sure you have the current version of the Vaddio Deployment Tool. If it notifies you that an update is available, install the update. This ensures that you have access to the full capabilities of the tool. Old versions may not recognize the newest products.

### To complete the initial device set-up with the Vaddio Deployment Tool:

1. Power up the camera and other devices if you have not done so already.
2. On the Find Devices page, select Scan. If the scan does not locate the devices you need to set up, your computer may be on a different subnet. Return to the Find Devices page and set up an advanced scan to search the appropriate portion of the network.
3. In the list of equipment that the scan discovers, locate the devices marked Not Set Up.

Vaddio Deployment Tool

File Edit View Window Help

vaddio

Finding Devices

Done 100%

Scanned: 256 Found: 2 IP Address Range(s): 192.168.0.\* 192.168.0.\*

Search

Name	Connection	Location	IP / Hostname	Firmware	Status
RoboSHOT 12E HDBT Camera		Luxor Luxor	192.168.0.101 vaddio-roboshot-hdbt-80-1F-12-48-82-EB	3.2.1	
ConferenceSHOT AV Camera			192.168.0.102	1.5.0	Not set up

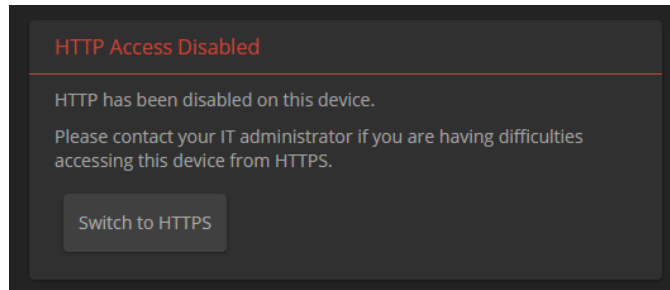
4. For each device that you need to work with, select Not Set Up and set the admin password. You can now access the administrative web interface for system administration and other configuration tasks.

## Manual Access and Initial Device Set-Up

If you do not use a Vaddio Device Controller or the Vaddio Deployment Tool, you will need to complete the initial device set-up manually, by browsing to the device's web interface using its IP address. See [Getting the Camera's IP Address](#).

### Initial Access to the Web Interface

HTTP access is disabled initially. Enter the camera's IP address in your browser's address bar using `https://` as a prefix. (Example: `https://10.30.200.125`) When you access the web interface without using the `https://` prefix, the browser may treat it as a search query, or you may encounter this message:



Switch to HTTPS if you see this message.

***Expect a security warning from your browser the first time you access the device's web interface.***

Different browsers will respond with different messages and options. Your browser will probably present a message indicating one of these things:

- The connection is not private
- The site is not secure
- The site is not trusted
- The site poses a security threat

This is because the certificate (the product's website security credential) is self-signed, not issued by an external certificate authority. *Your HTTPS connection is secure and traffic is encrypted.*

**You will need to make the selections that your browser's security message discourages.**

Depending on the browser, the warning presents an option to learn more, view details, or go to the "Advanced" page. When you select this, your browser provides an explanation and a button or link to continue to the IP address you entered, with a reminder that it may be unsafe. Select the option to continue. *Your HTTPS connection is safe.*

After you have accessed the product's web interface once, your browser may remember its IP address and not present the security message again.

### Completing the Initial Device Set-up

Set the admin password and complete any other required tasks, such as accepting agreements. The full administrative interface opens when you finish.

#### **Note**

*This page includes a link to the company's standard privacy policy. This product does not record or save audio or video files, and it does not store any identifying information other than what you may choose to enter on the Room Labels page of the web interface. However, the device's IP address is considered "personally identifiable information" for the purposes of the privacy policy.*

## System Administration

This chapter covers settings for managing the camera as an element of your network.

- Security – Passwords, guest access, other IT security-related settings
- Network configuration
- Time settings

See [Configuring Camera Behavior](#) for information on image adjustments, streaming configuration, and other items related to camera behavior.

### Note

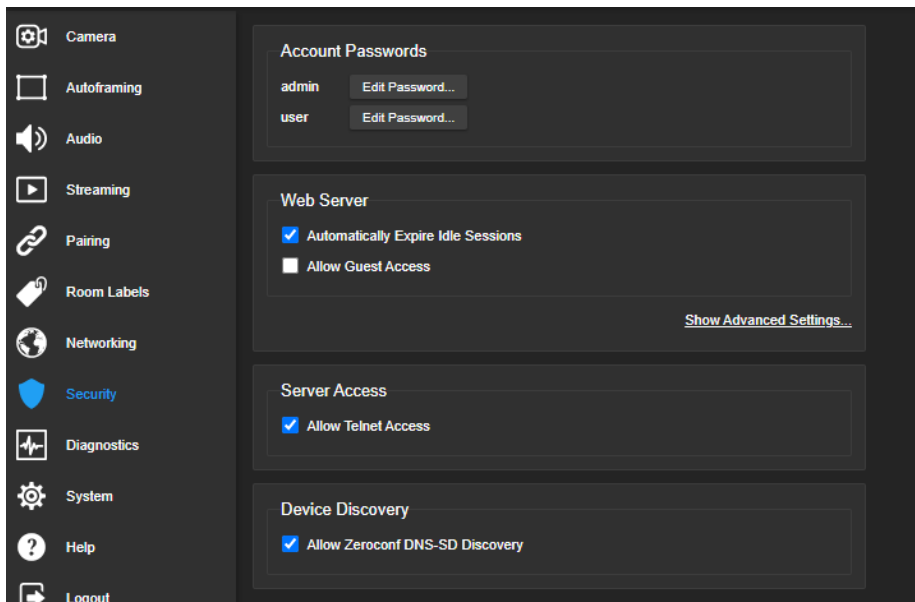
*Vaddio products are designed with very similar web interfaces. The screen shots in this manual may look slightly different from your camera's web interface. Some may be from other cameras.*

## Configuring Access and Other Security Settings

### SECURITY PAGE

The Account Passwords and Web Server areas of the Security page provide basic security for the web interface:

- **Admin password** – Required. The web interface is unavailable if no admin password is set.
- **User password** – Password-protected access to the operator's page of the web interface.
- **Allow Guest Access** – Allow access the operator's page without a password. Disabled by default.
- **Automatically Expire Idle Sessions** – Automatically logs you out after 30 minutes of inactivity.



Other security settings include:

- **Allow Telnet Access** – disabled by default.
- **Allow Zeroconf DNS-SD discovery** – allowed by default.
- Advanced Settings – **Enable HTTP access** (disabled by default) and **Manage SSL Certificate**.

### Note

*Consult your network security specialist before changing any of these settings. Seek explicit guidance concerning the SSL certificate.*



## Configuring the Camera for Your Network

By default, the camera is set to DHCP, and will receive an IP address automatically if your network assigns IP addresses. Work with your network specialist to ensure that the camera is configured to comply with the organization's network policies.

### Caution

*Consult your IT department before changing network settings. Errors in network configuration can make the camera inaccessible from the network.*

### Note

*When you change the camera's hostname, IP address, or other network information, you will need to log in to the web interface again. This does not happen if the only change you make is from DHCP to static addressing or vice-versa.*

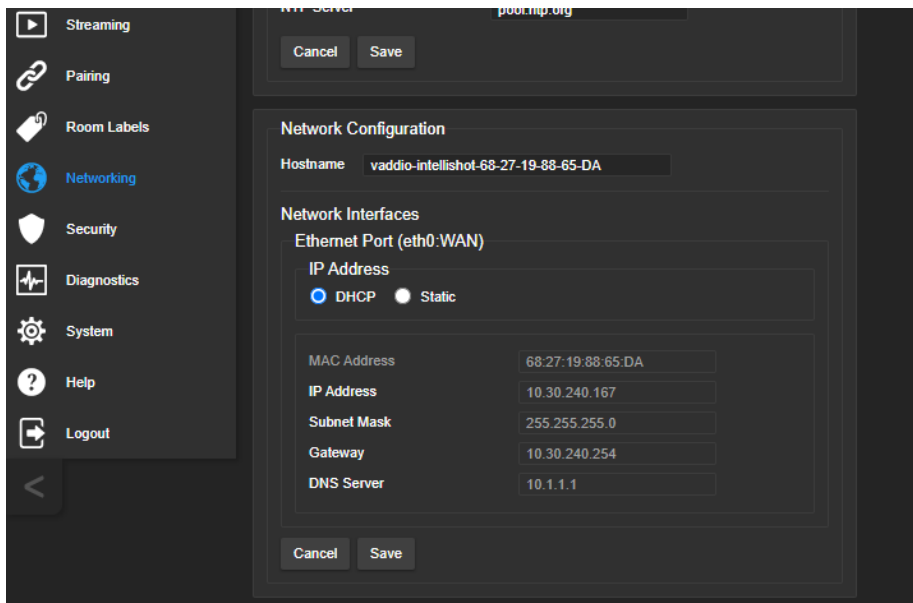
## Configuring the Device with a Static IP Address

### NETWORKING PAGE

If no DHCP server is available to automatically assign an IP address, the camera uses its default IP address (169.254.1.1). If you install more than one camera or other device on this network, you must follow this procedure to prevent IP address conflicts.

#### If the camera is currently at 169.254.1.1:

1. Work with your IT department's network specialist to determine the correct network settings.
2. Connect your computer's network port to the camera's network port.
3. Set IP Address to Static. Then enter the IP address, subnet mask, and gateway. DNS Server is optional; ask the network specialist.



#### If the camera is currently at an IP address other than 169.254.1.1:

Work with your IT department to determine whether the device's current IP address is suitable.

If it is, you only need to set the IP Address to Static.

If not, set IP Address to Static and enter the IP address, subnet mask, and gateway as directed. Again, DNS Server is optional; ask the network specialist.

## Changing the Camera's Hostname

### NETWORKING PAGE

If your network supports hostname resolution, you can browse to the camera using its hostname. Giving it a simple, easy-to-remember hostname means you don't need to know its IP address. Work with your IT department to ensure that the new hostname conforms to the organization's naming conventions.

#### Note

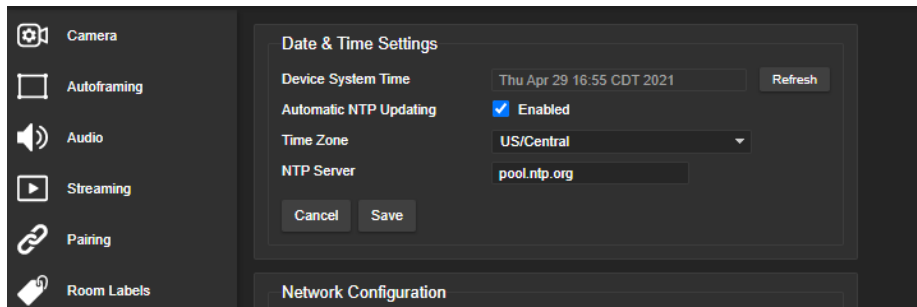
You may need to log in to the web interface again after changing the hostname.

## Specifying Time Zone and NTP Server

### NETWORKING PAGE

Using automatic NTP updating ensures that the timestamps in the camera's diagnostic log are accurate. Specifying your time zone may make it easier to match logged events with other actions and external events.

1. To make the time zone and NTP server editable, enable Automatic NTP Updating.
2. If you are not sure what to use for NTP Server, use the default.
3. Select the desired time zone from the list.

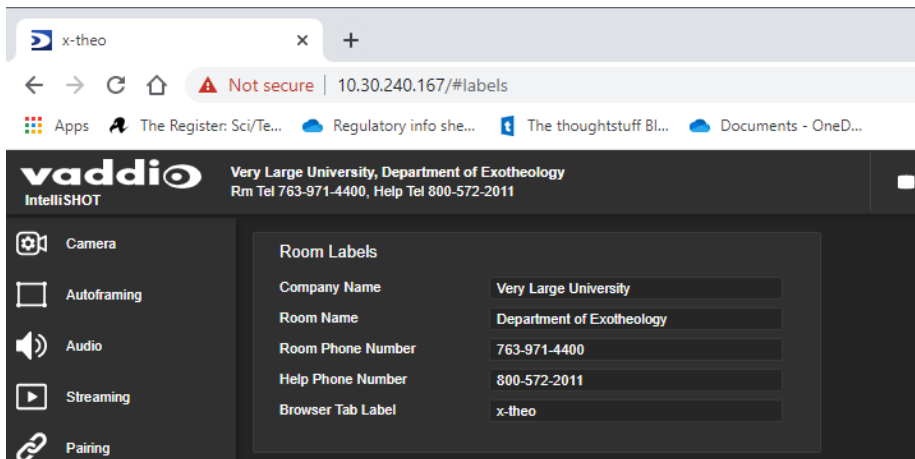


You may need to refresh the system time display.

## Adding Room Information to the Camera's Web Interface

### ROOM LABELS PAGE

The information you enter on this page is displayed on every page of the web interface. In a multi-camera environment, you may also wish to specify what appears on the browser tab.



## Configuring Camera Behavior

This chapter covers settings for defining how the camera performs in your environment:

- Autoframing adjustments
- Streaming
- Manual-mode settings and adjustments – presets, color and lighting, speed, focus
- Audio adjustments
- Other camera settings

### Fine-Tuning Autoframing Behavior

The Autoframing feature can be tuned to your specific installation. This includes defining areas where the camera does not evaluate motion (masking), adjusting the tracking area, speed, sensitivity, and responsiveness.

#### How It Works: Digital Pan/Tilt/Zoom

Optical Zoom and Electronic Zoom are the names of two Autoframing adjustments, in addition to being simple terms for the two ways that a camera can zoom. This section talks about how zooming works.

The lenses in a camera control how much of the room can be in the shot – the image area. Zooming in optically makes the image area smaller by moving the lenses. Zooming in digitally makes the image area smaller by using the pixels from a smaller portion of the image sensor. Either way, the effect is the same: When the image area is smaller, everything in the shot looks bigger.

Digital pan and tilt work when the camera is zoomed in. If some image area is available outside the shot, the camera can pan and tilt by moving the image area to use pixels outside the current shot. As the camera zooms in, the image area is a smaller part of the total field, so more pan and tilt is available. But if the current shot uses all the pixels, there's no room to pan or tilt.

The unmasked portion in each frame of the diagram represents the zoomed image while the camera pans from the Mars globe to Dr. Sagan.



## How It Works: Autoframing

Autoframing is based on motion detection. It won't mistake pictures for people, it still works if you turn away from the camera, and you don't have to wear a special device. But with no special device to follow, Autoframing does not necessarily keep the shot on its original subject.

Autoframing pans and tilts to center the source of motion, so the image is almost always zoomed in at least slightly.

- Autoframing is enabled by default.
- The camera tries to keep the frame centered on the source of motion.
- If the motion is small, the camera zooms in.
- When the camera does not detect any motion, by default it zooms out. This behavior is configurable.
- If the motion is near the edge of the field of view, it can't be centered in the frame.
- If the motion is mostly outside the field of view, the camera can only detect the small part of the motion within its field of view.

In this diagram, the unmasked area represents the tracking area. The area of motion is large (which limits the zoom) and the two people on the left are near the edge of the total field of view, so the camera cannot pan far enough to center the people in the frame.



## Basic Autoframing Adjustments

### AUTOFRAMING PAGE

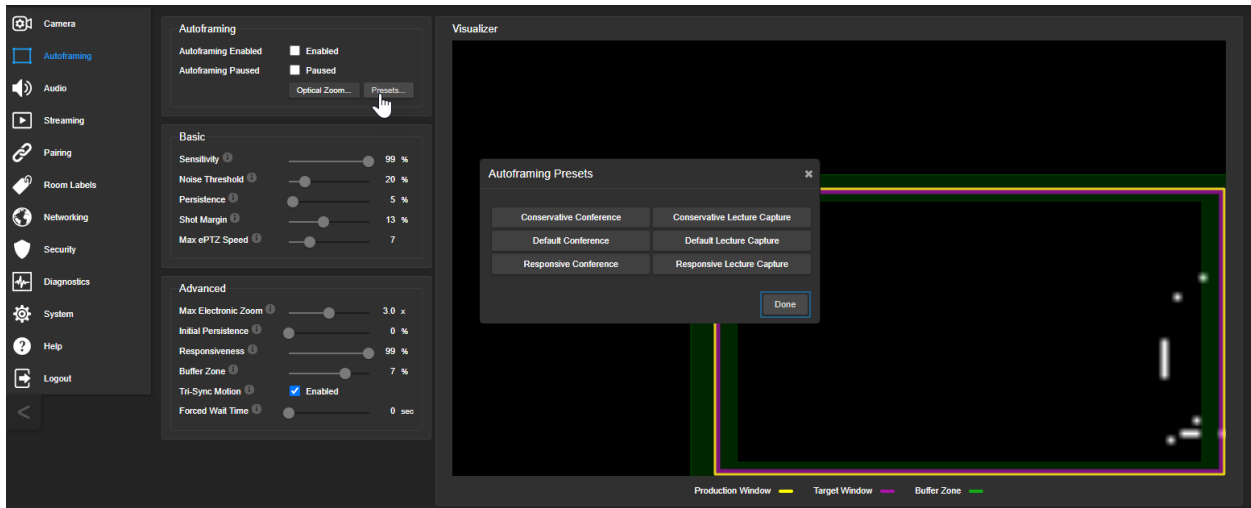
When making adjustments, compare the Visualizer's image to the video output.

**Optical Zoom** – Sets the area in which motion can be tracked. Adjust this first.

**Autoframing Presets** – Factory configurations. "Conservative" settings are less sensitive and track at lower speeds than "responsive" settings. Select the one closest to the room's requirements, then make other adjustments if needed.

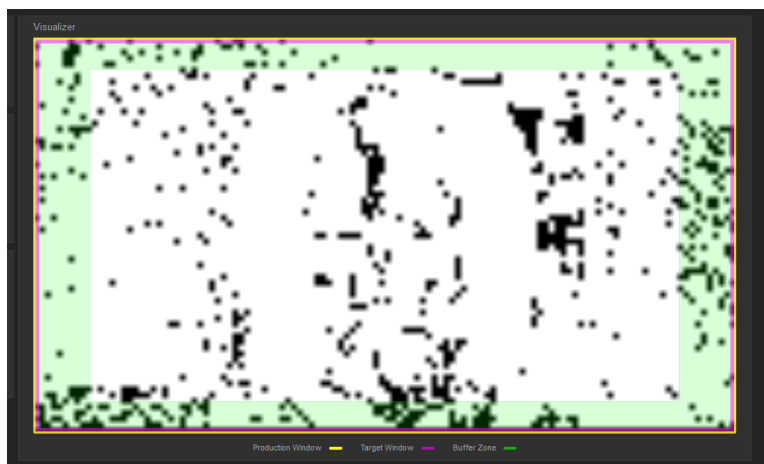
### Note

*In many cases, the camera delivers good Autoframing performance with no adjustments beyond setting the optical zoom and selecting the appropriate Autoframing preset.*



**Sensitivity** – How quickly the camera responds to new motion. High sensitivity may respond to brief, unwanted motion, such as people walking past an open door. Typically 70% to 90% for conferencing, 95% or higher for lecture capture.

**Noise Threshold** – The minimum change recognized as motion. Default value is 20%. If Noise Threshold is high, the Visualizer shows less movement data (white dots). If Noise Threshold is too low, the Visualizer shows pixel changes that are not motion, such as camera noise and small changes in lighting.



**Persistence** – How long the camera remembers motion and stays on its source after other trackable motion starts. Typically 25% to 100% for conferencing, below 15% for lecture capture.

**Shot Margin** – Controls how tight or wide the shot will be around the people in the camera's field of view. A high value will result in a wider shot and a low value results in a tighter shot around the person or group of people. Default value is 7% for conferencing and 13% for lecture capture.

**Max ePTZ Speed** – The maximum speed for pan, tilt, and zoom while tracking. Low speed may lose fast-moving motion sources. High speed may seem jumpy. Typically 5 to 6 for conferencing, 12 to 18 for lecture capture.

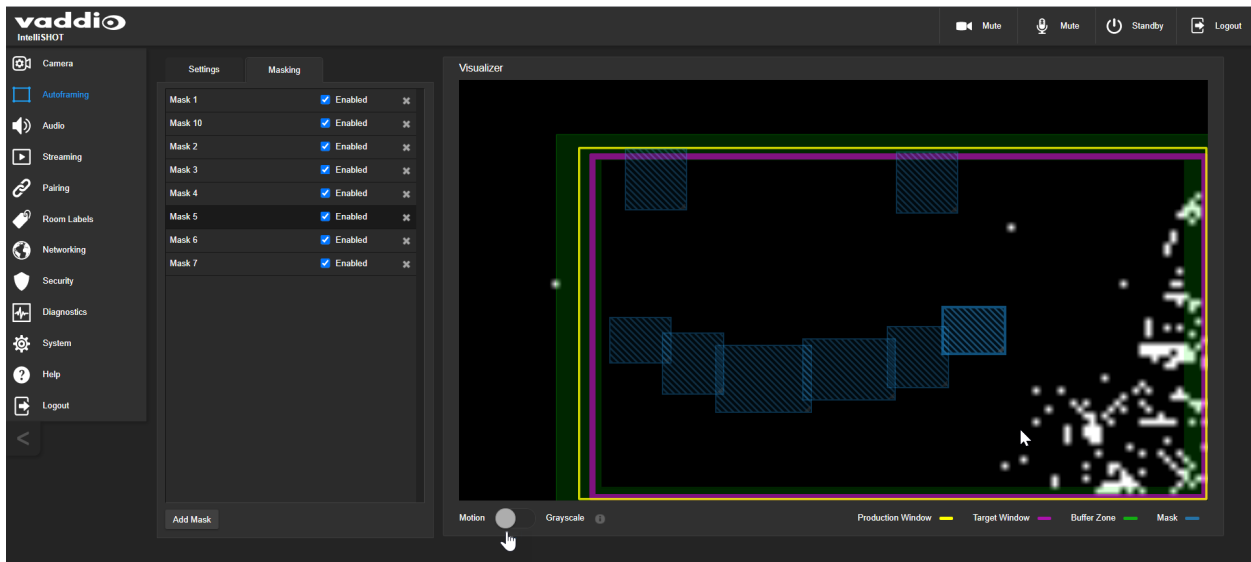
## Masking Unwanted Motion

### [AUTOFRAMING PAGE](#), [MASKING TAB](#)

Masks are areas where the camera ignores motion. For example, if a door is within the camera's field of view, a mask can prevent the camera from responding to the movement of the door or people in the doorway. You can create multiple masks to fine-tune the camera's performance.

#### Things to know about masks:

- When you select the Masking tab, the Autoframing Visualizer mode automatically switches to a view of the room, so you can see what part of the room each mask affects.
- After you select Add Mask, drag the new mask to the desired location. Adjust its dimensions by dragging its corners or edges.
- Right-click the mask name to rename it.
- Clear a mask's Enabled check box to disable the mask without deleting it.
- Set the Visualizer mode to Motion to test the mask.



## Advanced Autoframing Adjustments

### AUTOFRAMING PAGE

**Max Electronic Zoom** – Sets the default size of the tracking frame relative to the area defined by Optical Zoom. Default value is 3x for all Autoframing presets.

**Initial Persistence** – How the camera remembers motion when it starts; similar to Persistence. Typically 25% to 100% for conferencing, 0 for lecture capture or presenter tracking.

**Responsiveness** – How quickly Autoframing reacts to new motion. Typically 70% to 90% for conferencing, 95% or higher for lecture capture.

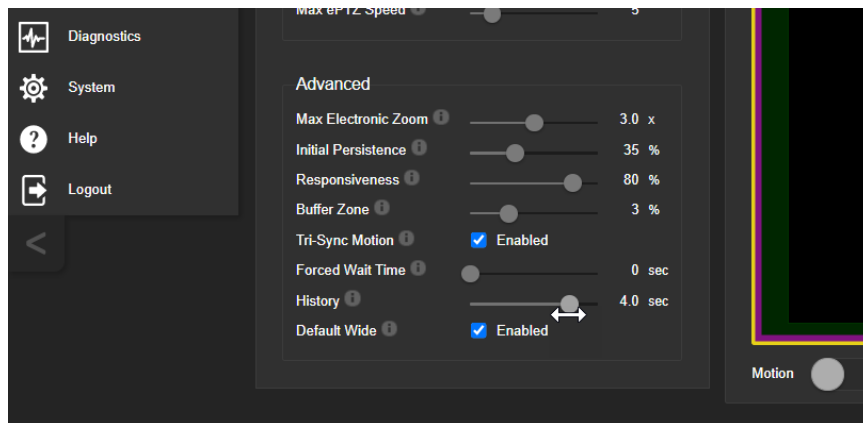
**Buffer Zone** – The area around the edge of the frame where new motion causes the image to re-center. Typically 3% for conferencing, 7% for lecture capture. Adjust this value higher to make the camera move less.

**Tri-Sync Motion** – Smooth pan/tilt/zoom. When Tri-Sync Motion is disabled, the camera snaps to position presets. Enabled by default.

**Forced Wait Time** – Minimum number of seconds between camera movements. Default is 0. Increasing Persistence often provides better performance than setting a Forced Wait Time.

**History** – History data is used for motion detection. High settings are best for conferencing and other low-motion situations, because they allow the camera to detect small motions such as changes in expression; but they increase latency. Low History settings provide more reactive tracking, with the possible drawback that the camera moves away from a motion source that pauses, and may not respond to small motions. Low History settings are best for lecture capture and other high-motion uses.

**Default Wide** – In Default Wide mode, the camera widens the shot (zooms out) when it detects no motion. This is best for conferencing or other situations with low motion. When Default Wide is not enabled, the camera remains where it last detected motion. We recommend disabling Default Wide mode for lecture capture.



## Autoframing Adjustment Quick Reference

Set Optical Zoom and select the Autoframing preset that is most similar to the room's requirements. Then adjust Autoframing to meet the unique demands of your space. These tables may help.

### Not Tracking Enough

To correct this	Do this	For this effect
Autoframing isn't working	Resume Autoframing; avoid using manual controls	Manual controls override Autoframing
Autoframing takes too long to start	Increase Responsiveness and Sensitivity	"Notice" motion sooner
	Decrease Initial Persistence	Respond to motion sooner
The camera only frames participants who move frequently	Increase Sensitivity	Recognize smaller movements, such as participants who don't gesture or fidget
	Decrease Noise Threshold	Recognize brief motion
The presenter moves faster than the camera	Increase Max ePTZ Speed and Shot Margin	Pan, tilt, and zoom faster
The presenter keeps moving out of the frame	Increase Responsiveness	"Notice" motion sooner
	Decrease Initial Persistence	Respond to motion sooner
	Decrease Optical Zoom	Enlarge the tracking area

### Tracking Too Much

To correct this	Do this	For this effect
The camera keeps moving away from the person who is speaking	Increase Persistence	Stay on the last source of motion longer
	Increase Noise Threshold	Require movements to be bigger before they are evaluated
Movement seems jumpy	Decrease Max ePTZ Speed	Slower camera movements
	Increase Buffer Zone	Fewer camera movements
The camera keeps zooming in too far	Reduce Max Electronic Zoom	Limits how far the camera can zoom in while tracking
The camera recenters even when the presenter is still within the frame	Increase the Buffer Zone	Enlarges the area where new movement does not cause the camera to recenter



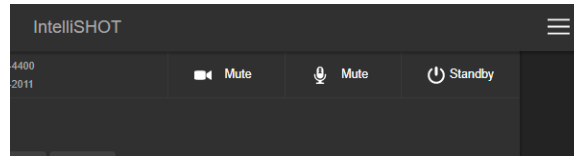
## Managing Audio

### AUDIO PAGE

Controls for individual inputs (audio from your site) and outputs (audio from the far end of the conference) are on separate tabs.

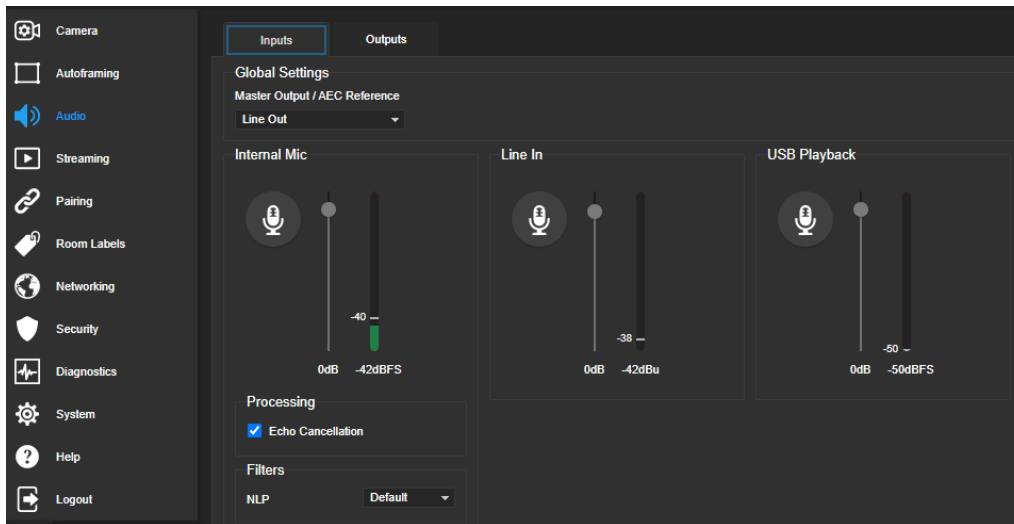
#### To mute all audio inputs together:

To stop sending audio, use the audio mute button at the top of any page of the web interface.



#### To mute or control volume for individual audio inputs or outputs:

Use the button to mute the desired audio input or output. Use the slider for the appropriate audio input or output to set the volume.



#### Note

For best performance with most computers, we recommend setting the USB Record volume high. This allows people at the far end of the call to adjust the audio to their environment.

## Other Audio Settings and Adjustments

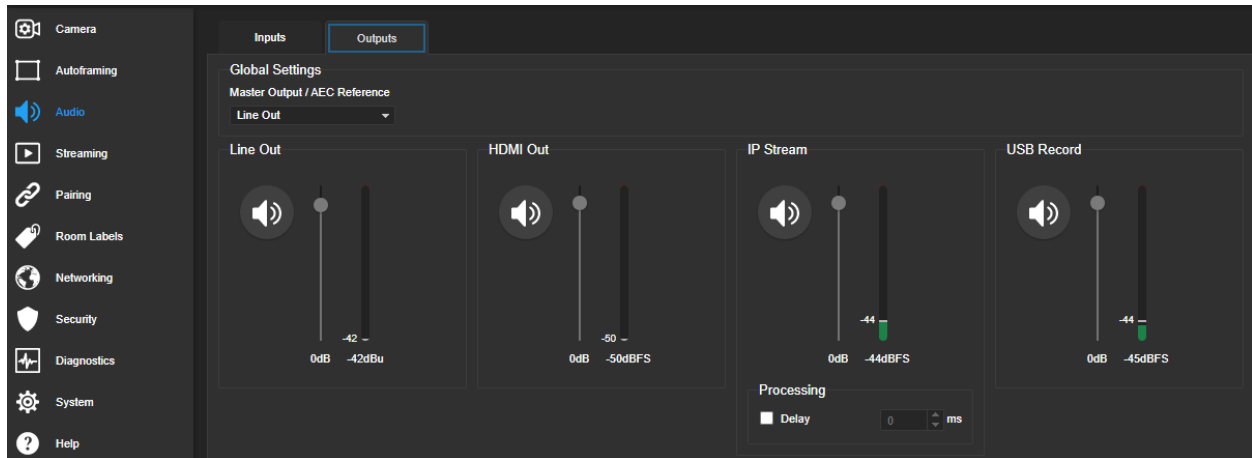
#### To adjust microphones for best far-end audio performance:

Select the desired adjustments:

- **Echo Cancellation** – Keeps microphones from feeding the speaker output back into the system. Under most circumstances, echo cancellation is desirable. Echo cancellation is on by default.
- **Master Output/AEC Reference** – The source for the far-end audio to be canceled from the signal that the built-in microphone picks up. Select Line Out to use the connected speaker as the reference, or HDMI Out to use the built-in speakers of the connected HDMI display.
- **NLP (non-linear processing) filter** – Select Reverberant to correct for poor acoustical treatment in the room.

**To sync the sound with the video in the IP stream:**

On the Outputs tab, check the Delay box and enter a delay value in milliseconds.

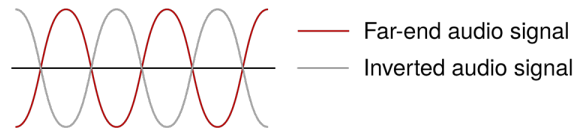


**About Echo Cancellation**

When a microphone picks up the audio from a speaker (far-end audio) during a conference, it sends the far-end audio back to the participants at the far end, creating an echo. Acoustic echo cancellation prevents this.

Here's how it works:

1. The speaker feeds the far-end audio into the room. This signal also goes to the audio processor as the reference that needs to be canceled.
2. The audio processor inverts the signal and sends it to the microphone.
3. The sum of the audio that the microphone picks up from the speaker and the inverted signal is 0: The echo is canceled.



With the audio from the speaker canceled out, the audio from the microphone includes only the sounds originating at your end of the conference.

## Configuring Streaming Behavior

Conferencing applications use *USB streaming*. After initial device set-up is complete, the camera's USB stream is always enabled.

*IP streaming* is disabled by default.

### Notes

The screen shots in this section are representative, and may differ from what you see. Some may refer to other Vaddio products.

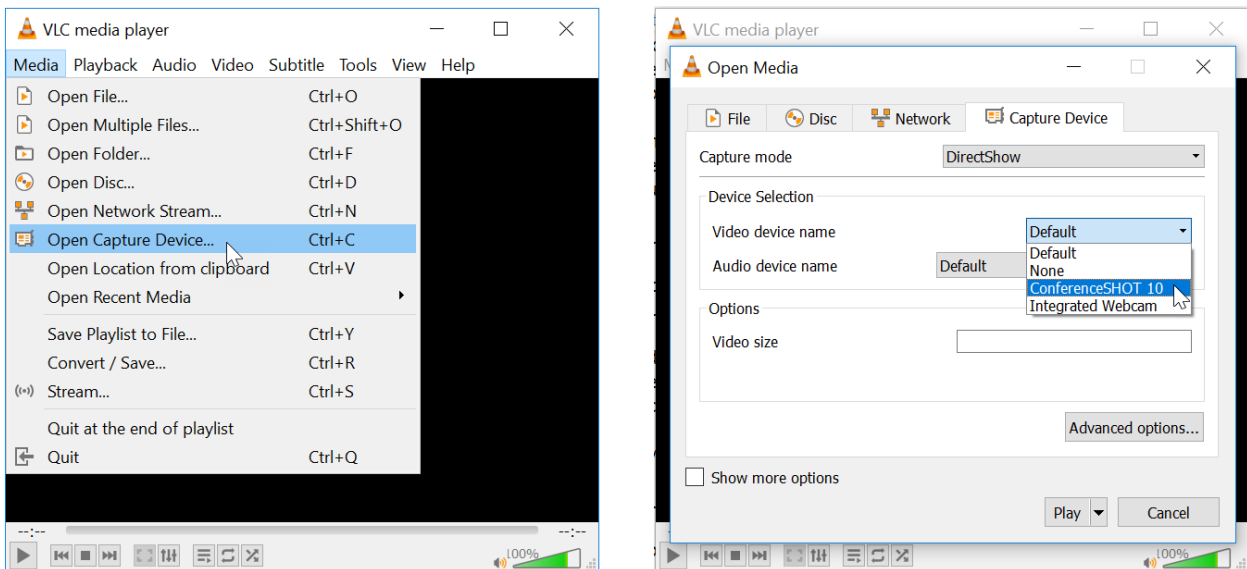
You may be prompted to reboot the camera when you save changes to the streaming settings.

## Viewing the USB Stream

Do one of these things:

- Start or join a conference.
- Open a stream viewer and select the camera as the video capture device.

The image below shows how to view a camera's USB stream using VLC Media Player. The media player will correctly identify your camera by model.



## Configuring USB Streaming

### STREAMING PAGE

These settings affect how the camera works with soft conferencing applications.

**USB Device Name** – Specify how the camera shows up in your soft client's camera selection list.

**HID Audio Controls** – Enable to allow conferencing applications to control the audio.

**Enable UVC Extensions** – Allow conferencing applications to control the camera.

Depending on the conferencing application that you use, you may also need to change the USB stream format setting. See [Additional Camera Settings](#).

## Enabling or Disabling IP Streaming

### STREAMING PAGE

IP streaming is disabled by default.

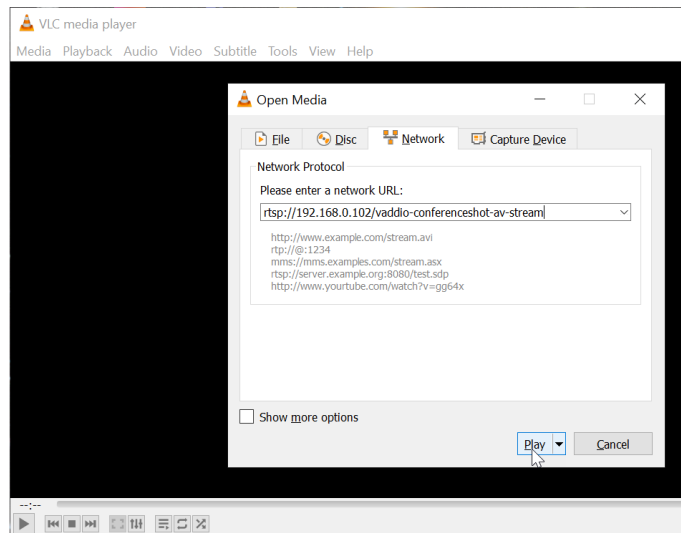
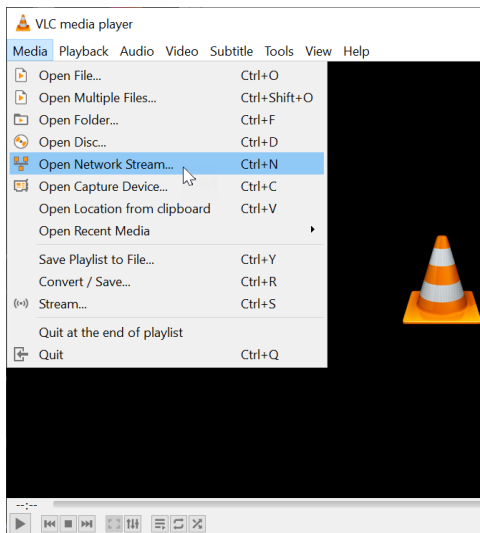
Two IP streaming protocols are available:

- *RTSP streaming* delivers an IP stream that people can access from your network using a media player.
- *RTMP streaming* sends a stream to a content service provider such as YouTube. To use RTMP streaming, you must have an account with a streaming service.

### Viewing the IP Stream (RTSP)

1. Open a stream viewer such as VLC Media Player.
2. Select "Network stream" or your viewer's equivalent option.
3. Copy the streaming URL from the camera's Streaming page and paste it into the viewer as the URL for the network stream.

The image below shows how you would view a camera's IP stream using VLC Media Player. The media player will correctly identify your camera by model.



## RTSP Streaming Protocol and URL

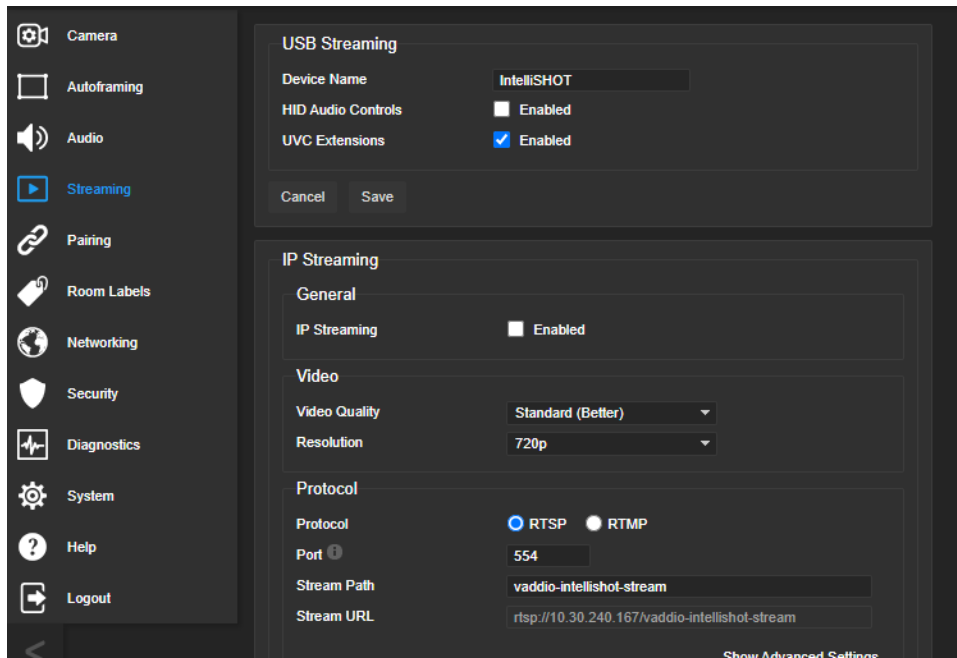
### STREAMING PAGE

When IP streaming is enabled and RTSP is selected, the RTSP stream is automatically available. Consult your IT department before changing these settings.

**RTSP port:** Vaddio strongly recommends using the default RTSP port number.

**Path:** The portion of the streaming URL that appears after the IP address. You may wish to change this to help identify the stream source – for example, `demo-studio-3`.

**URL:** The location where the stream can be viewed. This will change if you edit the path.



## Setting up IP Streaming in Easy Mode

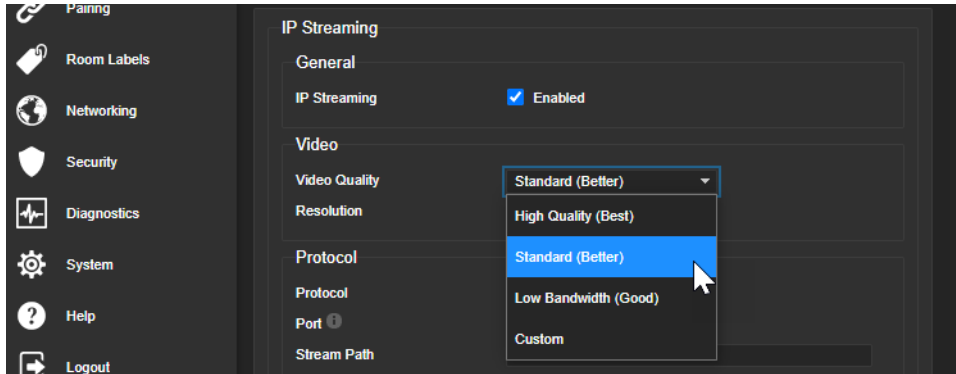
### STREAMING PAGE

**Note**

Consult your network specialist when setting up IP streaming, to be sure that you select settings that are appropriate for the network.

If you are not sure about these settings, start with the defaults.

1. Select Video Quality – High Quality, Standard, or Low Bandwidth.
2. Select the desired IP streaming resolution. This determines the size of the stream viewer window.



**Note**

The IP streaming resolution and frame rate cannot be higher than the local video rate (see [Additional Camera Settings](#)).

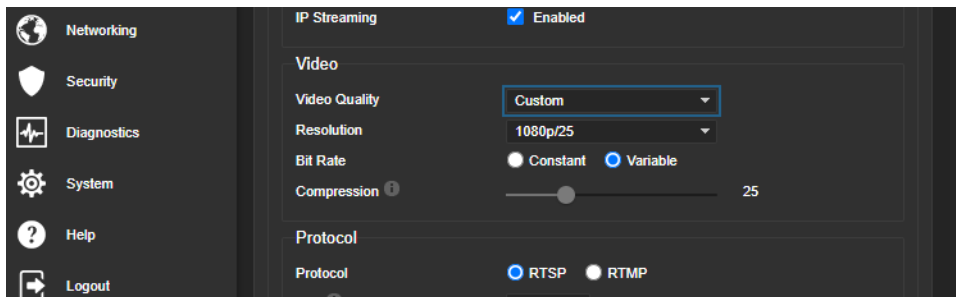
## Customizing IP Streaming Settings

### STREAMING PAGE

**Note**

Consult your network specialist when setting up IP streaming, to be sure that you select settings that are appropriate for the network.

1. Select Custom quality mode.
2. Select the desired resolution and frame rate.
3. Select Constant or Variable Bit Rate.
4. Constant Bit Rate only: Set Max Bandwidth.
5. Variable bit rate only: Set the Compression slider. Then save your changes.



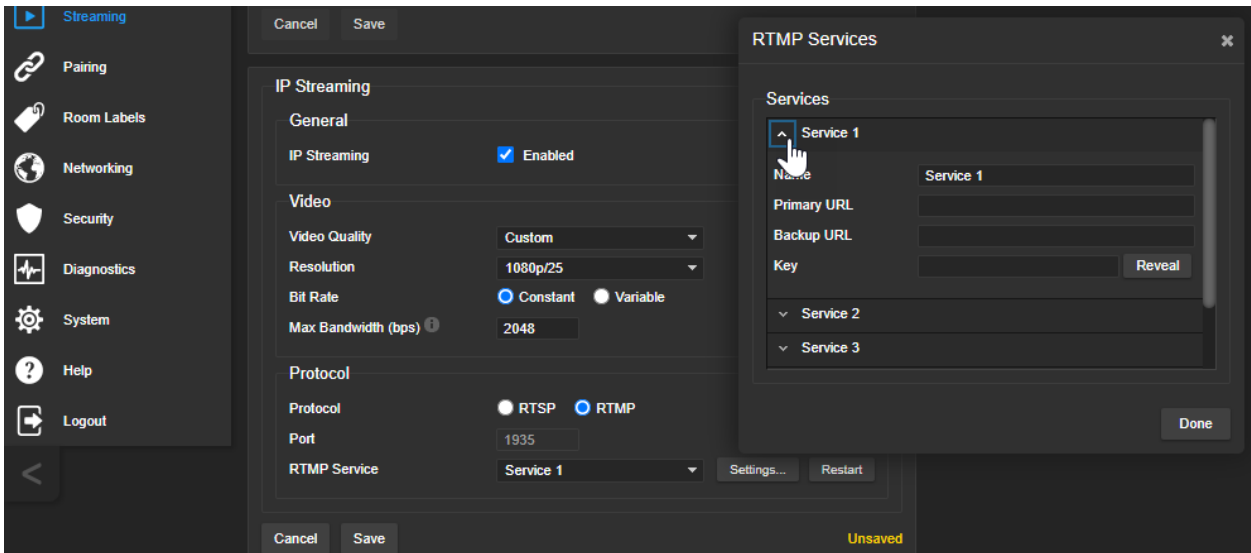
## Configuring RTMP Streaming

### STREAMING PAGE

To use RTMP streaming, you must have an account with a streaming service.

#### To configure an RTMP streaming service:

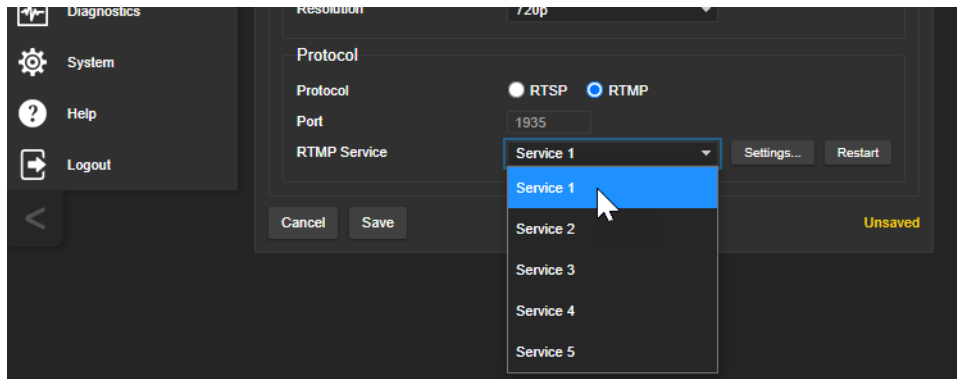
1. Select RTMP streaming, then select Settings.
2. Expand the information box for the service.



3. Enter the name of the service.
4. Paste in the key and URL(s) provided by the service.

#### To select the enabled RTMP streaming service:

Expand the list of available streaming services, and select the one to use.



#### Note

When RTMP streaming is selected and a service is configured, the camera streams to that service until you stop the stream.

## Changing MTU

### STREAMING PAGE, ADVANCED SETTINGS

The default packet size for streaming is 1400. Do not change this except in consultation with your network administrator.

## Configuring Manual Mode Behaviors

Although Autoframing mode is normally used with this camera, there are times when you need conventional PTZ behaviors. This section covers:

- Preset shots
- Speed controls
- Direction controls

These settings are on the Camera page of the web interface.

### Setting the Home Position and Other Preset Shots

#### CAMERA PAGE

Although the camera's Autoframing feature is the simplest way to keep the focus on the presenter, there are times when you need a static shot – such as a zoomed-in shot of the room's dry-erase board.

Presets are saved shots. Each preset includes pan, tilt, zoom, and (optionally) color settings.

When Autoframing is not enabled, the camera returns to the Home preset when it comes out of Standby or reboots.

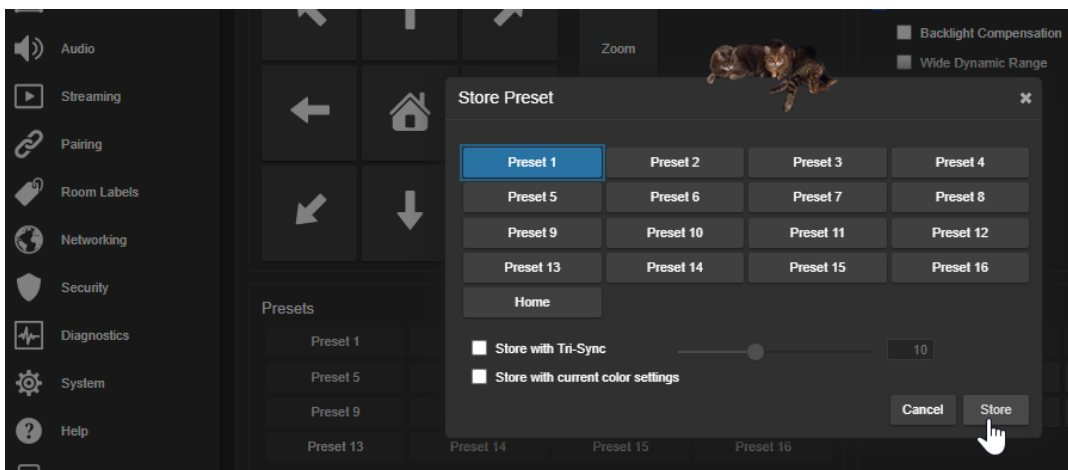
#### To store a preset:

1. Set up the shot.
2. In the Presets area, select Store to open the Store Preset dialog.
3. Select the preset to store. The preset button changes color.

#### Note

*The Store Preset dialog box does not indicate whether presets have already been defined, but the main display dims the preset buttons if they have no preset information stored.*

4. Select the behavior for the preset:
  - To save the preset with specific color settings, select Store with Current Color Settings.
  - To pan/tilt smoothly to the preset, select Save with Tri-Sync. Use the slider to control the speed.
  - The camera will cut to the preset if you leave the Save with Tri-Sync checkbox clear.
5. Store the preset.



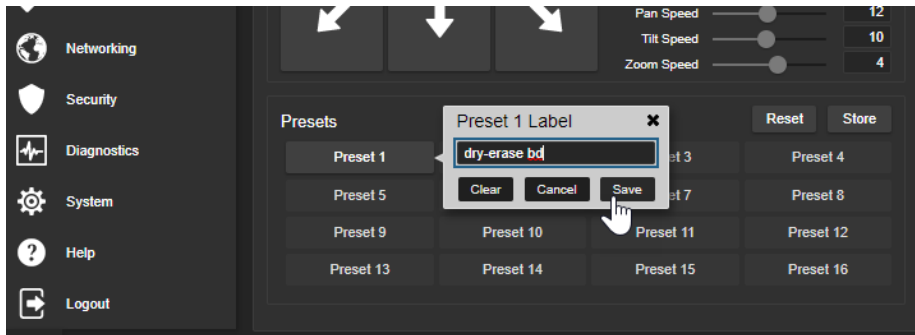


## Renaming Presets and Custom CCU Scenes

### CAMERA PAGE

You can rename presets and custom scenes to identify them. This also helps you identify and avoid overwriting them when you store new ones. The process is the same for both.

Right-click the button for the preset or custom scene, and edit the label.



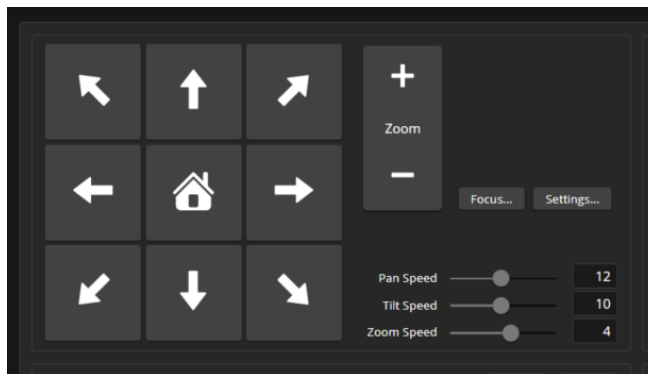
## Speed Adjustments

### CAMERA PAGE

The following speed adjustments are available:

- Manual pan, tilt, and zoom speeds – Used when you control camera movements with the RF remote or the arrow buttons in the web interface
- Tri-Sync – Only available when storing a preset. Specifies a speed for the camera to pan, tilt, and zoom to the shot, as a motorized PTZ camera would do. If you save the preset without Tri-Sync, the camera cuts to the shot instead.

Use the Pan Speed, Tilt Speed, and Zoom Speed sliders to adjust how fast the camera moves in response to the direction and zoom controls on the remote and in the web interface.



## Setting the Direction for Camera Movements

### CAMERA PAGE

By default, the arrow buttons on the remote and in the web interface show the direction the image frame moves from the camera's point of view. This may not suit your situation.

**If the presenter will control the camera with the remote:**

- Select Settings to open the direction control box.
- Set Pan Direction to Inverted to make the camera move to the presenter's left when they press the left arrow button.

## Adjusting Color, Lighting, and Image Quality Settings

### CAMERA PAGE

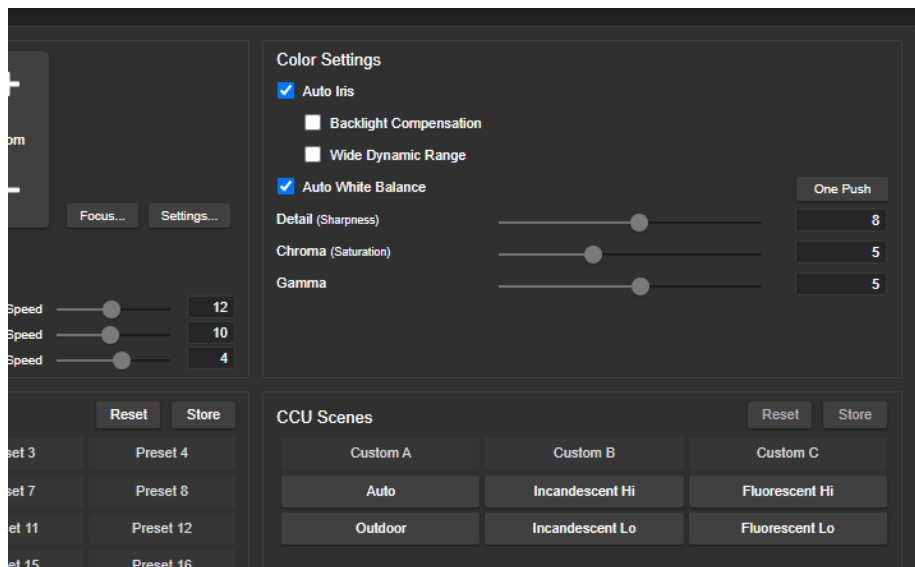
No two rooms are exactly alike – but a lot of rooms are a lot alike. The technical folks at Vaddio (Scott, to be specific) have already set up adjustments for common lighting scenarios (CCU scenes) – Incandescent Hi, Incandescent Lo, Fluorescent Hi, Fluorescent Lo, and Outdoor. The Auto setting allows the camera to determine the appropriate adjustments.

When adjusting for the room lighting, start with a factory-defined CCU scene and fine-tune the color and lighting as needed using the Color Settings controls. After you customize the camera's color and lighting settings, you can save the adjustments as a custom CCU scene.

- **Auto Iris** allows the camera to compensate automatically for the light level. Clear this box to adjust iris and gain manually.
- **Backlight Compensation** (available when Auto Iris is selected) reduces contrast to adjust for bright light behind the main subject of the shot. This setting can't be used with Wide Dynamic Range.
- **Wide Dynamic Range** (available when Auto Iris is selected) increases the contrast between the brightest and darkest areas. This setting can't be used with Backlight Compensation.
- **Auto White Balance** adjusts color automatically. Clear this box to adjust red gain and blue gain manually.
- **Red Gain** and **Blue Gain** (available when Auto White Balance is not selected) provide manual color adjustment.
- **Detail** adjusts the image sharpness. If the video looks grainy or “noisy,” try a lower Detail setting.
- **Chroma** adjusts the color intensity.
- **Gamma** adjusts the range (grey density) between bright areas and shadows.

The [Lighting and Image Quality Quick Reference](#) and [Color Adjustment Quick Reference](#) may be helpful.

If you make a change that you don't like, start over by selecting and then deselecting Auto White Balance.








## Lighting and Image Quality Quick Reference

Here are some tips for using the CCU settings for lighting and image quality.

What do you need to correct?	Make this adjustment:
The image is too dark	Increase Iris (lower F-stop value)
	Increase Iris Gain
The image looks washed out or faded	Decrease Iris (higher F-stop value)
	Decrease Iris Gain
	Increase Chroma
	Decrease Gamma
The subject is silhouetted against a bright background	Enable Backlight Compensation
Highlights and shadows look right, but mid-tones are too dark.	Increase Gamma
Shadows are too dark	Enable Wide Dynamic Range (WDR)
	Decrease Gamma
The image looks grainy	Decrease Detail
	Decrease Iris Gain
"Soft focus" effect; the image looks unrealistically smooth	Increase Detail

## Color Adjustment Quick Reference

Here are some tips for using the color-related CCU settings.

What do you need to correct?	Make this adjustment:			
Colors look less vivid than they should	Increase Chroma			
Colors look too vivid	Decrease Chroma			
Colors look wrong; white objects do not appear white	Enable Auto White Balance			
	One Push White Balance			
	Disable Auto White Balance and... <ul style="list-style-type: none"> <li>▪ adjust Red Gain (decrease for less red, increase for less green)</li> <li>▪ adjust Blue Gain (decrease for less blue, increase for less yellow)</li> </ul>			
Too much red	Not enough red	Too much blue	Not enough blue	Balanced
				

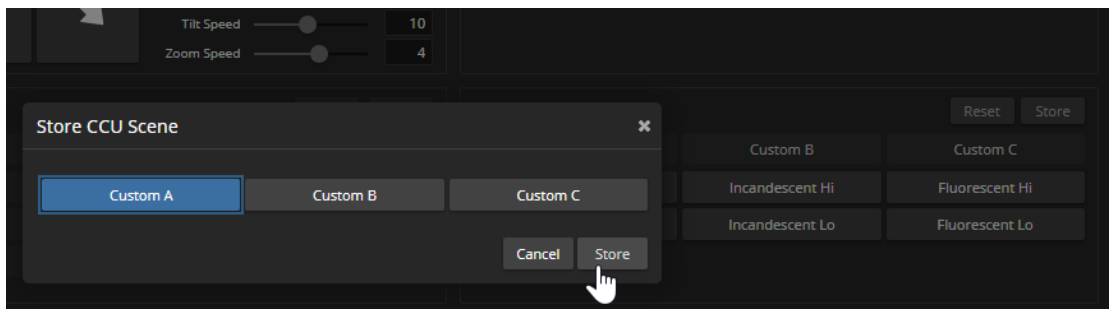
If you are adjusting for lighting conditions that are likely to recur, you can .

## Saving Color and Lighting Settings

### CAMERA PAGE

If you are adjusting for lighting conditions that are likely to recur, you can save your adjustments as a custom scene or store them as an element of the presets you set up.

1. Select Store CCU Scene.
2. In the Store CCU Scene dialog box, select the custom scene to store (Custom A, B, or C) and select Store. The button for this scene becomes available in the web interface.

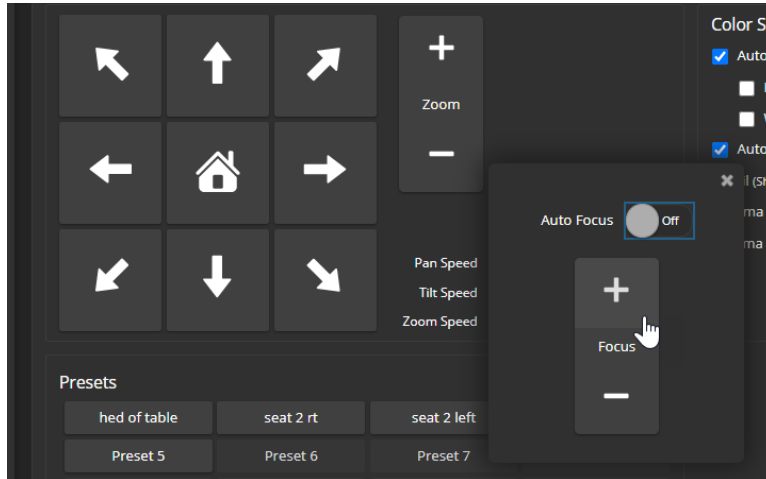


3. Optional: Right-click the button for your custom CCU scene, and enter a short name for it in the text box that opens. Save the name.

## Adjusting the Focus

### CAMERA PAGE

Open the Focus control to select Auto-focus, or set manual focus with the + (near) and – (far) buttons. The + and – buttons only work when Auto Focus is not selected.



Focus control is available to non-administrative users via the RF remote.

## Additional Camera Settings

### SYSTEM PAGE, GENERAL TAB

Additional settings are available on the General tab on the System page.

**LED On** – In most cases, Vaddio recommends leaving the status lights on, to let people in the room know whether the camera is currently sending video.

**LED On in Standby** – Select Disabled to turn off the LED when the camera is in standby mode.

**LED Color Scheme** – Status light color codes for Unified Communications (conferencing) or Pro AV (broadcast). Default is UC.

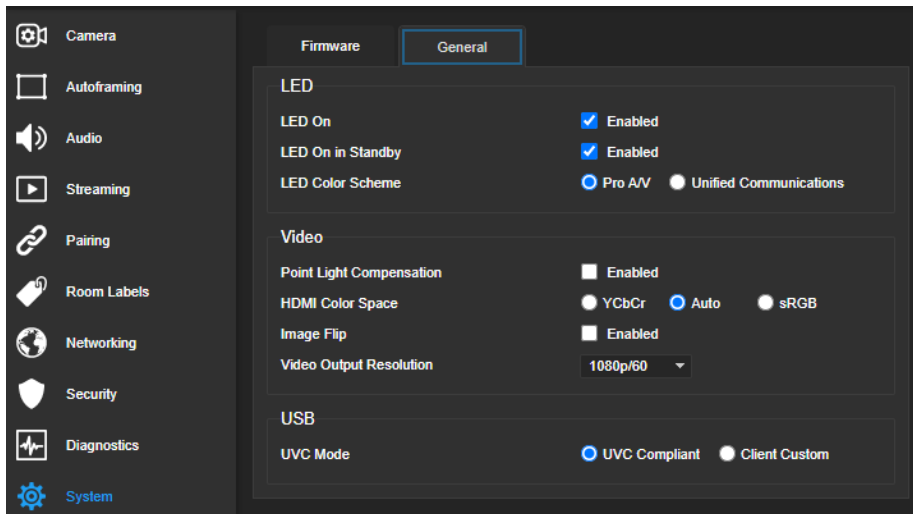
**Point Light Compensation** – Reduces the intensity of small, extremely bright areas (point light sources) that would otherwise swamp the camera with light and make it difficult to see details in areas with less intense lighting.

**HDMI Color Space** – Set the color space for the HDMI output to YCbCr (default) or sRGB.

**Image Flip** – If mounting the camera upside-down, set Image Flip ON. This orients the video image correctly and sets the camera to respond appropriately to tilt commands from the remote, web interface, and connected control devices.

**Video Output Resolution** – Select the desired resolution for the HDMI output. IP streaming is set separately. See [Setting up IP Streaming in Easy Mode](#).

**UVC Mode** – USB stream format. Client Custom enables far-end camera control when used with the Zoom soft client. Use the default UVC Compliant setting with most other conferencing applications.



## Operating the Camera

When you need to control the camera in manual mode rather than using Autoframing, you can use

- The RF remote
- The web interface (accessible from your computer's browser or using a Vaddio Device Controller)
- A third-party control device

When you use the manual controls, Autoframing pauses. It's similar to cruise control in a car: Using a preset or directional control is like tapping the brake pedal. The camera remains under manual control until you resume Autoframing.

## Operating the Camera from the Web Interface

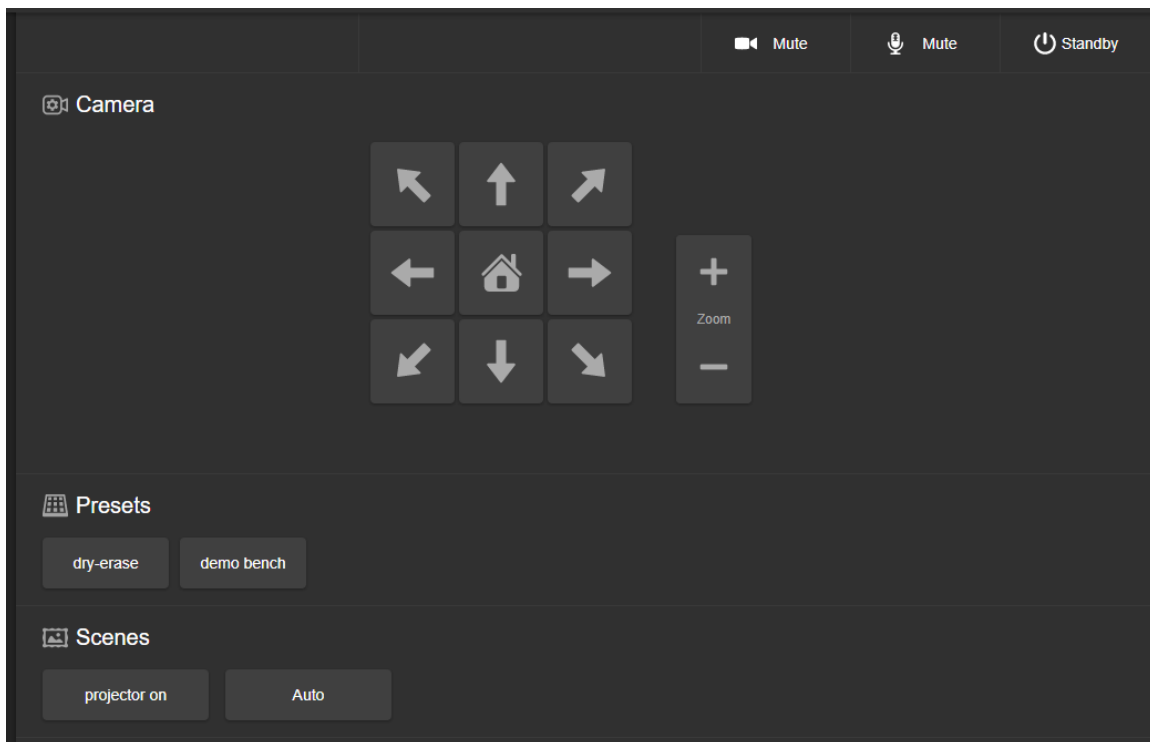
### CAMERA PAGE (USER OR GUEST ACCESS)

By default, the operator's page of the web interface is not available. The administrator must set a password for the `user` account or enable guest access.

Only the operator's page is available with user or guest access.

The operator's Camera page provides most of the same controls as the remote:

- Audio and video mute
- Camera standby
- Pan, tilt, and zoom
- Camera presets, if any have been stored
- Custom color/lighting settings, if any have been stored



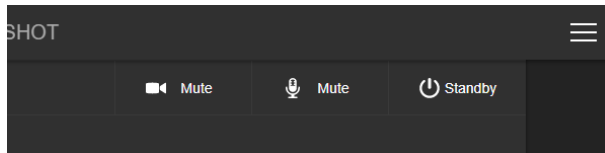
## Muting Audio and Video

Use the audio mute button to stop sending audio. Use the video mute button to temporarily stop sending video from the camera without placing it in standby.

Use the RF remote to control volume.

## Managing the Camera Ready State

Use the Standby button to switch between low-power (standby) and ready states.

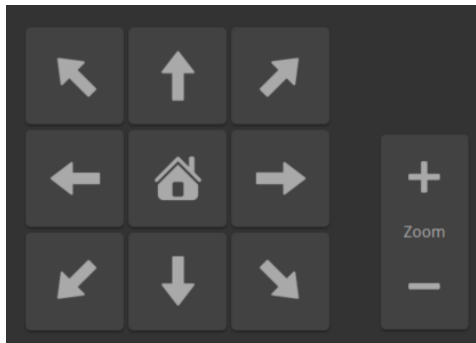


## Moving the Camera

Use the arrow buttons for camera pan and tilt. The center button moves the camera to the home position.

## Zooming In or Out

Use the Zoom + button to zoom in and the Zoom – button to zoom out.



## Moving the Camera to a Preset Position

Use the Preset buttons (if available) to move the camera to any of its programmed positions. Presets are only available if they have been set in the administrative interface or with the RF remote.



## Operating the Camera with the RF Remote

The RF remote provides basic in-conference functionality – pan, tilt, zoom, presets, volume control, and muting. You can also use it to get the camera's IP address. When you have the IP address, you can open the camera's web interface.

Before you can use the remote, you will need to:

- Install the batteries
- Pair the remote with the camera

IntelliSHOT cameras are not compatible with IR remotes.

### Installing the Batteries

The remote uses two AAA batteries.

1. Remove the cover from the back of the remote. You may need to press down on the inner edge while sliding it off.
2. Install the batteries as shown in the diagram in the battery opening.
3. Slide and snap the cover back into place.

### Pairing the Remote to the Camera

The camera does not recognize or respond to the remote until they are paired. Do this after the camera is turned on and its status light is white.

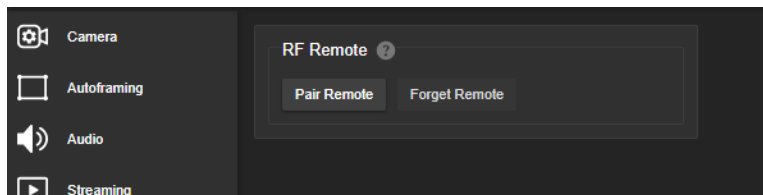
#### **If you do not have access to the administrative web interface:**

1. Press and hold the IP button on the connector panel until the status light blinks cyan.
2. While the status light blinks cyan, press the pairing button on the remote. The camera's status light changes to steady white when the pairing is complete. You may need to press the remote's pairing button more than once.
3. If the status light changes from blinking cyan to blinking blue, this indicates a pairing error: The pairing was not successful and pairing mode has timed out. Go back to step 1. If the problem persists, contact Vaddio Technical Support.

#### **Note**

*Any time a pairing error occurs (status light blinking blue), Vaddio recommends rebooting the camera as soon as feasible. If pairing was successful, the remote remains paired through the reboot process.*

#### **If you have access to the administrative web interface:**



1. On the Pairing page of the web interface, select Pair Remote.
2. When the camera's status light blinks cyan, press and hold the pairing button on the remote until the status light changes to steady white.

## RF Remote Quick Reference

	<b>Indicator and Power button</b> – Set the camera to standby mode, or return to full-power mode.	
	<b>Function buttons</b> – Reserved for future use.	
	<b>Arrow buttons</b> – Pan and tilt. Autoframing pauses if you use these buttons.	
	<b>Home button</b> – Resumes Autoframing if it is paused.	
	<b>Network button</b> – Display the camera's IP address on the video output.	
	<b>Pairing button</b> – Use when pairing the remote with the camera.	
	<b>Mute button</b> – Mute the microphone(s).	
	Reserved for future use.	
	<b>Volume +/- button</b> – Increase or decrease the volume from the connected speaker.	
	<b>Focus +/- buttons</b> – Adjust the focal distance in or out, when Manual focus mode is selected.	
	<b>Zoom +/- button</b> – Increase or decrease the zoom.	
	<b>Auto and Man buttons</b> – Select automatic or manual focus.	
	<b>Preset buttons</b> – Set, clear, or select preset shots. Autoframing pauses if you use these buttons.	

## Other Things to Know About the Remote

Here are some common situations in which the remote can behave in ways you don't expect.

- **Environments with cameras in adjacent rooms** – If the remote is currently paired to a camera and within range of that camera, it will not pair with another camera.
- **The remote goes to standby mode after a brief period of inactivity.** Press a button to wake it up.
- **The remote is no longer paired after restoring the camera's factory defaults.** If you restore factory defaults on the camera, pair it with the remote again.

## Unpairing the Remote

### PAIRING PAGE

If you need to unpair the remote from the camera that currently recognizes it, you will need admin access to the camera's web interface. On the Pairing page, select Forget Remote.

## System Maintenance

This chapter covers tasks for keeping your system up-to-date and operating properly:

- Rebooting
- Backing up and restoring the camera configuration
- Installing firmware updates
- Getting help

### Saving (Exporting) or Restoring (Importing) a Configuration

SYSTEM PAGE, FIRMWARE TAB

If you need to restore a camera's factory default settings, you can export the configuration beforehand to restore customized information instead of re-entering it manually.

The data export includes home and other presets, NTP and time zone information, and room labels.

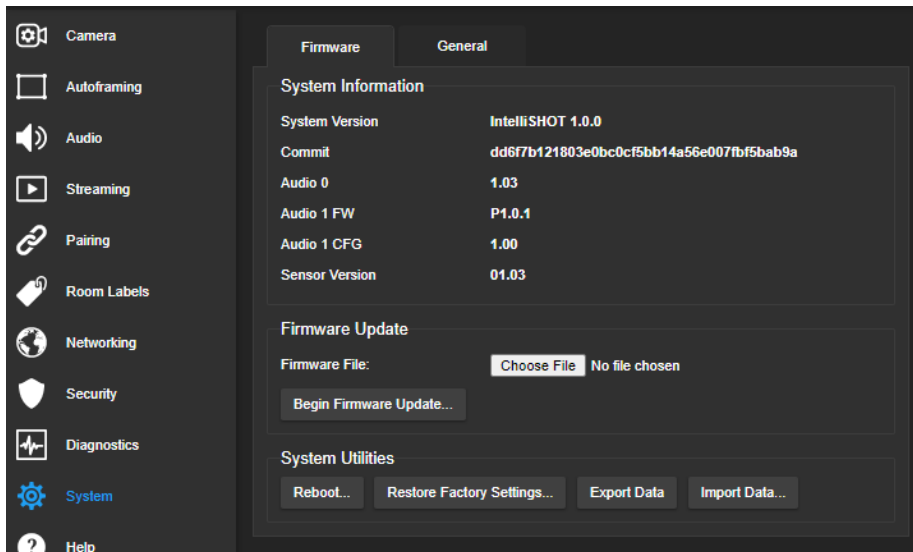
It does not include any information that is unique to the device, such as passwords, hostname, camera settings, or remote pairing.

#### To export a configuration:

Select Export Data. The export downloads to your computer as a .dat file. The filename is the camera's hostname.

#### To import a configuration file:

Select Import Data. The web interface prompts you to select the file to import.



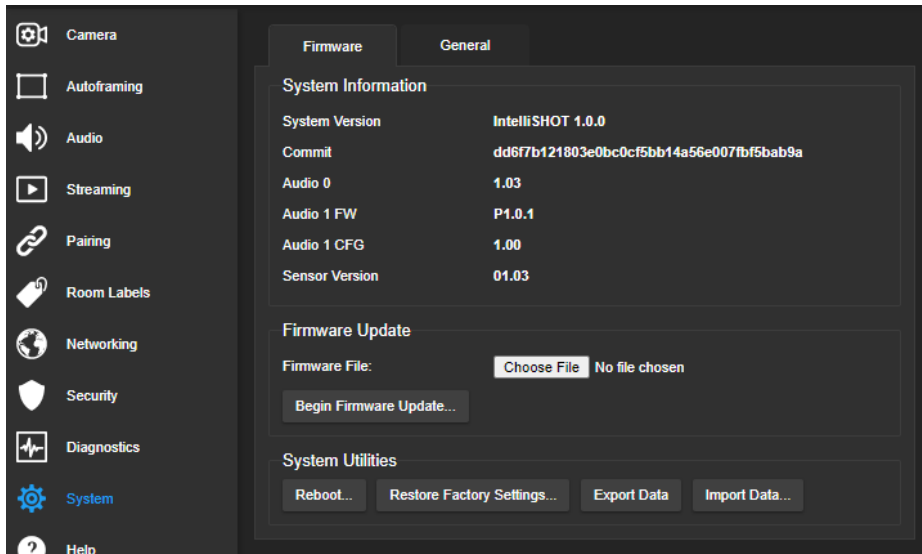
## Installing a Firmware Update

SYSTEM PAGE, FIRMWARE TAB

### Caution

Be sure the camera stays connected to power and to the network during the update. Interrupting the update could make it unusable.

1. Read the release notes and download the firmware update file from the product's web page at [www.legrandav.com](http://www.legrandav.com). The release notes can help you to decide whether to install the update.
2. On the camera's System page, select Choose File. Then select the firmware update file that you downloaded. The filename ends with .p7m.



3. Select Begin Firmware Update.
4. Read and understand the information in the Confirm dialog box, then select Continue. A progress message box opens and the camera's status lights turn yellow. If the update process presents warnings or error messages, read them carefully.

The camera reboots to complete the update, and the web interface prompts you to log in again.

## Rebooting the Camera

SYSTEM PAGE, FIRMWARE TAB

This can help if the camera stops responding as you expect.

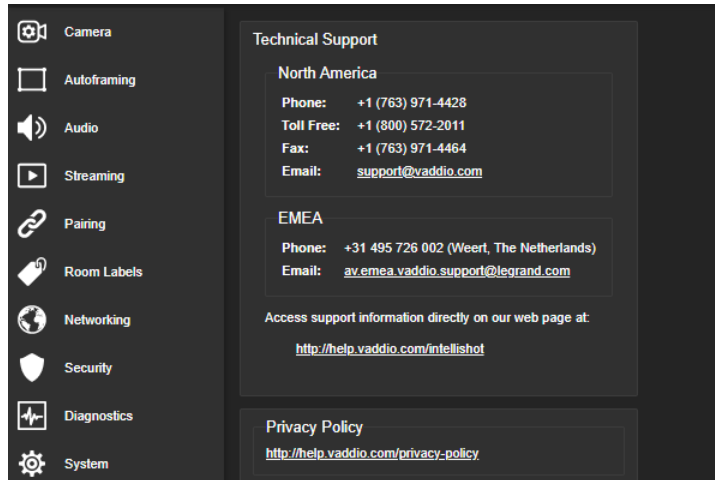
In the System Utilities section, select Reboot.

## Contacting Vaddio Technical Support and Viewing Diagnostic Logs

[HELP PAGE](#), [DIAGNOSTICS PAGE](#)

If you can't resolve an issue using your troubleshooting skills (or the [Troubleshooting](#) tables in this manual), we are here to help.

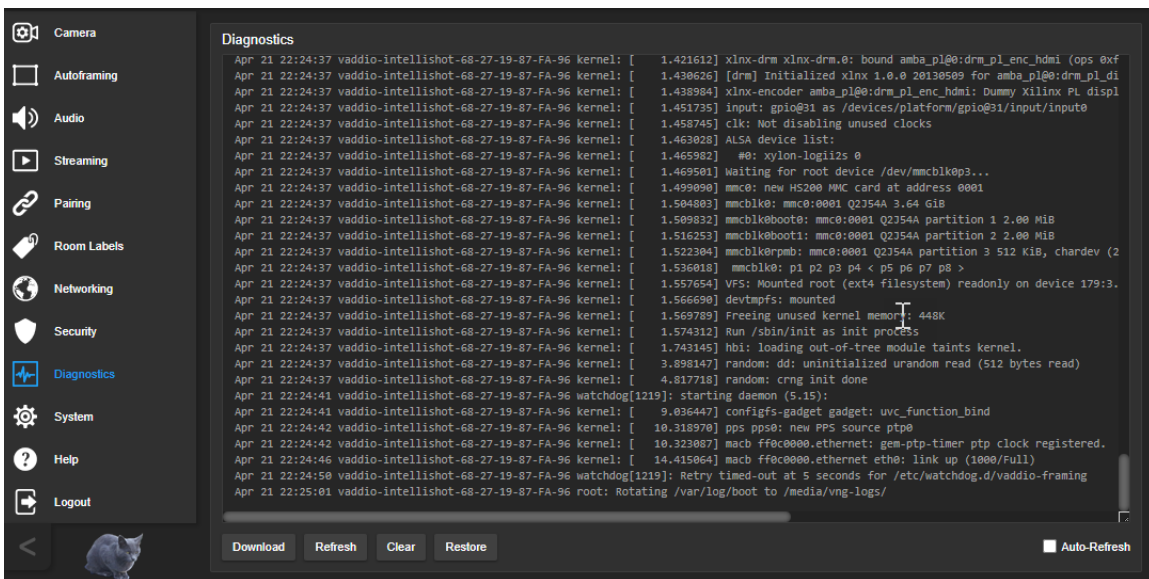
You'll find information for contacting Vaddio Technical Support on the Help screen.



### Note

The Help page links to our standard privacy notice. This product does not record or save video files, or store any identifying information except what you enter on the Room Labels page. However, the camera's IP address is considered "personally identifiable information" for the purposes of the privacy notice. This information is stored for display to the user, but not otherwise shared or transmitted.

Your technical support representative may ask you to download the event log file from the Diagnostics page. The log may include large numbers of internal events even when no errors have occurred. Rebooting generates over 100 log entries.



## Telnet Serial Command API

The Vaddio Telnet command API allows an external device such as an AMX or Crestron presentation system to control the camera. It is also used for writing macros.

### Requirements

- Telnet must be enabled on the Security page of the device's web interface.
- Your computer must have a Telnet client. Telnet port 23 is used.
- Your computer must be able to connect to the device over the network.
- When you connect via Telnet, you must log in using the admin account.

### Usage Notes

- The > character is the command prompt.
- In addition to the camera control commands, Telnet session management commands are available – help, history, and exit.
- CTRL-5 clears the current serial buffer on the device.

### Getting More Information

*Use a question mark as a command or command parameter* to display a list of available commands, subcommands, or command parameters. For example, ? returns all top-level commands; **network ?** returns the valid subcommands for the **network** command; and **network ping ?** returns the parameters available for the **network ping** command.

*To discover the valid range of values for a command*, use a value that you expect to be out of range. For example, **camera zoom set 64** returns an error message stating the valid range of zoom values.

Firmware updates sometimes implement new commands or command parameters. We do not update the manuals for every firmware update, and occasionally the author makes a mistake. Querying returns the command parameters that are currently available, along with guidance on command syntax.

### Typographical Conventions

- { x | y | z } – Choose x, y, or z.
- <variable> – Substitute the desired value here.
- < x - y > – Valid range of values is x through y.
- [parameter] – Parameter is optional.

## Autoframer Commands

Commands to manage and adjust Autoframing fall roughly into three categories.

Status commands:

- autoframer enabled
- autoframer paused

Shot definition commands:

- camera optical-zoom
- autoframer shot-margin
- autoframer max-electronic-zoom
- autoframer buffer-zone

Autoframing behavior adjustment commands:

- autoframer sensitivity
- autoframer responsiveness
- autoframer initial-persistence
- autoframer persistence
- autoframer max-speed
- autoframer noise-threshold
- autoframer tri-sync-motion
- autoframer forced-wait-time

### autoframer enabled

Enable or disable Autoframing. This is normally on. Use the `autoframer paused` command to switch to manual mode with the intent of resuming Autoframing.

Synopsis	<code>autoframer enabled { get   off   on   toggle }</code>	
Options	<code>get</code>	Returns the current enable state for Autoframing
	<code>off</code>	Turns off Autoframing
	<code>on</code>	Turns on Autoframing
	<code>toggle</code>	Changes the Autoframing state
Examples	<pre>&gt;autoframer enabled off OK &gt;  Stops Autoframing, placing the camera in manual mode.  &gt;autoframer enabled get autoframer enabled:    false OK &gt;</pre> <p>Returns the current state of Autoframing.</p>	



## autoframer paused

Pause or resume Autoframing. Autoframing pauses automatically when the camera receives a pan, tilt, zoom, or preset recall command from any source.

Synopsis	autoframer paused { get   off   on   toggle }	
Options	get	Returns the pause state for Autoframing
	off	Turns off the pause state (restarts Autoframing)
	on	Pauses Autoframing
	toggle	Changes the Autoframing pause state
Examples	<pre>&gt;autoframer paused on OK &gt;  Pauses Autoframing, placing the camera in manual mode.  &gt;autoframer paused get autoframer paused:    true OK &gt;</pre> <p>Returns the current pause state of Autoframing.</p>	

## autoframer default-wide

Specify how the camera behaves when it detects no motion. This setting is on by default.

Synopsis	autoframer default-wide { get   off   on }	
Options	get	Returns the state of the Default Wide setting (on or off)
	off	Turns off Default Wide mode. The camera remains on the shot where it last detected motion.
	on	Turns on Default Wide mode. The camera zooms all the way out when it detects no motion.
Examples	<pre>&gt;autoframer default-wide off OK &gt;  Turns off Default Wide mode. The camera does not zoom out to "search" for motion.  &gt;autoframer default-wide get default wide:  false OK &gt;</pre> <p>Returns the current state of the Default Wide setting.</p>	

## camera optical-zoom

Adjusts the area in which Autoframing can occur.

Synopsis	camera optical-zoom { in [<speed>]   out [<speed>]   stop   get }	
Options	in	Zooms the camera in.
	out	Zooms the camera out.
	speed[1 - 7]	Optional: Zoom speed (integer).
	stop	Stops the camera's zoom movement.
	get	Returns the camera's zoom setting.
Examples	<pre>&gt;camera zoom in OK &gt;  Zooms the camera in at the default speed.  &gt;camera zoom out 7 OK &gt;  Zooms the camera out at its highest speed.  &gt;camera zoom stop OK &gt;  Stops the camera's zoom motion.</pre>	

## autoframer buffer-zone

Get or set the size of the Autoframing buffer zone.

Synopsis	autoframer buffer-zone { get   set <value> }	
Options	get	Returns the current value for the Autoframing buffer zone
	set <value>	Sets the Autoframing buffer zone
Examples	<pre>&gt;autoframer buffer-zone set 10 OK &gt;  Sets the buffer zone to 10.  &gt;autoframer buffer-zone get autoframer buffer-zone:      10 OK &gt;  Returns the current size of the buffer zone.</pre>	

## autoframer shot-margin

Get or set the size of the Autoframing shot margin.

Synopsis	autoframer shot-margin { get   set <value> }	
Options	get	Returns the current value for the Autoframing shot margin
	set <value>	Sets the Autoframing shot margin
Examples	<pre>&gt;autoframer shot-margin set 15 OK &gt;  Sets the shot margin to 15.  &gt;autoframer shot-margin get autoframer shot-margin:      15 OK &gt;</pre> <p>Returns the current size of the shot margin.</p>	

## autoframer sensitivity

Get or set Autoframing sensitivity.

Synopsis	autoframer sensitivity { get   set <value> }	
Options	get	Returns the current value for sensitivity
	set <value>	Sets Autoframing sensitivity
Examples	<pre>&gt;autoframer sensitivity set 95 OK &gt;  Sets the sensitivity to 95.  &gt;autoframer sensitivity get autoframer sensitivity:      95 OK &gt;</pre> <p>Returns the current sensitivity value.</p>	

## autoframer responsiveness

Get or set Autoframing responsiveness.

Synopsis	autoframer responsiveness { get   set <value> }	
Options	get	Returns the current value for responsiveness
	set <value>	Sets Autoframing responsiveness
Examples	<pre>&gt;autoframer responsiveness set 95 OK &gt;  Sets responsiveness to 95.  &gt;autoframer responsiveness get autoframer responsiveness:      95 OK &gt;</pre> <p>Returns the current responsiveness value.</p>	

## autoframer initial-persistence

Get or set the initial persistence value.

Synopsis	autoframer initial-persistence { get   set <value> }	
Options	get	Returns the current value for initial persistence
	set <value>	Sets initial persistence
Examples	<pre>&gt;autoframer initial-persistence set 15 OK &gt;  Sets the initial persistence to 15.  &gt;autoframer initial-persistence get autoframer initial-persistence:  15 OK &gt;</pre> <p>Returns the current initial persistence value.</p>	

## autoframer persistence

Get or set Autoframing persistence.

Synopsis	<code>autoframer persistence { get   set &lt;value&gt; }</code>	
Options	<code>get</code>	Returns the current value for persistence
	<code>set &lt;value&gt;</code>	Sets persistence
Examples	<pre>&gt;autoframer persistence set 15 OK &gt;  Sets persistence to 15.  &gt;autoframer persistence get autoframer persistence:      15 OK &gt;</pre> <p>Returns the current persistence value.</p>	

## autoframer max-electronic-zoom

Get or set the value for the Autoframing maximum electronic zoom. This limits how far the camera zooms in for Autoframing.

Synopsis	<code>autoframer max-electronic-zoom { get   set &lt;value&gt; }</code>	
Options	<code>get</code>	Returns the current value for the maximum electronic zoom
	<code>set &lt;value&gt;</code>	Sets the maximum electronic zoom
Examples	<pre>&gt;autoframer max-electronic-zoom set 4 OK &gt;  Sets the maximum electronic zoom to 4.  &gt;autoframer max-electronic-zoom get autoframer max-electronic-zoom:  4 OK &gt;</pre> <p>Returns the current maximum electronic zoom.</p>	

## autoframer max-speed

Get or set the value for the Autoframing maximum ePTZ speed. This limits pan, tilt, and zoom movements during Autoframing.

Synopsis	autoframer max-speed { get   set <value> }	
Options	get	Returns the current value for the maximum speed
	set <value>	Sets the maximum speed
Examples	<pre>&gt;autoframer max-speed set 7 OK &gt;  Sets the maximum speed to 7.  &gt;autoframer max-speed get autoframer max-speed: 7 OK &gt;  Returns the current maximum speed.</pre>	

## autoframer noise-threshold

Get or set the value for the Autoframing noise threshold. This helps the camera to identify motion.

Synopsis	autoframer noise-threshold { get   set <value> }	
Options	get	Returns the current value for the noise threshold
	set <value>	Sets the noise threshold
Examples	<pre>&gt;autoframer noise-threshold set 4 OK &gt;  Sets the noise threshold to 10.  &gt;autoframer noise-threshold get autoframer noise-threshold: 10 OK &gt;  Returns the current noise threshold.</pre>	

## autoframer tri-sync-motion

Enable or disable Tri-Sync Motion. This allows the camera to pan, tilt, and zoom smoothly. When Tri-Sync Motion is off, the camera snaps to the new position.

Synopsis	autoframer tri-sync-motion { get   off   on   toggle }	
Options	get	Returns the current state for Tri-Sync Motion
	off	Turns off Tri-Sync Motion
	on	Turns on Tri-Sync Motion
	toggle	Changes the state of Tri-Sync Motion
Examples	<pre>&gt;autoframer tri-sync-motion on OK &gt;</pre> <p>Turns on Tri-Sync Motion, so the video pans, tilts, and zooms like a motorized camera.</p> <pre>&gt;autoframer tri-sync-motion get autoframer tri-sync-motion:  on OK &gt;</pre> <p>Returns the current state of Tri-Sync Motion.</p>	

## autoframer history

Get or set the value for the Autoframing History setting. This is the number of seconds of data that the camera evaluates for motion. Increase the value if the camera does not reliably detect motion in a low-motion environment.

Synopsis	autoframer history { get   set <value> }	
Options	get	Returns the current value for the history
	set <value>	Sets the history as a floating-point value from 0 to 5 seconds.
Examples	<pre>&gt;autoframer history set 2 OK &gt;</pre> <p>Sets History to 4 seconds.</p> <pre>&gt;autoframer history get autoframer history:  2 OK &gt;</pre> <p>Returns the current History value.</p>	

## autoframer forced-wait-time

Get or set the value for the Autoframing forced wait time. This sets a minimum time to hold the shot before responding to new motion. Increasing persistence and reducing responsiveness may produce more satisfactory results.

Synopsis	autoframer forced-wait-time { get   set <value> }	
Options	get	Returns the current value for forced wait time
	set <value>	Sets the forced wait time
Examples	<pre>&gt;autoframer forced-wait-time set 0 OK &gt;</pre> <p>Sets the forced wait time to 0 (the default value).</p> <pre>&gt;autoframer forced-wait-time get autoframer forced-wait-time: 0 OK &gt;</pre> <p>Returns the current forced wait time.</p>	



## Camera and Video Management Commands

The following camera and video management commands are available:

- camera home
- camera pan
- camera tilt
- camera zoom
- camera ptz-position
- camera focus
- camera preset
- camera ccu get
- camera ccu set
- camera led
- camera icr
- video mute

### camera home

Moves the camera to its home position and zoom level. Color settings may also be part of the home preset.

Autoframing pauses when the camera receives this command.

Synopsis	camera home
Example	> <b>camera home</b> OK >

## camera pan

Moves the camera horizontally.

Autoframing pauses when the camera receives this command.

The amount of pan available depends on the zoom level. A tight shot can move more than a wide one. (See [How It Works: Digital Pan/Tilt/Zoom](#).) If the camera is fully zoomed out, pan commands do not result in a change, because there is no room to shift the shot.

The `camera pan set` command specifies where the shot is to be centered in terms of pixel column, not angle. If the camera cannot center the shot on the specified column, it gets as close as possible

Example: `camera pan set 1536` specifies that the shot should center at the rightmost column of pixels. This isn't possible, so the camera centers the shot as close to the rightmost column of pixels as possible. No error is generated if the command specifies a pixel column that exists.

Synopsis	<code>camera pan { left [&lt;speed&gt;]   right [&lt;speed&gt;]   stop   get   set &lt;position&gt; [&lt;speed&gt;] [no_wait] }</code>	
Options	<code>left</code>	Moves the camera left.
	<code>right</code>	Moves the camera right.
	<code>&lt;speed&gt;</code>	Optional: Specifies the pan speed (integer).
	<code>stop</code>	Stops the camera's horizontal movement.
	<code>get</code>	Returns the camera's pan position
	<code>set</code>	Centers the shot as close as possible to the specified column of pixels on the image sensor; snaps to the specified position if no speed is given
	<code>&lt;position&gt;</code>	The pixel column to center the shot on. Range is 1536 to -1536.
	<code>no_wait</code>	Optional – allows the command to return the command prompt and respond to new commands immediately, while the camera is still panning.
Examples	<pre>&gt;camera pan left OK &gt; Pans the camera left at the default speed.  &gt;camera pan right 20 OK &gt; Pans the camera right using a speed of 20.  &gt;camera pan stop OK &gt; Stops the camera's horizontal motion.</pre>	

## camera tilt

Moves the shot vertically.

Autoframing pauses when the camera receives this command.

The amount of tilt available depends on the zoom level. A tight shot can move more than a wide one. (See [How It Works: Digital Pan/Tilt/Zoom](#).) If the camera is fully zoomed out, tilt commands do not result in a change, because there is no room to shift the shot.

The `camera tilt set` command specifies where the shot is to be centered in terms of pixel row, not angle. If the camera cannot center the shot on the specified row, it gets as close as possible

**Example:** `camera tilt set 864` specifies that the shot should center at the topmost row of pixels. This isn't possible, so the camera centers the shot as close to the top row of pixels as possible. No error is generated if the command specifies a pixel row that exists.

Synopsis	<code>camera tilt { up [&lt;speed&gt;]   down [&lt;speed&gt;]   stop   get   set &lt;position&gt; [&lt;speed&gt;] [no_wait] }</code>	
Options	<code>up</code>	Moves the shot up at the default speed or the specified speed
	<code>down</code>	Moves the shot down at the default speed or the specified speed
	<code>&lt;speed &gt;</code>	Optional: Specifies the tilt speed (integer)
	<code>stop</code>	Stops the tilt movement
	<code>get</code>	Returns the camera's tilt position
	<code>set</code>	Centers the shot as close as possible to the specified row of pixels on the image sensor; snaps to the specified position if no speed is given
	<code>&lt;position&gt;</code>	The pixel row to center the shot on. Range is 864 to -864.
	<code>no_wait</code>	Optional – allows the command to return the command prompt and respond to new commands immediately, while the camera is still tilting
Examples	<pre>&gt;camera tilt up OK &gt; Tilts the camera up at the default speed.  &gt;camera tilt down 20 OK &gt; Tilts the camera down at a speed of 20.  &gt;camera tilt set -560 OK &gt; Attempts to center the shot at pixel row -560.</pre>	

## camera zoom

Moves the camera in toward the subject or out away from the subject.

Autoframing pauses when the camera receives this command.

Synopsis	camera zoom { in [<speed>]   out [<speed>]   stop   get   set <position> [<speed>] [no_wait] }	
Options	in	Zooms the camera in
	out	Zooms the camera out
	speed[1-7]	Optional: Specifies the zoom speed as an integer
	stop	Stops the camera's zoom movement.
	get	Returns the camera's zoom setting
	set <zoom>	Sets the camera's zoom level; snaps to the requested zoom unless speed is specified
	no_wait	Optional; when camera zoom set specifies a speed, allows the command to return the command prompt immediately, while the camera is still moving to the shot
Examples	<pre>&gt;camera zoom in OK &gt;  Zooms the camera in at the default speed.  &gt;camera zoom out 7 OK &gt;  Zooms the camera out using a speed of 7.  &gt;camera zoom stop OK &gt;  Stops the camera's zoom motion.</pre>	

## camera ptz-position

Specifies a shot by zoom and center coordinates.

Autoframing pauses when the camera receives this command.

The amount of pan and tilt available depend on the zoom level. A tight shot can move more than a wide one. (See [How It Works: Digital Pan/Tilt/Zoom.](#)) If zoom = 1, there is no movement to the specified pan and tilt coordinates, because the camera is fully zoomed out, leaving no room to shift the shot.

The `camera ptz-position` command specifies the coordinates where the shot is to be centered in terms of pixel column and row, not angle. If the camera cannot center the shot as requested, it gets as close as possible.

Pan, tilt, and zoom may be specified in any order. The camera calculates the desired shot; if the calculated shot area would include pixel rows or columns that don't exist (for example, a wide shot centered near the leftmost or rightmost column of pixels), the camera centers the shot as close as possible to the requested position. When no speed is specified, the camera snaps to the shot.

Synopsis	<code>camera ptz-position pan &lt;position&gt; tilt &lt;position&gt; zoom &lt;position&gt; [&lt;speed&gt;] [no_wait]</code>	
Options	<code>pan &lt;position&gt;</code>	The pixel column to center the shot on. Range is 1536 to -1536.
	<code>tilt &lt;position&gt;</code>	The pixel row to center the shot on. Range is 864 to -864.
	<code>zoom &lt;position&gt;</code>	<code>&lt;position&gt;</code> is a floating-point value 1.0 to 10.0.
	<code>&lt;speed&gt;</code>	Optional; speed of movements (integer) if the camera should not snap to the specified position
	<code>no_wait</code>	Optional; when speed is specified, allows the command to return the command prompt immediately, while the camera is still moving to the shot.
Examples	<pre>&gt;camera ptz-position pan -150 tilt 200 zoom 3 OK &gt;</pre> <p>Centers the shot at pixel column -150, row 200, at a zoom level of 3. The camera snaps to the shot, because no speed is specified. At this zoom level, the shot can be centered exactly as requested.</p> <pre>&gt;camera ptz-position pan -1470 tilt 200 zoom 2 speed 5 no_wait OK &gt;</pre> <p>Attempts to center the shot at pixel column -1470, row 200, at a zoom level of 2. The camera moves at speed 5 and returns the command prompt before the motion is finished. The shot cannot be centered exactly as requested, because it is relatively wide and the requested center is close to the leftmost column of pixels. The shot's left edge will be the leftmost column of pixels.</p>	


## camera preset

Moves the camera to the specified preset, or stores the current camera position and type of motion to use, optionally including color and lighting information.

Synopsis	<code>camera preset { recall   store} &lt;1 - 16&gt; [tri-sync &lt;1 - 24&gt;] [save-ccu]</code>	
Options	<code>recall &lt;1 - 16&gt;</code>	Moves the camera to the specified preset
	<code>store &lt;1 - 16&gt;</code>	Stores the current camera position as the specified preset
	<code>tri-sync &lt;1 - 24&gt;</code>	Optional: Tri-Sync Motion pans, tilts, and zooms smoothly to the shot, at the specified speed; if not used, the camera snaps to the preset
	<code>save-ccu</code>	Optional: Saves the current color and lighting settings as part of the preset
Examples	<pre>&gt;camera preset recall 3 OK &gt; Snaps to preset 3.  &gt;camera preset store 2 tri-sync 10 save-ccu OK &gt; Stores the current shot as preset 2. The camera will apply the current CCU settings and use Tri-Sync Motion at speed 15 to move to this preset.</pre>	

## camera focus

Changes the camera focus.

Synopsis	<code>camera focus { near [&lt;speed&gt;]   far [&lt;speed&gt;   stop   mode {get   auto   manual} }</code>	
Options	<code>near</code>	Brings the focus nearer to the camera; manual mode only
	<code>far</code>	Moves the focus farther from the camera; manual mode only
	<code>speed &lt;1 - 8&gt;</code>	Optional: focus speed (integer)
	<code>mode get</code>	Returns the current focus mode
	<code>mode auto</code>	Puts the camera in auto-focus mode
	<code>mode manual</code>	Puts the camera in manual focus mode
	<code>stop</code>	Stops the focus movement
Examples	 <pre> <b>camera focus far 7</b> OK &gt; Moves the focus farther from the camera at a speed of 7.  <b>camera focus mode get</b> auto_focus:    on OK &gt; Returns the current focus mode.                     </pre>	


## camera ccu scene

Stores the current CCU scene or recalls the specified ccu scene.

Synopsis	<code>camera ccu scene {recall {factory &lt;1 - 6&gt;   custom &lt;1 - 3&gt;}   store custom &lt;1 - 3&gt;}</code>	
Options	<code>recall factory &lt;1 - 6&gt;</code> <code>recall custom &lt;1 - 3&gt;</code>	Recalls the camera to the specified scene (factory 1 - 6 or custom 1 - 3)
	<code>store custom &lt;1 - 3&gt;</code>	Saves the current scene as a custom scene
Examples	<pre> &gt;<b>camera ccu scene recall factory 2</b> OK &gt; Sets the camera to use factory CCU scene 2.  &gt;<b>camera ccu scene store custom 1</b> OK &gt; Saves the current CCU scene as custom CCU scene 1.                     </pre>	

## camera ccu get

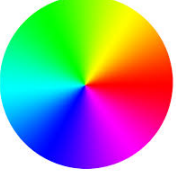
Returns CCU (lighting and color) information. Entering the command without specifying a parameter returns all current CCU settings.

Synopsis	<code>camera ccu get &lt;param&gt;</code>	
Options  	<code>auto_white_balance</code>	Current auto white balance setting (on or off)
	<code>red_gain</code>	Red gain value (integer)
	<code>blue_gain</code>	Blue gain value (integer)
	<code>backlight_compensation</code>	Current backlight compensation setting (on or off)
	<code>auto_iris</code>	Current auto-iris state (on or off)
	<code>iris</code>	Iris value (integer)
	<code>gain</code>	Iris gain value (integer)
	<code>detail</code>	Detail value (integer)
	<code>chroma</code>	Chroma value (integer)
	<code>gamma</code>	Gamma value (integer)
	<code>wide_dynamic_range</code>	Current wide dynamic range setting (on or off)
	<code>all</code>	All current CCU settings
	Examples	<pre>&gt;camera ccu get iris iris    6 OK &gt;</pre> <p>Returns the current iris value.</p>



## camera ccu set

Sets the specified CCU (lighting) information.

Synopsis	camera ccu set <param> <value>	
Options 	auto_white_balance	Sets auto white balance on or off
	red_gain	Sets the red gain value (integer)
	blue_gain	Sets the blue gain value (integer)
	backlight_compensation	Sets backlight compensation on or off
	auto_iris	Sets auto-iris state on or off
	iris	Sets the iris value (integer)
	gain	Sets the iris gain value (integer)
	detail	Sets the detail value (integer)
	chroma	Sets the chroma value (integer)
	gamma	Sets gamma (integer)
	wide_dynamic_range	Sets Wide Dynamic Range (on or off)
Examples	<pre>&gt;camera ccu set auto_iris off OK &gt;</pre> <p>Turns off auto-iris mode, returning the camera to manual iris control.</p> <pre>&gt;camera ccu set red_gain 10 OK &gt;</pre> <p>Sets the red gain value to 10.</p>	

## camera led

Set or change the behavior of the status lights.

Synopsis	camera led { get   off   on }	
Options	get	Returns the status lights' current state (on or off)
	off	Turns off the status lights
	on	Turns on the status lights
Examples	<pre>&gt;camera led off OK &gt;</pre> <p>Turns off the status lights. When LED is off, you cannot tell by looking at the camera whether it is sending video.</p> <pre>&gt;camera led get led:  on OK &gt;</pre> <p>Returns the current state of the status lights.</p>	

## video mute

Gets or sets the camera's video mute status. When video is muted, the camera sends blue or black video with an on-screen message stating that video mute is on. This can be desirable when preparing the room, or when privacy is needed.

### Note

*In systems with audio, this command does not affect the audio.*

Synopsis	video mute { get   off   on   toggle }	
Options	get	Returns the current video mute status
	off	Unmutes the video
	on	Mutes the video
	toggle	Changes the video mute status
Examples	<pre>&gt;video mute get mute:  off OK &gt;</pre> <p>Returns video mute status.</p> <pre>&gt;video mute on OK &gt;</pre> <p>Transmits blue or black video.</p>	

## camera standby

Set or change camera standby status.

Synopsis	camera standby { get   off   on   toggle }	
Options	get	Returns the camera's current standby state
	off	Brings the camera out of standby (low-power) mode
	on	Stops video and puts the camera in standby mode
	toggle	Changes the standby state
Examples	<pre>&gt;camera standby off OK &gt;</pre> <p>Brings the camera out of standby mode.</p> <pre>&gt;camera standby get standby:      on OK &gt;</pre> <p>Returns the current standby state.</p>	

## Audio Commands

The following audio commands are available:

- audio volume
- audio mute

### audio volume

Gets or sets the volume of the specified audio channel.

Synopsis	audio < channel > volume { get   up   down }	
Channels	internal_mic	The built-in microphone
	line_in	The Line In port (often a microphone)
	usb_playback	Audio portion of the incoming (far-end) USB stream
	line_out	Line Out port (speaker output)
	hdmi_out	Audio portion of the HDMI output (far-end audio to the display's speakers)
	ip_out	Audio portion of the IP stream output.
	usb_record	Outbound (near-end) audio portion of the USB stream.
Options	get	Returns the current volume
	up	Increases the volume
	down	Reduces the volume
Examples	<pre>audio line_in volume up OK &gt;</pre> <p>Increases the volume for the device connected to the Line In port.</p> <pre>audio line_out volume get volume -10.0 dB OK &gt;</pre> <p>Returns the current volume for the speaker connected to the line out port.</p>	

## audio mute

Gets or sets the mute status of the specified audio channel.

Synopsis	<code>audio &lt; channel &gt; mute { get   on   off   toggle }</code>	
Channels	<code>master</code>	Applies the command to all audio channels
	<code>internal_mic</code>	The built-in microphone
	<code>line_in</code>	The Line In port (often a microphone)
	<code>usb_playback</code>	Audio portion of the incoming (far-end) USB stream
	<code>line_out</code>	Line Out port (speaker output)
	<code>hdmi_out</code>	Audio portion of the HDMI output (far-end audio to the display's speakers)
	<code>ip_out</code>	Audio portion of the IP stream output.
	<code>usb_record</code>	Outbound (near-end) audio portion of the USB stream.
Options	<code>get</code>	Returns the channel's current mute status
	<code>on</code>	Mutes the channel
	<code>off</code>	Unmutes the channel
	<code>toggle</code>	Changes the mute state
Examples	<pre>&gt; audio line_out mute get mute: off OK &gt;</pre> <p>Returns the current mute state of the connected audio line out device. Mute is off, so the speaker audio is on.</p> <pre>&gt; audio master mute on OK &gt;</pre> <p>Mutes all audio.</p>	

## audio echo-cancel

Gets or sets the echo cancellation status of the specified audio channel. On the IntelliSHOT camera, echo cancellation is available for the internal microphone only.

Synopsis	audio < channel > echo-cancel { get   on   off   toggle }	
Channels	internal_mic	The built-in microphone
Options	get	Returns the channel's current echo cancellation status
	on	Turns on echo cancellation
	off	Turns off echo cancellation
	toggle	Changes the state of echo cancellation
Examples	<pre>&gt; audio internal_mic echo-cancel get echo-cancel:  on OK &gt;</pre> <p>Returns the current echo cancellation state of the channel.</p>	

## Network and Communication Commands

The following communication-related commands are available:

- network settings get
- streaming ip enable
- streaming settings get

### network settings get

Returns the camera's current network settings and MAC address.

Synopsis	network settings get
Example	<pre>network settings get Name                eth0:WAN MAC Address         00:1E:C0:F6:CA:7B IP Address          10.30.240.67 Netmask             255.255.255.0 VLAN                Disabled Gateway            10.30.240.1 Hostname            intellishot-manchaca OK &gt;</pre>

### streaming ip enable

Set or change the state of IP streaming.

Synopsis	streaming ip enable { get   on   off   toggle }	
Parameters	get	Returns the current state of IP streaming
	on	Enables IP streaming
	off	Disables IP streaming
	toggle	Changes the state of IP streaming
Example	<pre>&gt;streaming ip enable on &gt; OK  Enables IP streaming.  &gt;streaming ip enable get enabled: true &gt; OK  Returns the current state of IP streaming.</pre>	

## streaming settings get

Returns current IP and USB streaming settings.

Synopsis	streaming settings get	
Parameters	USB Active	True if a USB stream is present
	USB Device	USB Device Name
	USB Resolution	Resolution and frame rate of the USB stream
	USB Enumeration Speed	0 if no USB connection
	HID Audio Controls Enabled	Allow or disable far-end control of audio
	UVC Extensions Enabled	Allow or disable far-end control of the camera
	IP Streaming Enabled	True if IP streaming is enabled
	IP Video Quality	Video quality mode
	IP Preset Resolution	Resolution (Easy mode)
	IP Custom Resolution	Resolution and frame rate (Custom mode)
	IP Bit Rate Mode	Constant or Variable
	IP Max Bandwidth	Maximum bandwidth for Constant Bit Rate
	IP Compression	Compression used with Variable Bit Rate
	IP Protocol	IP streaming protocol in use
	IP RTSP Port	Port for RTSP streaming
	IP RTMP Port	Port for RTMP streaming
	IP RTSP URL	URL where the RTSP stream is available
	IP RTSP MTU	Current MTU setting for RTSP streaming
IP RTMP Service	Service selected for RTMP streaming	
Example	<pre> &gt;streaming settings get USB Active                false USB Device                IntelliSHOT USB Resolution            0x0/0 USB Enumeration Speed    0 HID Audio Controls Enabled      true UVC Extensions Enabled true IP Streaming Enabled      true IP Video Quality          Standard (Better) IP Preset Resolution      720p IP Custom Resolution      1080p/25 IP Bit Rate Mode          Variable IP Max Bandwidth          2048 bps IP Compression            25 IP Protocol               RTSP IP RTSP Port              554 IT RTMP Port              1935 IP RTSP URL                vaddio-huddleshot-stream IP RTSP MTU                1400 IP RTMP Service            Service 1 OK &gt; </pre>	

## Maintenance and Troubleshooting Commands

The following commands are available for maintenance and troubleshooting:

- camera recalibrate
- network ping
- system reboot
- system factory-reset
- version

### version

Returns the current firmware version. "System version" may show a product family name or more than one product name, as multiple products sometimes use the same firmware.

Synopsis	version
Example	<pre>&gt;version Audio 0          1.03 Audio 1 CFG     1.00 Audio 1 FW      P1.0.1 Commit          966a78e827a2e6f871011eb820706dcaa64ec0e2 Sensor Version 01.03 System Version IntelliSHOT 1.0.0 OK &gt;</pre>

### network ping

Sends an ICMP ECHO\_REQUEST to the specified hostname or IP address.

Synopsis	network ping [count <count>] [size <size>] <string>	
Options	<count>	The number of ECHO_REQUEST packets to send. Default is five packets.
	<size>	The size of each ECHO_REQUEST packet. Default is 56 bytes.
	<string>	The hostname or IP address where the ECHO_REQUEST packets will be sent.
Examples	<pre>&gt;network ping 192.168.1.66 PING 192.168.1.66 (192.168.1.66): 56 data bytes 64 bytes from 192.168.1.66: seq=0 ttl=64 time=0.476 ms 64 bytes from 192.168.1.66: seq=1 ttl=64 time=0.416 ms 64 bytes from 192.168.1.66: seq=2 ttl=64 time=0.410 ms 64 bytes from 192.168.1.66: seq=3 ttl=64 time=0.410 ms 64 bytes from 192.168.1.66: seq=4 ttl=64 time=3.112 ms --- 192.168.1.66 ping statistics --- 5 packets transmitted, 5 packets received, 0% packet loss round-trip min/avg/max = 0.410/0.964/3.112 ms &gt;</pre> <p>Sends five ECHO_REQUEST packets of 56 bytes each to the host at 192.168.1.66.</p>	
	<pre>&gt;network ping count 10 size 100 192.168.1.1</pre> <p>Sends 10 ECHO_REQUEST packets of 100 bytes each to the host at 192.168.1.1. The command returns data in the same form as above.</p>	




### system reboot

Reboots the system either immediately or after the specified delay. Note that a reboot is required when resetting the system to factory defaults (system factory-reset).

Synopsis	system reboot [<seconds>]	
Options	<seconds>	The number of seconds to delay the reboot.
Examples	<pre>&gt;system reboot OK &gt; The system is going down for reboot NOW!intellishot-D8-80-39-62-A7-C5  Reboots the system immediately.  &gt;system reboot 30  Reboots the system in 30 seconds. The response is in the same form; the system message appears at the end of the delay.</pre>	

### system factory-reset

Gets or sets the factory reset status. When the factory reset status is on, the system will resets to factory defaults on the next reboot.

Synopsis	system factory-reset { get   on   off}	
Options	get	Returns the camera's current factory reset status.
	on	Enables factory reset on reboot and returns he camera's current factory reset status.
	off	Disables factory reset on reboot and returns he camera's current factory reset status.
Examples	 <pre>&gt;system factory-reset get factory-reset (software):      off OK &gt;  Returns the factory reset status. This evaluates the most recent system factory-reset on or off command, if one has been received.  &gt;system factory-reset on factory-reset (software):      on OK &gt;  Enables factory reset upon reboot.  <b>Note</b> This command does not initiate a factory reset. The factory reset takes place on the next reboot.</pre>	

## Telnet Information and Session Management Commands

The following commands are available for Telnet help and session management:

- history
- help
- exit

### history

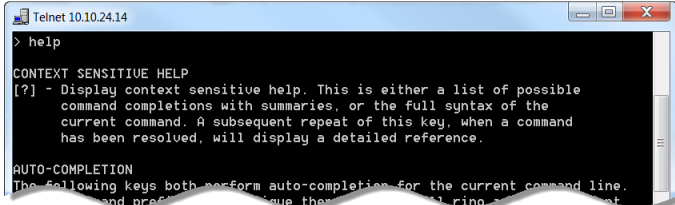
Returns the most recently issued commands from the current Telnet session. Since many of the programs read user input a line at a time, the command history is used to keep track of these lines and recall historic information.

Synopsis	history <limit>	
Options	<limit>	Integer value specifying the maximum number of commands to return.
Examples	<b>history</b> Displays the current command buffer. <b>history 5</b> Sets the history command buffer to remember the last 5 unique entries.	
Additional information	You can navigate the command history using the up and down arrow keys. This command supports the expansion functionality from which previous commands can be recalled from within a single session. History expansion is performed immediately after a complete line is read. Examples of history expansion: * !! Substitute the last command line. * !4 Substitute the 4th command line (absolute as per 'history' command) * !-3 Substitute the command line entered 3 lines before (relative)	



### help

Displays an overview of the CLI syntax.

Synopsis	help
Example	<b>help</b> 



### exit

Ends the command session and closes the socket.

Synopsis	exit
Example	<b>exit</b>



## Troubleshooting and Care

When the camera doesn't behave as you expect, check the status lights on the front before you do anything else. See [Status Lights](#).


### Note

*If the symptoms suggest even the smallest possibility of a bad cable, please try a known good cable. Factory-made cables can be defective. Cables can appear to be good but only work part of the time. A cable may pass a standard continuity check but be unable to pass enough power to the connected device. Crimping tools can crimp unevenly, contacts can break internally, and individual conductors in the cable can break inside the jacketing material. Any of these can result in a cable that passes a continuity check but does not work reliably.*

*(The author would like to confess having made a certain number of almost-good cables. It happens.)*

Use this table to determine whether it's time to call Vaddio Technical Support.

### Power and Control

What is it doing?	Possible causes	Check and correct
Nothing. The lights on the front are off and no video is available. 	At least one of the cables is bad.	Check using known good cables.
	The wall outlet is not active. (Check by finding out if it powers something else, such as a laptop or phone charger.)	Use a different outlet.
	The camera or its PoE power injector is bad.	Contact your reseller or Vaddio Technical Support.
The lights on the front of the camera are off but the web interface and video are available.	The status lights are turned off.	Enable the status lights. (System page, General tab, LED On setting)
The camera is not responding to the remote and the lights are yellow.	A firmware update is in progress.	Wait a few minutes, and try again when the lights turn white.
The camera does not respond to the remote, but the web interface is available.	The remote is not paired to the camera.	Pair the remote to the camera. See <a href="#">Pairing the Remote to the Camera</a> .
	The batteries in the remote are dead.	Put new batteries in the remote.
	The batteries were installed incorrectly in the remote.	Install the batteries as shown in the diagram inside the remote.
The camera responds to the remote but the web interface is not available.	The camera is not using the IP address you browsed to.	Press the Data Screen button on the remote to see camera information.

## Video and Streaming

What is it doing?	Possible causes	Check and correct
No IP stream.	IP streaming is not enabled.	Enable IP streaming: Streaming page in the web interface.
No USB stream.	The USB cable is not connected.	Connect the USB cable.
No video.	Video is muted.	Unmute the video.
Poor video in the IP stream.	Limited bandwidth.	On the Streaming page, select a less resource-intensive video quality or resolution.

## Audio

What is it doing?	Possible causes	Check and correct
No audio from the speaker (far-end audio)	Far-end microphone is muted (the conferencing window may show a mute icon for that site's microphone)	Ask the participants at that site to unmute their microphone.
	Speaker is not connected.	Check all connections carefully.
	Speaker volume is turned all the way down.	You checked that first, right?
Far end reports that they can't hear you. (No near-end audio)	Your microphone is muted.	Unmute your microphone.
Echo cancellation is not working.	The soft conferencing client is not using the camera's microphone and connected speaker.	In the soft conferencing client, the camera's microphone and connected speaker as the conference audio devices.
	Echo cancellation is not enabled.	Enable echo cancellation (Audio page, Inputs tab) and select the appropriate master output/AEC reference.

Need help? Call Vaddio Technical Support at (+1) 763-971-4400 or 800-572-2011.

## Status Lights

The lights in the camera's head indicate its current state.

- Purple – Initializing
- White – Active
- Red – Audio is muted
- Blinking red – Video is muted
- Yellow – Firmware update is in progress
- Blinking cyan – Remote pairing mode
- Blinking blue – Pairing error

### Caution

*Do not remove power or reset the camera while the status lights are yellow, showing a firmware update in progress. Interrupting a firmware update can make the camera unusable.*

### Note

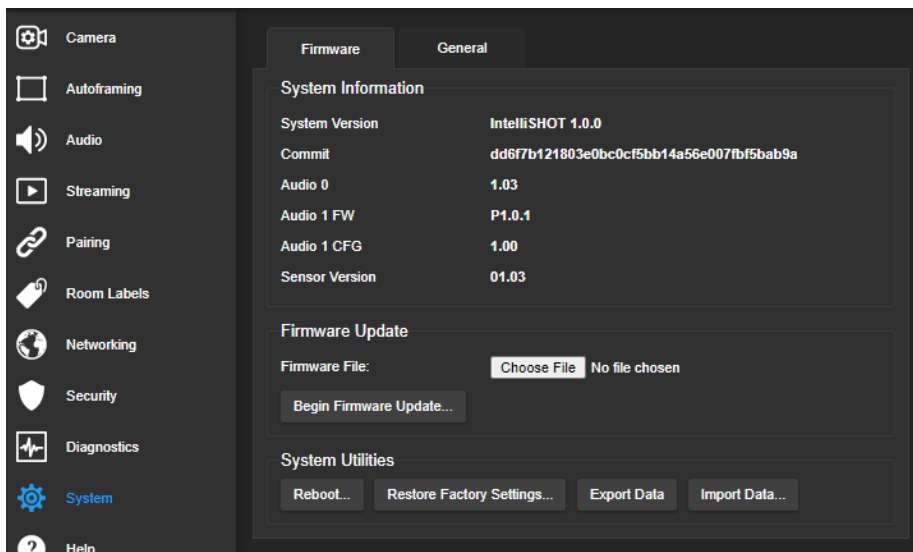
*By default, the camera's status lights are active during normal operation; however, they can be configured to remain off when the camera is powered up. The camera may be sending video even if the lights are off.*

## Restoring Default Camera Settings

This returns the camera to its original state. If you export the camera's configuration before restoring factory defaults, you will be able to restore the room label, time zone information, and home information by importing the configuration afterward.

**Using the IP button on the connector panel:** Disconnect the network cable. Then press and hold the IP button while reconnecting the cable. Continue to hold the button for about 10 seconds.

**From the web interface:** Log on using the admin account, go to the System page's Firmware tab, and select Restore Factory Settings.



## Operation, Storage, and Care

For smears or smudges on the product, wipe with a clean, soft cloth. Use a lens cleaner on the lens. Do not use any abrasive chemicals.

Keep this device away from food and liquids.

Do not operate or store the device under any of the following conditions:

- Temperatures above 104° F (40° C) or below 32° F (0° C)
- High humidity, condensing or wet environments
- Inclement weather
- Severe vibration
- Mars or its satellites
- Dry environments with an excess of static discharge

Do not attempt to take this product apart. There are no user-serviceable components inside.

## Glossary

### **AEC**

Acoustic echo cancellation. Audio processing that subtracts the far-end (speaker) audio from the sound that your microphone picks up.

### **auto white balance**

A setting that allows the camera to manage color adjustments automatically.

### **Autoframing**

Vaddio's motion-based technology for automatically keeping the camera on the action.

### **backlight compensation**

A setting that reduces contrast to adjust for bright light behind the main subject of the shot.

### **bandwidth**

Data transfer rate (bits per second) for the stream. In some cases, using a high bandwidth can slow down other network traffic. On networks with very low bandwidth, video issues may result. Streaming at a lower resolution or frame rate can reduce bandwidth usage.

### **CCU scene**

A stored set of color and lighting adjustments. (CCU = Camera Control Unit)

### **chroma**

A setting that adjusts color intensity.

### **Default Wide**

Autoframing setting, enabled by default. Causes the camera to zoom all the way out if it detects no motion. When disabled, the camera remains on the last shot where motion was detected.

### **detail**

A setting that adjusts image sharpness. If detail is set too low, the image may appear unrealistically smooth.

### **DHCP**

Dynamic Host Configuration Protocol. A network management protocol that assigns an IP address to a device automatically when it is connected to the network.

### **DIY**

Do It Yourself. As in, "You can copy information from this document to create a DIY room guide customized for your conference room." Yes! You can do that! In fact, the "Info for DIY Room Guides" document is specifically designed for you to adapt and customize.

### **dynamic range**

The amount of difference between extremes - for example, the darkest and lightest areas in a shot, or the softest and loudest sounds that a microphone picks up.

### **echo cancellation**

Audio processing that subtracts the far-end (speaker) audio from the sound that your microphone picks up.

### **ePTZ**

Electronic pan/tilt/zoom. No motors needed!

### **far end**

(conferencing) A location in the conference other than the one where you are. Far-end video is what you typically see in a conference – the people at the other end of the call.

**Field of View (FOV)**

How wide the video image is. Vaddio measures horizontal field of view. Some manufacturers use diagonal field of view, which yields a bigger number for the same actual image area. Tilt your head to one side and diagonal FOV will make sense.

**flombodulator**

A technically complex item the name of which you can't recall at the moment.

**frame rate**

The number of output video frames per second. Different outputs (such as the IP stream and the USB stream) may use different frame rates. For streaming, higher frame rates use more bandwidth.

**full-duplex**

Simultaneous two-way (or multi-way) audio; conference participants at the near end can talk and still hear the participants at the far end(s), as in a face-to-face meeting.

**gamma**

A setting that adjusts the range (gray density) between bright areas and shadows.

**gateway**

Network information automatically assigned in a DHCP network. If installing equipment on a non-DHCP network, get this information from the network administrator.

**HDMI**

A video output format; may also carry audio information.

**HID audio controls**

(Human Interface Device) Controls to enable conference participants to use the conferencing client to control the audio.

**home**

The button (web interface or remote) that restarts Autoframing.

**HTTP**

HyperText Transfer Protocol. The magic that makes websites work.

**HTTPS**

HyperText Transfer Protocol Secure. The magic that uses encryption to make websites work securely. See SSL certificate for more information.

**IP address**

Where a given device is on the IP network, logically. The IP address enables the network to route data to the right device – and that's the reason IP address conflicts are bad.

**IP address conflict**

Two or more devices attempting to use the same IP address on a network. Results are unpredictable but never good.

**LED**

Light-Emitting Diode. An indicator light.

**mask (autoframing)**

An area where the camera does not evaluate motion. Create masks to keep the camera from framing unwanted motion or pixel changes such as doorways, windows, and projection screens.

**mic**

Microphone. Pronounced "mike" because the etymology matters more than English pronunciation rules, which are inconsistent anyway.



**MTU**

Maximum Transmission Unit. The largest number of bytes allowed in a packet. If you don't know what that means, don't change MTU size.

**near end**

(conferencing) Your location in a conference. When you mute the video, your camera stops sending near-end video.

**NLP**

Non-Linear Processing. Removes certain particularly challenging types of undesirable audio, such as the echo in a room without acoustic treatment, or background chatter in an office.

**noise**

Changes that are not meaningful. Audio noise typically sounds like a background hiss; video noise is visible at relatively low resolution as individual pixels randomly changing color.

**noise threshold**

The amount of noise that is ignored. Autoframing does not work properly unless the noise threshold is set high enough to allow video noise (such as shifting light levels) to be ignored.

**NTP**

Network Time Protocol. Ensures that NTP-enabled devices on the network all show the same system time, so timestamps are accurate.

**pairing**

The process of "teaching" two specific devices to recognize each other. The HuddleSHOT camera and its remote must be paired for the remote to control the camera.

**PoE, PoE+, PoE++**

Power over Ethernet; a means of powering a device using its network connection. Requires a mid-span power injector. PoE+ and PoE++ deliver more power than PoE.

**preset**

A stored camera shot. Contains pan, tilt, and zoom position; may also include color and Tri-Sync Motion speed settings.

**resolution**

1. The image size. For Vaddio cameras, resolution is expressed in terms of digital TV standards, with 1080p being the default in most cases. Resolution and frame rate are set together on Vaddio cameras. 2. The thing that usually flies out the window by January 10th.

**RTMP**

Real-Time Messaging Protocol. Used for livestreaming video (and audio, if available) to a service such as YouTube Live.

**RTSP**

Real-Time Streaming Protocol. Used for streaming video and audio over your network.

**soft conferencing client**

A conferencing application (such as Zoom, Google Hangouts, or Skype for Business) that uses a computer rather than requiring a conferencing codec.

**SSL certificate**

A file used with HTTPS proving that a web page really originates from its purported source. If you enable or require HTTPS on a camera or other device without installing an SSL certificate, your browser will pop up security warnings when you try to browse to the device's web interface.

**streaming protocol**

A set of rules that define how video and audio data are sent over the network. See RTMP and RTSP.

**subnet mask**

Network information automatically assigned in a DHCP network. If installing equipment on a non-DHCP network, get this information from the network administrator.

**tracking**

Keeping the camera on a subject by following a specific target such as a tracking device that the subject carries or wears.

**UAC drivers**

(Universal Audio Class) Standard USB audio drivers used by Vaddio conferencing products with audio capabilities.

**UCC, UC conferencing**

Unified Communications Conferencing; refers to soft-client conferencing (such as Zoom or Skype for Business) using a computer with USB-connected peripherals.

**USB playback**

Audio from other sites (far-end audio) in a conference call.

**USB record**

Audio from your site (near-end audio) in a conference call.

**UVC drivers**

(Universal Video Class) Standard USB video drivers used by Vaddio cameras. They're the reason your computer doesn't have to stop and download a driver when you connect your new Vaddio USB camera to it.

**UVC extensions**

Controls in UVC drivers to allow participants at the far end of a conference to control your camera, if it processes UVC commands. The administrator may choose to disable these.

## Photo Credits

This guide may include some of these photos.

European Space Agency (ESA) astronaut Samantha Cristoforetti, a Flight Engineer with Expedition 42, photographs the Earth through a window in the Cupola on the International Space Station

By NASA - [https://blogs.nasa.gov/ISS\\_Science\\_Blog/2015/03/06/women-in-space-part-two-whats-gender-got-to-do-with-it/](https://blogs.nasa.gov/ISS_Science_Blog/2015/03/06/women-in-space-part-two-whats-gender-got-to-do-with-it/), Public Domain, <https://commons.wikimedia.org/w/index.php?curid=38834990>

Carl Sagan, Bruce Murray, Louis Friedman (founders) and Harry Ashmore (advisor), on the occasion of signing the papers formally incorporating The Planetary Society

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Main Control Room / Mission Control Room of ESA at the European Space Operations Centre (ESOC) in Darmstadt, Germany

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Expedition 42 on orbit crew portrait, International Space Station, Mar. 7, 2015 – Barry Wilmore (Commander) Top, Upside down, to the right cosmonaut Elena Serova, & ESA European Space Agency Samantha Cristoforetti. Bottom center US astronaut Terry Virts, top left cosmonauts Alexander Samokutyaev and Anton Shkaplerov.

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European Space Agency astronaut Luca Parmitano, Expedition 36 flight engineer, outside the International Space Station

By NASA - <http://spaceflight.nasa.gov/gallery/images/station/crew-36/html/iss036e016704.html>, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=27263573>

Chris Cassidy, Luca Parmitano, and Karen Nyberg, ISS, 2013. Photo Credit: NASA

Nicolas Altobelli, Rosetta Scientist at ESA's European Space Astronomy Centre, Villanueva de la Cañada, Madrid, Spain

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Andrea Accomazzo, ESA Rosetta Spacecraft Operations Manager, providing a live update from the Main Control Room at ESA's European Space Operations Centre, Darmstadt, Germany during the Rosetta wake-up day.

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Author's own cats, photos by author, you're welcome.

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