



Complete Manual for

# **RoboSHOT 12E NDI and RoboSHOT 30E NDI**

High-Performance PTZ Cameras

Document 411-0038-30 Rev. B  
November 2020

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# Contents

Overview .....	1
What's in this Guide .....	1
Camera Features .....	1
Unpacking the Camera .....	2
A Quick Look at the Camera .....	3
Front of the Camera .....	3
Back of the Camera .....	4
Installing the Camera .....	5
Don't Void Your Warranty! .....	5
Before You Start .....	5
Cabling Notes .....	6
Functional Check .....	6
Status Light .....	7
Video Resolution Setting .....	7
About Ceiling-Mounted Cameras .....	7
RS-232 Serial Communication Settings .....	8
RS-232 Connector Pin-Out .....	8
Installing the Wall Mount .....	9
Connecting the Camera .....	10
Installing the Camera .....	11
Powering Up the Camera .....	11
Initial Device Set-Up and System Administration Tasks .....	12
Browser Support .....	12
Initial Device Set-up Process Overview .....	12
Access and Initial Device Set-Up Using the Vaddio Device Controller .....	13
Initial Device Set-Up and Access Using the Vaddio Deployment Tool .....	14
Manual Access and Initial Device Set-Up .....	16
Getting the Camera's IP Address for Manual Access .....	16
Accessing the Camera's Web Interface Using NDI Software .....	16
If the Camera Is At 169.254.1.1 .....	17
Opening the Web Interface .....	17
Initial Access to the Web Interface .....	17
System Administration .....	19
For Non-DHCP Environments: Configuring the Device with a Static IP Address .....	19
Optional For DHCP Environments: Changing from a DHCP Address to a Static IP Address .....	22
Specifying a DNS Server .....	22
Changing the Camera's Hostname .....	23
Managing Access and Passwords .....	24
Configuring Other Security Settings .....	24
Enabling Telnet Access .....	25

Enabling HTTP Access .....	25
Installing an SSL Certificate .....	25
Specifying Time Zone and NTP Server .....	26
Adding Room Information to the Camera's Web Interface .....	27
Configuring Camera Behavior .....	28
Setting the Custom Home Position and Other Preset Shots .....	28
Renaming Presets and Custom CCU Scenes .....	29
Initial Lighting and Color Settings .....	30
Lighting Adjustments .....	31
Fine-Tuning Image Quality and Color .....	31
Lighting and Image Quality Cheat Sheet .....	32
Color Adjustment Cheat Sheet .....	33
Saving Color and Lighting Settings .....	33
Adjusting the Focus .....	34
Speed Adjustments .....	34
About Tri-Synchronous Motion .....	34
Setting the Speed for Manual Movements .....	35
Setting the Speed of Movements to Presets .....	35
Adjusting Tri-Synchronous Motion Speed .....	36
Setting the Direction for Camera Movements .....	37
Basic Camera Settings .....	38
Software-Controlled Video Output Resolution Setting .....	39
Indicator Light Behavior Settings .....	39
System Maintenance .....	40
Saving (Exporting) or Restoring (Importing) a Camera Configuration .....	41
Installing a Camera Firmware Update .....	42
Rebooting the Camera .....	43
Contacting Vaddio Technical Support .....	44
Accessing the Diagnostic Logs .....	45
Using the IR Remote .....	46
Storing a Preset Using the Remote .....	46
Clearing a Preset Using the Remote .....	46
Operating the Camera from the Web Interface .....	47
Switching the Camera Off or On (Standby) .....	47
Stop or Resume Sending Video (Mute) .....	47
Moving the Camera .....	48
Zooming In or Out .....	48
Moving the Camera to a Preset Position .....	48
Adjusting the Color and Lighting .....	48
Telnet Command Reference .....	49
Camera and Video Management Commands .....	49

camera home .....	50
camera pan .....	50
camera tilt .....	51
camera zoom .....	52
camera ptz-position .....	53
camera focus .....	54
camera preset .....	55
camera ccu scene .....	56
camera ccu get .....	57
camera ccu set .....	58
camera led .....	59
camera standby .....	59
Maintenance and Troubleshooting Commands .....	60
network settings get .....	60
network ping .....	60
system reboot .....	61
system factory-reset .....	61
version .....	62
Telnet Information and Session Management Commands .....	63
history .....	63
help .....	63
exit .....	63
RS-232 Serial Command Reference .....	64
Camera Movement, Zoom, and Focus Commands .....	64
Movement, Zoom, and Focus Inquiry Commands .....	66
Color and Light Management Commands .....	67
Shutter Speed Values (CAM_Shutter) .....	69
Iris Values (CAM_Iris) .....	70
Iris Gain and Gain Limit Values (CAM_Gain) .....	70
Color and Light Management Inquiry Commands .....	71
Other Commands .....	72
Other Inquiry Commands .....	72
Specifications .....	73
Troubleshooting and Care .....	74
Check the Status Light First .....	74
Check the Cables Next .....	74
Power/Responsiveness Issues .....	75
Video Issues .....	75
Camera Control and Other Issues .....	76
Restoring Factory Settings from the Web Interface .....	76
Restoring Factory Default Settings Via Hardware .....	76

Operation, Storage, and Care .....	77
Compliance and Conformity Statements .....	78
FCC Part 15 Compliance .....	78
ICES-003 Compliance .....	78
European Compliance .....	79
Photo Credits .....	80
Index .....	81

## Overview

This guide covers RoboSHOT® NDI® cameras:

- RoboSHOT 12E NDI, North America – 999-99407-000 (black), 999-99407-000W (white)
- RoboSHOT 12E NDI, Europe/UK – 999-99407-001 (black), 999-99407-001W (white)
- RoboSHOT 12E NDI, Australia/New Zealand – 999-99407-009 (black), 999-99407-009W (white)
- RoboSHOT 30E NDI, North America – 999-99437-000 (black), 999-99437-000W (white)
- RoboSHOT 30E NDI, Europe/UK – 999-99437-001 (black), 999-99437-001W (white)
- RoboSHOT 30E NDI, Australia/New Zealand – 999-99437-009 (black), 999-99437-009W (white)



For information about NewTek NDI technology and products, please visit NewTek Inc.'s website:

<https://www.newtek.com/ndi/>

## What's in this Guide

This guide covers:

- Unpacking
- Physical features
- Installation
- Web interface: System administration, performance/behavior configuration, and maintenance
- Operating the camera from the web interface
- Controlling the camera using the IR remote
- Telnet and RS-232 API references
- Specifications
- Troubleshooting
- Compliance/conformity information

For your convenience, the information you need to install this product is also available in the smaller, stand-alone **Installation Guide for RoboSHOT 12E NDI and RoboSHOT 30E NDI High-Performance PTZ Cameras**, which covers unpacking, physical features, switch settings, installation, and initial power-up.

Download manuals, dimensional drawings, and other information from [www.legrandav.com](http://www.legrandav.com).

## Camera Features

- Deploy directly into an NDI® AV-over-IP environment; no extension or bridging device required
- Native 1080p/60 NDI streaming with ultra-low latency – under 100 msec
- Courtesy HDMI output
- Exmor R™ back-lit 1/2.5 type, high-speed, low-noise image sensor
- RoboSHOT 30E NDI: 30x zoom with 70° horizontal field of view (wide end)  
RoboSHOT 12E NDI: 12x zoom with 70.2° horizontal field of view (wide end)
- Tri-Synchronous Motion™ simultaneous 3-axis pan/tilt/zoom movement between presets
- Smooth, silent direct-drive motors – ultra-accurate positioning, from 120° per second down to 0.35° per second
- Web interface for remote administration and operation, integration-ready Telnet or serial RS-232 control, presenter-friendly IR remote control

## Unpacking the Camera

Make sure you received all the items you expected.



### Caution

Always support the camera's base when picking it up. Lifting the camera by its head or mounting arm will damage it.

**RoboSHOT 12E NDI, North America** – 999-99407-000 (black), 999-99407-000W (white)

**RoboSHOT 12E NDI, Europe/UK** – 999-99407-001 (black), 999-99407-001W (white)

**RoboSHOT 12E NDI, Australia/New Zealand** – 999-99407-009 (black), 999-99407-009W (white)

- RoboSHOT 12E NDI camera (black or white)
- Thin Profile Wall Mount with mounting hardware, black or white, depending on camera color
- Vaddio IR Remote Commander
- PoE+ mid-span power injector with AC cord set(s)
- Quick-start guide



**RoboSHOT 30E NDI, North America** – 999-99437-000 (black), 999-99437-000W (white)

**RoboSHOT 30E NDI, Europe/UK** – 999-99437-001 (black), 999-99437-001W (white)

**RoboSHOT 30E NDI, Australia/New Zealand** – 999-99437-009 (black), 999-99437-009W (white)

- RoboSHOT 30E NDI camera (black or white)
- Thin Profile Wall Mount with mounting hardware, black or white, depending on camera color
- Vaddio IR Remote Commander
- PoE+ mid-span power injector with AC cord set(s)
- Quick-start guide





## A Quick Look at the Camera

RoboSHOT NDI cameras are available in black or white.

### Front of the Camera



- **Camera and Zoom Lens**
  - **RoboSHOT 12E NDI:** 12x zoom is ideal for classrooms and small to medium sized conference rooms.
  - **RoboSHOT 30E NDI:** 30x zoom delivers superb clarity and detail even in large spaces.
- **IR Sensors:** Sensors in the front of the camera base receive signals from the remote. Make sure there's nothing directly in front of the camera base, and point the remote at the camera.
- **Status indicator:** The multicolored LED indicates the camera's current state.
- **Really Cool Logo Badge (RCLB):** Attractive and shiny, with a sophisticated brushed-metal finish.

## Back of the Camera

The connector panels of the RoboSHOT 12E NDI and RoboSHOT 30E NDI cameras are identical.



From left to right:

- **Network PoE+:** RJ-45 connector. Connect to the network via PoE+ injector for power, control, and video.
- **HD Video Select switch:** Rotary switch to select the HDMI output resolution. See [Video Resolution Setting](#).
- **HDMI:** Courtesy HDMI video output connector.
- **RS-232:** RJ-45 connector. Typically not used.

**Note**

*A label on the bottom of the camera lists the rotary switch settings.*

## Installing the Camera

This section covers:

- Selecting the location for the camera
- Pre-installation functional check
- Information on cables and (if applicable) RS-232 communication
- Connection diagram
- Settings for physical switches (if any)
- Installing the camera mount
- 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**

*Always support the camera's base when picking it up. Lifting the camera by its head or mounting arm will damage it.*

### **Caution**

*This product is for indoor use only. Use an appropriate protective enclosure if installing it outdoors or in a humid environment. 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 Start

Things to keep in mind when deciding where to install the camera:

- Consider camera viewing angles, lighting conditions, line-of-sight obstructions, and in-wall obstructions.
- If the IR Remote Commander will be used, ensure that nothing blocks the IR lens in the camera's base.
- Ensure that the camera body can move freely and will normally point away from the ceiling and lights.

The video image may appear off-level in any of these situations:

- The mount is not level
- The mount is not installed on the centerline of the room
- The back wall of the room is not perpendicular to the centerline of the room

Prepare for a successful installation:

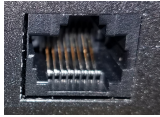
- Be sure you can identify all cables correctly.
- Check Cat-5 cables for continuity.
- Ensure that the video resolution rotary switch is set appropriately.
- *Talk to the network administrator.* If installing the camera in a non-DHCP network (one that does not automatically assign IP addresses), you may need to configure the camera with a static IP address as directed by the network administrator before connecting it to the network. Work with the network administrator to determine how to configure the equipment.

## Cabling Notes

Use Cat-5e or better cable. Cat-6 or Cat-7 cabling allows longer maximum cabling distance, and may provide better performance in noisier RF or EMF environments. We recommend 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. When in doubt, use shielded Cat-6 cable or better.

### Caution

When making cables for Vaddio products, do not use pass-through RJ-45 connectors. If they are crimped incorrectly, they can damage the connectors on the product, cause intermittent connections, and degrade signal quality. Physical damage to the connectors will void your warranty.



**Intact** – Contact fingers will make reliable contact with the cable connector



**Damaged** – Some contact fingers are bent and will NOT make reliable contact with the cable connector

We recommend using high-quality connectors and a high-quality crimping tool.

### 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.



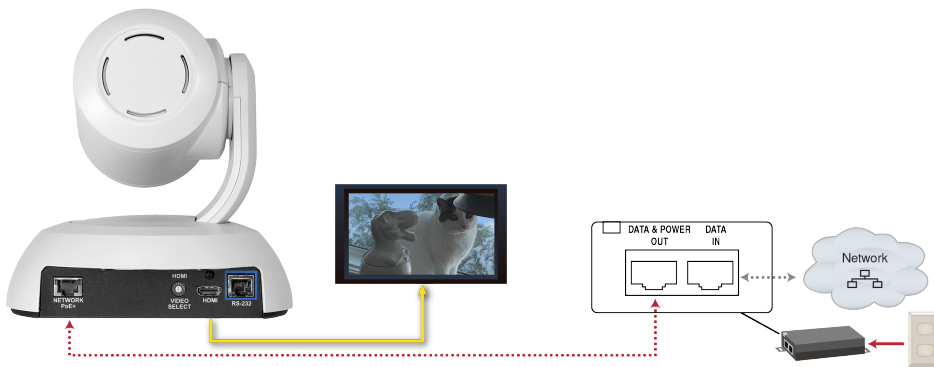
### Pro Tip

To prevent tragic mishaps, label both ends of every cable.

## Functional Check

Before you install the camera, you may want to verify functionality.

1. Connect the camera in its minimum functional configuration.
2. Connect power. The camera moves, the indicator light turns blue, and video is available on the connected display.
3. If the camera turns on and sends video, continue with the installation.



## Status Light

The light in the camera's base indicates its current state.

- **Blue:** Normal operation (blinks once when the camera receives a command from the remote)
- **Red:** On-air tally (signal provided by external device via serial connection)
- **Blinking red:** Video is muted (UC color scheme only)
- **Purple:** In standby mode or booting
- **Yellow:** Firmware update in progress

### Caution

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

### Note

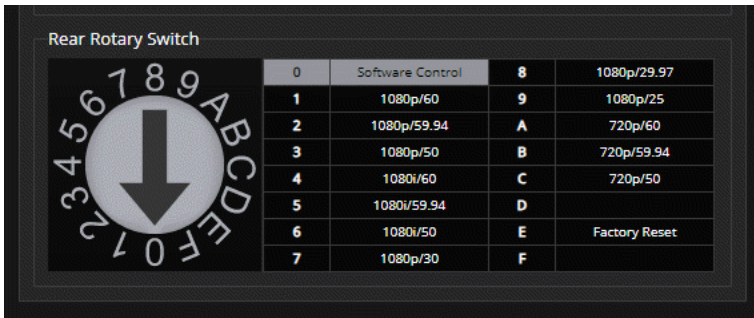
*By default, the camera's status light is active during normal operation; however, it can be configured to remain off when the camera is powered up. The camera may be sending video even if the indicator light is off.*

## Video Resolution Setting

Set the desired video output resolution with the rotary switch before installing the camera.

Position 0 selects software control, which allows you to set the video output resolution in the web interface. The default resolution for this setting is 1080p/59.94.

See [Software-Controlled Video Output Resolution Setting](#).



## About Ceiling-Mounted Cameras

If you use an inverted mount, you will need to use the Image Flip setting to orient the video image correctly and set the tilt motors to respond appropriately to tilt commands from the remote, web interface, and connected control devices. After the camera has power, this setting is available to the administrator on the System page of the web interface, under the DIP Switches tab.

### Note

*If mounting this camera using the Half-Recessed Ceiling Mount, you will need to power the mount's IR receiver separately to use the IR remote with the camera. Use Power Extension Module 999-1005-021. This camera does not supply power to the mount's IR receiver.*

## RS-232 Serial Communication Settings

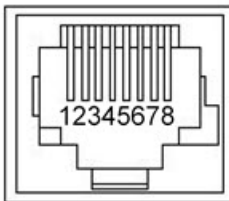
In most situations, all control is via the NDI connection; however, the RS-232 serial port (color-coded blue) provides an alternate means of controlling the camera from a third-party device. If using the RS-232 connection, be sure the camera is set to the same baud rate as the external control device.

Specification	Value
Communication Speed	9600 or 38400 baud, selectable
Number of start bits	1
Number of stop bits	1
Number of data bits	8
Parity	None
Flow control	None

The camera's default baud rate is 9600. The 38400 baud setting is optional if the connected device supports it.

## RS-232 Connector Pin-Out

- Pin 1: Not used
- Pin 2: Not used
- Pin 3: Not used
- Pin 4: Not used
- Pin 5: Not used
- Pin 6: GND
- Pin 7: RXD (from TXD of control source)
- Pin 8: TXD (to RXD of control source)



### Caution

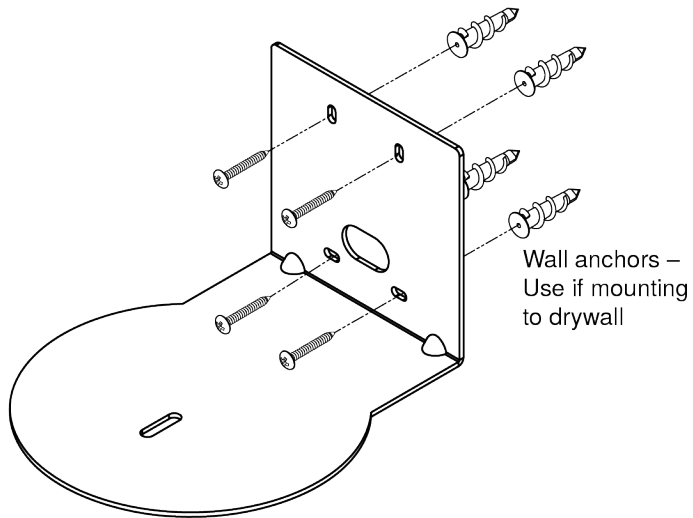
*Check your cables. Connecting a cable to the wrong port or using the wrong pin-out can result in equipment damage and will void the warranty.*

## Installing the Wall Mount

The camera is shipped with a Thin Profile 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 2-gang wall box or directly to the drywall.

- If you mount it to drywall, use the wall anchors provided with the wall mount.
- If you mount it to a wall box, use the cover plate screws supplied with the wall box.



## Connecting the Camera

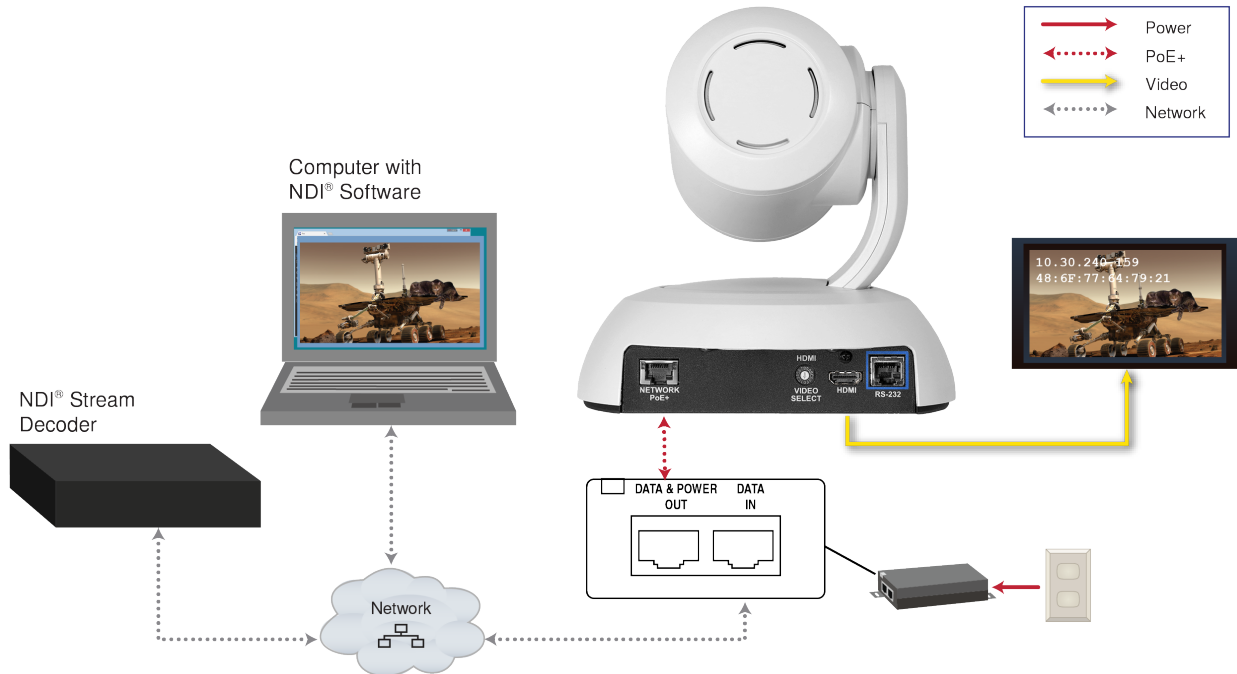
### Note

**Talk to the network administrator before you connect the equipment.**

If you install this equipment on a non-DHCP network (one that uses only static IP addresses), you may need to configure the camera with a static IP address before you connect it to the network. Work with the network administrator to determine how to configure the equipment.

See [Configuring the Camera with a Static IP Address](#) for step-by-step instructions to configure a static IP address.

This diagram shows a simple installation for a RoboSHOT NDI camera.





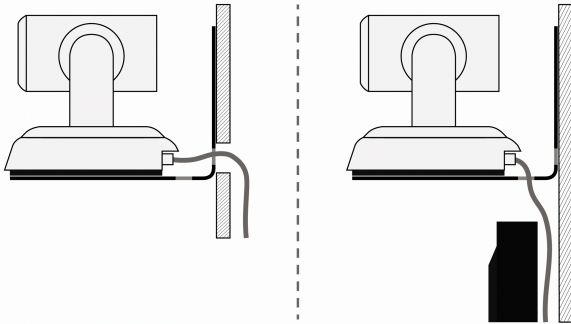
## Installing the Camera

Be sure you have already set the camera's video resolution switch.

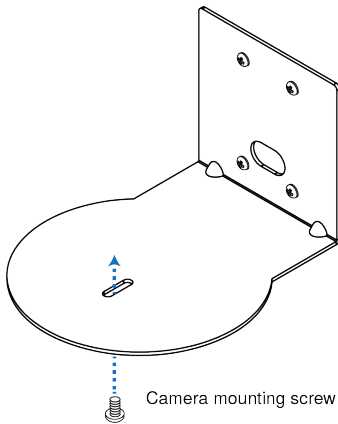
### **Caution**

*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. Route the cables to the camera location.
2. Route the cables through the mount, and install the mount on the wall or attach it to the wall box. Leave the screws loose enough to adjust the position of the mount.
3. Level the mount and tighten the mounting screws.
4. Connect the cables to the camera.
5. Place the camera on the mount.



6. Attach the camera to the mount using the 1/4"-20 x .375 mounting screw supplied with the camera.



*Images for illustration only; not to scale. Camera and mount details may differ.*

## Powering Up the Camera

Connect camera power.

The camera will run a self-test routine and move. This will take a few seconds.

When the camera is initialized and ready, video is available and the status light is blue. At this point, the camera is ready to accept control information.

### **Note**

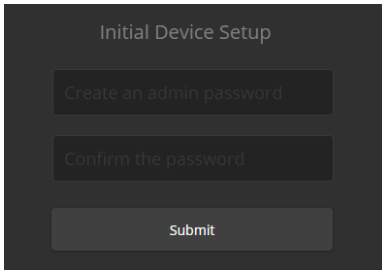
*Wait until the camera finishes initializing before trying to operate or control it.*

## Initial Device Set-Up and System Administration Tasks

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

When any Vaddio product is shipped from the factory, there is no admin password and the administrative controls are not available. This is also true if you restore factory defaults, which returns the device to a "like new" state.

Initial device set-up includes setting the admin password, and may include additional tasks.



After initial device set-up, the web interface provides password-protected pages for administrative access to tasks such as configuring network and security settings, customizing device behaviors, and installing firmware updates. The administrator can configure the operator's page to be password-protected or not.

## Browser Support

We have tested this product with these web browsers:

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

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 sequence of tasks for initial device set-up and system administration differs somewhat, depending on which method you use.

Ways to access the camera for initial device set-up:

- **Locate and browse to the camera from the NDI software on your computer.**
- **Locate and set up the camera using the Vaddio Deployment Tool** – This tool is available as a free download at <https://info.legrandav.com/VaddioDeploymentTool>. The tool scans the network for Vaddio devices, lists them by model and IP address, 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 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. The process is the same for all products.
- **Access the web interface directly** – The classic method. Discover the camera's IP address and browse to its web interface. The way you discover the IP address depends on the device. The rest of the process is the same for all products.

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

The Vaddio Device Controller is a stand-alone appliance for working with Vaddio products' web interfaces.



Ways the Vaddio Device Controller makes your tasks easier:

- Easily scan your network for Vaddio devices – no more complicated procedures for discovering devices' IP addresses.
- Following the scan, select a device and exit straight to its web interface.
- No annoying messages about HTTPS connections – you automatically connect via HTTPS.

Unlike the Vaddio Deployment Tool, it does not need to be updated to support new products. For detailed instructions on installation and use, refer to the Vaddio Device Controller's manual.

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

1. Be sure the touch-panel is installed 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 and select Scan. You will need to enter the Vaddio Device Controller's PIN to access the Configuration page.
3. Locate the device you need to work with, and select Use.
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.*

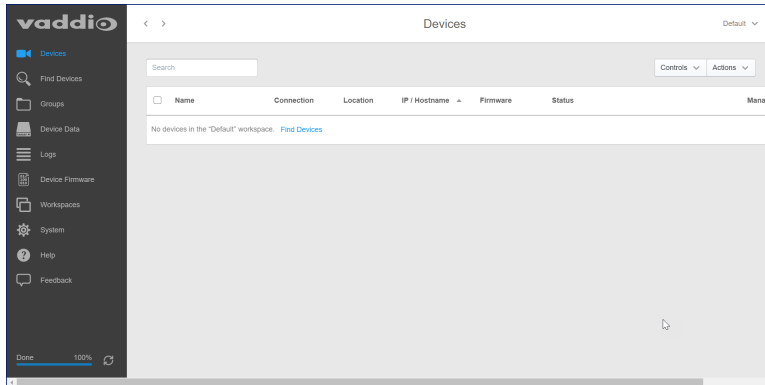
5. Complete the initial device set-up.

### If the Vaddio Device Controller does not find the camera:

- Verify that the camera is connected to the network, on the same subnet as the Vaddio Device Controller.
- [Check the camera's IP address manually.](#)

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

The Vaddio Deployment Tool simplifies provisioning and system administration for most Vaddio products, and provides a shortcut to each device's web interface. This tool is available as a free download at <https://info.legrandav.com/VaddioDeploymentTool>.



Ways the Vaddio Deployment Tool makes your tasks easier:

- Easily scan your network for Vaddio devices – no more complicated procedures for discovering devices' IP addresses.
- View scan results as a dashboard; easily identify unprovisioned and unauthenticated devices.
- Provision new devices or update device firmware from the dashboard.
- Import or export device configurations, reboot, or restore a device to factory defaults from its detail page.
- Access devices' web interfaces directly.
- Change a device's admin password from its detail page.
- Standby and mute controls available on the dashboard for authenticated devices.
- Organize Vaddio devices into groups – for example, by product type or physical location.

As Vaddio introduces new products, we issue updates to the Vaddio Deployment Tool. Be sure you have the latest version of the tool, to ensure that it supports the products you are working with.

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

**Note**

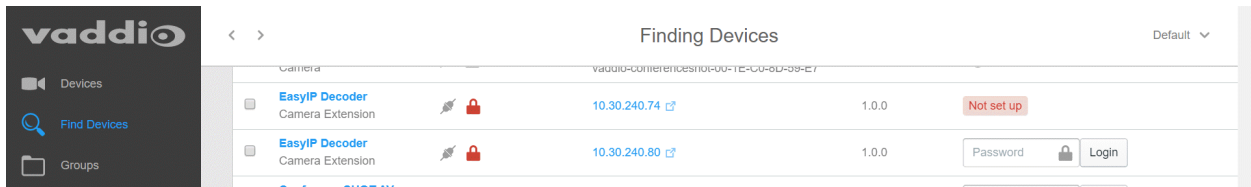
The screen shots in this procedure show a different device; the steps are the same for any Vaddio camera or other device.

1. Power up the camera if you have not done so already.
2. On the Find Devices page of the Vaddio Deployment Tool, click Scan. If the scan does not locate the camera, click Advanced and specify the appropriate portion of the network to scan – your computer may be on a different subnet from the equipment you need to set up.

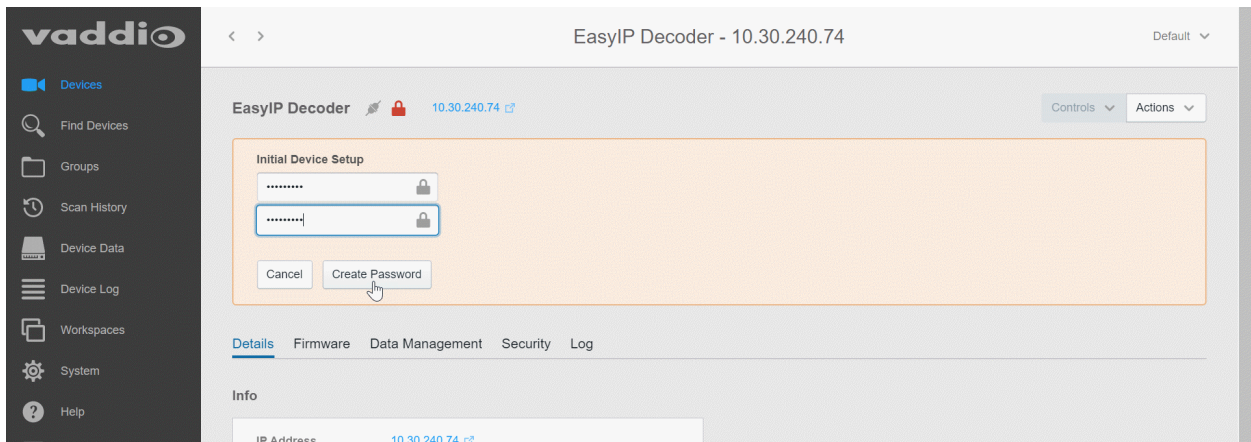
**Note**

If the camera is a recent addition to the Vaddio product line, older versions of the Vaddio Deployment Tool may not recognize it. Be sure you have the current version.

3. In the list of equipment that the scan discovers, locate the devices marked Not Set Up.



4. For each device, click the Not Set Up button. The device detail page opens.
5. Set the admin password. If there are other initial set-up tasks, they are also available here.



The device now shows up as unlocked.

**Pro tip**

On the Groups page of the Vaddio Deployment Tool, you can create a group containing the products in one room, products of one type, or any other grouping that you find convenient.

### To access the camera's web interface from the Vaddio Deployment Tool:

Select the camera's IP address from any page where it appears. The Vaddio Deployment Tool does one of these things:

- Takes you to the camera's Initial Device Setup page if no admin password has been set.
- Prompts you to authenticate if the initial device setup has been done.
- Logs you in to the web interface as `admin` if you have already authenticated.

### If the Vaddio Deployment Tool does not find the camera:

- Download the latest version of the Vaddio Deployment Tool.
- Verify that the camera is connected to the network.
- Be sure you are scanning the right subnet.
- [Check the camera's IP address manually](#).

## Manual Access and Initial Device Set-Up

For manual access and initial device set-up, the general process is:

1. Discover the camera's IP address.
2. Access its web interface.
3. Complete the initial device set-up.

## Getting the Camera's IP Address for Manual Access

If you are not using the Vaddio Deployment Tool or a Vaddio Device Controller to access the camera's web interface, you will need to know its IP address.

**If you know that your network does not automatically assign IP addresses**, skip this section: The camera's address is 169.254.1.1. You will need to connect your computer's network port to the camera's network port to do the initial device configuration and network configuration.

**If you are not sure, or you know that your network automatically assigns IP addresses**, you will need to be able to view the camera's video output on an HDMI display.

Point the IR Remote Commander toward the camera and press the Data Screen button. The camera's IP and MAC addresses are displayed. Press the Data Screen button again to dismiss the display.

**If the address is 169.254.1.1**, the camera is using its default IP address.

## Accessing the Camera's Web Interface Using NDI Software

Under the following conditions, you can access the camera's web interface without knowing its IP address:

- You have access to a computer using NDI software
- The camera is deployed on a DHCP network, on a subnet available to the NDI software

In this situation, the camera is listed by its hostname in the NDI software as an available device. The camera's hostname begins with `vaddio-roboshot-ndi`.

To access the camera's web interface:

1. Open the NDI software if you have not done so already.
2. Select the camera from the list of available devices. The video stream opens, with camera controls overlaid on the display.
3. Select the Settings icon at the bottom of the camera controls. The camera's web interface opens.

## 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 is not connected to the network.
- The network does not automatically assign IP addresses, and you need to configure the camera for the network.

To communicate directly with the camera, connect a cable from your computer's network port to the camera's network port. This will allow you to access the web interface.

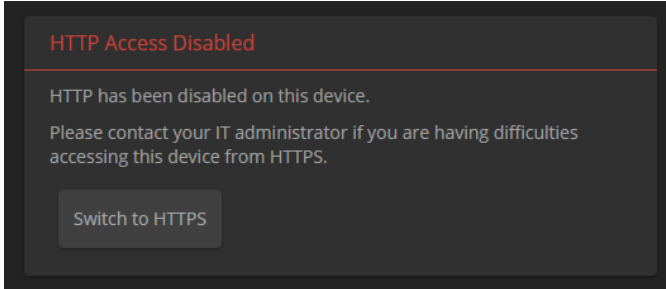
After you have done the initial device set-up, you will need to configure the camera for the network.

## Opening the Web Interface

Enter the IP address or hostname in your browser's address bar. You may need to enter `https://` as a prefix to keep the browser from treating it as a search query.

## Initial Access to the Web Interface

Before the product is configured, HTTP access is disabled. **This is also true after restoring factory defaults.** When you access the web interface, 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

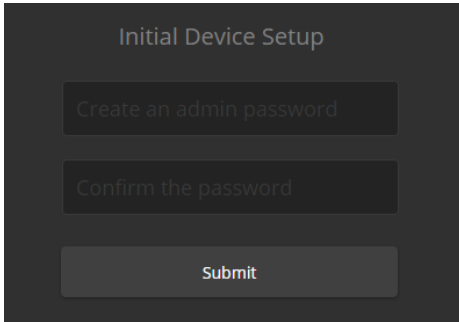
This is because the certificate (the product's website security credential) is self-signed rather than being issued by an external certificate authority. *The HTTPS connection is secure and traffic is encrypted, however.*

To proceed to the product's web interface, **you will need to make the selections that your browser's security message discourages.** The security warning page may present an option to learn more, view details, or go to the "Advanced" page. When you select the applicable option, your browser provides a button or link to continue to the IP address you entered, with a reminder that it may be unsafe. Select this option. *Your HTTPS connection is safe.*

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

**To complete the initial device set-up:**

The first time you access any Vaddio device's web interface, it presents a landing page to set the admin password. There may be additional initial device set-up tasks. After you complete the initial device set-up, you will be able to work with the product.

A screenshot of a web interface titled "Initial Device Setup". The interface is dark-themed and contains three input fields. The first field is labeled "Create an admin password", the second is labeled "Confirm the password", and the third is a "Submit" button.

**Note**

*Because restoring factory defaults returns the product to a "like new" condition, you will need to do the initial device set-up after you restore factory defaults.*



## System Administration

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

What controls do you need?	Go to this screen
Network settings <ul style="list-style-type: none"> <li>■ Hostname</li> <li>■ DHCP or static addressing</li> <li>■ Static: IP address, subnet mask, gateway</li> </ul>	Networking
Access management <ul style="list-style-type: none"> <li>■ Account passwords</li> <li>■ Guest access</li> <li>■ Idle session time-out</li> <li>■ Telnet access enabled/disabled</li> <li>■ Advanced security settings</li> </ul>	Security
Time zone and NTP server (source for system time/date)	Networking
Information about the camera location Help desk phone number for end users	Room Labels
Vaddio Technical Support contact information	Help
Diagnostic logs	Diagnostics

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

**Note**

*Vaddio's RoboSHOT series cameras all have very similar web interfaces. Some of the screen shots in this manual may be from other models in the RoboSHOT series.*

## For Non-DHCP Environments: Configuring the Device with a Static IP Address

NETWORKING PAGE

**Caution**

*Consult your IT department before editing network settings. Errors in network configuration can make the camera inaccessible from the network. Do not change DHCP/Static addressing, IP address, subnet mask, or gateway unless you are very familiar with the characteristics and configuration of the network where you install the camera.*

By default, the camera is set to DHCP and you do not need to configure it with a static IP address. However, if no DHCP server is available to automatically assign an address, the camera will use the default IP address of 169.254.1.1. If this is the case, you may need to follow this procedure.

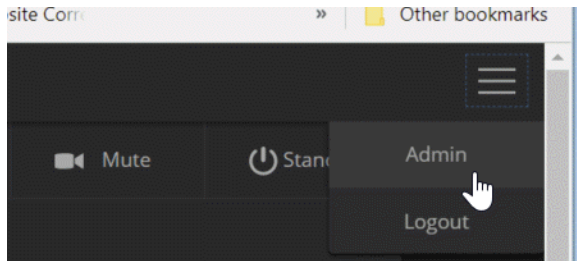
If you install more than one camera on a network that does not automatically assign IP addresses (a non-DHCP network), follow this procedure to prevent IP address conflicts.

**Note**

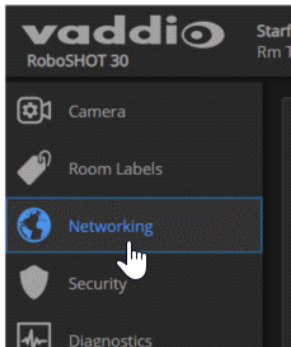
*If the camera is currently at an IP address other than 169.254.1.1, skip this section unless you are instructed to configure the camera with a static IP address.*

**To access the camera's Networking page during installation (skip this procedure if the camera has already been in service on this network):**

1. Connect the camera according to the connection diagram, but *do not connect the camera to the network*.
2. Connect the network port on the camera to the network port on a computer. Depending on the computer, you may need a crossover cable.
3. On the computer, open a browser and access the camera's web interface at <http://169.254.1.1>.
4. Log in as admin.

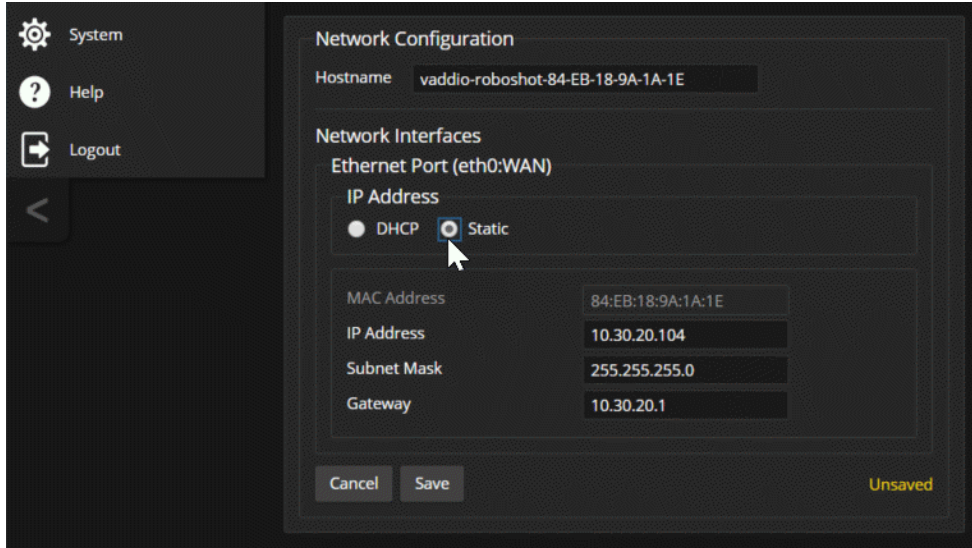


5. Navigate to the Networking page.



**To configure the camera with a static IP address:**

1. Work with your IT department to determine the correct IP address, subnet mask, and gateway to assign.
2. On the Networking page, set IP Address to Static.
3. Enter the IP address, subnet mask, and gateway as directed by the IT staffer; then save your work.

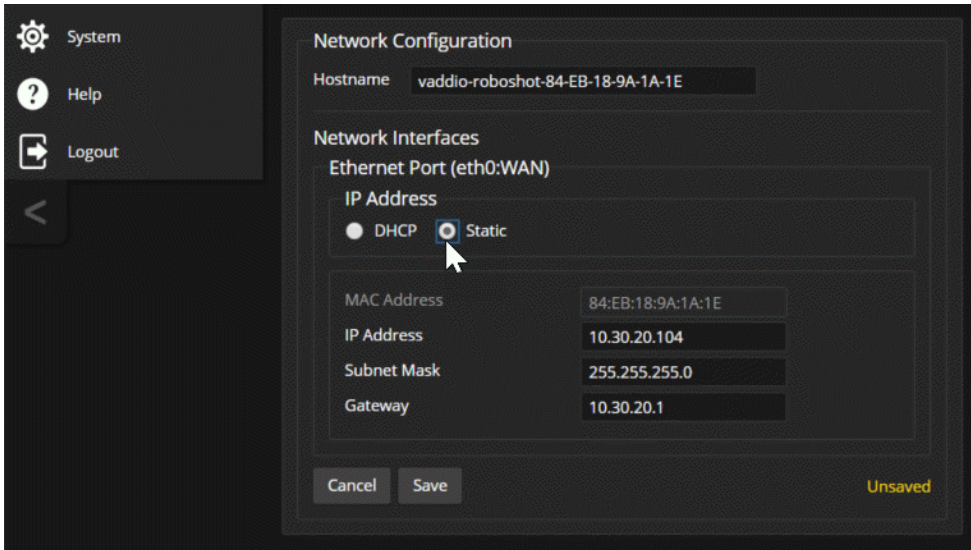


4. The camera is now ready to be connected to the network.

## Optional For DHCP Environments: Changing from a DHCP Address to a Static IP Address

### NETWORKING PAGE

In a network that assigns IP addresses automatically, the camera's IP address may change from time to time. To keep this from happening, set the IP address to Static. *Do not change the IP address, subnet mask, or gateway unless the network administrator instructs you to do so.*



### Specifying a DNS Server

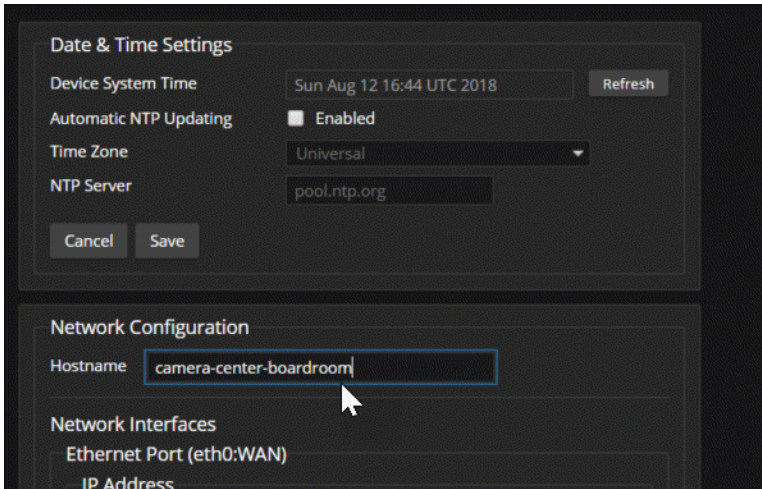
When the camera is set to use a static IP address, the DNS Server field becomes editable. *Do not edit this field unless the network administrator instructs you to do so.*

## Changing the Camera's Hostname

### NETWORKING PAGE

If your network supports hostname resolution, you may find it convenient to change the camera's hostname to something easy to remember, such as **camera-center-boardroom**.

Work with your IT department to ensure that the new hostname conforms to the organization's naming conventions.



## Managing Access and Passwords

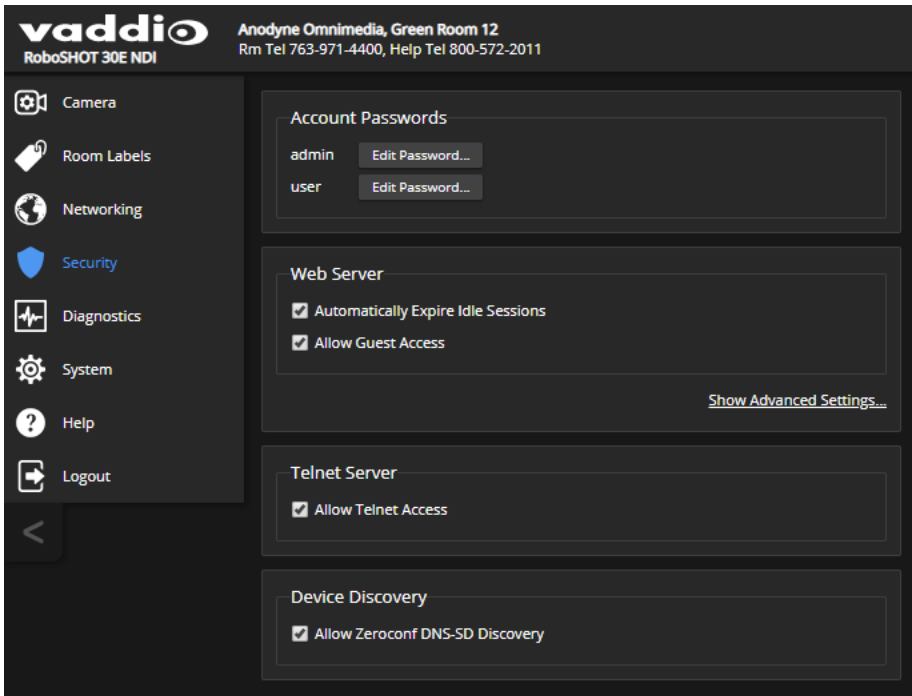
### SECURITY PAGE

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

- **Admin password** – Required for access to the admin pages of the web interface and for Telnet access to the device. There is no default admin password.
- **User password** – Required for access to the operator's page of the web interface unless guest access is enabled. There is no default user password.
- **Allow Guest Access** – Allows people to browse to the operator's page of the web interface without logging in. If guest access is not enabled, no controls are available until you log in. Guest access is disabled by default.
- **Automatically Expire Idle Sessions** – By default, sessions expire after 30 minutes with no interactions.

### Note

*Consult your network security specialist before changing any of these settings.*



## Configuring Other Security Settings

### SECURITY PAGE

Security settings include:

- Enabling or disabling access via Telnet (by default, access via Telnet is disabled)
- Enabling or disabling HTTP for web access (by default, access via HTTP is disabled) and installing the SSL certificate
- Allowing or denying device discovery (allowed by default)

### Note

*Consult your network security specialist before changing any of these settings.*

## Enabling Telnet Access

### SECURITY PAGE

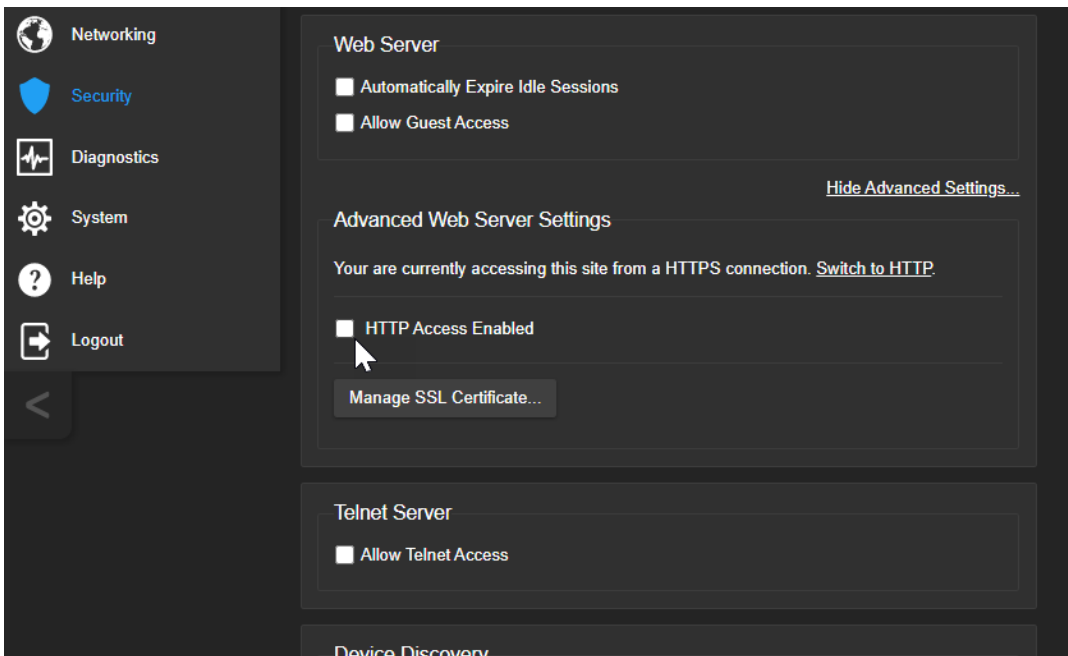
If your installation requires camera access via Telnet, you may choose to enable the camera's internal Telnet server.

## Enabling HTTP Access

### SECURITY PAGE

By default, the web interface uses the HTTPS protocol, and HTTP is disabled. You can configure the camera's web interface to allow a less secure HTTP connection instead.

1. Select Show Advanced Settings. The advanced options open.
2. To allow HTTP connections, select HTTP Access enabled. The camera's web interface will be available via HTTP or HTTPS connection.
3. To switch to an HTTP connection, select Switch to HTTP.



## Installing an SSL Certificate

### SECURITY PAGE

When the camera does not have an SSL certificate, your browser's address bar may display a security indication.

Work with your network security professional to install the camera's SSL certificate.

### **Caution**

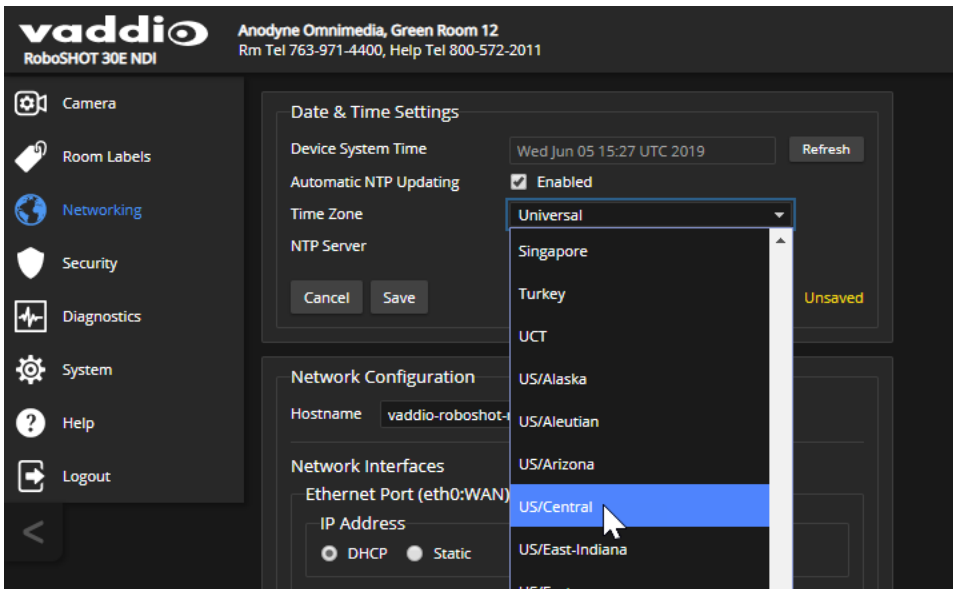
*Consult your network security professional to manage the camera's SSL certificate. Do not make any changes in the Certificate or Private Key text boxes without guidance from your organization's network security professional.*

## Specifying Time Zone and NTP Server

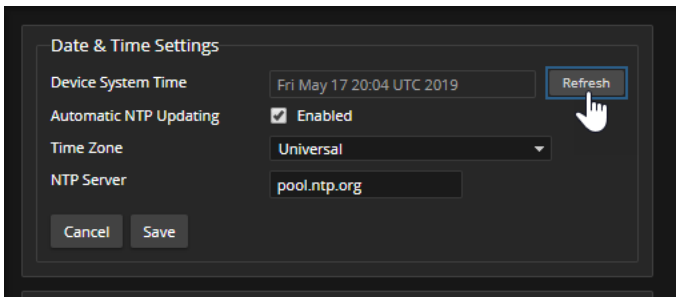
### NETWORKING PAGE

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. Select the desired time zone from the list.
3. If desired, specify the NTP server to use. Otherwise, use the default.



You may need to refresh the system time display.

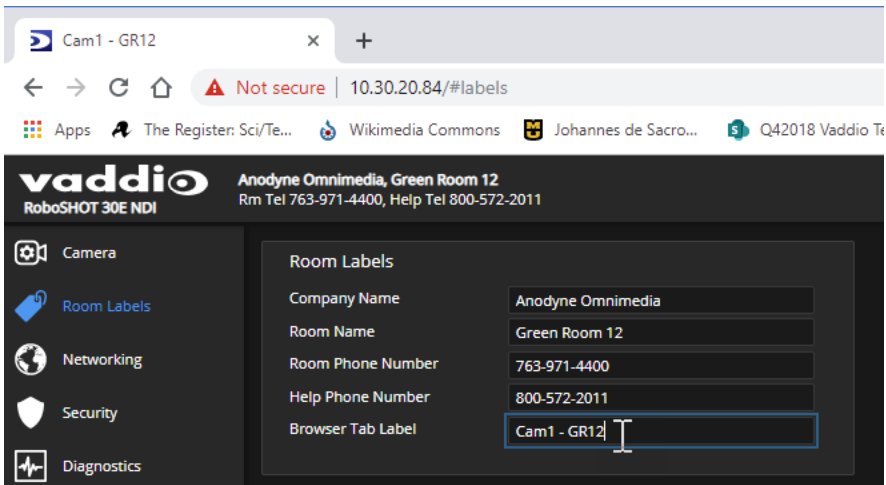




## Adding Room Information to the Camera's Web Interface

### ROOM LABELS PAGE

The information you enter on this page is displayed on every page of the web interface.



## Configuring Camera Behavior

This chapter covers managing the camera as a part of the room's AV environment.

What controls do you need?	Go to this screen
Camera behavior and adjustments <ul style="list-style-type: none"> <li>■ Set or clear presets</li> <li>■ Set the speed for pan, tilt, or zoom motions</li> <li>■ Focus the camera</li> <li>■ Work with color and lighting adjustments (CCU scenes)</li> </ul>	Camera
<ul style="list-style-type: none"> <li>■ IR1, IR2, IR3 (Frequency Selection) for controlling up to 3 cameras independently with the remote</li> <li>■ IR on/off for enabling/disabling control via the remote</li> <li>■ Image Flip for inverted camera installation</li> <li>■ Baud rate for RS-232 serial communication</li> </ul>	System (DIP Switches and General tabs)
Advanced camera settings <ul style="list-style-type: none"> <li>■ Indicator light – select color scheme, enable/disable, set behavior in standby mode</li> <li>■ Codec control mode</li> </ul>	System (DIP switches tab, General tab)
Read-outs of the camera's hardware switch settings	System (DIP switches tab)

Streaming settings are managed by NDI software or devices, not on the camera.

### Note

Vaddio's RoboSHOT series cameras all have very similar web interfaces. Some of the screen shots in this manual may be from other models in the RoboSHOT series.

## Setting the Custom Home Position and Other Preset Shots

### CAMERA PAGE

The camera's default home position is 0° pan and 0° tilt, at 1x zoom; you can set a different home position.

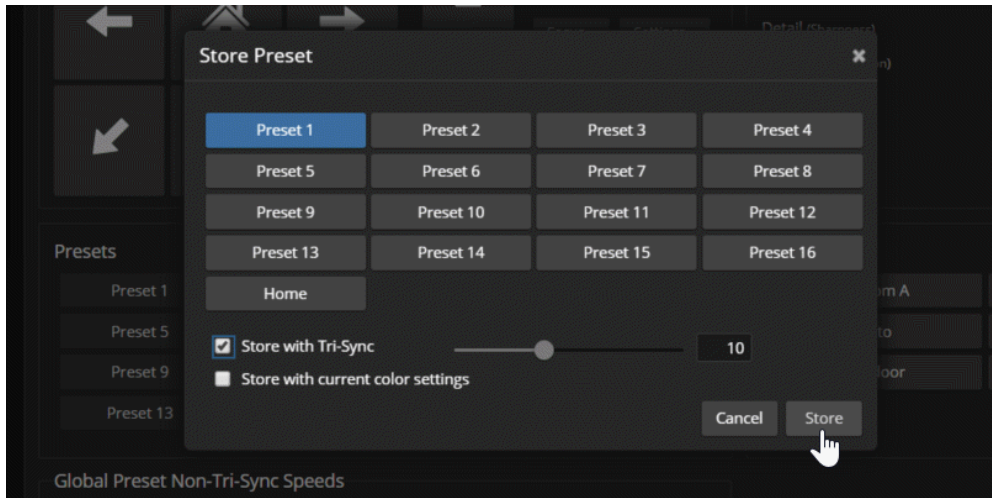
You can also define other presets for shots that you expect to use repeatedly.

### Note

Storing a preset overwrites any information that was previously associated with that preset. The Store Preset dialog does not show which presets have already been defined. Vaddio recommends renaming presets when you store them.

**To store a preset or custom home position:**

1. Set up the shot. If necessary, adjust color and lighting (CCU settings) as well.
2. Select Store to open the Store Preset dialog.



3. Select the preset to define.
4. Select Store with Current Color Settings to save the current CCU settings along with the camera position.
5. Select Save with Tri-Sync to allow the pan, tilt, and zoom motors to move simultaneously from other presets to this position.
6. Store the preset.

**Note**

*Tri-Synchronous Motion works best for on-air shots requiring significant movement. It is not useful when moving the camera less than 10° or when the camera is not on the air.*

## Renaming Presets and Custom CCU Scenes

### CAMERA PAGE

You can rename presets and custom scenes. The process is the same for both. Right-click the button for the custom scene or preset, and edit the label.



## Initial Lighting and Color Settings

### CAMERA PAGE

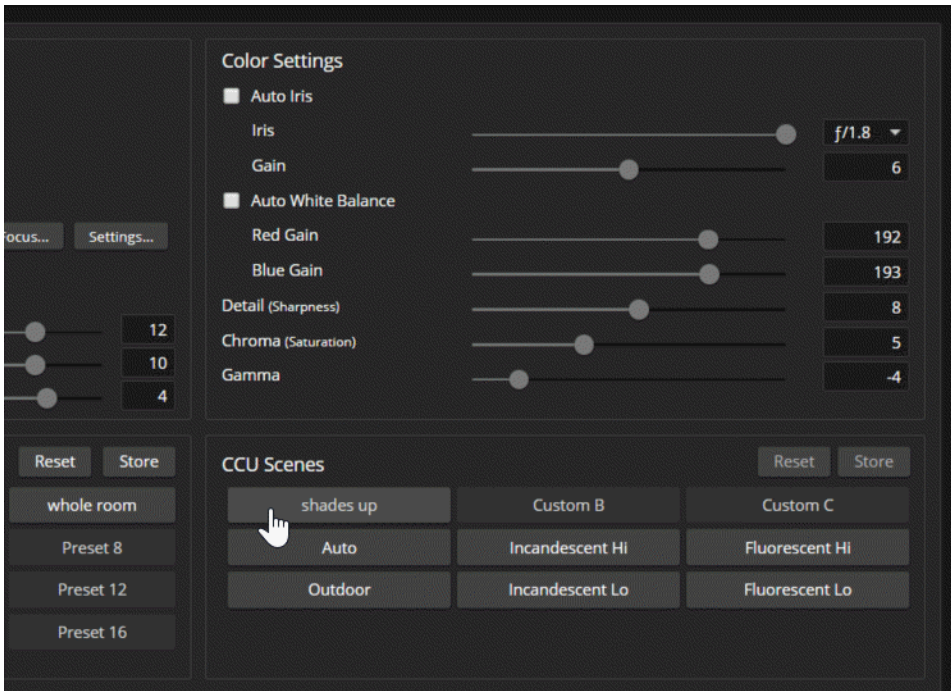
No two rooms are exactly alike – but a lot of rooms are a lot alike. The technical folks at Vaddio (Scott, to be specific) have already set up adjustments for common lighting scenarios (CCU scenes) – Incandescent Hi, Incandescent Lo, Fluorescent Hi, Fluorescent Lo, and Outdoor. The Auto setting allows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

Adjust the camera for the lighting in use by selecting the CCU scene that best fits your environment.

Some adjustments to lighting and color may be necessary.

**Note**

*Color adjustments are not available when the Auto scene is selected.*



## Lighting Adjustments

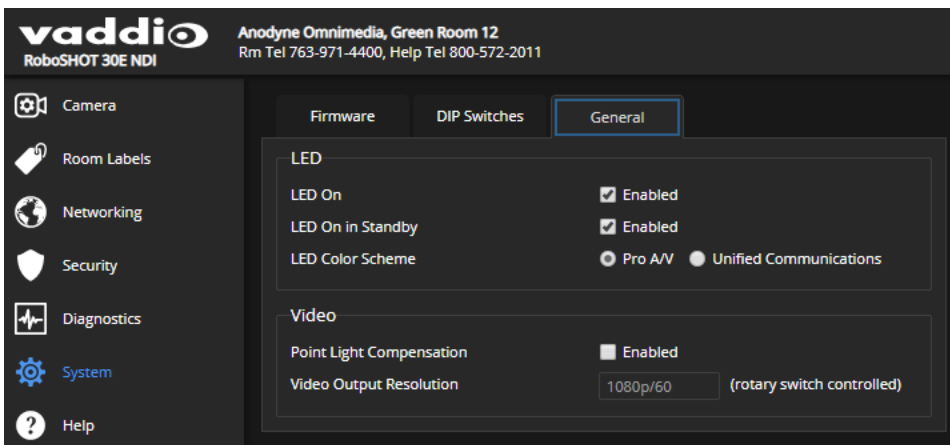
### CAMERA PAGE

The camera provides settings to compensate for common lighting problems.

- **Auto Iris** allows the camera to compensate automatically for the light level.
- **Backlight Compensation** reduces contrast to adjust for bright light behind the main subject of the shot. Use this if the subject is in front of a window, projector screen, or other bright area and appears as a silhouette. This setting can't be used with Wide Dynamic Range.
- **Wide Dynamic Range** automatically darkens bright areas and brightens dark areas to provide a more properly exposed image in challenging lighting conditions. This setting can't be used with Backlight Compensation.

### SYSTEM PAGE, GENERAL TAB

**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. This setting is on the General tab of the System page.



The [Lighting and Image Quality Cheat Sheet](#) may be helpful.

## Fine-Tuning Image Quality and Color

### CAMERA PAGE

Fine-tune the color and lighting as needed using the Color Settings controls.

- **Auto White Balance** adjusts color automatically. Red gain and blue gain controls are not available when Auto White Balance is selected.
- **Red Gain** and **Blue Gain** provide manual color adjustment.
- **Detail** adjusts the image sharpness. If the video looks grainy or “noisy,” try a lower Detail setting. (As in conversation, too much detail is bad.)
- **Chroma** adjusts the color intensity.
- **Gamma** adjusts the range (grey density) between bright areas and shadows.

If you change Red Gain or Blue Gain and you don't like the results, start over by selecting and then deselecting Auto White Balance.

The [Color Adjustment Cheat Sheet](#) may be helpful.



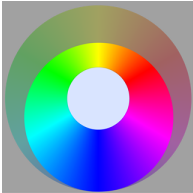


## Lighting and Image Quality Cheat Sheet

Here are some tips for using the CCU settings for lighting and image quality. For more detailed information on each setting, see [Lighting Adjustments](#) and [Fine-Tuning Image Quality and Color](#).

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
Small sources of bright light (point sources) make it hard to see details in areas with less intense lighting.	Enable Point Light 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 Cheat Sheet

Here are some tips for using the color-related CCU settings. For more detailed information on each setting, see [Fine-Tuning Image Quality and Color](#).

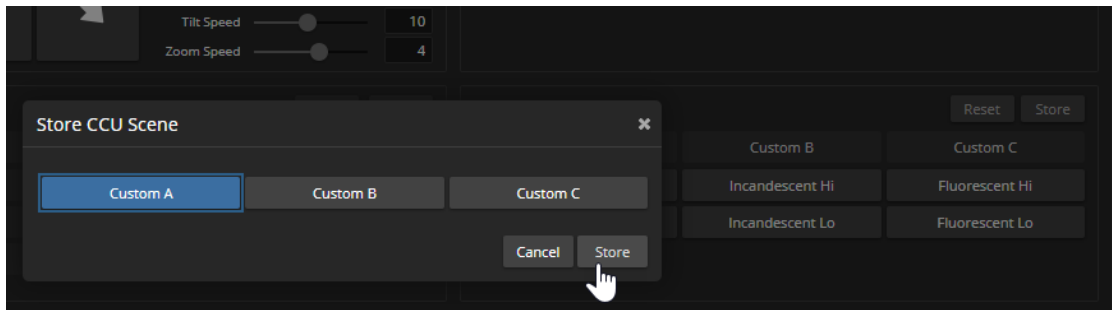
What do you need to correct?	Make this adjustment:
Colors look less vivid than they should	Increase Chroma
Colors look too vivid	Decrease Chroma
Colors look wrong; white objects do not appear white	Enable Auto White Balance
	One Push White Balance
	Disable Auto White Balance and <ul style="list-style-type: 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>
<div style="display: flex; justify-content: space-around; text-align: center;"> <div> <p>Too much red</p>  </div> <div> <p>Not enough red</p>  </div> <div> <p>Too much blue</p>  </div> <div> <p>Not enough blue</p>  </div> <div> <p>Balanced</p>  </div> </div>	

## 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.

1. Adjust lighting, image quality, and color.
2. When the scene looks the way you want it to, click Store CCU Scene.
3. In the Store CCU Scene dialog box, select which custom scene to store (Custom A, B, or C) and select Save.

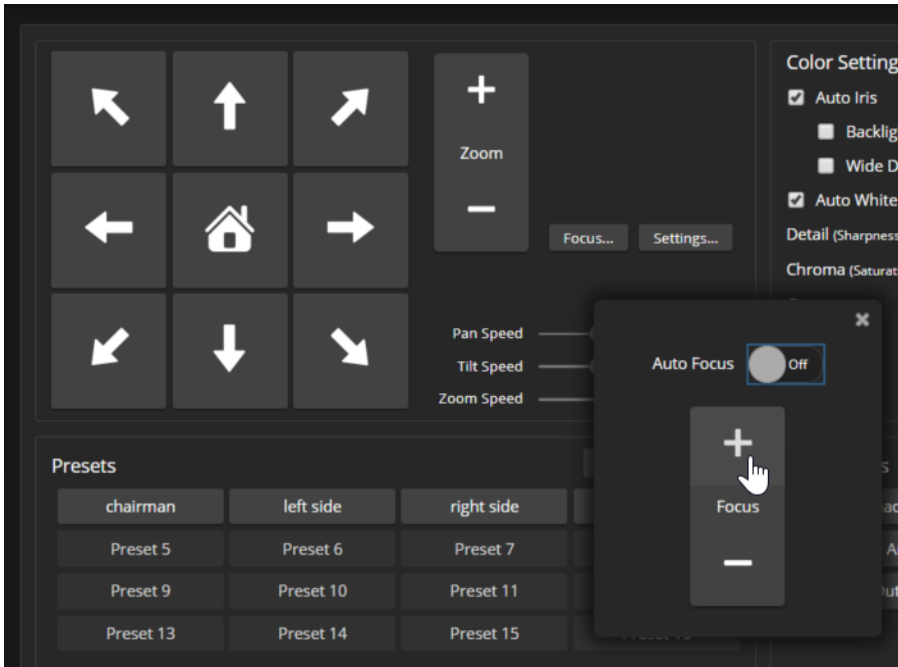


4. Optional: Name the new scene by right-clicking its button. A dialog box opens. Enter the name and save it.

## Adjusting the Focus

### CAMERA PAGE

Open the Focus control to select Auto-focus, or set manual focus with the + (near) and – (far) buttons. I know you already understand this, but I'm going to say it anyway: The + and – buttons don't work when Auto Focus is selected.



For users who are not logged in as admin, focus control is available via the IR Remote Commander.

## Speed Adjustments

### CAMERA PAGE

The following speed adjustments are available:

- Manual pan, tilt, and zoom speeds – Used when you control camera movements with the IR Remote Commander or the arrow buttons in the web interface
- Global Preset Non-Tri-Sync Speeds – Separate pan, tilt, and zoom speeds used for movements between presets that do not use Tri-Synchronous Motion.
- Tri-Synchronous Motion speed – Only available when storing a preset with the Store with Tri-Sync option selected.

## About Tri-Synchronous Motion

The Tri-Synchronous Motion algorithm calculates the pan, tilt and zoom speeds needed for the camera to move to a preset position, so that all three movements begin together and arrive at the same time. It ensures smooth on-air movements when making large changes in position, particularly when the zoom also changes. Tri-Synchronous Motion is only available as an option for moving to specific preset position.

Tri-Synchronous Motion is not helpful in movements of less than 10°, and is typically used only for on-air operation.



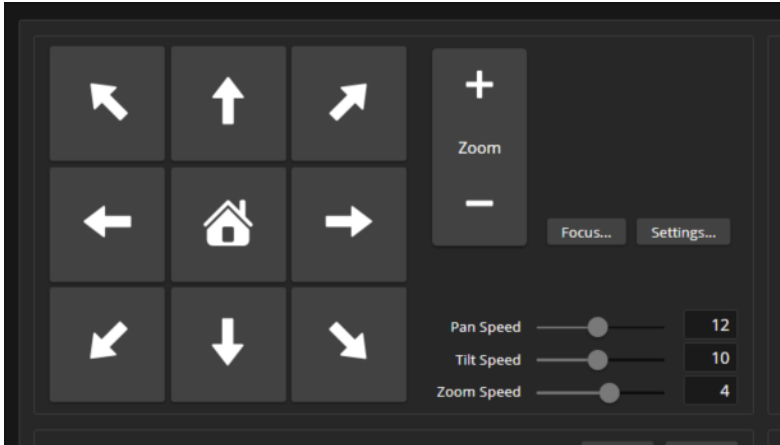
## Setting the Speed for Manual Movements

### CAMERA PAGE

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

#### To set speeds for movements using the arrow buttons:

Use the speed sliders to adjust the speed of movements that you control with the buttons for pan, tilt, and zoom. For tight shots, slower is usually better.

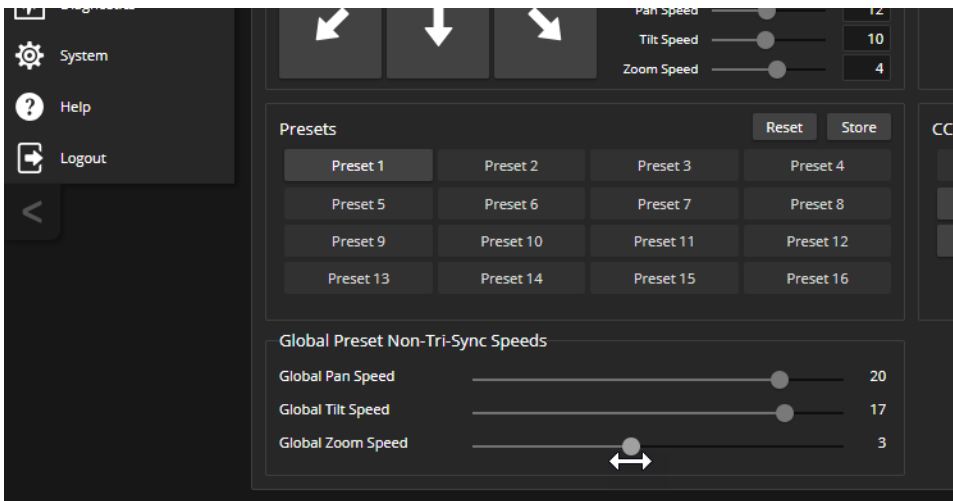


## Setting the Speed of Movements to Presets

### CAMERA PAGE

#### To set speeds for movements to presets:

1. Store presets at several points in the room, at different zoom levels, saving them without selecting the Tri-Sync option.
2. Move among the presets using the preset buttons.
3. Use the Global Preset Non-Tri-Sync Speed sliders to adjust as needed.



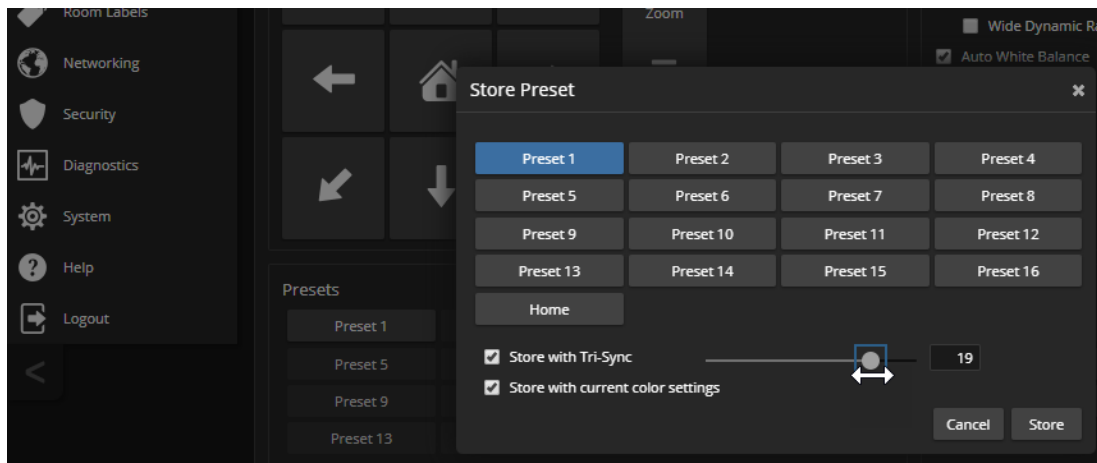
## Adjusting Tri-Synchronous Motion Speed

### CAMERA PAGE

The Tri-Synchronous Motion algorithm calculates the pan, tilt and zoom speeds needed for the camera to move from one preset to the next so that all three movements begin together and arrive at the same time.

You may need to experiment to find the best Tri-Sync speed setting. Here is a simple method:

1. Store a preset, checking Save with Tri-Sync and setting the speed slider about a third of the way along the scale.
2. Move the camera to a different pan, tilt, and zoom position, and save this position as another preset. Again, check Save with Tri-Sync; but set the speed slider to about the halfway point.
3. Move the camera from one preset to the other to evaluate which movement is closer to the speed you want. Use the Tri-Sync speed associated with that preset, or adjust it as needed.
4. Store all the presets you will need.
5. Switch among the presets to determine whether any of them should use different Tri-Sync speeds.
6. Adjust the speeds as needed.



## Setting the Direction for Camera Movements

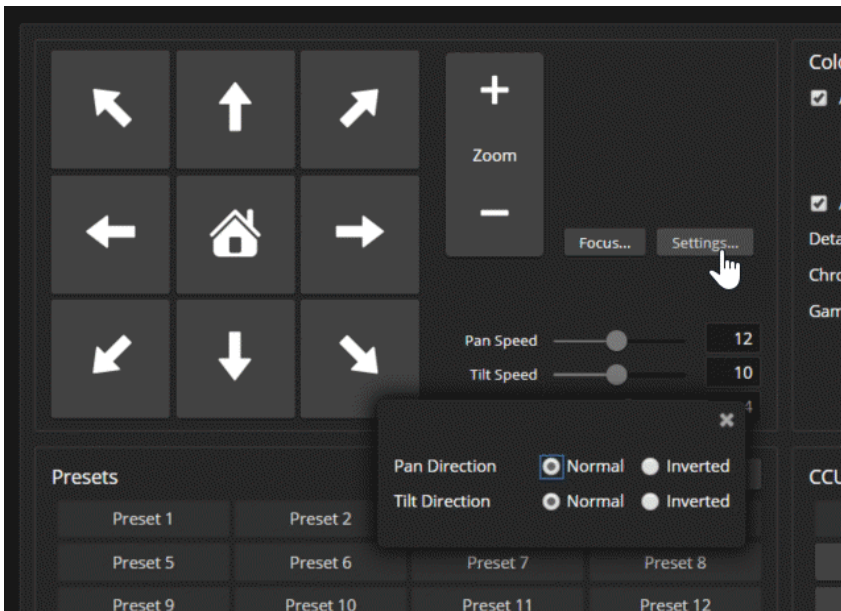
### CAMERA PAGE

By default, the arrow buttons on the remote and in the web interface show the direction you would see the camera move if you were looking the same direction as the camera. If a person facing the camera is controlling it with the remote, using the right arrow pans the camera to the person's left.

To make the arrow buttons indicate camera movement from the perspective of a person facing the camera, open the Settings control and invert the pan direction.

#### Note

*Tilt direction is automatically inverted when you select Image Flip for inverted mounting. You do not need to set tilt direction with the motor controls.*



## Basic Camera Settings

### SYSTEM PAGE, DIP SWITCHES TAB

**Standard Control Mode/Codec Control Mode** – Select Codec Control Mode if using the camera with a third-party codec.

**IR1, IR2, IR3 (Frequency Selection):** If there are two or three cameras in the room, they can be set to respond to different IR frequencies so that you can control each one independently using the IR Remote Commander. Use these two switches to configure the camera for the desired IR frequency. Then use the Camera Select buttons at the top of the remote to select the camera you want to control.

- Left and right IR switches up: IR frequency 1
- Left IR switch down, right IR switch up: IR frequency 2
- Left IR switch up, right IR switch down: IR frequency 3

**IR On/Off:** Leave this switch ON if the IR Remote Commander will be used.

**Image Flip:** If using an inverted mounting solution, set the Image Flip switch ON. This orients the video image correctly and sets the tilt motors to respond appropriately to tilt up and down commands from the remote, web interface, and connected control devices.

**Baud Rate:** Set this switch to match the baud rate of the device connected to the RS-232 port.

**HDMI color:** YCbCr (default) or sRGB.

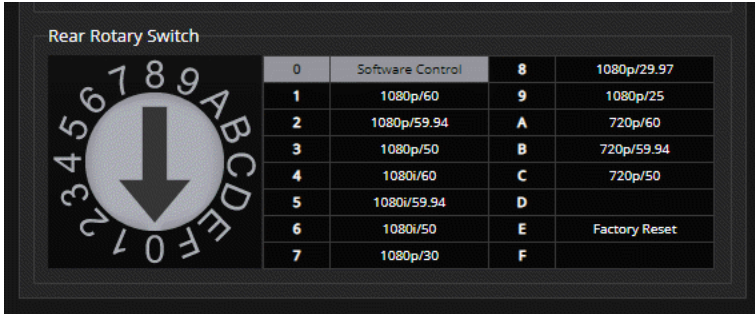
The screenshot shows the Vaddio web interface for a RoboSHOT 30E NDI camera. The 'DIP Switches' tab is active, displaying two sections: 'Standard Control Mode' (selected) and 'Codec Control Mode'. Below this is a table of 'Soft DIP Switches' with the following settings:

	SOFT-SW1	SOFT-SW2	IR 1	IR 2	IR 3	IR On	Image Flip	BAUD	HDMI Color
IR 1	UP	UP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Off	9600 bps	YCbCr
IR 2	DOWN	UP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IR 3	UP	DOWN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Off	On	38400 bps	sRGB

## Software-Controlled Video Output Resolution Setting

### SYSTEM PAGE, DIP SWITCHES TAB

Position 0 of the rotary switch on the back of the camera selects software control of the HDMI output resolution. The default resolution is 1080p/59.94. The NDI software controls the resolution of the NDI stream.



Set the video output resolution on the System page, General tab.

## Indicator Light Behavior Settings

### SYSTEM PAGE, GENERAL TAB

The following settings are available for the indicator light:

#### LED On:

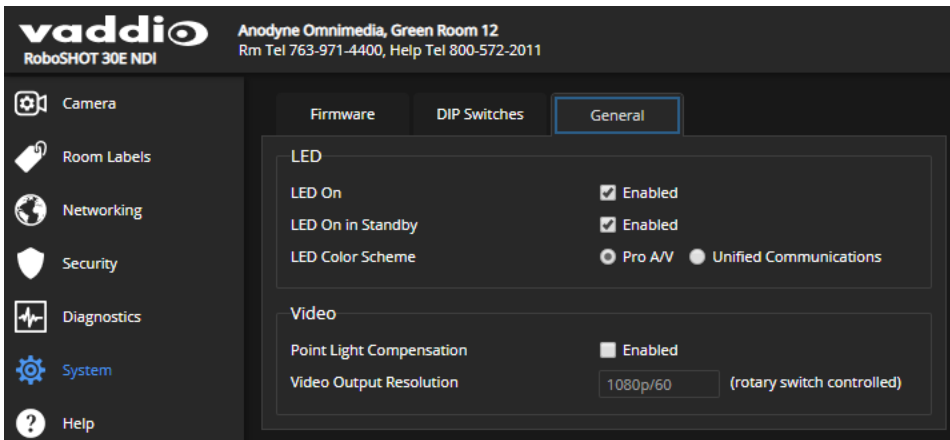
- Enabled (default setting) – The indicator is on when the camera is connected to power.
- Disabled – The indicator remains off at all times. This setting overrides the LED On in Standby setting.

#### LED On in Standby:

- Enabled (default setting) – The indicator remains on when the camera goes to standby (low-power) mode.
- Disabled – The indicator turns off when the camera is in standby mode.

#### LED Color Scheme:

- Pro A/V (default setting) – Includes a tally function.
- Unified Communications – Normally used in video conferencing installations.



## System Maintenance

This chapter covers maintenance and troubleshooting tasks.

What do you need to do?	Go to this page of the web interface
Save (export) and restore (import) the configuration data	System: Firmware
Update firmware or view the current firmware version	System: Firmware
Reboot or restore factory defaults	System: Firmware
Locate Vaddio Technical Support contact information	Help
View diagnostic logs	Diagnostics

**Note**

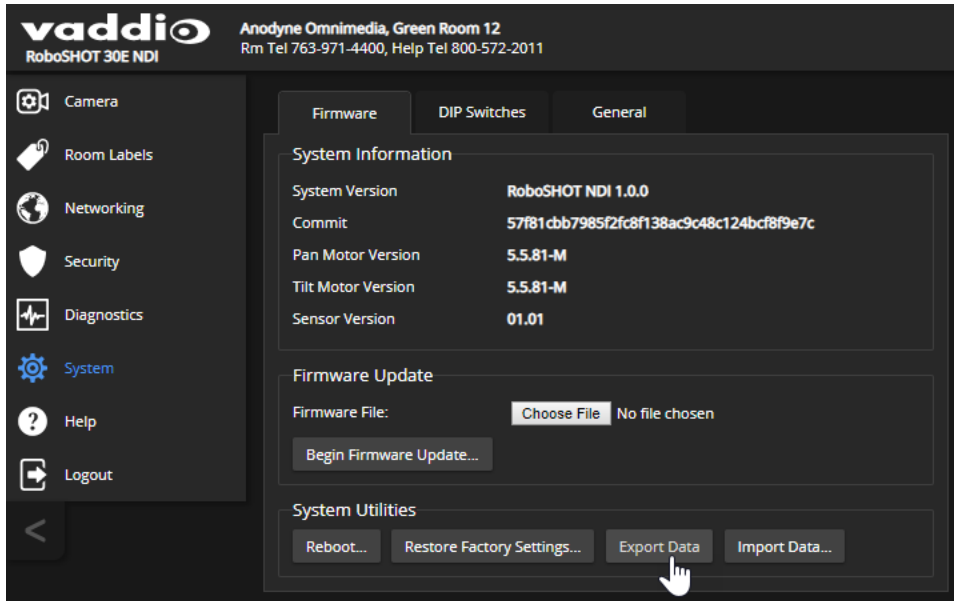
*Some of the screen shots of these web interface pages may be from different cameras.*

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

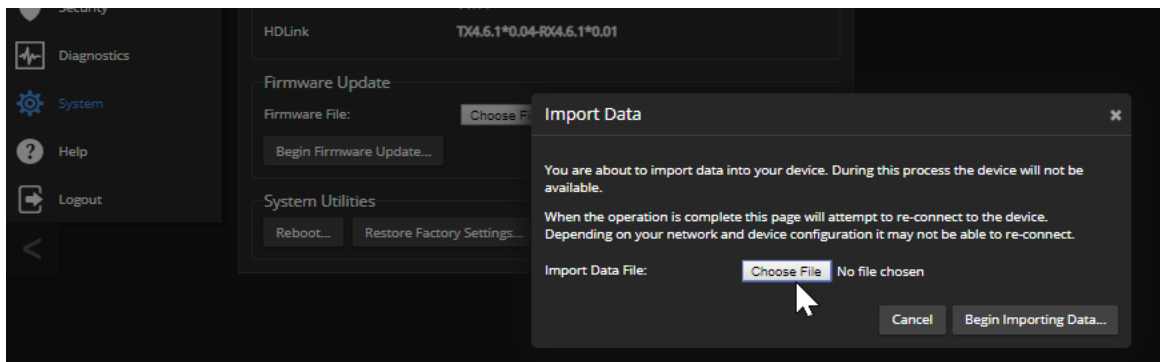
### SYSTEM PAGE, FIRMWARE TAB

You can import a configuration to several cameras if you need to configure them the same way. Cameras must be of the same model, and must have a compatible firmware version installed. Configuration data does not include passwords or unique information such as hostname.

1. Configure the first camera.
2. Export its configuration (Export Data button). The export downloads to your computer as a .dat file. The filename is the camera's hostname.



3. Import the configuration to the other cameras (Import Data button in each camera's web interface). The web interface prompts you to browse to the .dat file that will be imported.



## Installing a Camera Firmware Update

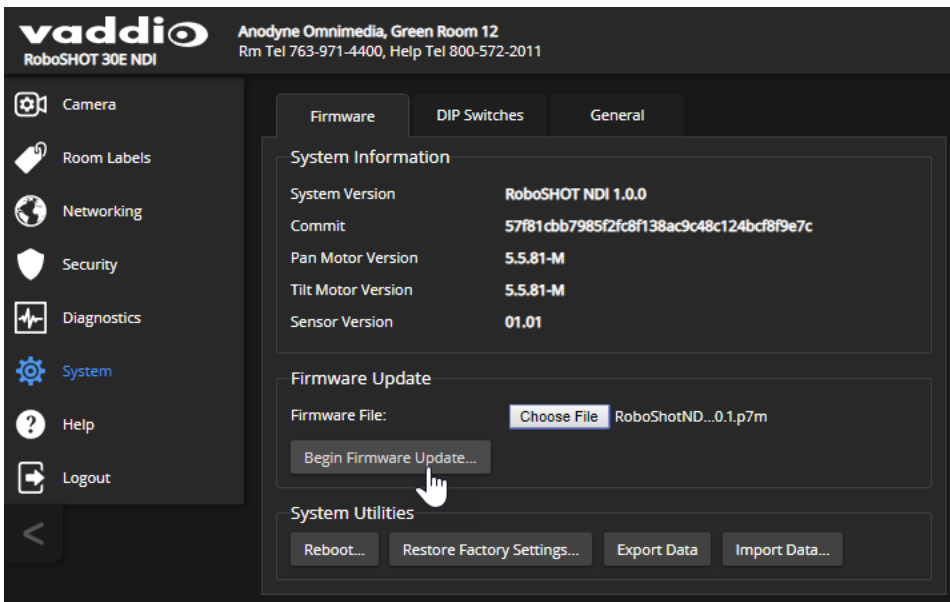
SYSTEM PAGE, FIRMWARE TAB

### Caution

*The camera must remain connected to power and to the network during the update. Interrupting the update could make the camera unusable.*

1. Download the firmware and its release notes.
2. Select Choose File, then browse to the downloaded firmware and select it. The filename ends with .p7m.
3. Select Begin Firmware Update.
4. Read and understand the information in the Confirm dialog box. It's dull, but it could save you some time and aggravation.
5. Select Continue. A progress message box opens and the indicator light on the front of the camera turns yellow. If the update process presents warnings or error messages, read them carefully.

The camera reboots when the update is complete.



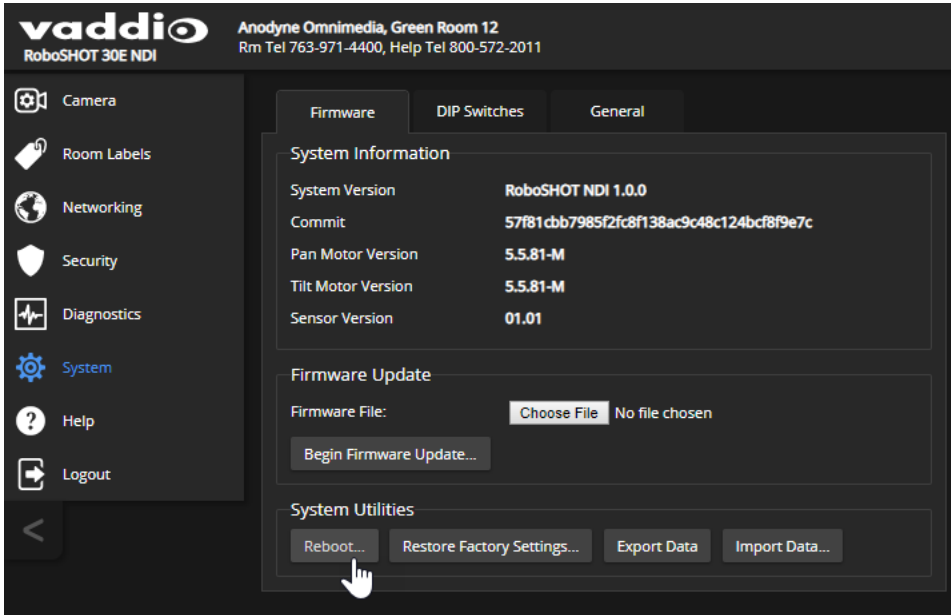


## Rebooting the Camera

SYSTEM PAGE, FIRMWARE TAB

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

In the System Utilities section, select Reboot.

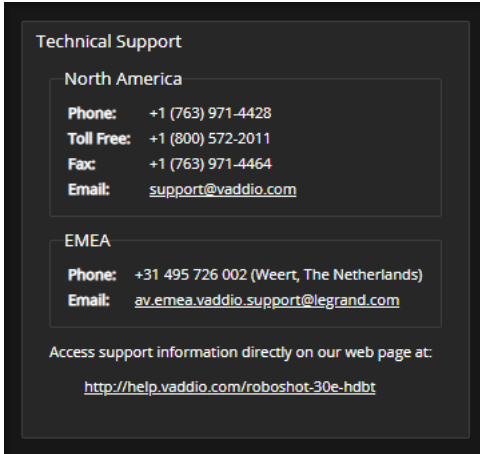


## Contacting Vaddio Technical Support

### HELP PAGE

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

You'll find information for contacting Vaddio Technical Support on the Help page. The model identifier and the link for support information vary depending on the camera model.



Technical Support

North America

Phone: +1 (763) 971-4428  
Toll Free: +1 (800) 572-2011  
Fax: +1 (763) 971-4464  
Email: [support@vaddio.com](mailto:support@vaddio.com)

EMEA

Phone: +31 495 726 002 (Weert, The Netherlands)  
Email: [av.emea.vaddio.support@legrand.com](mailto:av.emea.vaddio.support@legrand.com)

Access support information directly on our web page at:  
<http://help.vaddio.com/roboshot-30e-hdvt>

### Note

*The Help page provides a link to our standard privacy notice. This product does not record or save 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 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.*

## Accessing the Diagnostic Logs


### DIAGNOSTICS PAGE

When you contact Vaddio technical support, your support representative may ask you to download and email the log file available from the Diagnostics page.

The screenshot shows the Vaddio web interface for a RoboSHOT 30E NDI camera. The top navigation bar includes the Vaddio logo, contact information for Anodyne Omnimedia, and status icons for Mute, Standby, and Logout. A left sidebar contains menu items: Camera, Room Labels, Networking, Security, Diagnostics (highlighted), System, Help, and Logout. The main content area is titled 'Diagnostics' and displays a list of kernel log entries. Each entry starts with a timestamp 'Jun 6 12:47:45' followed by the device ID 'vaddio-roboshot-ndi-88-1f-12-50-83-70', the kernel version, and a specific kernel message. The messages include hardware initialization steps like 'libphy: Fixed MDIO Bus: probed', 'macb e000b000.ethernet eth0: Cadence GEN rev 0x0020118 at 0xe00b000 irq 29 (80)', and driver load messages for 'TI DP83867 ethernet-ffffffff:00: attached PHY driver', 'i2c /dev entries driver', 'cdns-izc e0004000.i2c: 382 KHz mmio e0004000 irq 23', 'cdns-izc e0005000.i2c: 382 KHz mmio e0005000 irq 24', 'lirc\_dev: IR Remote Control driver registered, major 246', and 'IR LIRC bridge handler initialized'. At the bottom of the log list are buttons for 'Download', 'Refresh', 'Clear', and 'Restore', along with an 'Auto-Refresh' checkbox.

## Using the IR Remote

The IR remote provides basic camera control.

What do you need to do?	Button(s)	
Power on or standby	<b>Power</b> (green button at top right)	
Select the camera to control (if this remote controls more than one)	<b>Camera Select</b> buttons 1 through 3 (second row of buttons)	
Discover the camera's IP address	<b>Data Screen</b> button (top left) overlays IP and MAC addresses on video output. Press again to dismiss.	
Move the camera	Arrow buttons and <b>Home</b> button (dark red)	
Make left and right arrows behave intuitively	<b>Std Pan</b> directions are from the camera's point of view, <b>Rev Pan</b> reverses this.	
Move the camera to a preset position	<b>Position Preset</b> buttons 1 through 6 (bottom two rows)	
Store a preset	<b>Preset</b> button + a numbered <b>Position Preset</b> button	
Clear a preset	<b>Reset</b> button + a numbered <b>Position Preset</b> button	
Adjust for excess light behind the camera's subject	<b>Back Light</b> button (top center)	
Focus the camera	<b>Auto Focus</b> button (near arrow buttons) <b>Manual Focus</b> buttons <b>Near</b> and <b>Far</b> (below Zoom Speed buttons)	
Zoom in (tele) or out (wide)	<b>Zoom Speed</b> buttons (light gray) - Slow <b>T</b> and <b>W</b> , Fast <b>T</b> and <b>W</b> for telephoto (zoom in) and wide-angle (zoom out) modes	

For information about configuring the camera to respond to the remote as camera 1, 2, or 3, see [Software Switch Settings](#).

### Storing a Preset Using the Remote

Position the camera. Then hold down the Preset button and press one of the numbered preset buttons.

### Clearing a Preset Using the Remote

Press and hold the Reset button while pressing the preset number you want to clear.

## Operating the Camera from the Web Interface

### CONTROLS PAGE

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.

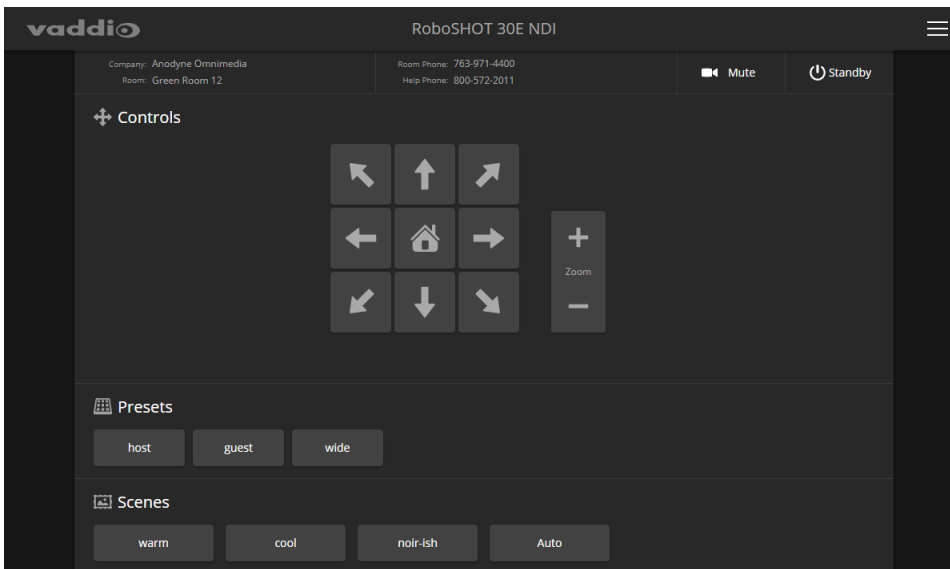
Only the operator's page is available with user or guest access.

The web interface is available on the touch panel (if your installation uses one) or from a computer's web browser.

The Controls page provides most of the same controls as the IR Remote Commander. See [Using the IR Remote](#).

- Stop or resume sending live camera video (video mute)
- Move to camera presets, if any have been stored
- Pan, tilt, zoom, or return it to its home position
- Put the camera in standby or bring it back to the ready state
- Select a custom lighting adjustment, if any have been stored

If your installation does not include a Vaddio Device Controller or other control surface, contact the system administrator to find out how to access the web interface.



### Switching the Camera Off or On (Standby)

Use the Standby button to switch between low-power (standby) and ready states. On entering standby mode, the camera moves to its standby position and stops sending video.

### Stop or Resume Sending Video (Mute)

Use the Mute button to stop sending live video without putting the camera in standby mode. When the video is muted, the camera sends a blue or black screen. If the camera is part of a conferencing system, this does not mute the audio.

## 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.



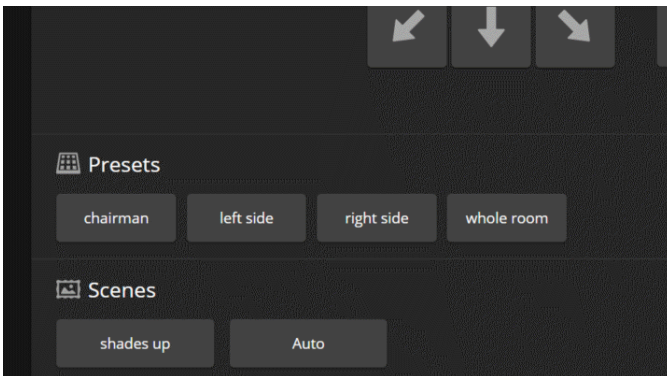
## Moving the Camera to a Preset Position

Presets are camera shots that have been stored. They include pan, tilt, and zoom information, and may include color and speed information as well. If no presets are defined, the Controls page does not present the Presets section.

Use the Preset buttons to move the camera to any of its preset positions.

## Adjusting the Color and Lighting

If any color and lighting adjustments (CCU scenes) have been saved, they are available in the Scenes area, along with the Auto setting. In most cases, the Auto setting is appropriate. This setting allows the camera to adjust to current conditions automatically.



## Telnet Command Reference

Vaddio's Telnet command protocol allows external devices to control the camera. Network connectivity and a Telnet client are required; Telnet port 23 is used. Telnet sessions require the administrator account login.

In addition to the camera control commands, Telnet session management commands are available – help, history, and exit.

Things to know about Telnet:

- By default, Telnet access is disabled in all firmware releases issued after mid-December 2019. Enable it on the Security page of the web interface.
- The > character is the command prompt.
- Using a question mark as a command parameter will bring up a list of available subcommands or parameters. Example:

```
camera focus ?
camera focus
near   Focus the camera near
far    Focus the camera far
stop   Stop the camera focus
mode   Camera focus mode
```

- CTRL-5 clears the current serial buffer on the device.

Typographical conventions used in this manual:

- { x | y | z } – Choose x, y, or z. Example: camera led { on | off | toggle }
- <variable> – Substitute the desired value here. Example: camera ccu get <param>
- < x - y > – Valid range of values is from x through y. Example: camera ccu set detail <0 -15>
- [parameter] – Parameter is not required. Example: camera pan left [<speed>]

## 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 standby

```
Telnet 192.168.1.66
BoardroomCamControl login: admin
Password:
Last login: Wed Mar 30 13:19:52 -0500 2016 on /dev/pts/0.
*****
Vaddio Interactive Shell
*****
WARNING: Authorized Access Only
*****

Welcome admin
> version
Serial      25120ceaf446a084cf282702a214efba0e6eb0c3
System Version PCC Premier 1.1.0-RC3
OK

> network settings get
Name       eth0 WAN
MAC Address 00:1E:00:8D:89:58
IP Address 192.168.1.66
Netmask    255.255.255.0
ULAN      Disabled
Gateway    192.168.1.254
OK
```

## camera home

Moves the camera to its home position.

Synopsis	camera home
Example	<pre>&gt;camera home OK &gt;</pre>

## camera pan

Moves the camera horizontally.

Synopsis	camera pan { left [<speed>]   right [<speed>]   stop   get   set }	
Options	left	Moves the camera left.
	right	Moves the camera right.
	speed <1 – 24>	Optional: Specifies the pan speed as an integer (1 to 24). Default speed is 12.
	stop	Stops the camera's horizontal movement.
	get	Returns the camera's absolute pan position in degrees, as a floating point value between approximately -150.00 (left) and 150.00 (right).
	set <position>	<p>Sets the camera's absolute pan position in degrees, as a floating point value between approximately -150.00 and 150.00. This is the minimum range. Individual cameras may have an additional degree or two of travel before they reach their physical limits. If the value is out of range, the camera returns an error message and no motion occurs. The speed parameter may be used with the <code>camera pan set</code> command.</p> <p>The <code>camera pan set</code> command blocks execution of subsequent commands until the camera reaches the specified position.</p>
Examples	<pre>&gt;camera pan left OK &gt;  Pans the camera left at the default speed.  &gt;camera pan stop OK &gt;  Stops the camera's horizontal motion.  &gt;camera pan set -15 22 OK &gt;  Pans the camera to 15° left of its centerline using a speed of 22.</pre>	



## camera tilt

Moves the camera vertically.

Synopsis	<code>camera tilt{ up [&lt;speed&gt;]   down [&lt;speed&gt;]   stop   get   set}</code>	
Options	<code>up</code>	Moves the camera up.
	<code>down</code>	Moves the camera down.
	<code>speed &lt;1 – 20&gt;</code>	Optional: Specifies the tilt speed as an integer (1 to 20). Default speed is 10.
	<code>stop</code>	Stops the camera's vertical movement.
	<code>get</code>	Returns the camera's absolute tilt position in degrees, as a floating point value between approximately -30.00 (down) and 90.00 (up). Note that the range is roughly 30.00 to -90.00 if Image Flip is selected.
	<code>set &lt;position&gt;</code>	Sets the camera's absolute tilt position in degrees, as a floating point value between approximately -30.00 and 90.00 (-90 to 30 if the camera is configured for inverted operation). This is the minimum range; individual cameras may have an additional degree or two of travel before they reach their physical limits. If the value is out of range, the camera returns an error message and no motion occurs. The speed parameter may be used with the <code>camera tilt set</code> command.  The <code>camera tilt set</code> command blocks execution of subsequent commands until the camera reaches the specified position.
Examples	<pre>&gt;camera tilt up OK &gt; Tilts the camera up at the default speed.  &gt;camera tilt stop OK &gt; Stops the camera's vertical motion.  &gt;camera tilt set -5 5 OK &gt; Tilts the camera 5° down from level at a speed of 5.</pre>	

## camera zoom

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

Synopsis	camera zoom { in [<speed>]   out [<speed>]   stop   get   set}	
Options	in	Moves the camera in.
	out	Moves the camera out.
	speed [1 – 7]	Optional: Specifies the zoom speed as an integer (1 to 7). Default speed is 3.
	stop	Stops the camera's zoom movement.
	get	Returns the camera's current zoom level as a floating point value.
	set <1 – n>	<p>Sets the zoom level as a floating point value. The value of <b>n</b> (maximum zoom) depends on the camera's capabilities. For example, the range is 1.00 to 12.00 for a 12x camera. If the value is out of range, the camera returns an error message and no zoom change occurs. The speed parameter may be used with the camera zoom set command.</p> <p>The camera zoom set command blocks execution of subsequent commands until the camera reaches the specified position. Use the no_wait parameter if this is not the desired behavior.</p>
Examples	<pre>&gt;camera zoom in OK &gt;  Zooms the camera in at the default speed.  &gt;camera zoom stop OK &gt;  Stops the camera's zoom motion.  &gt;camera zoom set 14 3 OK &gt;  Sets the camera's zoom level to 14x at a speed of 3.  &gt;camera zoom get 14 OK &gt;  Returns the camera's current zoom level.</pre>	

## camera ptz-position


Specifies multiple-axis movements to absolute positions.

Pan, tilt, and zoom may be specified in any order. All movements start simultaneously.

Synopsis	camera ptz-position pan <position> tilt <position> zoom <position> [no_wait]	
Options	pan <position>	<position> is a floating-point value approximately -160.00 to 160.00. Individual cameras may have slightly more travel.
	tilt <position>	<position> is a floating-point value approximately -30.0 to 90.0. Individual cameras may have slightly more travel.
	zoom <position>	<position> is a floating-point value 1.0 to 12.0 for 12x cameras or 1.0 to 30.0 for 30x cameras.
	no_wait	Optional – allows the command to return the command prompt immediately, while the requested camera movement is still in progress.
Examples	<pre>&gt;camera ptz-position pan -15 tilt 5 zoom 1.5 no_wait OK &gt;</pre> <p>Moves the camera 15° left from its centerline and 5° up from horizontal, and zooms to 1.5. The command prompt appears while the camera is still in motion.</p>	

## 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. Can only be used when camera is in manual mode.
	<code>far</code>	Moves the focus farther from the camera. Can only be used when camera is in manual mode.
	<code>speed &lt;1 – 8&gt;</code>	Optional: integer (1 to 8) specifies the focus speed.
	<code>stop</code>	Stops the camera's focus movement.
	<code>mode {get   auto   manual}</code>	Returns the current focus mode, or specifies automatic or manual focus.
Examples	<pre> <b>camera focus near</b> OK &gt; </pre>  <p>Brings the focus near at the default speed.</p> <pre> <b>camera focus far 7</b> OK &gt; </pre> <p>Moves the focus farther from the camera at a speed of 7.</p> <pre> <b>camera focus mode get</b> auto_focus:  on OK &gt; </pre> <p>Returns the current focus mode.</p>	

## camera preset

Moves the camera to the specified preset, or stores the current camera position and optionally CCU information, either with or without specifying that Tri-Synchronous Motion is to be used when moving to this position.

### Note

*This command corresponds to the CAM\_Memory commands in the RS-232 command set.*

Synopsis	camera preset { recall   store } <1 – 16> [tri-sync <1 – 24>] [save-ccu]	
Options	recall <1 – 16>	Moves the camera to the specified preset, using Tri-Synchronous Motion if this was saved with the preset. If CCU information was saved with the preset, the camera switches to the CCU setting associated with the preset.
	store <1 – 16>	Stores the current camera position as the specified preset.
	tri-sync <1 – 24>	Optional: Specifies that the camera uses Tri-Synchronous Motion to move to this position, using the specified speed.
	save-ccu	Optional: Saves the current CCU settings as part of the preset. If not specified, the last color settings are used when recalled.
Examples	<pre>&gt;camera preset recall 3 OK &gt;</pre> <p>Moves the camera to preset 3.</p> <pre>&gt;camera preset store 1 OK &gt;</pre> <p>Saves the camera's current position as preset 1.</p> <pre>&gt;camera preset store 4 tri-sync 15 OK &gt;</pre> <p>Stores the camera's current position as preset 4. The camera will use Tri-Synchronous Motion at speed 15 when it is recalled to this preset.</p> <pre>&gt;camera preset store 2 save-ccu OK &gt;</pre> <p>Stores the camera's current position as preset 2. The camera applies the current CCU settings when it is recalled to this preset.</p>	


## camera ccu scene

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

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

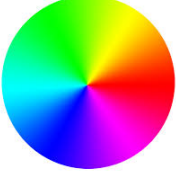
## camera ccu get

Returns CCU (lighting and color) information.

Synopsis	<code>camera ccu get &lt;param&gt;</code>	
Options  	<code>all</code>	Returns all current CCU settings.
	<code>auto_white_balance</code>	Returns the current state of the auto white balance setting (on or off).
	<code>red_gain</code>	Returns red gain (integer, 0 to 255).
	<code>blue_gain</code>	Returns blue gain (integer, 0 to 255).
	<code>backlight_compensation</code>	Returns the current state for backlight compensation (on or off).
	<code>auto_iris</code>	Returns the current auto-iris state (on or off).
	<code>iris</code>	Returns the iris value (integer, 0 to 13).
	<code>gain</code>	Returns gain (integer, 1 to 11).
	<code>detail</code>	Returns detail (integer, 0 to 15).
	<code>chroma</code>	Returns chroma (integer, 0 to 14).
	<code>gamma</code>	Returns gamma (integer, -64 to 64)
	<code>wide_dynamic_range</code>	Returns the current state for Wide Dynamic Range (on or off).
Examples	<pre>&gt;camera ccu get iris iris 6 OK &gt;</pre> <p>Returns the current iris value.</p> <pre>&gt;camera ccu get red_gain red_gain 201 OK &gt;</pre> <p>Returns the current red gain value.</p> <pre>&gt;camera ccu get all auto_iris on auto_white_balance on backlight_compensation off blue_gain 193 chroma 2 detail 8 gain 3 iris 11 red_gain 201 wide_dynamic_range off OK &gt;</pre> <p>Returns all current CCU settings.</p>	

## camera ccu set

Sets the specified CCU (lighting and color) information.

Synopsis	camera ccu set <param> <value>	
Options 	auto_white_balance {on   off}	Sets the current state of the auto white balance setting (on or off). Overrides red gain and blue gain manual settings.
	red_gain <0 – 255>	Sets the red gain value as an integer (0 to 255). Only valid when auto white balance is off.
	blue_gain <0 – 255>	Sets the blue gain value as an integer (0 to 255). Only valid when auto white balance is off.
	backlight_compensation {on   off}	Sets the current state of the backlight compensation setting (on or off). Only valid when wide dynamic range mode is off.
	iris <0 – 13>	Sets the iris value as an integer (0 to 13). Only valid when auto-iris is off.
	auto_iris {on   off}	Sets the auto-iris state (on or off). Disables manual iris and gain when on.
	gain <1 – 11>	Sets gain value as an integer (1 to 11). Only valid when auto-iris is off.
	detail <0 – 15>	Sets the detail value as an integer (0 to 15).
	chroma <0 – 14>	Sets the chroma value as an integer (0 to 14).
	gamma <-64 – 64>	Sets the gamma value as an integer (-64 to 64).
	wide_dynamic_range {on   off}	Sets Wide Dynamic Range mode on or off. Only valid when backlight compensation is 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 indicator light.

Synopsis	<code>camera led { get   off   on }</code>	
Options	<code>get</code>	Returns the indicator light's current state (on or off).
	<code>off</code>	Disables the indicator light.
	<code>on</code>	Enables the indicator light.
Examples	<pre>&gt;camera led off OK &gt;</pre> <p>Disables the indicator light. 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 indicator light.</p>	

## camera standby

Set or change camera standby status.

Synopsis	<code>camera standby { get   off   on   toggle}</code>	
Options	<code>get</code>	Returns the camera's current standby state.
	<code>off</code>	Brings the camera out of standby (low power) mode.
	<code>on</code>	Stops video and puts the camera in standby mode.
	<code>toggle</code>	Changes the camera's standby state – if it was not in standby mode, it enters standby; if it was in standby mode, it "wakes up."
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>	

## Maintenance and Troubleshooting Commands

The following commands are available for maintenance and troubleshooting:

- network settings
- network ping
- system reboot
- system factory-reset
- version

### network settings get

Returns the current network settings for MAC address, IP address, subnet mask, and gateway.

Synopsis	<code>network settings get</code>
Example	<pre>&gt; network settings get Name          eth0:WAN MAC Address   48:6F:77:64:79:21 IP Address    192.168.1.67 Netmask       255.255.255.0 VLAN          Disabled Gateway       192.168.1.254 OK &gt;</pre>

### network ping

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

Synopsis	<code>network ping [count &lt;count&gt;] [size &lt;size&gt;] &lt;string&gt;</code>	
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;</pre> <p>Reboots the system immediately.</p> <pre>&gt;system reboot 30</pre> <p>Reboots the system in 30 seconds. The response is in the same form; the system message appears at the end of the delay.</p>	

## system factory-reset

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

Synopsis	system factory-reset { get   on   off }	
Options	get	Returns the camera's current factory reset status.
	on	Enables factory reset on reboot.
	off	Disables factory reset on reboot.
Examples	<pre>&gt;system factory-reset get factory-reset (software):    off factory-reset (hardware):   off OK &gt;</pre> <p>Returns the factory reset status.</p> <p>This evaluates the most recent <code>system factory-reset on</code> or <code>off</code> command, if one has been received, then reads the rear panel DIP switches and returns the status <code>on</code> if they are all in the down position.</p> <pre>&gt;system factory-reset on factory-reset (software):    on factory-reset (hardware):   off OK &gt;</pre> <p>Enables factory reset upon reboot.</p> <p><b>Note</b> <i>This command does not initiate a factory reset. The factory reset takes place on the next reboot.</i></p>	

## version

Returns the current firmware version.

Synopsis	<b>version</b>
Example	<pre> &gt; <b>version</b> Commit          536572696f75736c792075207265616420646973 Pan Motor Version 5.5.81-M Sensor Version   01.01 System Version   RoboSHOT NDI 1.0.0 Tilt Motor Version 5.5.81-M OK  Returns current firmware version information. Your camera may return slightly different information.                     </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	<p><b>history</b> Displays the current command buffer.</p> <p><b>history 5</b> Sets the history command buffer to remember the last 5 unique entries.</p>	
Additional information	<p>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.</p> <p>Examples of history expansion:</p> <ul style="list-style-type: none"> <li>* !! Substitute the last command line.</li> <li>* !4 Substitute the 4th command line (absolute as per 'history' command)</li> <li>* !-3 Substitute the command line entered 3 lines before (relative)</li> </ul>	



### help

Displays an overview of the CLI syntax.

Synopsis	help
Example	<p><b>help</b></p>



### exit

Ends the command session and then closes the socket.

Synopsis	exit
Example	<b>exit</b>

## RS-232 Serial Command Reference

The Vaddio RS-232 Serial Control Protocol is similar to the Sony® VISCA command set in order to be compatible with several popular control devices. Not all VISCA commands are supported, and there are Vaddio-specific commands in the following command and inquiry lists.

The Vaddio RS-232 Serial Control Protocol is available in the event that serial control is needed. Be sure the camera is set to the same baud rate as the controller or other device originating the commands. See [Software Switch Settings](#).

### Camera Movement, Zoom, and Focus Commands

Command Set	Command	Command Packet	Comments
CAM_Zoom	Stop	8x 01 04 07 00 FF	Variable speed: p = 0 (low) to 7 (high) Direct: pqrs = zoom position (0h-4000h for 12x, 0h-7AC0h for 30x)
	Tele (std)	8x 01 04 07 02 FF	
	Wide (std)	8x 01 04 07 03 FF	
	Tele (variable)	8x 01 04 07 2p FF	
	Wide (variable)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 0p 0q 0r 0s FF	
Corresponds to <code>camera zoom</code> in Telnet API			
CAM_Focus	Stop	8x 01 04 08 00 FF	Variable speed: p = 0 (low) to 7 (high) Direct and Near Limit: pqrs = focus position (1000h – F000h)
	Far (std)	8x 01 04 08 02 FF	
	Near (std)	8x 01 04 08 03 FF	
	Far (variable)	8x 01 04 08 2p FF	
	Near (variable)	8x 01 04 08 3p FF	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	
	One Push Trigger	8x 01 04 18 01 FF	
	Near Limit	8x 01 04 28 0p 0q 0r 0s FF	
Corresponds to <code>camera focus</code> in Telnet API			
CAM_Focus Mode	Auto Focus	8x 01 04 38 02 FF	
	Manual Focus	8x 01 04 38 03 FF	
	Auto/Manual	8x 01 04 08 10 FF	

Command Set	Command	Command Packet	Comments
Pan-TiltDrive	Up	8x 01 06 01 vv ww 03 01 FF	vv= Pan speed (01h-18h) ww=Tilt speed (01h-14h)
	Down	8x 01 06 01 vv ww 03 02 FF	
	Left	8x 01 06 01 vv ww 01 03 FF	
	Right	8x 01 06 01 vv ww 02 03 FF	
	UpLeft	8x 01 06 01 vv ww 01 01 FF	
	UpRight	8x 01 06 01 vv ww 02 01 FF	
	DownLeft	8x 01 06 01 vv ww 01 02 FF	
	DownRight	8x 01 06 01 vv ww 02 02 FF	
	Stop	8x 01 06 01 vv ww 03 03 FF	
	Home	8x 01 06 04 FF	Returns the camera to its default position
Pan-TiltDrive	Absolute Position	8x 01 06 02 vv ww 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	0Y0Y0Y0Y = Pan position (90E2h-6BD8h) 0Z0Z0Z0Z = Tilt position (EB99h-3D59h)
Pan-Tilt-ZoomDrive	Up	8x 01 06 0A vv ww rr 03 01 03 FF	vv= Pan speed (01h-18h) ww=Tilt speed (01h-14h) rr=Zoom speed (00h - 07h)
	Down	8x 01 06 0A vv ww rr 03 02 03 FF	
	Left	8x 01 06 0A vv ww rr 01 03 03 FF	
	Right	8x 01 06 0A vv ww rr 02 03 03 FF	
	In	8x 01 06 0A vv ww rr 03 03 01 FF	
	Out	8x 01 06 0A vv ww rr 03 03 02 FF	
	Stop	8x 01 06 0A vv ww rr 03 03 03 FF	
	Home	8x 01 06 0C FF	Returns the camera to the default position and zoom
Pan-Tilt-ZoomDrive	Absolute Position	8x 01 06 0B vv ww 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z 0R 0R 0R 0R FF	0Y0Y0Y0Y = Pan position (90E2h-6BD8h) 0Z0Z0Z0Z = Tilt position (EB99h-3D59h) 0R0R0R0R = Zoom position (0h-4000h for 12x, 0h-7AC0h for 30x)

Command Set	Command	Command Packet	Comments
CAM_Memory	Reset	8x 01 04 3F 00 0p FF	Corresponds to camera preset in Telnet API. p= preset number(0h-0Fh) qr= Speed(01h-18h)
	Set standard	8x 01 04 3F 01 0p FF	
	Set standard with 'scene'	8x 01 04 3F 21 0p FF	
	Set Tri-sync	8x 01 04 3F 11 0p 0q 0r FF	
	Set Tri-Sync with 'scene'	8x 01 04 3F 31 0p 0q 0r FF	
	Recall	8x 01 04 3F 02 0p FF	
			Corresponds to camera preset in Telnet API.
CAM_PTZ_PresetSpeed		8x 01 7e 01 0b pp qq rr FF	pp: pan speed (01h-18h) qq: tilt speed (01h-14h) rr: zoom speed (0h-07h)

### Movement, Zoom, and Focus Inquiry Commands

Inquiry Command	Command	Response Packet	Comments
Pan-TiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0z 0z 0z 0z FF	www= Pan position zzzz=Tilt Position
CAM_ZoomPosInq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom position
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus position
CAM_FocusModeInq	8x 09 04 38 FF	y0 50 02 FF	Auto focus
		y0 50 03 FF	Manual focus
			Corresponds to camera focus mode get in Telnet API.
CAM_MemoryInq	8x 09 04 3F FF	y0 50 pp FF	pp: Preset number recalled last (00h - 0Fh)
CAM_MemoryStatusInq	8x 09 04 3F 0p FF	y0 50 0p 0q 0r 0s FF	p: Preset number (00h - 0Fh) q: mode (00-std, 10-std /w ccu, 01-trisync, 11-trisync /w ccu) rs: speed (0x1-0x18) 1 - 24
CAM_MemSaveInq	8x 09 04 23 0X FF	y0 50 0p 0q 0r 0s FF	X: 00h to 0Fh (preset number) pqrs: 0000h to FFFFh (Data)
CAM_PTZ_PresetSpeedInq	8x 09 7E 01 0B FF	y0 50 p q r FF	p:pan speed (01h-18h) q:tilt speed (01h-14h) r:zoom speed (0h-07h)



## Color and Light Management Commands

Command Set	Command	Command Packet	Comments
CAM_WB	Auto	8x 01 04 35 00 FF	Normal auto
	Manual	8x 01 04 35 05 FF	Manual control mode
Corresponds to <code>camera ccu set auto_white_balance</code> in Telnet API.			
CAM_RGain	Reset	8x 01 04 03 00 FF	Manual control of red gain pq = red gain (00h – FFh)
	Up	8x 01 04 03 02 FF	
	Down	8x 01 04 03 03 FF	
	Direct	8x 01 04 43 00 00 0p 0q FF	
Corresponds to <code>camera ccu set red_gain</code> in Telnet API.			
CAM_BGain	Reset	8x 01 04 04 00 FF	Manual control of blue gain pq = blue gain (00h – FFh)
	Up	8x 01 04 04 02 FF	
	Down	8x 01 04 04 03 FF	
	Direct	8x 01 04 44 00 00 0p 0q FF	
Corresponds to <code>camera ccu set blue_gain</code> in Telnet API.			
CAM_AE	Auto	8x 01 04 39 00 FF	Auto exposure mode
	Manual	8x 01 04 39 03 FF	Manual control mode
Corresponds to <code>camera ccu set auto_iris</code> in Telnet API.			
CAM_Shutter	Reset	8x 01 04 0A 00 FF	Shutter setting pq = shutter position (00h – 15h) See <a href="#">Shutter Speed Values – CAM_Shutter Command</a>
	Up	8x 01 04 0A 02 FF	
	Down	8x 01 04 0A 03 FF	
	Direct	8x 01 04 4A 00 00 0p 0q FF	
CAM_Iris	Reset	8x 01 04 0B 00 FF	Iris setting pq = iris position (0h, 05h-11h) See <a href="#">Iris Values – CAM_Iris Command</a>
	Up	8x 01 04 0B 02 FF	
	Down	8x 01 04 0B 03 FF	
	Direct	8x 01 04 4B 00 00 0p 0q FF	
Corresponds to <code>camera ccu set iris</code> in Telnet API.			
CAM_Gain	Reset	8x 01 04 0C 00 FF	Iris gain setting pq = gain position (01h – 0Fh) p = gain limit (04h-0Fh) See <a href="#">Iris Gain and Gain Limit Values – CAM_Gain Command</a>
	Up	8x 01 04 0C 02 FF	
	Down	8x 01 04 0C 03 FF	
	Direct	8x 01 04 4C 00 00 0p 0q FF	
	+Gain Limit	8x 01 04 2C 0p FF	
Corresponds to <code>camera ccu set gain</code> in Telnet API.			
CAM_BackLight	On	8x 01 04 33 02 FF	Backlight compensation On/Off
	Off	8x 01 04 33 03 FF	
Corresponds to <code>camera ccu set backlight_compensation</code> in Telnet API.			

Command Set	Command	Command Packet	Comments
CAM_WD	On	8x 01 04 3D 02 FF	Wide Dynamic Range On
	Off	8x 01 04 3D 03 FF	Wide Dynamic Range Off
Corresponds to <code>camera ccu set wide_dynamic_range</code> in Telnet API. May be unavailable on some cameras.			
CAM_Aperture	Reset	8x 01 04 02 00 FF	Aperture setting pq = aperture position (0h-0fh)
	Up	8x 01 04 02 01 FF	
	Down	8x 01 04 02 02 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	
Corresponds to <code>camera ccu set detail</code> in Telnet API.			
CAM_Chroma	Direct	8x 01 7E 55 00 00 0p 0q FF	pq: 00h – 14h
Corresponds to <code>camera ccu set chroma</code> in Telnet API.			
CAM_GammaOffset	Direct	8x 01 04 1E 00 00 00 0s 0t 0u FF	s: polarity offset (0 is plus, 1 is minus) tu: offset s=0 (00h to 40h) offset s=1 (00h to 10h)
Corresponds to <code>camera ccu set gamma</code> in Telnet API.			
CAM_ICR	On	8x 01 04 01 02 FF	ICR mode on/off - adds an IR cut filter to the image for low light images
	Off	8x 01 04 01 03 FF	

## Shutter Speed Values (CAM\_Shutter)

Value	60/59.94/30/29.97 fps	50/25 fps
0x15	1/10000	1/10000
0x14	1/6000	1/6000
0x13	1/4000	1/3500
0x12	1/3000	1/2500
0x11	1/2000	1/1750
0x10	1/1500	1/1250
0x0F	1/1000	1/1000
0x0E	1/725	1/600
0x0D	1/500	1/425
0x0C	1/350	1/300
0x0B	1/250	1/215
0x0A	1/180	1/150
0x09	1/125	1/120
0x08	1/100	1/100
0x07	1/90	1/75
0x06	1/60	1/50
0x05	1/30	1/25
0x04	1/15	1/12
0x03	1/8	1/6
0x02	1/4	1/3
0x01	1/2	1/2
0x00	1/1	1/1

## Iris Values (CAM\_Iris)

Value	Iris
0x11	F1.6
0x10	F2
0x0F	F2.4
0x0E	F2.8
0x0D	F3.4
0x0C	F4
0x0B	F4.8
0x0A	F5.6
0x09	F6.8
0x08	F8
0x07	F9.6
0x06	F11
0x05	F14
0x00	CLOSED

## Iris Gain and Gain Limit Values (CAM\_Gain)

Iris Gain			Iris Gain Limit		
Value	Steps	Gain in dB	Value	Steps	Gain in dB
0x0F	28	77.8	0x0F	28	77.8
0x0E	26	44.4	0x0E	26	44.4
0x0D	24	41.0	0x0D	24	41.0
0x0C	22	37.5	0x0C	22	37.5
0x0B	20	34.1	0x0B	20	34.1
0x0A	18	30.7	0x0A	18	30.7
0x09	16	27.3	0x09	16	27.3
0x08	14	23.9	0x08	14	23.9
0x07	12	20.5	0x07	12	20.5
0x06	10	17.1	0x06	10	17.1
0x05	8	13.7	0x05	8	13.7
0x04	6	10.2	0x04	6	10.2
0x03	4	6.8			
0x02	2	3.4			
0x01	0	0			

## Color and Light Management Inquiry Commands

Inquiry Command	Command	Response Packet	Comments
CAM_WBModelInq	8x 09 04 35 FF	y0 50 00 FF	Auto
		y0 50 05 FF	Manual
CAM_RGainInq	8x 09 04 43 FF	y0 50 00 00 0p 0q FF	pq: Red gain
CAM_BGainInq	8x 09 04 44 FF	y0 50 00 00 0p 0q FF	pq: Blue gain
CAM_AEModelInq	8x 09 04 39 FF	y0 50 00 FF	Auto
		y0 50 03 FF	Manual
CAM_ShutterPosInq	8x 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: Shutter position
CAM_IrisPosInq	8x 09 04 4B FF	y0 50 00 00 0p 0q FF	pq: Iris position
CAM_GainPosInq	8x 09 04 4C FF	y0 50 00 00 0p 0q FF	pq: Gain position
CAM_WDModelInq	8x 09 04 3D FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_BackLightModelInq	8x 09 04 33 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ApertureInq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture gain
CAM_ChromaInq	8x 09 7E 55 FF	y0 50 05 00 00 00 0p FF	p: 0 – Eh
CAM_GammaOffsetInq	8x 09 04 1E FF	y0 50 00 00 00 0s 0t 0u FF	s: Polarity offset (0 is plus, 1 is minus) tu: Offset s=0 (00h to 40h) Offset s=1 (00h to 10h)

## Other Commands

Command Set	Command	Command Packet	Comments
CommandCancel		8x 2p FF	p= socket (1 or 2)
CAM_Power	On	8x 01 04 00 02 FF	Power on
	Off	8x 01 04 00 03 FF	Power off
Corresponds to <code>camera standby</code> in Telnet API.			
CAM_Tally	On	8x 01 7E 01 0A 00 02 FF	
	Off	8x 01 7E 01 0A 00 03 FF	
CAM_NR	--	8x 01 04 53 0p FF	p = noise reduction level (0: off, 1 – 5)
CAM_Mute	On	8x 01 04 75 02 FF	Video mute on/off
	Off	8x 01 04 75 03 FF	
	Toggle	8x 01 04 75 10 FF	
Corresponds to <code>video mute</code> in Telnet API.			

## Other Inquiry Commands

Inquiry Command	Command	Response Packet	Comments
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF	Off (standby)
Corresponds to <code>camera standby get</code> in Telnet API			
CAM_IPAddress	8x 09 08 4E 00 00 FF	y0 50 49 50 00 00 00 0p 0p 0p 0q 0q 0q 0r 0r 0s 0s 0s FF	IP address = ppp.qqq.rrr.sss
CAM_TallyInq	8x 09 7E 01 0A FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_NRInq	8x 09 04 53 FF	y0 50 0p FF	Noise reduction p: 00h to 05h
CAM_MuteModelInq	8x 09 04 75 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
Corresponds to <code>video mute get</code> in Telnet API			
Vaddio_ModelInq	8x 09 08 0e FF	y0 50 08 25 00 00 00 FF	

## Specifications

### Camera and image

<b>Image device</b>	1/2.5-Type Exmor R™ back-lit CMOS sensor
<b>Pixels</b>	8.5 Megapixels (Effective)
<b>Video Resolutions</b>	1080p/60, 59.94, 50, 30, 29.97, 25 1080i/60, 59.94, 50 720p/60, 59.94, 50
<b>Video Aspect Ratio</b>	16:9 for all resolutions
<b>Pan and tilt</b>	Pan ± 150°, tilt +90° -30°; speed 0.35°/sec to 120°/sec
<b>Lens and horizontal FOV</b>	RoboSHOT 30E NDI: 30x zoom, 70.2° (wide) to 3.1° (tele), f=4.4mm wide end to 88.4mm tele end, F2 to F3.8 RoboSHOT 12E NDI: 12x zoom, 70.2° (wide) to 6.8° (tele), f=4.4mm wide end to 88.4mm tele end, F2 to F3.8
<b>Min. working distance</b>	9 in. (0.23 m) wide, 31 in. (0.8 m) tele
<b>Min. illumination</b>	Recommended: 100+ lux
<b>Gain</b>	Auto/Manual (28 steps)
<b>Backlight compensation</b>	On/off
<b>Aperture/detail</b>	16 steps
<b>Focusing system</b>	Auto Focus, Manual Focus, One Push Trigger Mode, Infinity Mode, Near Limit Mode
<b>White balance</b>	Auto, ATW, Indoor, Outdoor, One-push, Manual
<b>Noise reduction</b>	On/Off, 6 Steps
<b>Sync system</b>	Internal
<b>S/N ratio</b>	More than 50 dB
<b>Remote management</b>	IR Remote Commander, web interface, Telnet and VISCA/RS-232 command APIs
<b>Power</b>	PoE+

### Physical and Environmental

<b>Height</b>	6.9 in. (17.6 cm)	<b>Weight</b>	4.85 lbs (2.2 kg)
<b>Width</b>	7.1 in. (17.9 cm)	<b>Operating/storage temperature</b>	0°C to +40°C (32°F to 104°F)
<b>Depth</b>	6.8 in. (17.2 cm)	<b>Operating/storage humidity</b>	20% to 80% RH, non-condensing

Specifications are subject to change without notice.

## Troubleshooting and Care

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

### Check the Status Light First

When the camera doesn't behave as you expect, check the indicator light before you do anything else.

- **Blue:** Normal operation (blinks once when the camera receives a command from the remote)
- **Red:** On-air tally (signal provided by external device via serial connection)
- **Blinking red:** Video is muted (UC color scheme only)
- **Purple:** In standby mode or booting
- **Yellow:** Firmware update in progress

If the status light is off, check whether you can access the camera via its web interface or Telnet. If so, the status light is disabled.

### Check the Cables Next

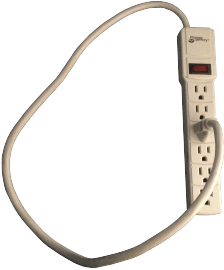
If the equipment behaves in a way that suggests even a remote possibility of a bad cable, please try a known good cable with the same pin-out.

Cables can be defective, whether they are purchased from a vendor or made at the installation site. 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, or does not pass enough power to the connected device.

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



## Power/Responsiveness Issues

What is it doing?	Possible causes	Check and correct
<p>Nothing. The status light is off, there is no video, and the camera does not respond to the remote.</p> 	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.
<p>The camera never finishes initializing and the light is purple. The web interface is not available.</p>	The camera is not receiving enough power. Is a PoE power injector connected?	Use <b>PoE+</b> instead. PoE does not deliver enough power for a PTZ camera.
	The PoE+ power injector is bad.	Contact your reseller or Vaddio Technical Support.
<p>The camera does not respond to the remote and the light is yellow.</p>	A firmware update is in progress.	Wait a few minutes, and try again when the light turns blue.

## Video Issues

What is it doing?	Possible causes	Check and correct
<p>Blue or black video. The camera's web interface is available and the camera responds to the directional controls on the remote.</p>	Video is muted.	Select the Mute button in the web interface. This button is available on every page of the web interface.
<p>Artifacts such as green "sparkles" in the video from the HDMI output.</p>	Poor cable connection.	Be sure the HDMI/DVI cable is fully seated.
	Bad HDMI/DVI cable.	Replace the cable.
<p>Unable to change resolution of the stream using the rotary switch</p>	The rotary switch only controls the resolution of the HDMI courtesy output.	Change the streaming resolution in the NDI software.

## Camera Control and Other Issues

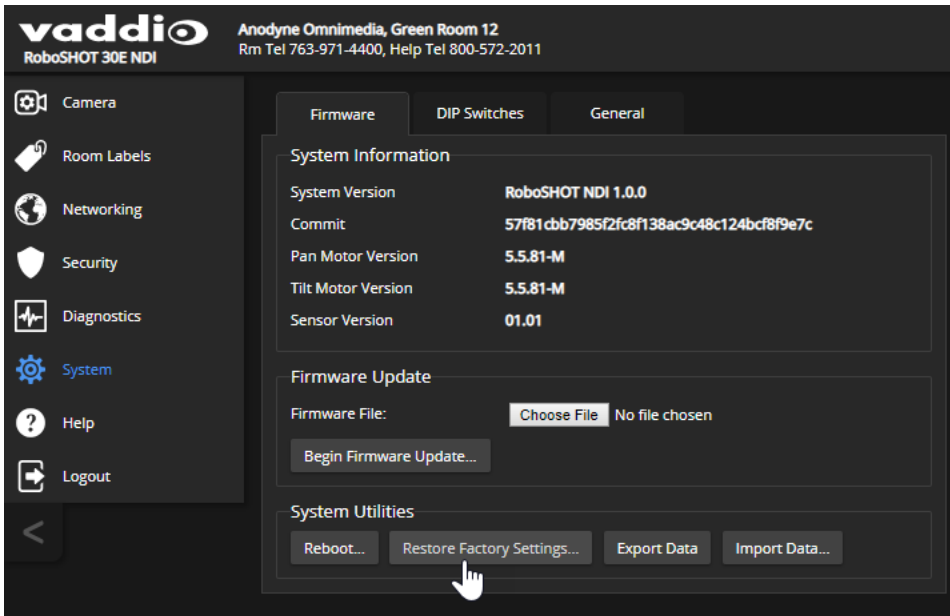
What is it doing?	Possible causes	Check and correct
The camera responds to the remote and local video is available, but is not discoverable to NDI software.	If the camera has just been powered up, it may take a few minutes before it is discoverable.	Wait a few minutes and try again.
	The camera is on a subnet that is not available to the software.	Move the computer running the NDI software to the same subnet as the camera.
The camera does not respond to the remote, but the web interface is available.	The remote and the camera are not using the same IR channel.	Press the <b>Camera Select 1</b> button on the remote. Try the other Camera Select buttons if necessary.
	The remote's batteries are dead.	Put new batteries in the remote.



## Restoring Factory Settings from the Web Interface

SYSTEM PAGE, FIRMWARE TAB

Sometimes it's easiest to just start over. To restore the original factory settings...click Restore Factory Settings. This will overwrite everything you have customized – custom CCU scenes and presets, soft DIP switch settings, passwords, room labels, and more. For this reason, you may want to back up (export) the camera's configuration after you set up the customizations you want. See [Saving \(Exporting\) or Restoring \(Importing\) a Configuration](#).



## Restoring Factory Default Settings Via Hardware

If the camera's administrative controls are not accessible, you can restore factory defaults using the switches on the back of the camera.

Set the rotary switch to the Factory Reset position (E) and cycle the power. Then return the rotary switch to its previous position.

## 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 40°C (104°F) or below 0°C (32°F)
- High humidity, condensing or wet environments
- Inclement weather
- Severe vibration
- Suspended by a fraying rope above a vat of acid
- Dry environments with an excess of static discharge

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

And a friendly reminder from our Training department...

As much as you might love our gear, do not attempt to romance your camera. As a robot it cannot return your love.



## Compliance and Conformity Statements

Compliance testing was performed to the following regulations:

FCC Part 15 (15.107, 15.109), Subpart B	Class A
ICES-003, Issue 54: 2012	Class A
EMC Directive 2014/30/EU	Class A
EN 55032: 2015	Class A
EN 55024: November 2010	Class A
KN24 2008 (CISPR 24: 1997 + A1: 2000 + A2: 2002)	Class A
IEC 60950-1:2005 (2nd Edition); Am 1: 2009 + Am 2: 2013	Safety
EN 60950-1: 2006 + A11: 2009 + A1: 2010 + A12: 2011 + A2: 2013	Safety

### FCC Part 15 Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15, Subpart B, of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) This device must accept any interference including interference that may cause undesired operation of the device.

Changes or modifications not expressly approved by Vaddio can affect emission compliance and could void the user's authority to operate this equipment.



### ICES-003 Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.



## European Compliance

This product has been evaluated for Electromagnetic Compatibility under the EMC Directive for Emissions and Immunity and meets the requirements for a Class A digital device. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Standard(s) To Which Conformity Is Declared:



### **EMC Directive 2014/30/EU**

**EN 55032: 2015**

Conducted and Radiated Emissions

**EN 55024: November 2010**

Immunity

EN 61000-4-2: 1995 + Amendments A1: 1998 + A2: 2001

Electrostatic Discharge

EN 61000-4-3: 2006 + A1: 2008

Radiated Immunity

EN 61000-4-4: 2004 + Corrigendum 2006

Electrical Fast Transients

EN 61000-4-5: 2006

Surge Immunity

EN 61000-4-6: 2009

Conducted Immunity

EN 61000-4-8: 2010

Power Frequency Magnetic Field

EN 61000-4-11: 2004

Voltage Dips, Interrupts and Fluctuations

### **KN24 2008 (CISPR 24: 1997 + A1: 2000 + A2: 2002)**

IT Immunity Characteristics

EN 61000-4-2

Electrostatic Discharge

EN 61000-4-3

Radiated Immunity

EN 61000-4-4

Electrical Fast Transients

EN 61000-4-5

Surge Immunity

EN 61000-4-6

Conducted Immunity

EN 61000-4-8

Power Frequency Magnetic Field

EN 61000-4-11

Voltage Dips, Interrupts and Fluctuations

**IEC 60950-1: 2005 (2nd Edition); Am 1: 2009 + Am 2: 2013**

Safety

**EN 60950-1: 2006 + A11: 2009 + A1: 2010 + A12: 2011 + A2: 2013**

Safety

## Photo Credits

This manual may include some or all 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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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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Sleeping goose

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STS-123 and Expedition 16 crews on the STS-123 crew's last full day onboard the International Space Station.

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

# Index

## A

- absolute position 53
- admin login 24
  - changing 24
- admin password 18
  - setting 18
- anatomy of the camera 3-4
- API 49-52, 54-64, 66-67, 69-72
  - RS-232 (VISCA) 64, 66-67, 69-72
  - Telnet 50-52, 54-63
- auto focus 34, 54
- auto iris 31, 57-58
- auto white balance 31, 33, 57-58
- automatic NTP updating 26

## B

- backing up a configuration 41
- backlight compensation 31-32, 57-58
- Baud Rate setting 38
- behavior on power-up 11, 28
- blue gain 31, 33, 57-58
- browser 17
  - security warnings 17
- browser compatibility 12

## C

- cable 4, 6, 74
  - connectors 4, 6
  - please check them (PLEASE) 6, 74
  - recommendations 6
- camera behavior settings 38
- camera control issues, troubleshooting 76
- camera hostname 16
- Camera ID setting 38
- camera mount, installing 9
- Camera page (web) 30-31
- camera select 46
- camera specifications 73
- camera standby position 47
- capabilities 1, 73
- CCU scenes 28-30, 33, 48, 56
  - custom 29, 33, 56
  - recalling 56
- CCU settings 32-33, 55, 57-58
- ceiling-mounted cameras 7

- cheat sheet 32-33, 46
  - color adjustment 33
  - lighting and image quality 32
  - Vaddio IR Remote Commander 46
- chroma setting 31-33, 57-58
- cleaning 77
- Codec Control Mode setting 38
- color codes for status light 7, 74
- color settings 30-31, 33, 57-58
- command history 63
- command set, RS-232 (VISCA) 64, 66-67, 69-72
- compatibility, browsers 12
- configuration, saving or restoring 41
- connection example 10
- connector identification 4
- connector pin-out, RS-232 8
- Controls page (web) 47
- custom CCU scenes 33
- custom home position, setting 28

## D

- damage, preventing 5-6, 8
- default 61, 76
  - settings, restoring 61, 76
- detail setting 31-32, 57-58
- DHCP vs. non-DHCP networks 17
- diagnostic logs 45
- Diagnostics page (web) 45
- directional controls 46, 48

## F

- factory defaults, restoring 61, 76
- fault isolation 74-76
- firmware 42, 62
  - version 62
- focus 34, 46, 54

## G

- gain 31-33, 57
  - blue 31, 33
  - iris 32
  - red 31, 33
- gamma setting 31-32
- getting help 44
- guest access 24

## H

- HDMI Color Space setting 38

HDMI resolution, setting 7  
 Help page (web) 44  
 home position 28, 48, 50  
     custom 28  
 hostname 16, 23  
     camera 23  
 HTTPS 17  
     browser warnings 17

## I

Image Flip setting 38  
 importing a configuration 41  
 inactive sessions (web interface) 24  
 indicator light 3, 7, 39, 59, 74  
     color scheme 39  
     enabling/disabling 39, 59  
     location 3  
     meaning of colors 7, 74  
 information, conference room 27  
 initial device set-up 12-13, 15, 18  
     using the Vaddio Device Controller 13  
     using Vaddio Deployment Tool 15  
 installation, typical 10  
 inverted installation 7  
 IP address 10, 16-17, 19, 21-22, 46  
     camera, discovering 16  
     default 17, 19, 22  
     EasyIP Decoder, discovering 16  
     preventing conflicts 10  
     static 21  
     static, configuring before installation 10, 19  
 IR remote 46  
 iris settings 31-32, 57-58

## L

labels, room 27  
 LED 3, 7, 39, 59, 74  
     enabling/disabling 59  
     location 3  
     meaning of colors 7, 74  
 LED Color Scheme setting 39  
 LED On/Off setting 39  
 light, status indicator 3, 7, 39, 59, 74  
     enabling/disabling 59  
     location 3  
     meaning of colors 7, 74  
 lighting settings 30-31, 48, 56-58  
 locations of connectors 4

log files 45  
 low-power (standby) state 47, 59

## M

manual focus 34, 46, 54  
 mounting cameras 5, 7, 9, 11  
 muting video 47

## N

NDI software 16  
 network configuration 19, 22-23, 60  
     current 60  
 Networking page (web) 19, 21-23, 26  
 NTP server 26

## O

One Push White Balance 33  
 operating environment 77  
 output resolution 7

## P

packing lists 2  
 page 19, 21-24, 26-27, 30-31, 38-39, 42-45, 47, 76  
     Camera 30-31  
     Control 47  
     Diagnostics 45  
     Help 44  
     Networking 19, 21-23, 26  
     Room Labels 27  
     Security 24  
     System 38-39, 42-43, 76  
 pan 34-35, 37, 50, 53  
     absolute position 53  
     direction 37  
     speed 34-35  
 pan/tilt/zoom controls 46, 48  
 passwords 18, 24  
     admin, setting 18  
 performance specifications 73  
 physical and environmental specifications 73  
 pin-out, RS-232 connector 8  
 ping command 60  
 point light compensation 31-32  
 position, absolute 53  
 power 11, 46, 75  
     issues, troubleshooting 75  
     on and off 11, 46  
 power-up settings 28



presets 29, 46, 48, 55  
 clearing 46  
 moving to 48  
 recalling 55  
 renaming 29  
 setting 46, 55  
 privacy 47  
 product capabilities 1

## Q

quick reference 32-33, 46  
 Vaddio IR Remote Commander 46

## R

ready state 47, 59  
 rebooting the camera 43, 61  
 red gain 31, 33, 57-58  
 remote control 46  
 reset See also rebooting the camera; restoring default settings  
 resolution 7, 39  
     setting in web interface 39  
 restoring a configuration 41  
 restoring default settings 61, 76  
 RJ-45 connectors 6  
 room information 27  
 Room Labels page (web) 27  
 rotary switch 7  
 RS-232 commands 64, 66-67, 69-72  
     setting values 69-70  
 RS-232 connector 8

## S

safety requirements 5  
 saving a configuration 41  
 scenes, CCU 29-30, 48  
     naming 29  
     storing 33  
 Scott 30  
 Security page (web) 24  
 self-signed certificate 17  
 session time-out 24  
 settings, default, restoring 61, 76  
 shelf-mounted cameras 11  
 shelf, camera mount 9  
 soft DIP switches 38  
 software control of video output resolution 39  
 solving problems 74-76  
 specifications 73

speed 34-35, 50-52, 54  
     focus 54  
     pan/tilt/zoom 34-35, 50-52  
 standby (low-power) state 47, 59  
 start-up behavior, setting 28  
 static IP address 19, 21-22  
 status light 3, 7, 59, 74  
     enabling/disabling 59  
     location 3  
     meanings of colors 7, 74  
 storage environment 77  
 storing a configuration 41  
 supported web browsers 12  
 switch settings 7, 42  
     Image Flip 7  
     reading from web interface 42  
     video resolution 7  
 System page (web) 38-39, 42-43, 76  
 system time 26

## T

tablet 13  
 technical specifications 73  
 technical support 44  
 Telnet 49, 53  
     commands 53  
     session 49  
     session history 63  
     session, ending 63  
 Telnet API 49-52, 54-63  
     command help 49  
     syntax help 63  
 temperature, operating and storage 77  
 tilt 34-35, 37, 51, 53  
     absolute position 53  
     direction 37  
     speed 34-35  
 time zone 26  
 Tri-Synchronous Motion (Tri-Sync) 34, 36, 55  
 troubleshooting 74-76  
 typical installation 11

## U

update 42  
 user login 24  
     changing 24

## V

- Vaddio Deployment Tool 12, 14-16
  - accessing discovered devices 16
  - check for the latest version 14
  - initial device set-up 15
- Vaddio Device Controller 12-13
- Vaddio IR Remote Commander 46
- version, firmware 62
- video issues, troubleshooting 75
- video mute 47
- Video Output Resolution (setting) 39
- video resolution 7
- VISCA commands 64, 66-67, 69-72
- voilà, a small cat 76

## W

- wall-mounted cameras 11
- wall mount 9
- warranty 5
- web browsers supported 12
- web interface 13, 16, 19-24, 26-27, 30-31, 38-39, 42-45, 47, 76
  - accessing 13, 16
  - accessing via direct connection 20
  - accessing via NDI software 16
  - Camera page 30-31
  - Controls page 47
  - Diagnostics page 45
  - Help page 44
  - Networking page 19, 21-23, 26
  - Room Labels page 27
  - Security page 24
  - System page 38-39, 42-43, 76
- wide dynamic range setting 31-32, 57-58

## Z

- zoom 48, 52-53
  - absolute position 53
- zoom speed 34-35, 46, 52

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