Complete Manual for the

RoboTRAK
Presenter Tracking System

Contents

Overview

This manual covers the RoboTRAK IR camera and presenter tracking system:
- RoboTRAK camera, North America – 999-7270-000B
- RoboTRAK camera, Europe and UK – 999-7270-001B
- RoboTRAK camera, Australia and New Zealand – 999-7270-009B
- Lanyard, North America – 999-7271-000
- Lanyard, Europe and UK – 999-7271-001
- Lanyard, Australia and New Zealand – 999-7271-009
- Lanyard with Back Loop Extension, North America – 999-7272-000
- Lanyard with Back Loop Extension, Europe and UK – 999-7272-001
- Lanyard with Back Loop Extension, Australia and New Zealand – 999-7272-009

This manual also covers the earlier model 999-7270-000/001/009 RoboTRAK camera.

The RoboTRAK system works with free-standing RoboSHOT® series cameras. It is not compatible with architectural cameras. The video camera is sold separately. Refer to the video camera's documentation for information on how to connect and configure it.

One lanyard is included with the system. Additional lanyards may be purchased separately. The lanyard with back loop extension accommodates long hair, head coverings, and bulky clothing.

What's in this Guide

This guide provides information on the following topics:
- Installing the RoboTRAK system
- Initial device set-up and system administration
- Configuration and fine-tuning
- Presenting with the RoboTRAK system
- Controlling the system
- Troubleshooting and maintenance

For your convenience, installation information is also available in the shorter, limited-purpose **Installation Guide for the RoboTRAK Presenter Tracking System**.

Features

- IR-based presenter tracking for medium to large rooms
- Designed for educators, in consultation with educators – move around, turn your head, invite others to the front of the room... the camera stays on you
- Switch between tracking and preset positions
- Simple configuration and administration using the Vaddio web interface
- Adjust the system's tracking behavior to match the presenter's style
- Operational range of 12 to 50 ft (3.7 to 15.2 m), height from 6 to 15 ft. (1.8 to 4.6 m)
- No belt pack – comfortable, highly wearable design
- Tracking lanyard with extension available – back loop can be placed over clothing or hair
- Up to 40 hours of lanyard battery power; 25 hours typical
- Recessed battery disconnect switch for full lanyard power-down – conserve battery life during storage; no risk of accidental actuation

A Quick Look at the RoboTRAK System

This section covers the physical features of the RoboTRAK system:

- IR camera
- Tracking lanyard

The RoboTRAK system requires a video camera as well. You can use any free-standing RoboSHOT camera as the video component of the system.

Refer to the documentation for your RoboSHOT camera for detailed information on connections and camera control.

Front of the RoboTRAK IR Camera

- **Camera assembly** – Based on the same reliable hardware as our PTZ video cameras.
- **Reflective lens** – Reduces interference from spurious IR sources. The reflective lens also provides a simple visual cue that it's not a standard video camera.
- **Status light** – Shows the IR camera's current status. May be turned off in the camera's web interface.

Back of the IR Camera

- **12 VDC, 3.0 Amp power connector** – Connect only the PoE splitter shipped with the camera.
- **Network** – Allows the RoboTRAK™ IR camera to control the video camera, and provides access to the web interface.
- **DIP switches** – Factory use only.

A Quick Look at the Tracking Lanyard

Vaddio recommends purchasing a second lanyard as a spare or for smooth transitions between multiple presenters.

A lanyard with a back loop extension is available for presenters whose hair, head covering, or clothing may otherwise cover the lanyard ribbon.

Medallion – Houses charging and control circuitry, switches to standby (low-power) mode when the IR camera switches to standby.

- **Button** – On/off switch for IR sources
- **Illuminated status light ring** – Directs light toward the wearer, not the audience
- **Battery** – Rechargeable Li-ion battery; up to 25 hour battery life, roughly 4 hour charging time
- **USB micro-B charging port** – Connect the supplied battery charger
- **Recessed battery disconnect switch** – Allows you to turn off the lanyard completely to extend battery life

Ribbon – Holds the medallion and contains the IR sources.

- **Strand of IR LEDs** – Provide a characteristic image pattern that the camera identifies and tracks
- **Safety clasp** – Automatically releases under tension

Caution
Do not pinch, crease, or stretch the lanyard ribbon. Do not pull the lanyard ribbon to release the clasp. Any of these will damage the circuitry in the ribbon.

Before You Start

Ensure that the room is suitable for the RoboTRAK system, and that all the required elements of the installation are present. This section covers the requirements for a successful installation.

Selecting the Installation Site

Note
Install the cameras with the IR camera directly above the video camera. Other physical orientations are not supported, as they pose tuning/configuration challenges.

- Choose a camera mounting location that will optimize camera performance. Consider camera viewing angles, lighting conditions, line-of-sight obstructions, and in-wall obstructions where the camera is to be mounted.
- Ensure that the camera body can move freely and will point away from the ceiling and lights.
- Follow the installation instructions included with the camera mount.

Camera Location

Siting requirements for the IR camera are similar to those for the video camera you use with it.
- Clear line of sight to the desired viewable area
- Acceptable camera distance 12 to 50 ft (3.7 to 15.2 m) from area of interest; best performance at 20 to 35 ft (6.1 to 10.7 m) from area of interest
- Height 7 to 15 ft (2.1 to 4.6 m) depending on distance
- Viewing angle as close as possible to the centerline of the tracking area

Camera Placement – Small Room
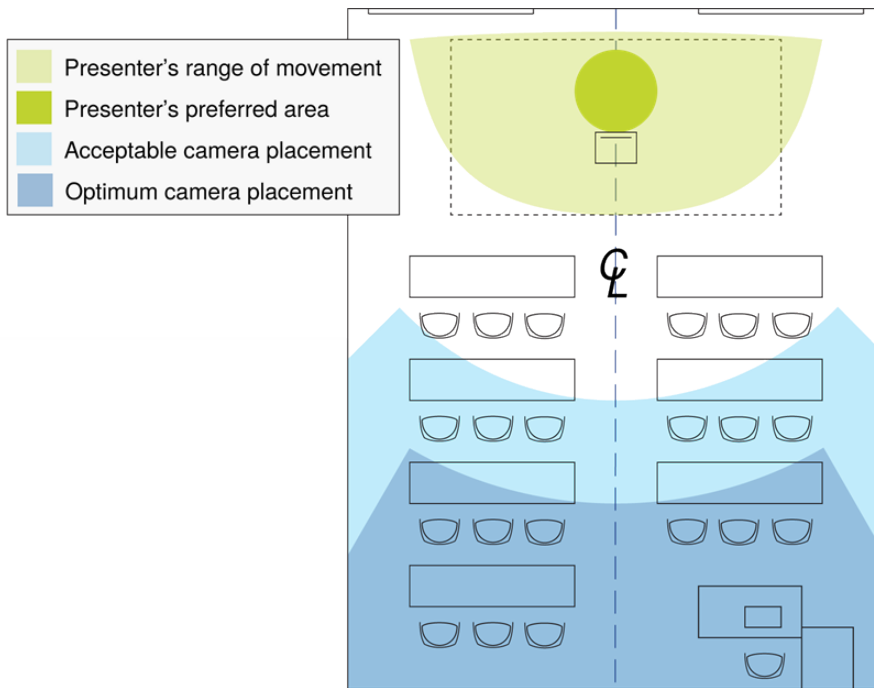
Camera Placement – Medium Room

Presenter's range of movement
Presenter's preferred area
Acceptable camera placement
Optimum camera placement
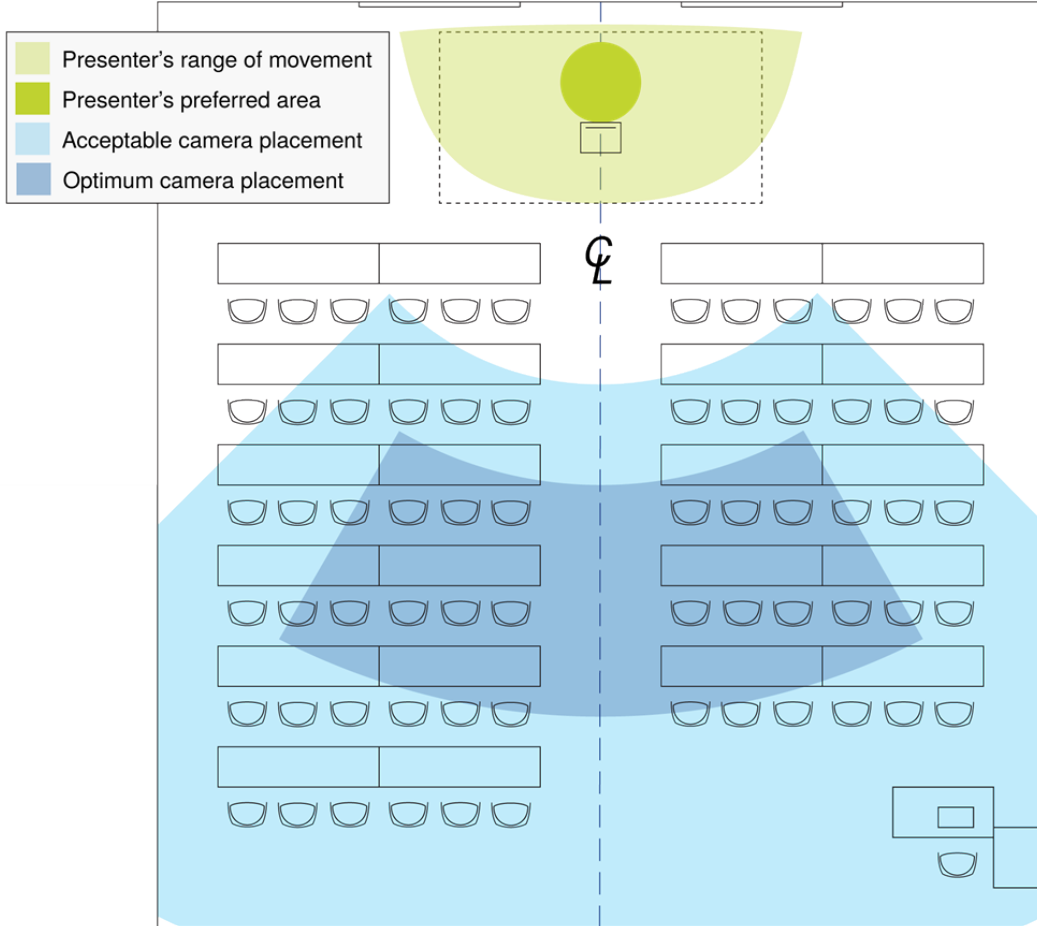
Camera Placement – Large Room

Legend:
- Presenter's range of movement
- Presenter's preferred area
- Acceptable camera placement
- Optimum camera placement
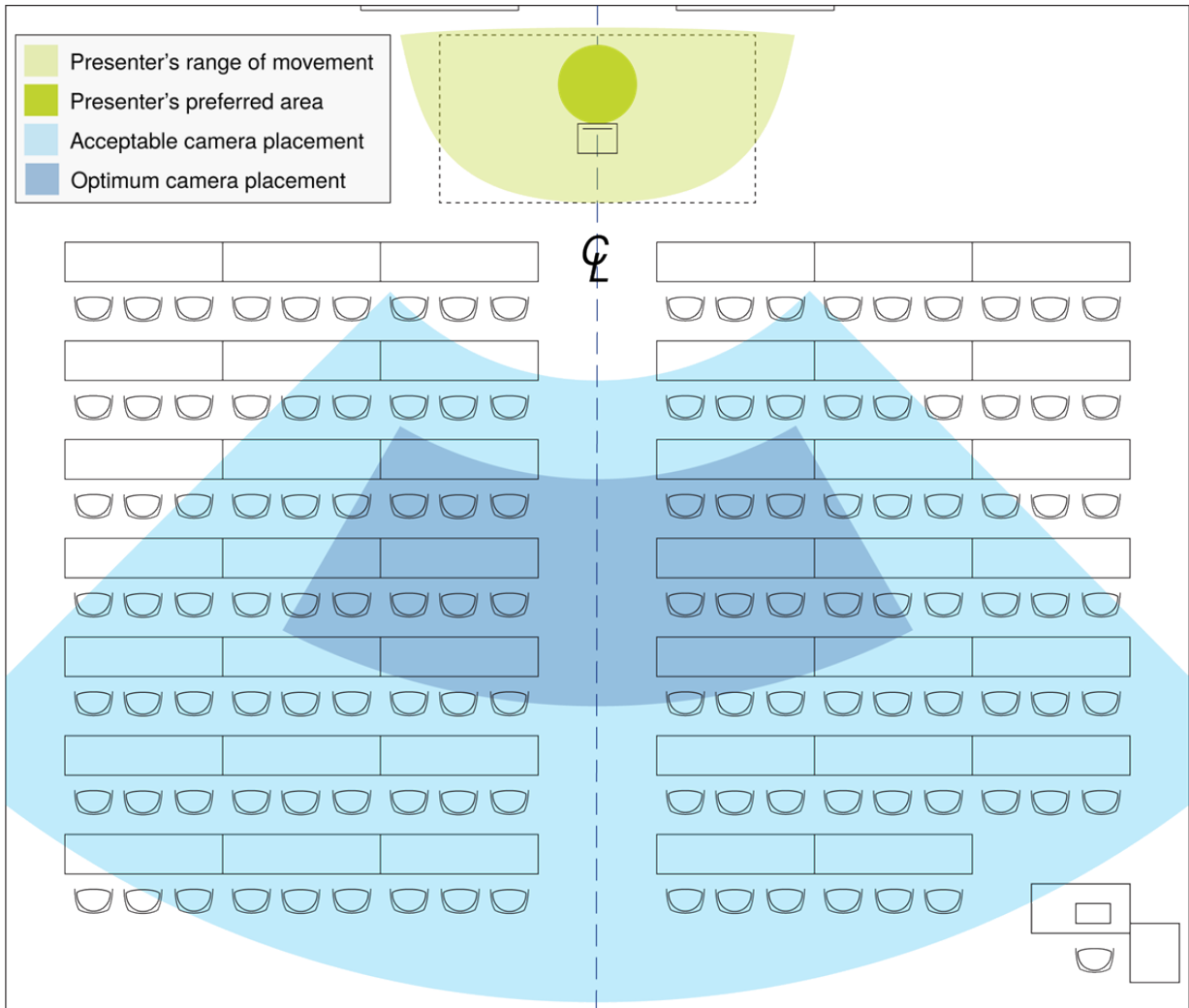
Lighting and IR

Note

The RoboTRAK IR camera works best in an IR-sterile environment. Natural lighting and halogen lamps produce enough stray IR to overwhelm the system.

- If the room has windows, blackout curtains or blinds are required - standard window blinds admit enough IR at the edges to keep the IR camera from identifying the tracking lanyard.
- Fluorescent or LED lighting is preferred.

This is a shot from the IR stream of a RoboTRAK camera in an IR-sterile room. Other than the presenter's lanyard, the room is dark. This is what you should see when you view the stream from the IR camera. (If the camera is not in setup mode, the image will not include the white rectangle.)
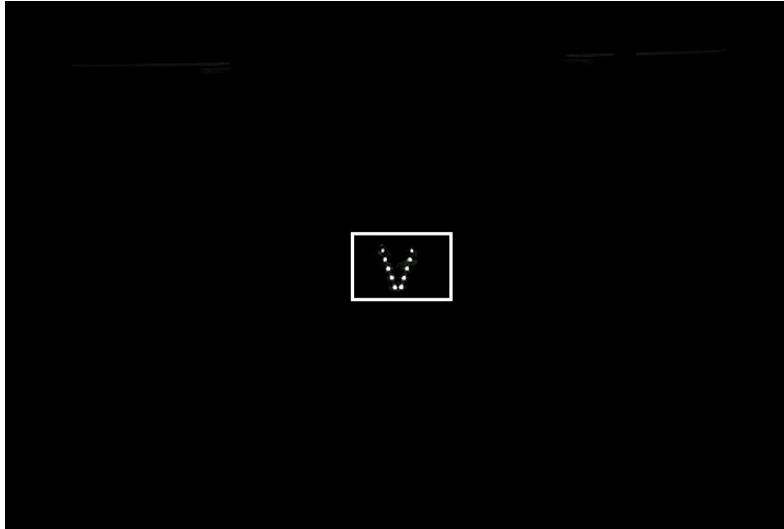
The photograph below shows almost the same shot from the RoboTRAK IR camera as shown in the previous photograph, but in a different room. The window shades are closed and the room looks dark - but the IR image shows that the whole room is flooded with IR, and the lanyard does not emit enough IR to be detected.

This room requires IR remediation.
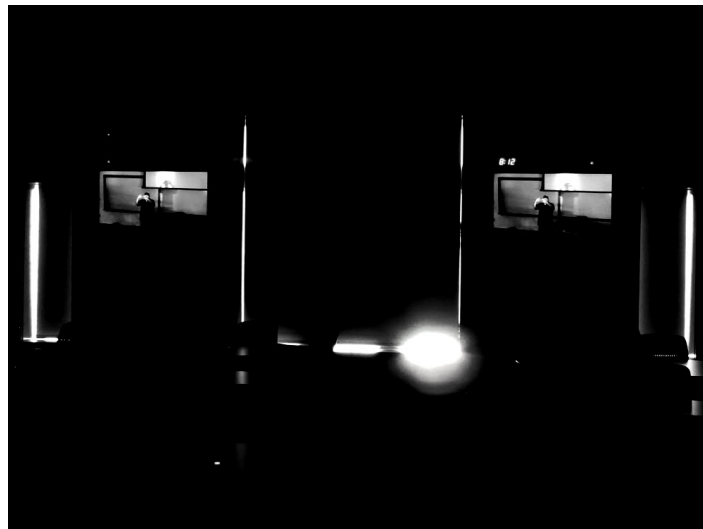
Certain types of room systems also emit IR, and can keep the tracking system from working properly:
- Assisted listening systems
- IR-based audio systems
- Room occupancy sensors

Turning any of these off may not be an option. In such cases, cover or remove reflective objects if possible. IR reflects the same way as visible light – an object that looks shiny to you also looks shiny to the IR camera.

Contact Vaddio Technical Support for help with stray IR mitigation.

Installation

This section covers installing the mount, functional check, and connecting the camera.

Don't Void Your Warranty!

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

Use only the power supply included with this product. Using a different one will void the warranty, and could create unsafe operating conditions or damage the product.

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.

Cabling Notes

Note
Do not use pass-through RJ-45 connectors. These can cause intermittent connections and degraded signal quality, resulting in problems that may be hard to diagnose. Use standard RJ-45 connectors.

Use Cat-5e or better cable and standard RJ-45 connectors (568B termination). We recommend using high-quality connectors and a high-quality crimping tool.

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.

Caution
Check Cat-5 cables for continuity before using them. Using the wrong pin-out may damage the camera system and void the warranty.

Pro Tip
Label all cables at both ends.

Network Requirements

- Network connections for both cameras
- Hostname resolution

Additional Equipment

- **Side-by-side displays** – The team or individual tuning the RoboTRAK system will need to see the IP stream from the IR camera and the live video feed from the video camera at the same time. The display for the IR camera is not needed after the system is configured and fine-tuned.
- **Vaddio Device Controller or other device with wifi access** – If you do not have an assistant for the tuning process, you will need to be able to work with the RoboTRAK IR camera's web interface while moving around the room.

The IR Camera's Default Hostname

You will need to reach both cameras' web interfaces to do the initial device setup and to configure the system for use. If you do not use the Vaddio Device Controller or Vaddio Deployment Tool to access the IR camera's web interface, you will need to point your browser to its default hostname. If this is the case, copy the default hostname from the label on the bottom of the camera, and keep this information in a place where it will be available to anyone who needs to work with the camera's web interface. This information may be required to access the camera for initial configuration, or after a factory reset.

Placing the PoE Splitter

Both connections to the IR camera are from the PoE splitter.

1. Remove the backing from one side of the rectangle of 3M® Dual Lock™ material to expose the adhesive, and press it firmly against the back of the PoE splitter.
2. Connect the long Cat-5e cable to the Power & Data connector on the PoE splitter.
3. Connect the short Cat-5e cable to the Data Out connector on the PoE splitter.
4. Check the connectors on the short power cable. If one has a center pin and the other does not, the connector without a center pin goes to the PoE splitter.
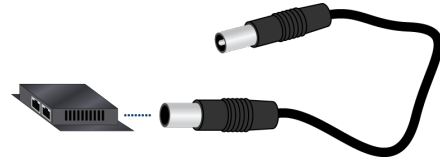
   Caution
   The short power cable shipped with older systems has two different connectors. If the connectors on the short power cable are NOT identical, attempting to connect the wrong end of the cable to the PoE splitter will damage the connector. (We did this in the lab, and we're admitting it so you can avoid our mistake.)

5. Holding the PoE splitter under the top shelf of the camera mount, route the two short cables through the cable opening for the upper camera.
6. Determine the best position for the PoE splitter, then remove the backing from the exposed side of the 3M Dual Lock material and press the PoE splitter into place within the camera mounting shelf.

Pre-Installation Functional Check

If you're installing the cameras where they are hard to reach, you may want to verify functionality before you install them.

1. Connect each camera in its minimum functional configuration.
2. Connect power. Each camera moves and its status light turns on.

If the cameras turn on, continue with the installation.

Connections for Configuring the System

To configure the system for the room and set up the desired tracking behavior, you will need to view the IP stream from the IR camera. Side-by-side displays of the IR camera stream and the video camera output are strongly recommended.
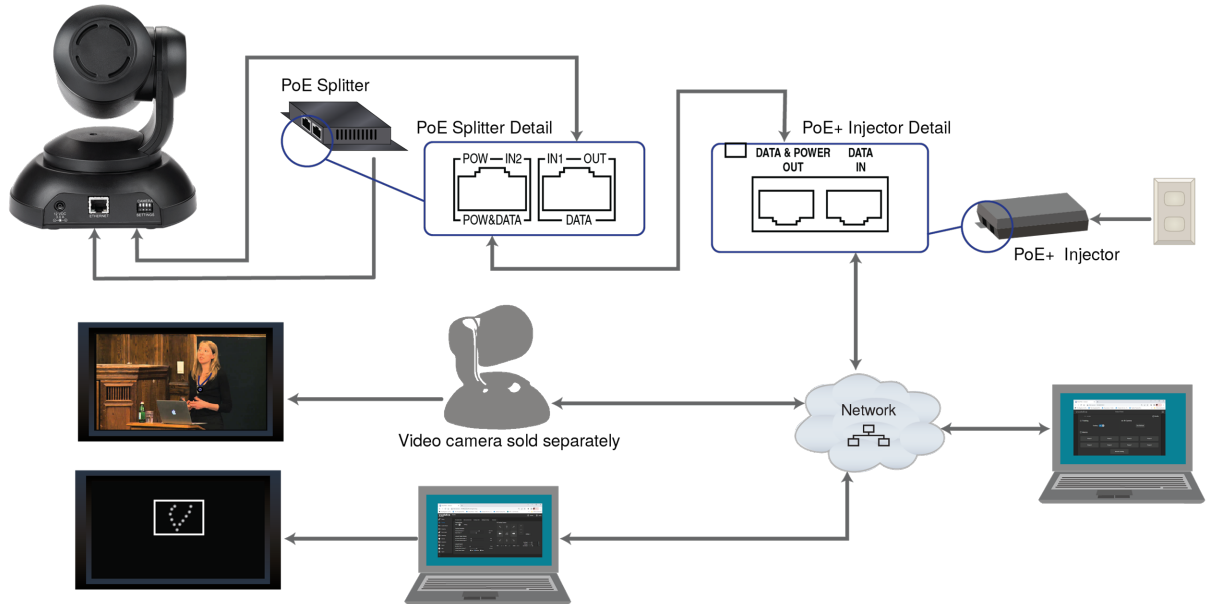
This is the only time you will need to view the IR camera's stream.

Connections for Service
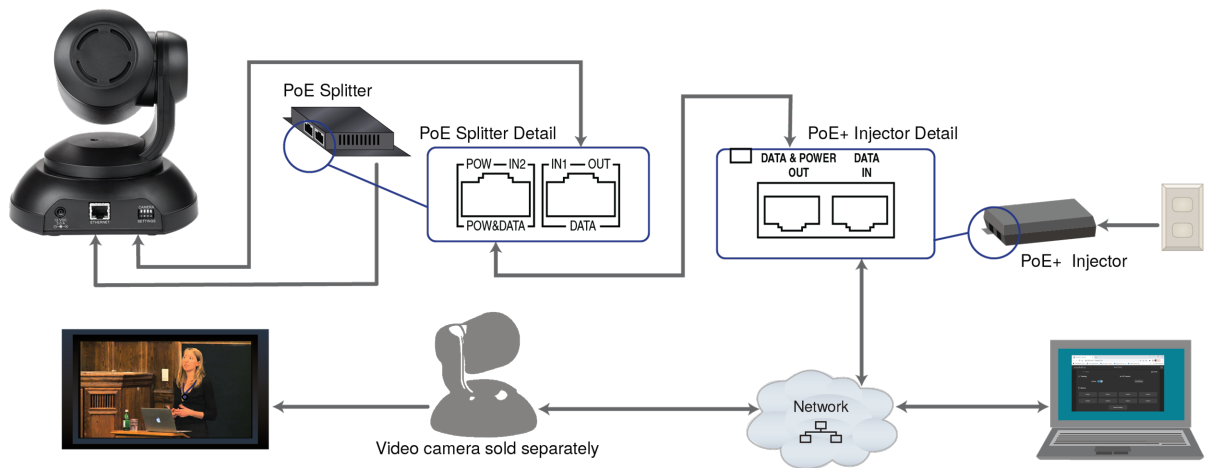
Video camera sold separately – use with any free-standing RoboSHOT camera. The RoboTRAK system is not compatible with architectural cameras.

Installing the Camera Mount

The RoboTRAK presenter tracking system's dual wall mount can be used with Vaddio's Offset Drop-down Ceiling Mount for RoboTRAK, part number 535-2000-045. Contact us if you don't have the camera mount you need.

Warning
Do not load the lower camera shelf with more than 30 lbs (13.6 kg). Do not load the upper camera shelf with more than 15 lbs (6.8 kg).

Wall Installation

Note
You can install the camera mount to a 2-gang wall box or directly to the drywall. If you install the wall mount on drywall, use the wall anchors provided with the wall mount. If you install it over a wall box, use the cover plate screws supplied with the wall box.

1. Route cables through the appropriate cable opening in the mount.
2. Attach the mount to the wall, using wall anchors if not attaching it to a wall box.
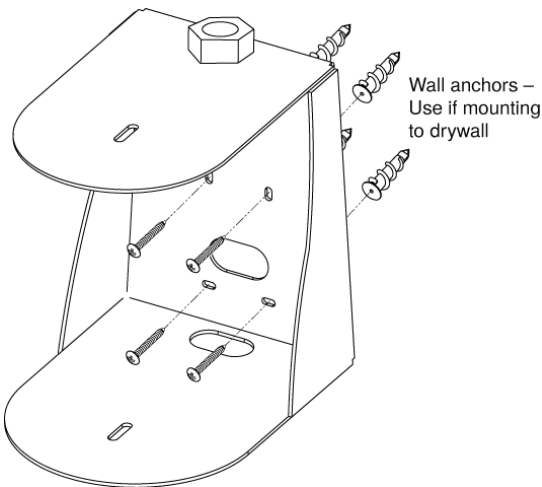3. Level the mount and tighten the mounting screws.
4. Check the level again.

Wall anchors –
Use if mounting
to drywall

Ceiling Installation

For a ceiling installation, you will need Vaddio's Offset Drop-down Ceiling Mount for RoboTRAK, part number 535-2000-045.

Vaddio does not recommend using a non-offset ceiling mount pole, as the system's center of mass is significantly forward of the 1" NPT threaded nut. Contact Vaddio if you don't have a suitable ceiling mount kit.

1. Install the ceiling mount kit according to the instructions provided with it.
2. At the appropriate step, route the cables for both cameras through the pipe.
3. At the appropriate step, attach the dual camera mount to the end of the threaded pipe.

Note
Inverted operation is not supported.

Installing the Cameras

Note
Copy the default hostname from the label on the bottom of the camera, and keep this information in a place where it will be available to anyone who needs to work with the camera's web interface. This information is required to access the camera for initial configuration, or after a factory reset.

Caution
Before you start, be sure you can identify all cables correctly. Connecting a cable to the wrong port can result in equipment damage.

Caution
Check Cat-5 cables for continuity before using them. Using the wrong pin-out may damage the camera system and void the warranty.

1. Connect the cables from the PoE splitter to the IR camera.
2. Place the camera on the upper shelf of the mount.
3. Attach the camera to the mount using the mounting screw supplied with the camera.
4. Ensure that the video camera's resolution switch and DIP switches (if any) are set appropriately. Refer to the video camera's manual for this information.
5. Connect the cables to the video camera.
6. Place the video camera on the lower shelf of the mount.
7. Attach the camera to the mount using the mounting screw supplied with the camera.

Turning on the Cameras

Connect camera power.

The cameras will wake up and initialize. This will take a few seconds. When the cameras are ready to accept control information, the IR camera's status light is blue and the video camera's status light may be blue or red. At this point, the system is ready to configure.

Camera Status Light

In normal use, the RoboTRAK IR camera's status light will provide more useful information than the video camera's status light.
- Green – Tracking or waiting at the home position
- Blue – Not in tracking mode (may be at a video camera preset position)
- Blinking green – Searching for the lanyard
- Blinking blue – Not paired or not in contact with the video camera
- Purple – In standby mode or booting
- Blinking yellow – Executing a pan-tilt reset
- Yellow – Updating firmware

Preparing the Tracking Lanyard for Use

You will need all the items from the box that the lanyard was shipped in:
- Lanyard
- USB charger
- USB charging cable
- Ferrite bead

Note
To ensure compliance with FCC regulations, you must install the ferrite bead as directed in step 1.

1. Snap the ferrite bead onto the charger cable about 2 inches (5 cm) from the connector that plugs into the lanyard.
2. Make sure the recessed battery disconnect switch is in the ON position.
3. Plug the charger into a power source, and connect the charger cable.
4. Plug the charger cable into the lanyard.
5. Leave the lanyard connected to the charger until the medallion blinks only occasionally. Charging may take several hours.

Note
The lanyard is not compatible with chargers for Apple products. Charging does not occur if the lanyard is connected to an Apple device charger.

Lanyard Status Light

The ring on the lanyard's center button is a status light that aims the light to the sides, so you can see it while wearing the lanyard.
- Blue – The lanyard is active; the IR LEDs in the ribbon are on and can be tracked
- Blinking yellow – The battery is too low to power the IR LEDs; no camera tracking possible
- Green or flashing green every 5 seconds – Charging

If the ring is dark, this can mean several things.

If the lanyard is...	And the button's behavior is...	It means...
Not connected to the charger	Lights up blue when pressed	The lanyard is ready for use.
	Flashes yellow twice when pressed	The battery is too low to power the IR LEDs.
	Remains dark when pressed	The battery is completely discharged, or the recessed battery disconnect switch is off (farther from the connector for the charging cable).
Connected to the charger	Lights up green if the lanyard is disconnected and reconnected	The battery is fully charged.
	Remains dark if the lanyard is disconnected and reconnected	The recessed battery disconnect is off and no charging has occurred.

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 is complete for both the IR camera and the video camera, you will need to complete system administration tasks for both cameras to define how they behave as elements of your network.

We recommend using the Vaddio Deployment Tool (available as a free download at https://info.legrandav.com/VaddioDeploymentTool) or the Vaddio Device Controller to locate your cameras on the network and complete the initial device setup.

Browser Support

This product is compatible with the current versions of these web browsers:
- Chrome®
- Firefox®
- Safari®
- Microsoft® Edge

Older versions of these browsers are likely to work, and other browsers may also work.

Initial Device Set-Up Using the Vaddio Deployment Tool

The Vaddio Deployment Tool simplifies provisioning and system administration for most products, and provides a shortcut to each device's web interface.

The screen shots are examples only, and show how to do this for a different product.

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

1. Download and install the Vaddio Deployment Tool if you have not done so already, then open it.
2. Turn on the cameras and other devices in your installation if you have not done so already.
3. On the Find Devices page, click Scan. If the scan does not locate the devices you are setting up, your computer may be on a different subnet. Return to the Find Devices page and click Advanced and specify the appropriate portion of the network to scan.
4. In the list of equipment that the scan discovers, locate the devices marked Not Set Up.
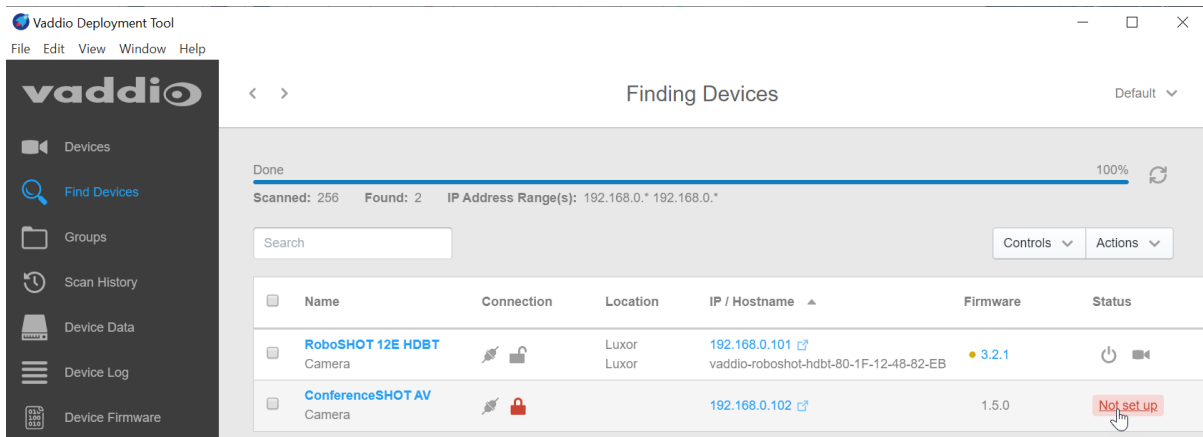
5. For each device that you need to work with, click the Not Set Up button and set the admin password on the device detail page that opens.
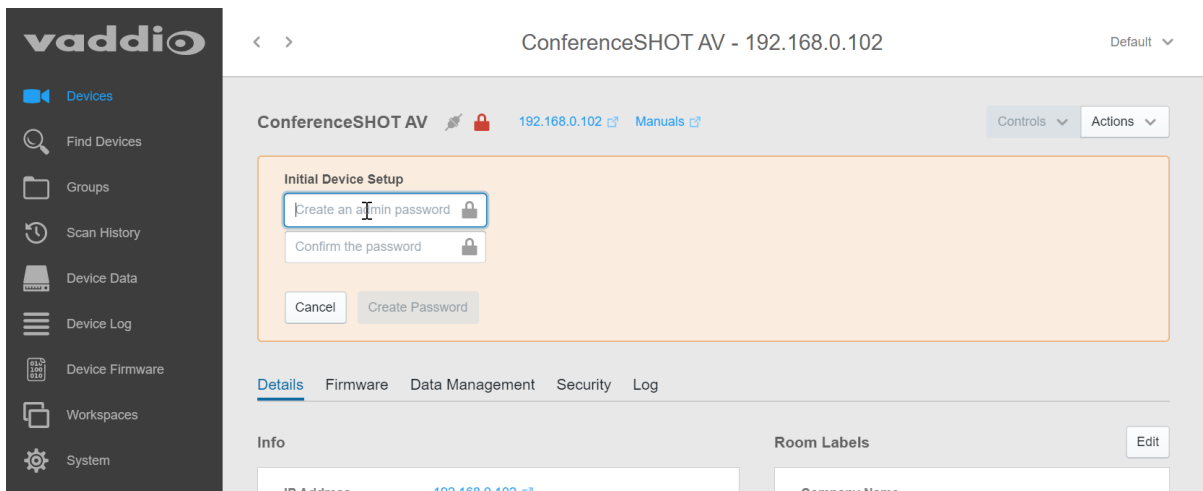
The device shows up as unlocked after you set the admin password. You can now access the administrative web interface to complete system administration and other configuration tasks.

That's it. No complicated procedures for finding all the newly installed devices on your network. You can find and manage your whole Vaddio deployment from the Vaddio Deployment Tool.

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.

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.
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.

Manual Access and Initial Device Set-Up

If your network does not use hostname resolution, you will not be able to browse to the camera's hostname. In this case, connect your computer's network port directly to the camera's network port. Then browse to the camera's default IP address, 169.254.1.1.

To complete the initial device set-up manually:

1. Browse to the device's default hostname or IP address using HTTPS. This will generate warnings from your browser.
2. Create a password for the admin login, and complete any other required steps (such as accepting agreements) for the initial device set-up.

The administrative web interface opens.

System Administration

This section covers basic system administration tasks:
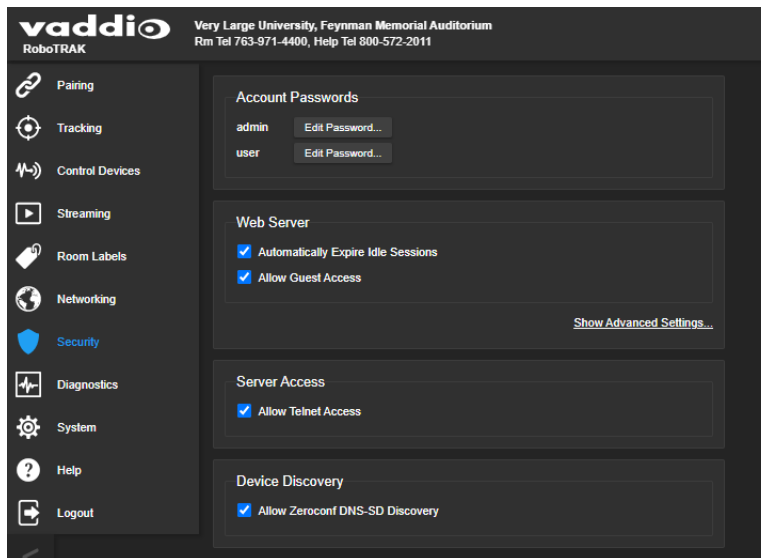- Security settings
- Specifying time zone and NTP server

These tasks are nearly identical to the corresponding system administration tasks for the video camera.

Configuring Access and Other Security Settings

SECURITY PAGE

The Account Passwords and Web Server areas of the Security page provide basic security for the web interface:
- **Admin password** – Required. The web interface is unavailable if no admin password is set.
- **User password** – Password-protected access to the operator's page of the web interface.
- **Allow Guest Access** – Allow access the operator's page without a password. Disabled by default.
- **Automatically Expire Idle Sessions** – Automatically logs you out after 30 minutes of inactivity.

Other security settings include:
- **Allow Telnet Access** – Disabled by default.
- **Allow Zeroconf DNS-SD discovery** – Allowed by default.
- Advanced Settings – **Enable HTTP access** (disabled by default) and **Manage SSL Certificate**.

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

Assigning a Hostname or IP Address

NETWORKING PAGE

In a network that supports hostname resolution, you can assign each camera a hostname that conforms to the organization's network policies. This is optional; you can continue to use the cameras' default hostnames.

If the network does not support hostname resolution, assign static IP addresses to both cameras to ensure that after they are paired, they remain paired.

Note
If you change hostnames or IP addresses after the cameras have been paired, you will need to update the camera information on the Pairing page. See Pairing the Cameras.
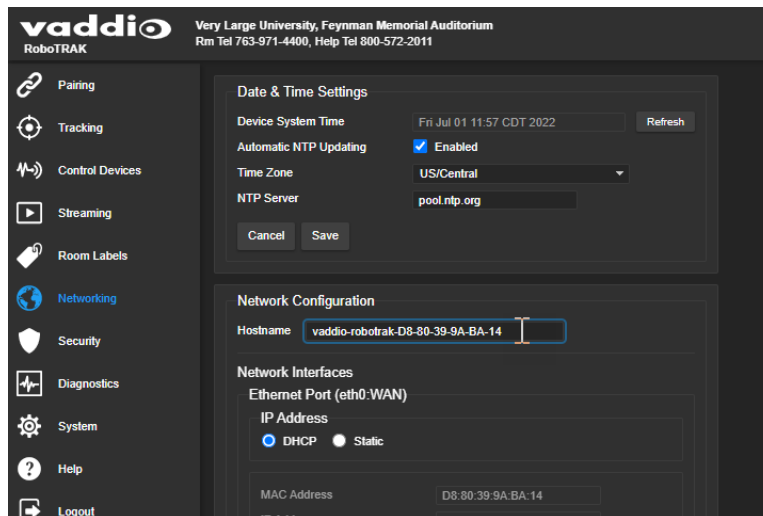
To assign a new hostname:

This is an optional configuration task. Vaddio recommends using the video camera's hostname rather than its IP address to identify it to the RoboTRAK IR camera, so that the cameras remain paired even if IP addresses change.

Work with the IT staff to define camera hostnames that conform to network policies.

The procedure for assigning a hostname is the same on both cameras:

1. Go to the Networking page of the web interface.
2. Replace the current hostname with the new hostname.
3. Save the change.

This will end your session. Log in again to continue configuring the system.

To assign a static IP address:

Work with the IT staff to determine the appropriate IP address, subnet mask, and gateway information.

The procedure for assigning a hostname is the same on both cameras:

1. On theNetworking page of the web interface, under Network Interfaces, set the IP address to Static.
2. Enter the new IP address, subnet mask, and gateway.
3. Save your changes.

This will end your session. Log in again to continue configuring the system.

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.
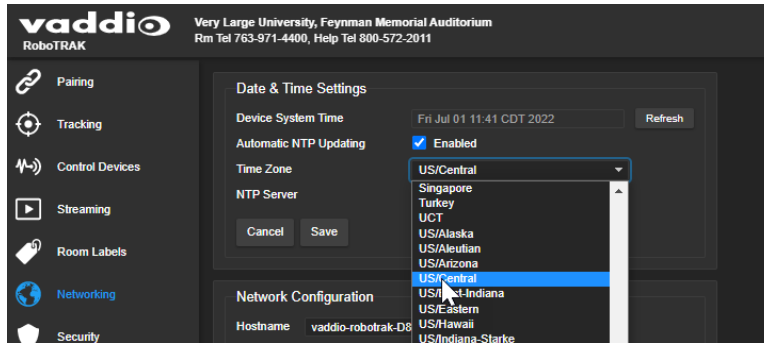
Configuring the Tracking System

Before you start, be sure the lanyard is fully charged and the ring glows blue to indicate it is powered up.

You will need:

- Equipment to view the IP streams from both cameras.
- A stream viewer application such as VideoLAN VLC Media Player – set caching time to 300 ms for best results when tuning the system.
- If you do not have an assistant to wear the lanyard and move around the room, you will need a tablet and wi-fi access.

The Tracking Configuration Process

Configuring tracking behavior and performance may be simple or complex, depending on the requirements of your installation.

- For most installations, the most basic form of the configuration process may be enough.
- Some installations require more precise tracking. The basic configuration with some additional adjustments may deliver the desired results, or you may need to import a distance configuration file before doing the rest of the configuration.
- For installations that pose special challenges, you may need to call Vaddio technical support for assistance.

Test the system's performance after setting up the lanyard shots, and after making any additional changes.

Basic configuration –The simplest form of the configuration process is:

1. Do the network and security configuration for both cameras.
2. Pair the cameras.
3. Set up the lanyard shots for both cameras.
4. Make adjustments on the Tracking page as needed.

Specific distance configuration – For greater tracking precision within a narrower range of distances, you may need to load a distance configuration file before completing the configuration. When you use a distance configuration file, the process is:

1. Do the network and security configuration for both cameras.
2. Import the distance configuration file. This will not overwrite network and security settings, but it will overwrite other changes you may have made – so do it before you make other changes.
3. Pair the cameras.
4. Set up the lanyard shots for both cameras.
5. Make adjustments on the Settings and Tuning tab of the Tracking page.

Distance configuration with additional adjustments – For specific challenges that you cannot solve with the adjustments on the Settings and Tuning tab or by loading a distance configuration file and repeating the configuration, you may need to change settings on the Advanced tab of the Tracking page. *Please call Vaddio technical support for assistance with the advanced settings.*

About Distance Configuration Files

The RoboTRAK camera's factory default configuration typically delivers good tracking performance for the area 20 to 40 ft. (6.1 to 12.2 m) from the cameras. Most installations use the default distance configuration.

In some installations, the configuration needs to be optimized for a specific range – for example, an auditorium stage or a small classroom. Vaddio provides distance configuration files on the RoboTRAK product page, https://www.legrandav.com/products/control/presenter_tracking/robotrak-presenter-tracking-system/999-7270-000b.

The three folders in the .zip file correspond to manufacturing changes over the life of the product.

The names of the files in each folder indicate the minimum distance at which each delivers best tracking: 20 ft (6.1 m), 30 ft (9.1 m), or 40 ft (12.2 m). Each distance configuration typically continues to deliver good tracking performance 15 to 20 ft. (4.6 to 6.1 m) beyond the minimum distance.

When you import a distance configuration file, it overwrites the room label and any camera and tracking adjustments that you may have made. (This happens when you import any configuration file to any Vaddio camera.) You will not need to redo the network and security settings, but you will need to do the rest of the configuration after loading the distance configuration file.

Determining Which Distance Configuration Files to Use

Do one of these things:
- Trial-and-error: Try loading the appropriate distance configuration file from some folder in the .zip file. We suggest trying the Files_for_Wo_MC108M2 folder first. Try another folder if the camera returns an error message. Even if you have to try files from all three folders, it typically takes less than 5 minutes.
- Query the camera via Telnet to determine which folder in the .zip file to open. To do this:
  1. Ensure that Telnet is enabled on the camera's Security page.
  2. Open a Telnet session to the camera, logging in with the admin credentials.
  3. Send the command **`camera master sensor get`**.
     - If the response is `Hi_SC210`, use the appropriate file from the Files_for_Hi_SC210 folder.
     - If the response is `Wo_MC108`, use the appropriate file from the Files_for_Wo_MC108 folder.
   - If the response is `Wo_MC108M2`, use the appropriate file from the Files_for_Wo_MC108M2 folder.

Loading the Distance Configuration File

Do this before you do any set-up or configuration. Loading a configuration will overwrite any configuration changes you have already made.

Vaddio provides RoboTRAK room configuration files for common room sizes and layouts.

1. Go to the main RoboTRAK product page, https://www.legrandav.com/products/control/presenter_tracking/robotrak-presenter-tracking-system/999-7270-000b.

2. Locate the room configuration files on the Resources tab. Select the link to download the file that best matches the room you are setting up.

3. Go to the System page. Under System Utilities, select Import Data and browse to the configuration file you downloaded. The filename ends in `.dat`.
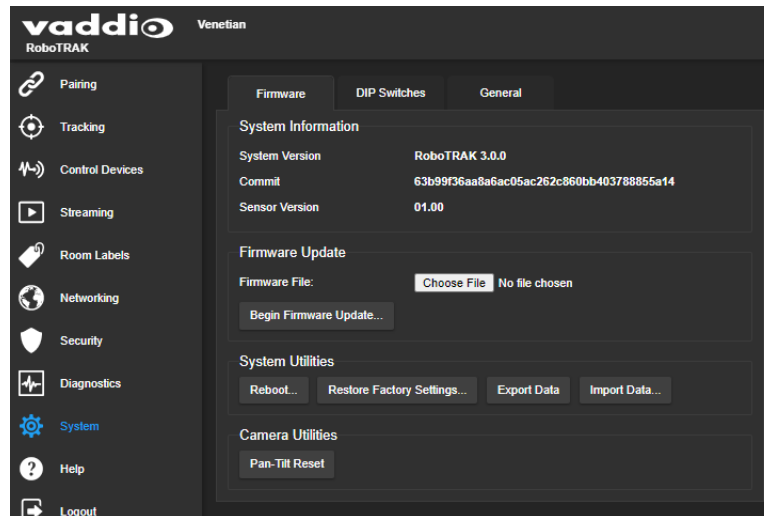
4. Confirm that you want to import the data.
5. Log in again after the camera finishes importing the data and reboots.

Setting the Room Label Information

ROOM LABELS PAGE

The information you enter on this page is displayed on every page of the web interface. You may also wish to specify what appears on the browser tab.
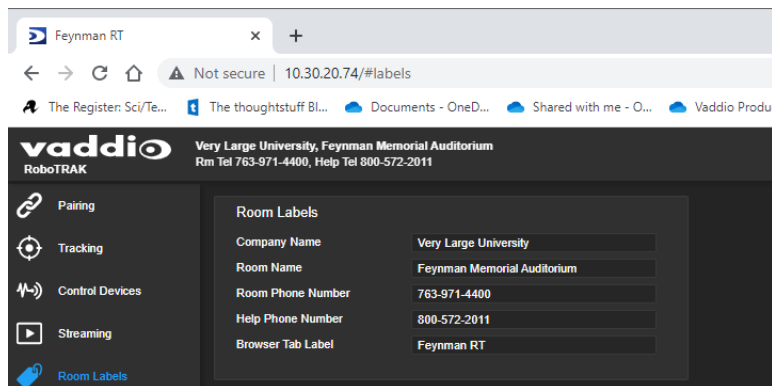
Pairing the Cameras

Notes
Load the configuration file of your choice before you pair the cameras.

If you plan to assign camera hostnames rather than using the default hostnames, assign them before pairing the cameras. Changing hostnames will remove the device pairing. See Assigning a Hostname or IP Address.

Select Discover Devices, and select the camera from the Discovered Devices list.
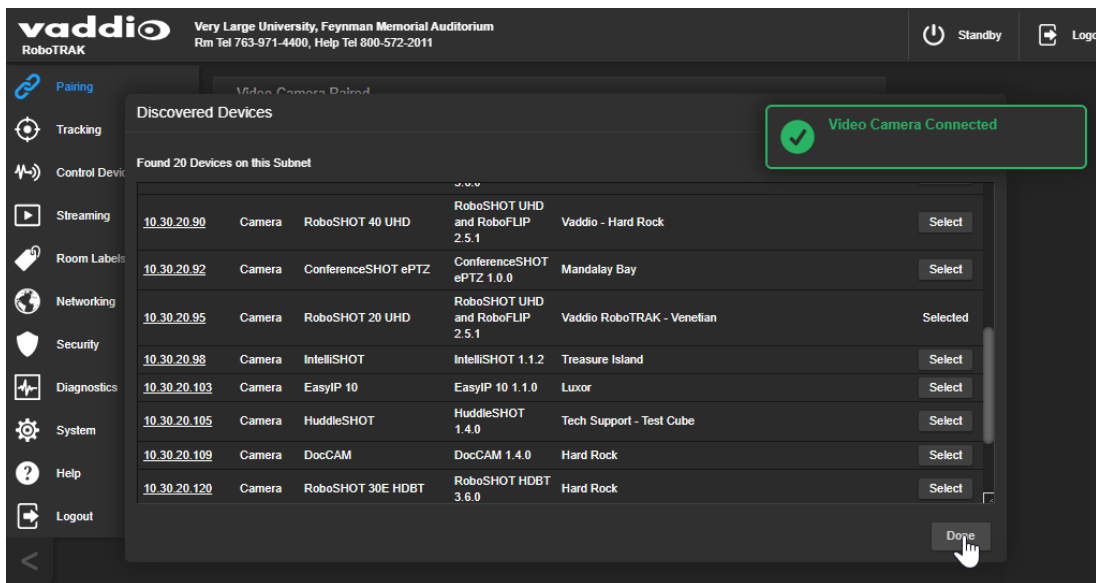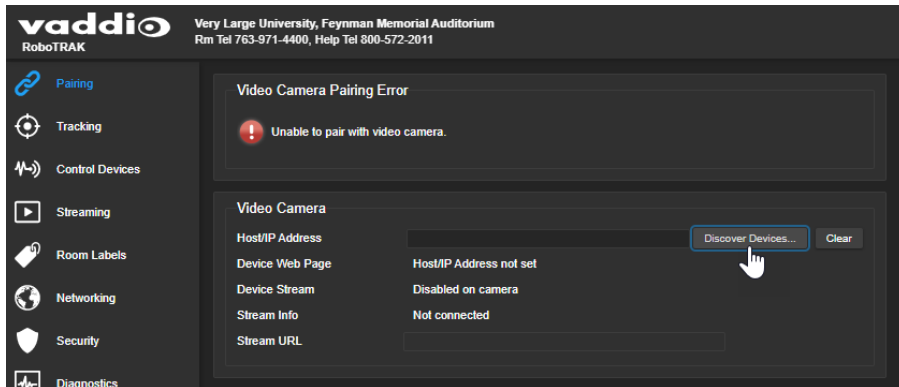
Now the cameras are ready for you to set up tracking.

Note
You can access the video camera's web interface by selecting its IP address or hostname from the Discovered Devices list or the camera information on the Pairing page.

Setting up the IR and Video Camera Lanyard Shots

This phase of RoboTRAK configuration includes:
- Viewing the IP stream from the RoboTRAK IR camera
- Viewing video from the video camera
- Framing the IR camera's lanyard shot
- Framing the video camera's lanyard shot

For the framing tasks and subsequent tuning, someone will need to wear the lanyard and move around in the area where the presenter will normally be. In this manual, anyone wearing a lanyard in range of the camera is "the presenter".

Viewing the Stream from the IR Camera

You will need a stream viewer for this. Several stream viewing applications are available; some of us here at Vaddio like VLC Media Player, which is available free of charge.

1. On the Streaming page, locate the URL for the IR camera's RTSP stream.
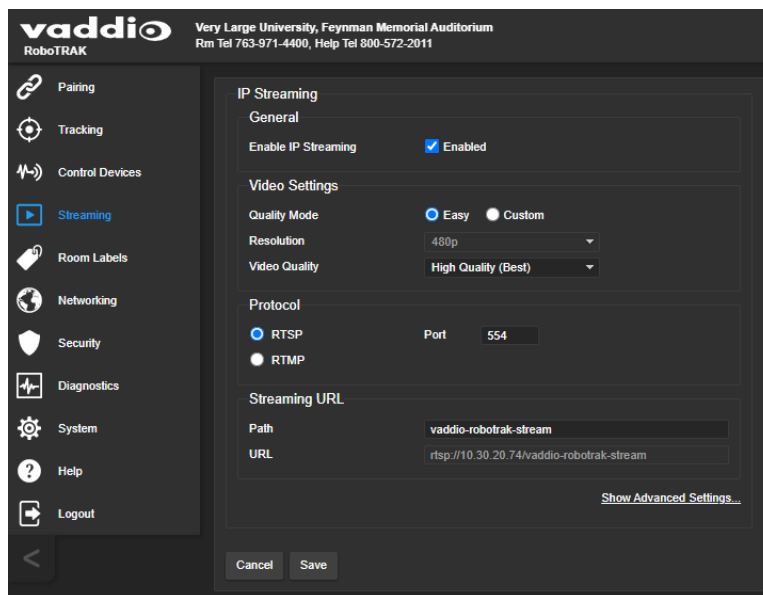
2. Open a stream viewer and point it to the streaming URL.

What you see depends on what you are doing in the web interface. It also depends on the room itself.

Storing the IR Camera's Lanyard Shot

TRACKING PAGE, IR CAMERA SHOT TAB

This shot ensures that tracking is smooth and accurate.
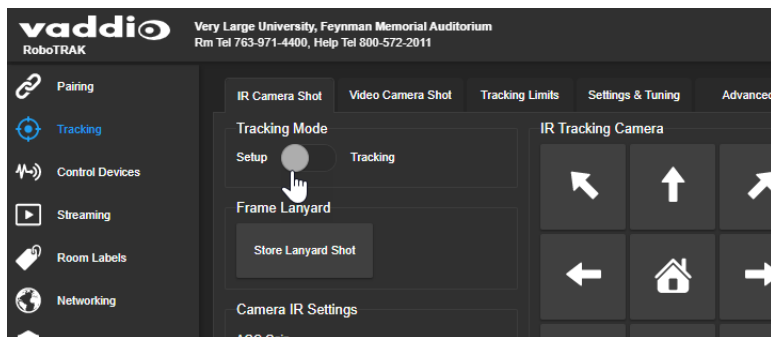
1. Be sure the lanyard is turned on. Then put it on, or have someone else put it on to act as the presenter.
2. Select Setup mode. The IR camera's stream shows a white rectangle outline at the center of the image. The lanyard shows up if the camera is pointing at it.

   Fun Fact
   If the presenter is in front of a reflective surface, the IR image may show a reflection of the IR sources near the lanyard's clasp. This can resemble glowing eyes.
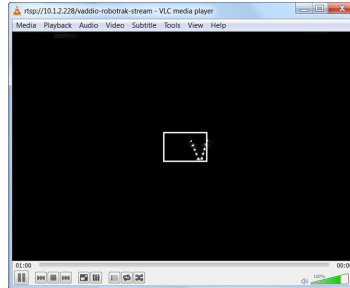
3. Have the presenter go to the middle of the area where a presenter will normally be when the system is in use. If presenters move around a lot in this room (for example, in a demonstration or lab setup), have the presenter go to a location about halfway between the nearest and farthest presenter distances from the camera.
4. Have the presenter face the camera directly.
5. On the IR Camera Shot tab of the Tracking page, use the arrow buttons to center the lanyard image side to side. This keeps the presenter centered in the video shot.
6. Use the zoom controls to adjust the shot so that the lanyard reaches the top and bottom edges of the framing rectangle without going outside the lines. If the lanyard is too large in this shot, tracking is likely to be choppy. If it is too small, the IR camera may lose the lanyard entirely.
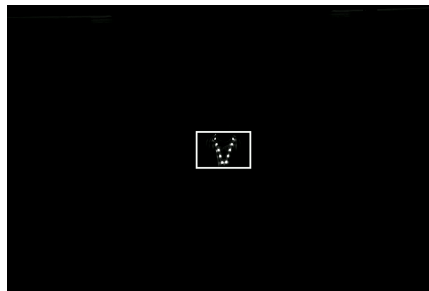
   Note
   In large rooms, it may not be possible to zoom in far enough to frame the lanyard in this way. You may need to [increase the AGC gain](increase-the-agc-gain) for reliable tracking.

7. Select Store Lanyard Shot.
8. We recommend continuing immediately to the next task, Storing the Video Camera's Lanyard Shot. Have the presenter remain exactly where they are, so that you can frame the video camera's lanyard shot to match the IR camera's lanyard shot. This ensures accurate tracking.

Storing the Video Camera's Lanyard Shot

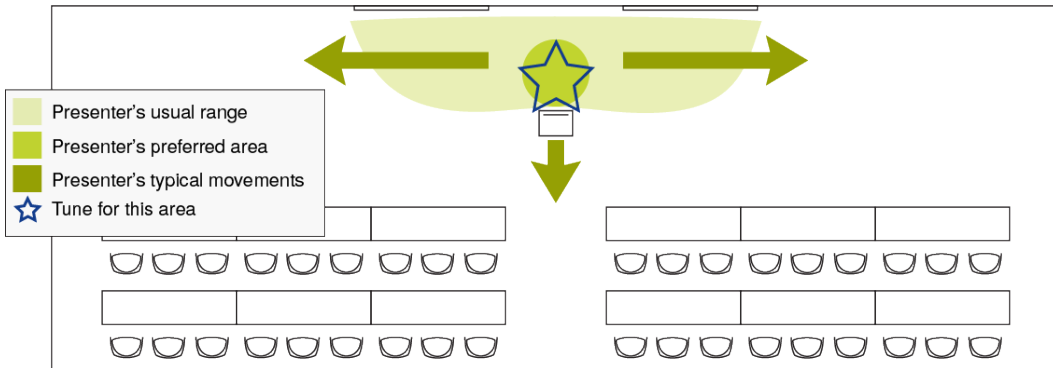TRACKING PAGE, VIDEO CAMERA SHOT TAB

Notes
You must [store the IR camera's lanyard shot](#) before you do this task.

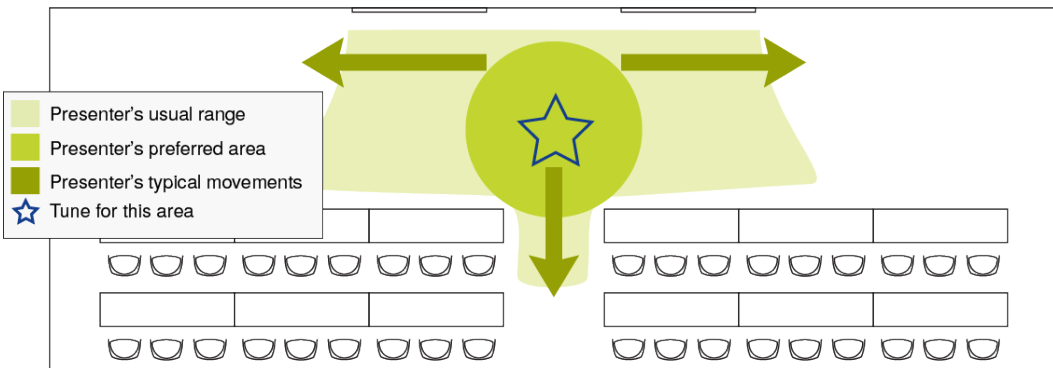*Be sure your presenter is in the same place they were for the IR camera's lanyard shot.*

The video camera does not zoom while tracking. The video lanyard shot ensures that the zoom level is appropriate and the presenter remains well-framed in the shot when approaching the camera.

The way you set up the shot depends on how presenters will use the room.

Example 1: The presenter typically stays behind a podium or lectern

Legend:
- Presenter's usual range
- Presenter's preferred area
- Presenter's typical movements
- ☆ Tune for this area

Example 2: The presenter typically moves across the room and often approaches the audience

Legend:
- Presenter's usual range
- Presenter's preferred area
- Presenter's typical movements
- ☆ Tune for this area

Example 3: The presenter typically gives demonstrations that require moving around

Legend:
- Presenter's usual range
- Presenter's preferred area
- Presenter's typical movements
- ☆ Tune for this area
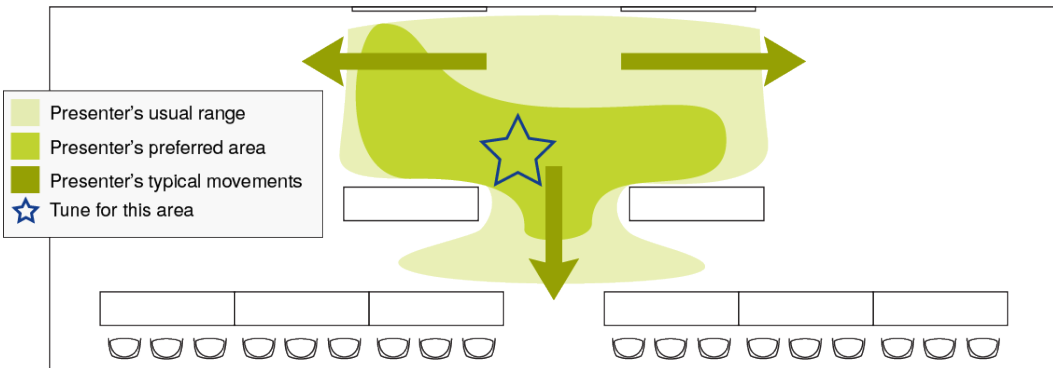
To compose and store the video camera's lanyard shot:

1. Change to Setup Mode if it is not already selected.
2. Have the presenter stay in exactly same place as for the IR lanyard shot.
3. Be sure the lanyard is perfectly framed in the IR image.
4. Using the arrow buttons and zoom controls on the Video Camera Shot tab of the Tracking page, compose the video shot:
   ○ The presenter is centered in the shot
   ○ The shot includes the presenter's knees
   ○ The shot includes 12 inches (30 cm) or more of space above the presenter's head - the closer the presenter moves to the camera, the more "head space" is needed in the lanyard shot.
5. Select Store Lanyard Shot.
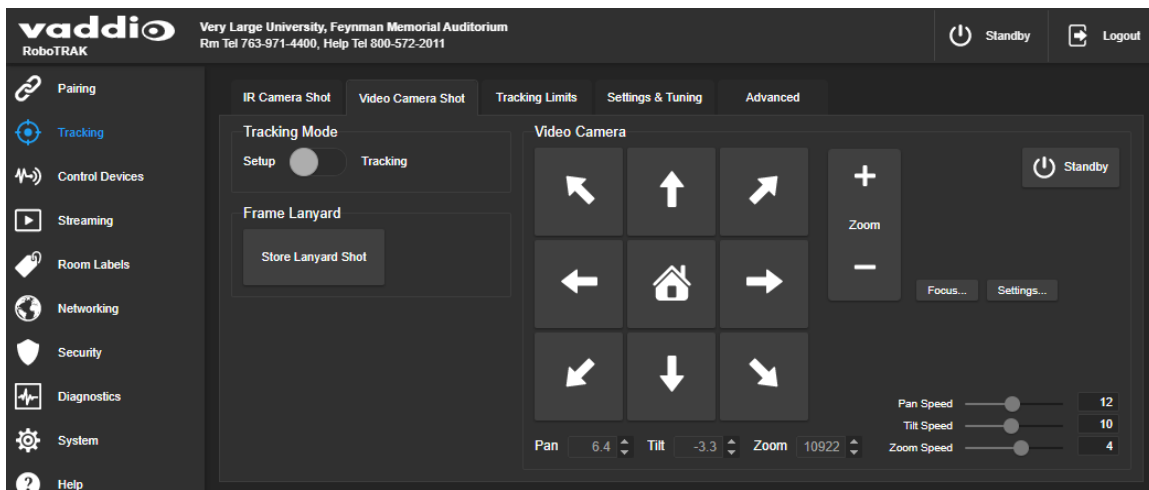
6. Change Tracking Mode to Tracking.
7. Test the shot by watching the video from the video camera and asking the presenter to move toward the cameras. At the nearest part of the presenter's area, the presenter's face and upper torso should still be in the frame.
8. If the presenter is not well-framed at the closest approach to the cameras, repeat steps 1 through 4, but compose a wider shot.
9. Test and recompose as needed, until the presenter is framed well at both the closest and most distant points in the presenter's area.

Testing and Fine-Tuning

TRACKING PAGE

Basic configuration and tuning – pairing the cameras and setting up the lanyard shots – is enough to make the system work. As the IR camera tracks the lanyard, the software drives the video camera based on the IR camera's motion. The tuning process tailors the system's response to the lanyard's motion.

To test the system:

On the Tracking page, set the IR camera to Tracking Mode. This control is available on all tabs of the Tracking page.
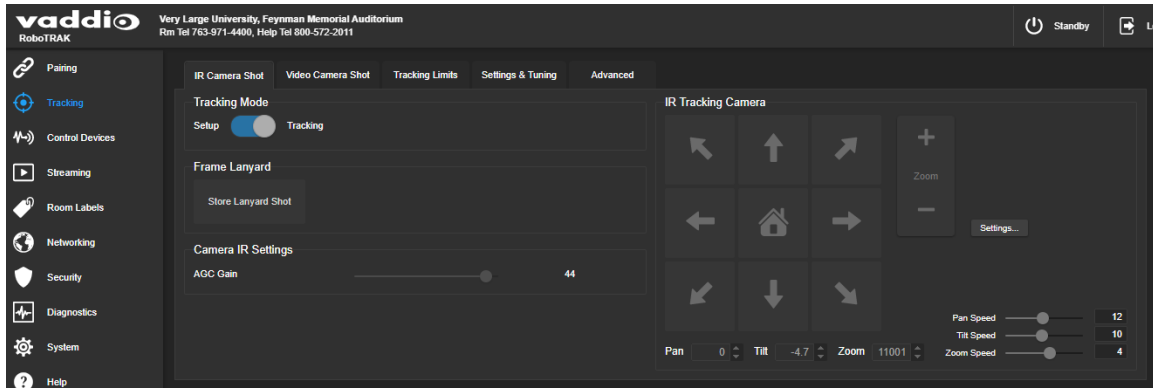
Ask the presenter to move around in the presentation area, and observe the video camera's tracking behavior. What needs improvement?

Tuning Cheat Sheet

Many adjustments affect each other, so the tuning process may require some experimenting.

Tracking behavior	What it means	How to fix it
The presenter is consistently off-center, even when not moving.	The IR and video lanyard shots don't line up properly	Be sure that the lanyard is exactly centered in the white rectangle of the IR image as you store a new video camera lanyard shot. See Framing the Video Lanyard Shot.
	The IR camera pan/tilt is out of calibration.	Reset the pan/tilt position. See Pan-Tilt Reset, Reboot, and Factory Reset.
At the closest approach to the camera, part of the presenter's face is not in the frame.	The video camera's lanyard shot is too tight.	Store a new video camera lanyard shot, with more head space than the current one. See Storing the Video Camera's Lanyard Shot.
The presenter consistently "outruns" the camera and moves out of the frame.	Video camera tracking speed is too slow.	Slightly increase the speed scalar for the video camera. See Setting the Tracking Speed.
	The video window is too large.	Make the video window slightly smaller. See Adjusting the Video Window Width.
	The presenter is too close to the cameras, and outruns the IR camera.	Store a new IR lanyard shot, with the IR camera zoomed out to size the lanyard appropriately. See Storing the IR Camera's Lanyard Shot.
	IR tracking speed is too slow.	Slightly increase tracking sensitivity. See Setting IR Camera Responsiveness.
The video camera constantly makes small adjustments during the presentation.	The video window is too small.	Make the video window slightly larger. See Adjusting the Video Window Width.
Tracking is interrupted when the presenter turns away.	The IR camera does not detect enough IR to recognize the lanyard.	Be sure the back of the lanyard is not covered by the presenter's hair or clothing. Store a new IR lanyard shot, zoomed in from the existing shot. Increase AGC gain slightly.

Setting the IR Camera's Home Position

TRACKING PAGE, TRACKING LIMITS TAB

As with RoboSHOT cameras, you can set a custom home position for the IR camera. It returns to this position when it is not tracking. A typical home position might be a shot of the presenter's podium or lectern.

To set the home position:

1. Select Setup mode if the camera is in Tracking mode.
2. Be sure the See Room option is checked.
3. Use the arrow buttons to aim the IR camera. If necessary, you can reduce the pan speed when the video shot is close to what you want. This does not affect camera operation during tracking. It only changes how fast the camera moves in response to the arrow buttons.
4. When the IR image shows the home position you want, select Save Current Pan Position.

Setting the Lanyard Searching Behaviors

TRACKING PAGE, TRACKING LIMITS TAB AND ADVANCED TAB

When the IR camera does not detect the lanyard for a specified length of time, it begins searching. If it does not find the lanyard, it moves to its home position.

| Default behavior	What to change	Where to find the control
Begin searching after 5 seconds	Increase the time the camera waits before it starts searching: Max Blind Time slider.	Tracking page, Advanced tab, Lanyard Search area
Stop searching after 60 seconds if the lanyard is not found	Increase or decrease the time the camera searches before it returns to the IR home position: Lanyard Search Timeout slider.	Tracking page, Advanced tab, Lanyard Search area
Pan 50° to right and to left when searching	Increase or decrease the searching area: Lanyard Search Pan Limit sliders and Store Left/Store Right buttons. *Note* *The search pan limits must be inside the tracking pan limits. See Setting the Presenter Area: Pan Limits.*	Tracking page, Tracking Limits tab, Lanyard Search Pan limits
Search at an appropriate pan speed	Select a different speed: Lanyard Search Speed buttons. For a large room where the presenter is far from the camera, use the Medium or Slow setting to ensure that the IR camera recognizes the lanyard. (If it moves too fast, it will just be-bop on past the presenter.)	Tracking page, Advanced tab, Lanyard Search area

Pan limits and search pan limits may be asymmetric.
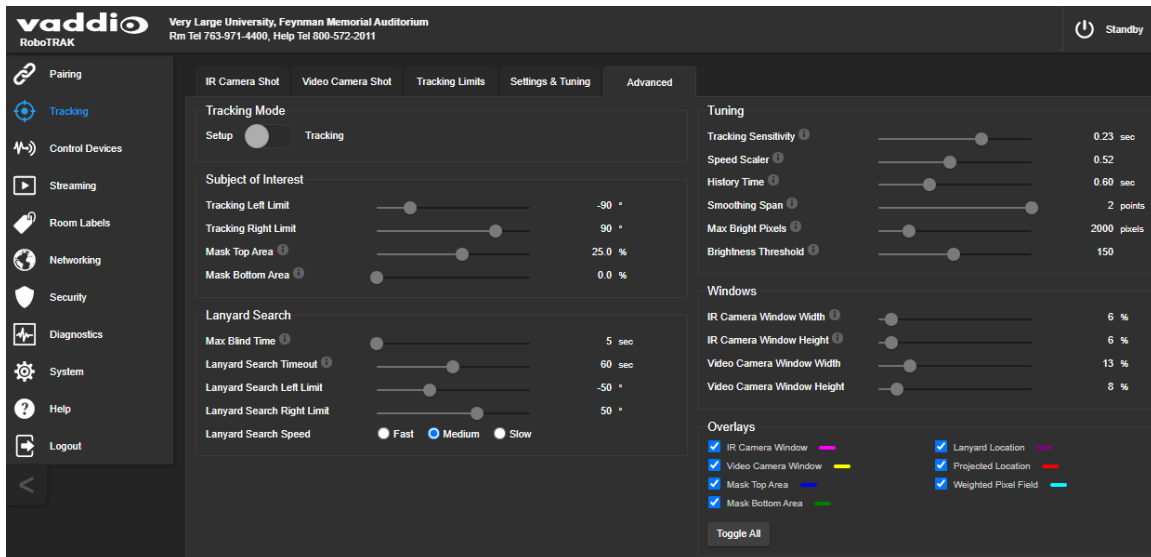
Setting the Presenter Area and Search Area

By default, the IR camera tracks the presenter anywhere within 90° to either side of its straight-ahead (0°) position. This area is defined by the tracking pan limits. If the IR camera stops detecting the lanyard, it searches a smaller area, defined by the search pan limits. The default is 50° to either side of the camera's 0° position. This allows the camera to track the presenter anywhere in a large part of the room, but limits the search to the front of the room.
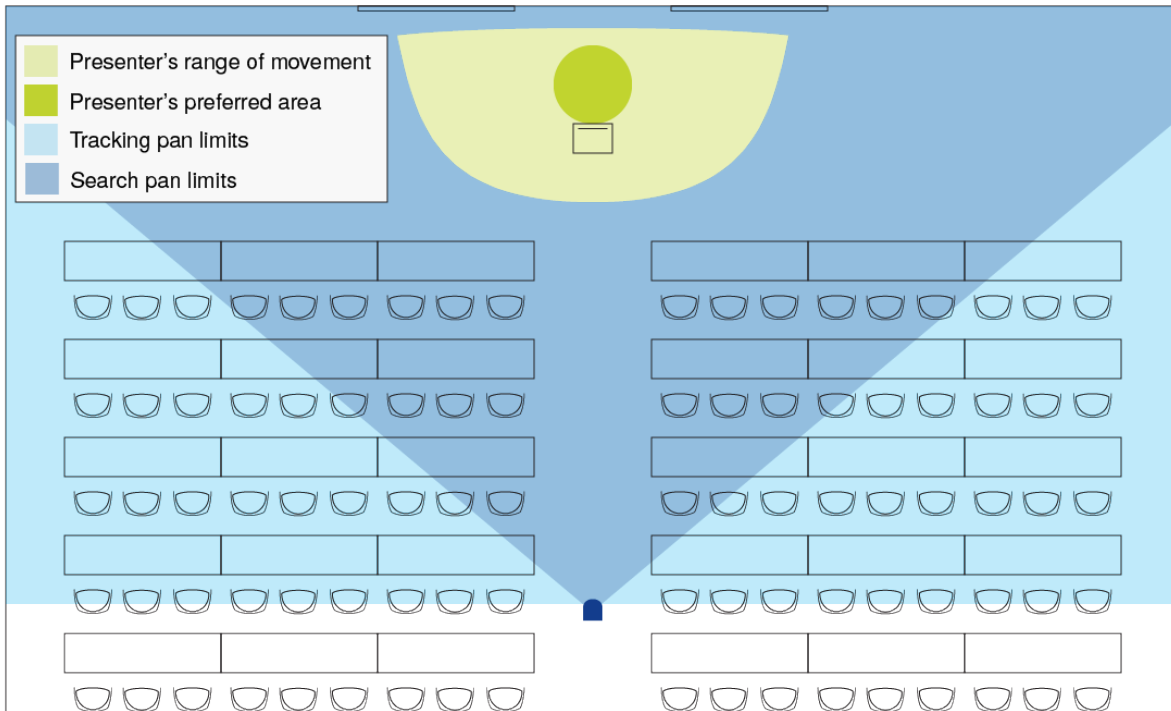
Narrowing the pan limits can be helpful in excluding sources of unwanted IR.

Both sets of limits can be modified. Right and left limits are independent of each other, but search pan limits must always be narrower than tracking pan limits.

Example
If you narrow the left side of the presenter area to 45°, you must reduce the search pan limit on the left side to less than 45°.

To adjust the IR Tracking Camera Pan Limits or Lanyard Search Pan Limits:

1. Use the pan left and pan right arrows to move the camera to the desired pan limit. The camera position dot moves along the pan limit indicators.

2. For greater precision, you can reduce the pan speed using the Pan Speed slider – or you can use the Pan position increment/decrement arrows below the directional controls to dial in the pan position to within 0.1°.

3. Use the appropriate Store button to save the new pan limit.
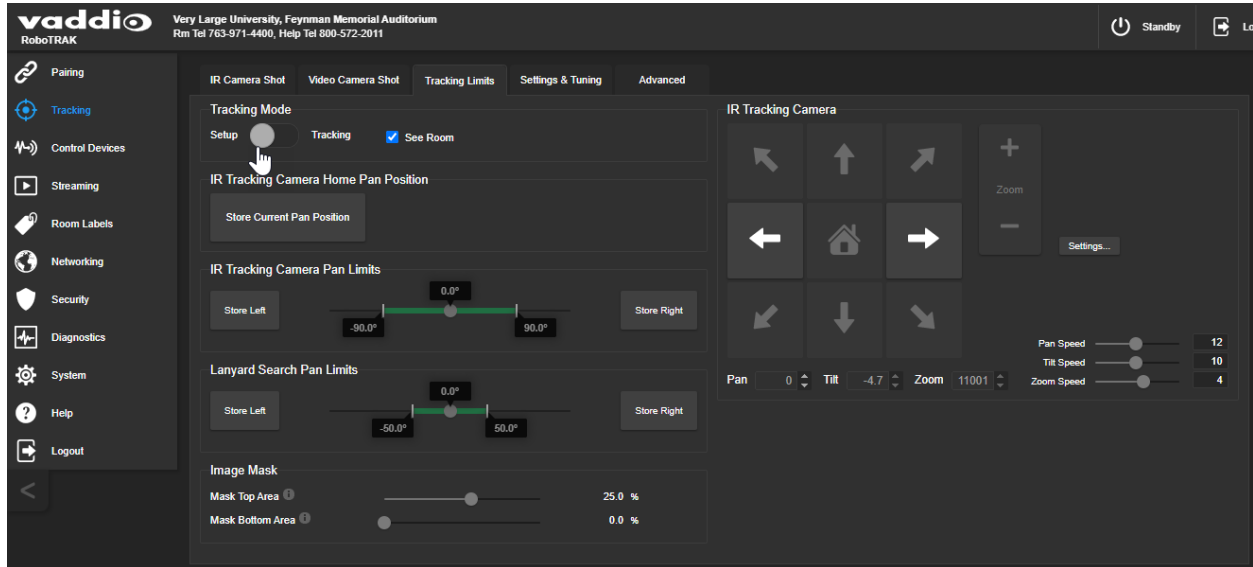
Adjusting AGC Gain

TRACKING PAGE, IR CAMERA SHOT TAB

Skip this adjustment if the IR camera tracks the lanyard reliably.

Do this if these things are true:
- You are tuning the system for a large room
- It's not possible to zoom in enough to store an ideal IR camera lanyard shot – the lanyard is too small in the shot.
- The IR camera has trouble "seeing" the lanyard – tracking is erratic.

If the IR camera does not track reliably due to the target size, increase the AGC gain using the the AGC gain slider.
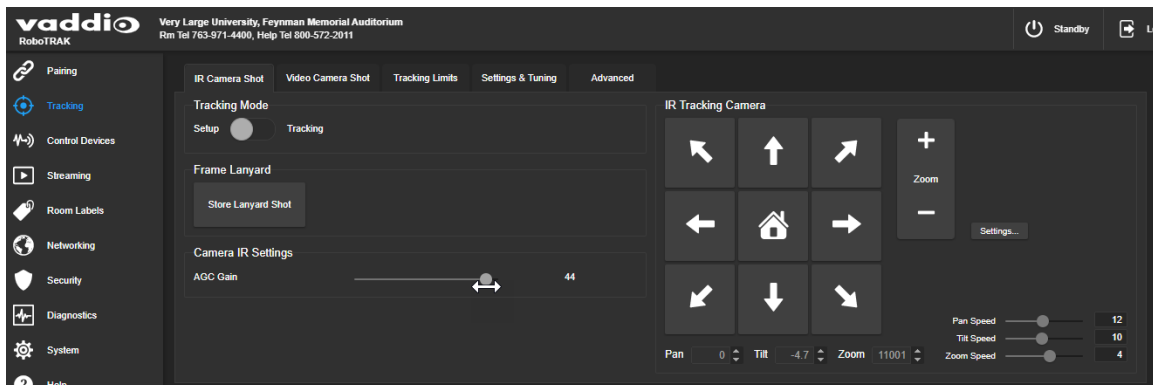
Setting the Tracking Speed: Speed Scaler

TRACKING PAGE, ADVANCED TAB

The speed scaler controls how quickly the video camera responds when the IR camera starts moving. The default value is 0.5 second, which works well for wide shots. For tighter shots, or in cases where the presenter will get closer to the camera, you may need to reduce this value to keep the presenter in the frame.

This adjustment differs from the Tracking Sensitivity adjustment, which controls how quickly the IR camera begins following the lanyard when the presenter moves.
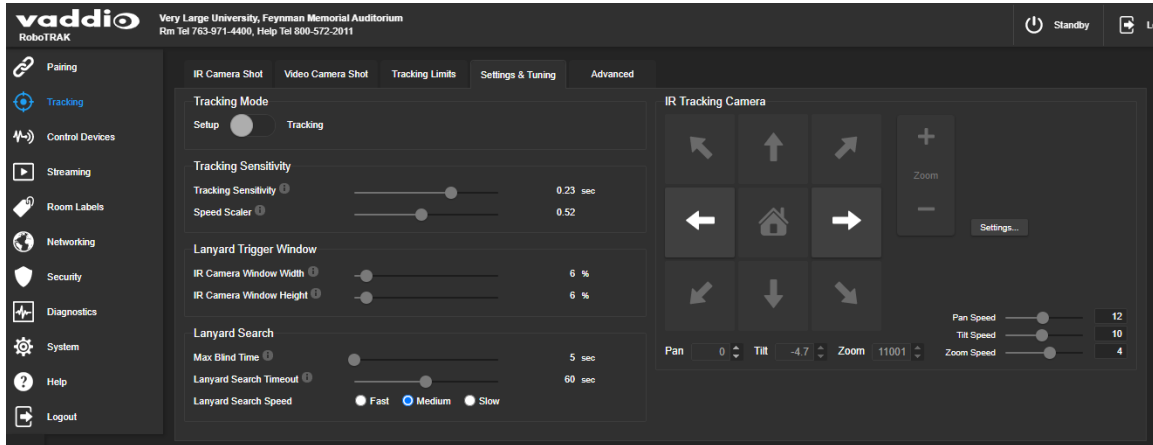
Adjustments:
- Increase the speed scaler value for wider shots
- Decrease the speed scaler value for tight shots, or if the presenter tends to outrun the camera.

Adjust in increments of 0.05 second for best control.

Setting IR Camera Responsiveness: Tracking Sensitivity

TRACKING PAGE, SETTINGS AND TUNING TAB

Tracking sensitivity controls how quickly the IR camera responds to the lanyard's motion. If the presenter will be relatively close to the camera, sensitivity may need to be increased slightly to ensure accurate tracking. As the presenter approaches the camera, the lanyard appears larger to the IR camera, and movements are proportionally larger. The IR camera needs to respond faster so that the presenter does not move out of the frame.

This adjustment differs from the Speed Scaler adjustment, which controls how quickly the video camera responds when the IR camera starts moving.

The default value for sensitivity is 0.24 second. Moving the slider to the right increases sensitivity by reducing the camera's response time. When changing the tracking sensitivity, adjust in increments of 0.02 second.
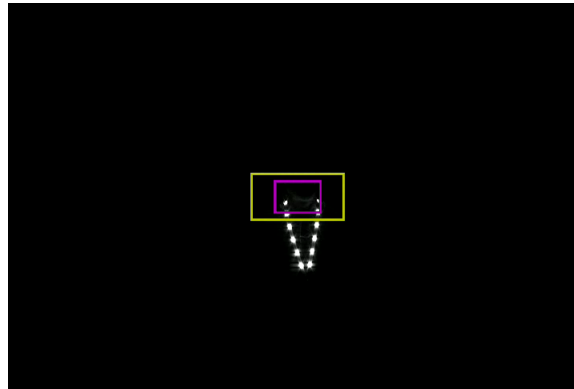
Adjustments:
- Increase sensitivity if the presenter stays relatively close to the camera (for example, in a small classroom) and the tracking camera lags behind the presenter's movements through the room.
- Decrease sensitivity if the tracking appears jittery or "aggressive."

Adjusting the Video Camera Window Width

People move around as they give their presentations. The system should accommodate natural gestures and body language without moving, and track only when the presenter is moving through the room. The video camera window width determines the distance that the presenter can move before the system starts following.

This adjustment differs from the Tracking Sensitivity and Speed Scaler adjustments, which control camera response speed.

Adjustments:

- If the cameras move every time the presenter moves, or there seems to be too much camera movement, increase the width of the video camera window.
- If the system is sluggish in responding to motion and the presenter moves out of the frame, decrease the width of the video camera window.

The default setting for the video frame is 16%. Make any needed adjustments in increments of 4%. The window must always be wider than it is tall, to ensure that the camera tilts appropriately.

Dealing with Stray IR

TRACKING PAGE, TRACKING LIMITS AND ADVANCED TABS

The RoboTRAK system is designed for environments without stray IR, but tuning can compensate for a limited amount of certain types of stray IR.

The IR camera's web interface provides adjustments to compensate for IR interference. These adjustments may help in cases where the stray IR is significantly less intense than the IR from the lanyard. They will not help if the room is flooded with IR.

Stray IR Mitigation Cheat Sheet

Problem	Adjustment	Over-adjusting looks like...
Light fixtures emit significant IR	Mask top area – increase. (Tracking page, Tracking Limits tab)	Tracking may become erratic when the presenter is far from the camera.
Reflective tabletops or other objects near the bottom of the frame	Mask bottom area - increase. (Tracking page, Tracking Limits or Advanced tab)	Tracking stops when the presenter approaches the camera.
Bright area (IR bloom)	Max bright pixels - decrease. (Tracking page, Advanced tab)	Tracking may become erratic.
	If the problem is near the edge of the presentation area: reduce IR tracking pan limits on the appropriate side to exclude the stray IR. (Tracking page, Tracking Limits tab) You may also need to reduce the lanyard search pan limit on the same side. Lanyard search pan limits must always be inside the area defined by the IR tracking camera pan limits.	Part of the presenter's preferred area may be out of tracking range.
Camera tracks a reflection of the lanyard	Brightness threshold - increase. (Tracking page, Advanced tab)	Tracking may become erratic.

Tracking page, Tracking Limits tab: Mask top and bottom areas, change pan limits
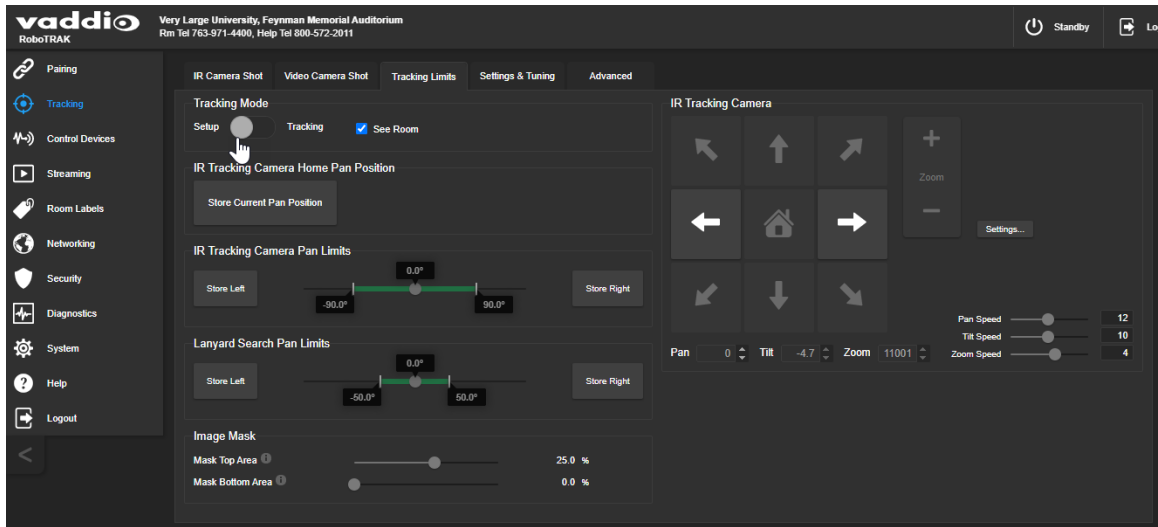
Tracking page, Advanced tab: Adjust brightness threshold and max bright pixels, mask top and bottom areas
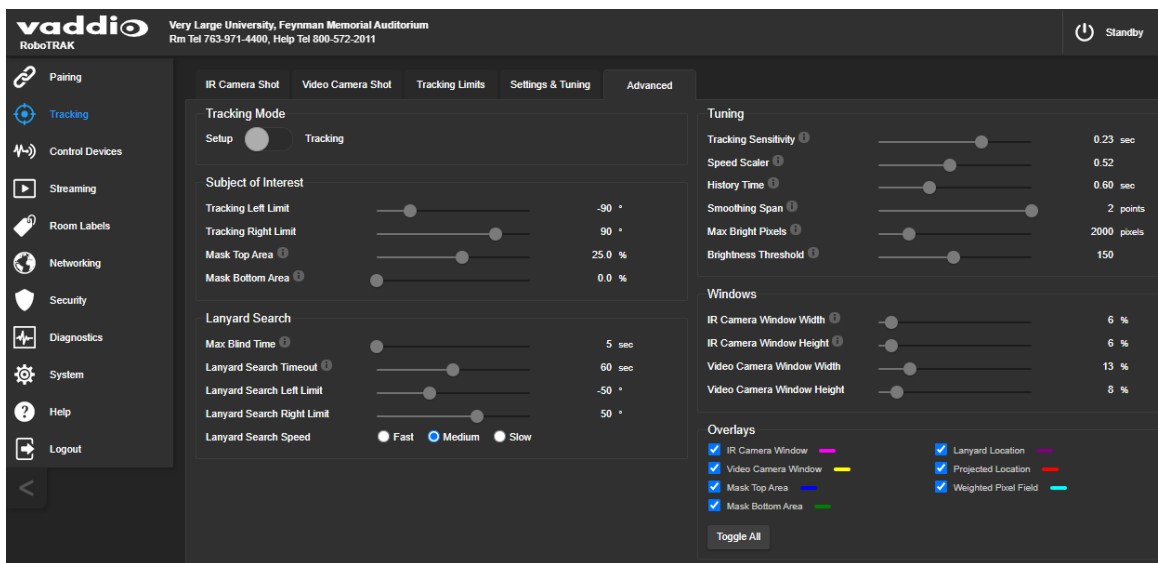
Configuring the Video Camera

You will need to configure the video camera as well as the IR camera. Configuration options vary somewhat, depending on the camera. Refer to the video camera's manual for configuration tasks.Manuals are available on the product pages of the Vaddio website.

Key tasks:
- **Define position presets.** These typically provide a tighter shot at a specific location, such as the presenter at the lectern, a close-up of a demonstration, or a wider static shot of the presentation area for multiple presenters. The IR camera is factory-configured to access up to eight position presets after you store them on the video camera.
- **Enable IP streaming,** if available.

Other common tasks:
- **Define the room label information.** This can help to identify the camera in installations with multiple rooms and cameras.
- **Set the time zone.** The event log timestamps use system time, which is typically not accurate until you set the time zone and NTP server information.
- **Save custom color settings (CCU scenes).** If the camera's predefined settings or Auto setting for color and lighting do not produce the desired results, you can adjust the settings manually and save your adjustments.

After the video camera is paired to the IR camera, you can access the video camera's web interface from the IR camera's Pairing page, using the Device Web Page link.
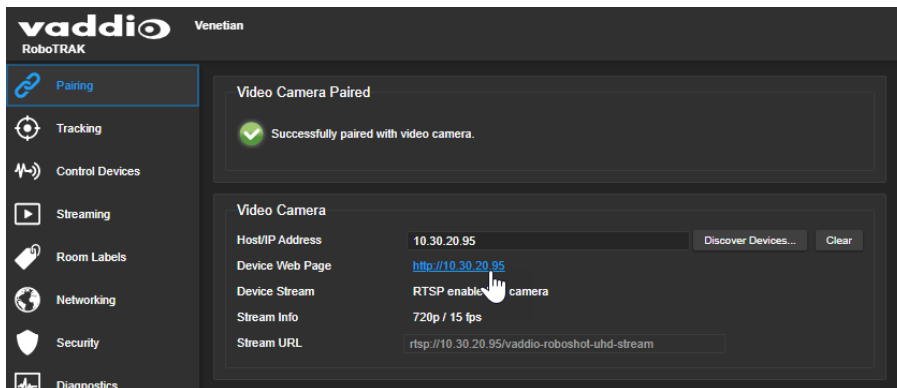

Setting the Video Camera's Standby Behavior

SYSTEM PAGE, GENERAL TAB

By default, the video camera remains active when the IR camera goes to standby mode.

If the video camera will only be used with the IR camera, check the Standby Connected Cameras box in the Standby Settings. This provides privacy by ensuring that the video camera does not continue to send video when the IR camera is in standby mode.
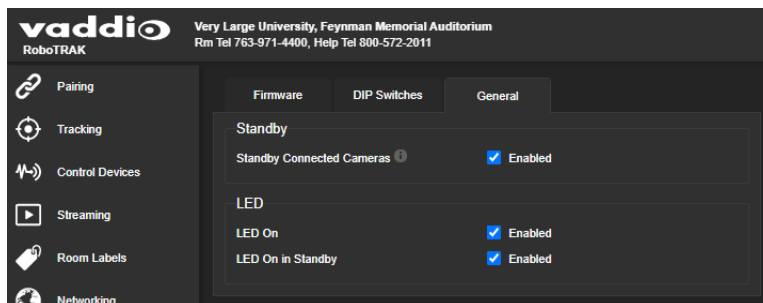
Setting up Macros and Triggers

CONTROL DEVICES PAGE

Macros are sequences of commands. Refer to the [Telnet Serial Command API](#) section for a full list of commands.

Triggers register events or state changes that can be associated with macros, to make them run. The RoboTRAK camera provides software triggers that allow you to add operator controls, such as defining the buttons on a conference room touch-screen. Macros also appear as buttons on the operator's page of the web interface when associated with a trigger.

When you associate a macro with a trigger, you must specify whether it runs when the trigger turns on, or when it turns off – so you can associate two macros with each trigger, one to run when the trigger is activated, and one to run when the trigger is turned off.

Note
The macro can only run successfully if all the commands in the macro can run successfully. If the macro has external requirements, it will only run properly if those requirements are met. For example, if the macro includes a command to move a camera to a preset, the specified camera must be available and the applicable preset must be stored before the macro can run successfully.

The System's Predefined Preset Macros

By default, the RoboTRAK IR camera has eight macros to send position preset recall commands to the video camera. These are available to the operator on the non-administrative page of the web interface as Preset 1 through Preset 8. *These macros cannot run until you create the presets on the video camera.*
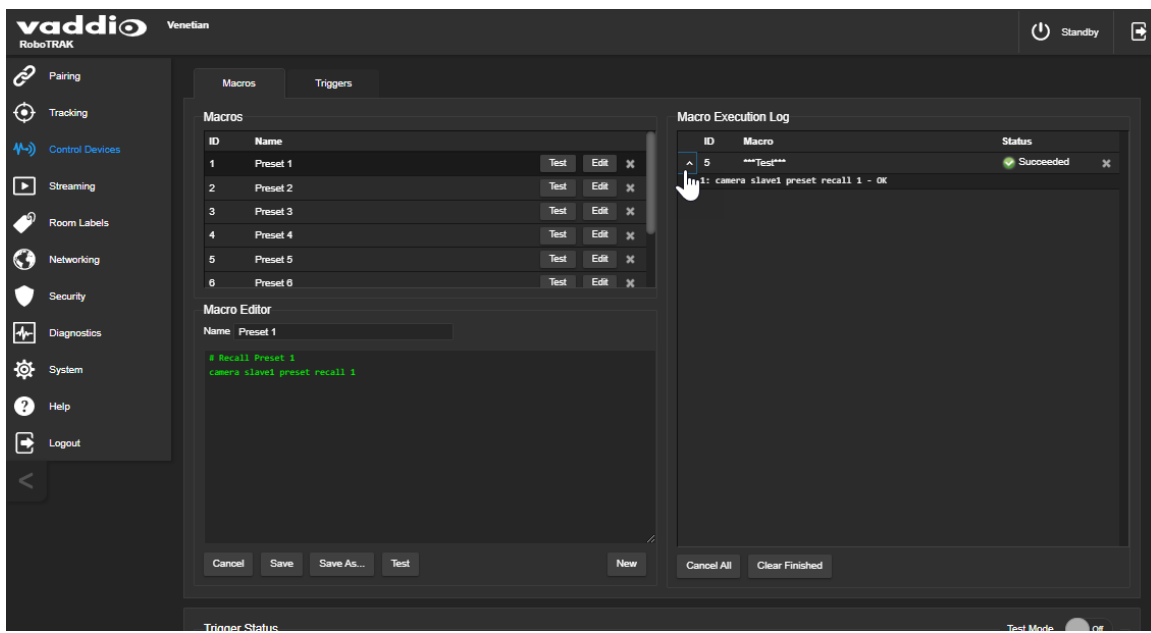
Writing and Editing Macros

To edit or define a macro:

1. Select the Edit button associated with an existing macro, or enter a name for a new macro in the Macro Editor's Name field.

2. Enter one or more Telnet commands in the editing area. To include a comment, use the # character at the beginning of the line.

   Camera commands must specify which camera they apply to – for example, `camera slave1 preset recall 1` applies to the video camera, sending it to preset 1 if that preset has been defined. (This command is saved as the macro Preset 1.)

3. Optional but strongly recommended: Use the Test button to check your work while you are writing the macro.

4. Save your work when you are finished, or select New to start over.

Testing Macros

The Macro Editor has a Test button. You can test the macro while you are editing it, or after saving it. The Macro Execution Log shows the result of each command as the test runs.

When the test finishes, the execution log shows a pass message or a fail message and hides the line-by-line results. If you need to debug the macro, you can expand the log again by selecting the down-arrow.

Assigning Macros to Triggers

A trigger may be associated with a macro that runs when the trigger is on, one that runs when the trigger is off, or one of each.

To assign a macro to a trigger:

Do at least one of these things:
- Select a macro in the Execute Macro on Enter field. This macro will start when the trigger turns on.
- Select a macro in the Execute Macro on Exit field. This macro will start when the trigger turns off.

Right-click a trigger label or test button to rename the trigger.

When the macro is associated with a trigger, it becomes available to the operator on the non-administrative page of the web interface.

To remove macro assignments from a trigger:

Select the X on that trigger's row. This is equivalent to setting both macros to `(none)`.
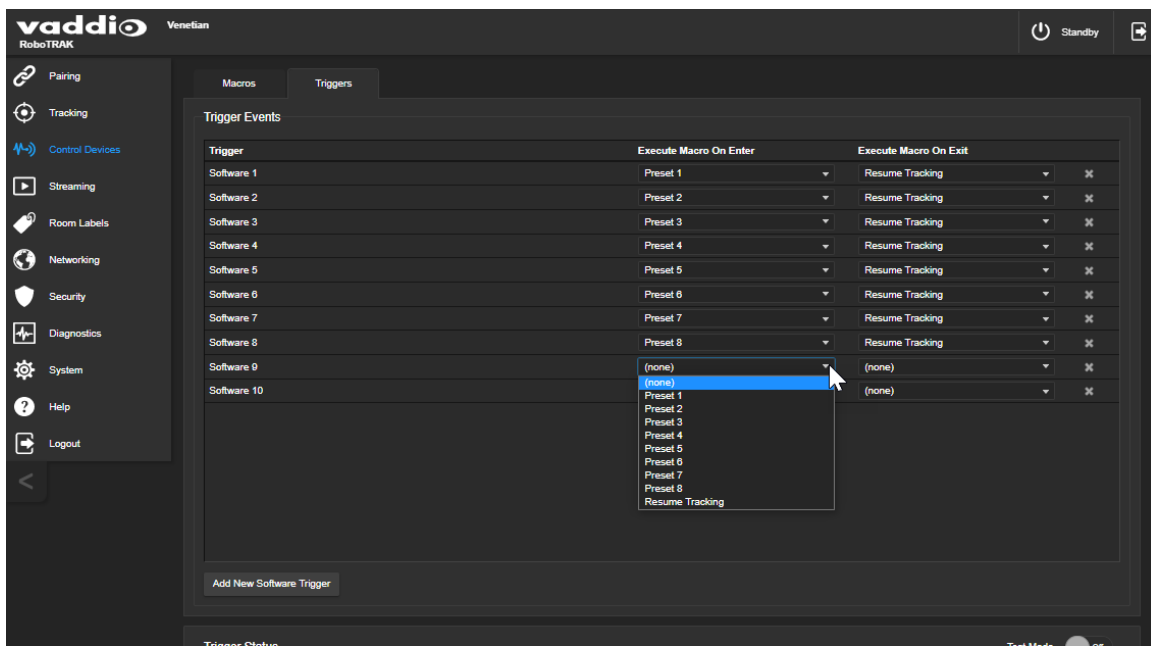
Testing Triggers

CONTROL DEVICES PAGE

Just as it can be helpful to test macros when you write them, it can also be helpful to test triggers when you assign macros to them. The Trigger Testing section is available from both tabs of the Control Devices page.

To test a trigger:

1. Set Test Mode on. The web interface displays a notification.
2. Select the trigger to run the macro associated with turning the trigger on.
3. Select the trigger again to run the macro associated with turning the trigger off, if there is one.
4. Turn off Test Mode when you finish testing.

Note
Triggers are not available to the control device when Test Mode is selected.

System Maintenance

This section covers basic system maintenance tasks:
- Exporting and importing configurations
- Downloading and installing firmware updates

These tasks are nearly identical to the corresponding tasks for the video camera.

Exporting the Configuration

SYSTEM PAGE

Now that you have everything working exactly the way you want it to, save your work.

To export the RoboTRAK configuration:

On the System page, select Export Data. The configuration file downloads to your computer. Its filename is the camera's hostname, with the file extension `.dat`.
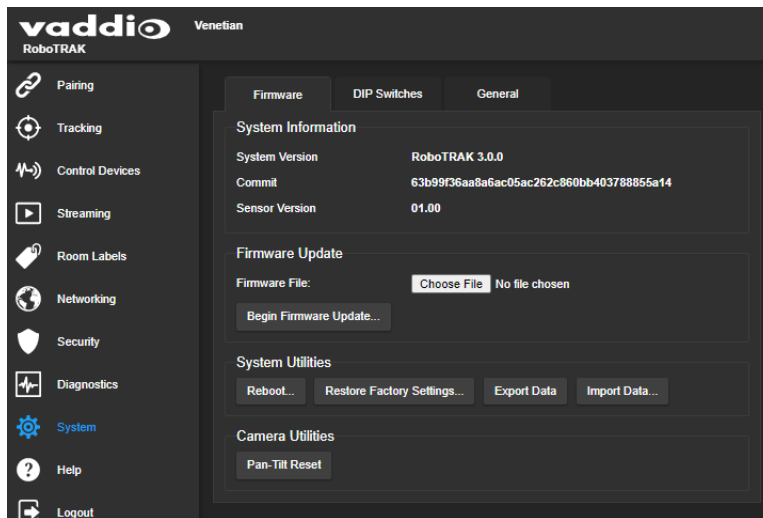
Importing a Configuration

SYSTEM PAGE

If you have saved a configuration, you can return the camera to the same state by importing the configuration. The process is the same as for loading a distance configuration, except for the filename.

To restore the RoboTRAK camera to the configuration you saved:

1. Select Import Data.
2. In the Import Data dialog box, select Choose File and browse to the configuration file.
3. Select Begin Importing Data. You will be logged out of the web interface while the camera imports the configuration. When the import is complete, you will be able to log in again.

Installing Firmware Updates

SYSTEM PAGE

The RoboTRAK IR camera and the RoboSHOT video camera use the same procedure for firmware updates.

1. Locate the link to download the camera's firmware update from the website, and select it. It's with the link for the release notes.
2. OPTIONAL: Select Export Data to save a copy of the camera's current configuration. You probably won't need it, but it could save time if you need to roll back the update.
3. On the camera's System page, select Choose File, browse to the firmware update file that you downloaded, and select it. The filename ends with `.p7m`.
4. Select Begin Firmware Update. A confirmation dialog box opens.
5. Please READ the information in the dialog box and be sure you understand it. It's boring, but it could save you a lot of time and aggravation.
6. When you are ready to start the update, select Continue. A progress message box opens and the status light on the front of the camera turns yellow to show the firmware update is in progress. The process may take a few minutes.

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

7. If the update process presents warnings or error messages, read them carefully.

When the update is complete, the camera restarts. This logs you out of the web interface.

Contact Vaddio technical support if you encounter any problems with the update.

Operating and Presenting with the RoboTRAK System

The system can operate in tracking mode, or you can control the video camera as you would do with any PTZ camera.

How It Works

To present with the system in tracking mode, you wear the lanyard, which is an IR source that the IR camera can track. In tracking mode, the IR camera follows the lanyard, and the video camera follows the IR camera. Command the space! Turn around, move into the audience – the RoboTRAK system won't lose you.

When you want to stop tracking and go to a shot that's already been set up and saved – a preset – you will need to use the presentation controls. Because the system uses an IR source for tracking, the video camera's IR remote is typically not used.
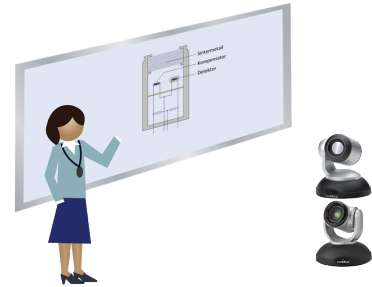
Tips for Great Presentations

To get the most out of the RoboTRAK presenter tracking system:
- Wear the IR lanyard outside your clothing, so it is clearly visible. The IR camera needs to "see" the IR emitters in the lanyard to follow your movements.
- Be sure the back of the lanyard is clearly visible, not tucked under your collar or hair. A lanyard with a back loop extension is available for presenters whose hair, head covering, or clothing may otherwise cover the lanyard ribbon. This lets the camera keep following you even when you turn around.
- If you are moving and the light on the IR camera starts blinking green, the IR camera has lost you. Be sure the lanyard is visible over your clothing and hair.
- Stay 12 feet (3.7 m) or more from the cameras. The video camera does not zoom while the system is tracking.
- If you are co-presenting with another person and both of you to have lanyards, turn off your lanyard as your co-presenter turns on their own. This ensures a smooth transition.
- When you invite others to the front of the room, be sure they do not block the line of sight between the IR camera and your lanyard.

Starting Your Presentation

1. Be sure the light on the IR camera is green and steady, meaning the system is in tracking mode.
2. Put on the lanyard.
3. Turn on the lanyard by pressing the button at the center of the medallion. Blue light shines from the sides of the light ring.
4. If the light ring does not illuminate, turn on the power/battery disconnect switch.
5. Move in front of the IR camera. The system starts tracking you immediately.

Presentation Controls

The operator's page of the web interface provides presentation controls. Your room AV system may provide this page. It includes:

Tracking on/off control – Enables or disables tracking. When tracking is on and the lanyard is on, the IR camera follows the lanyard if the lanyard is within the camera's tracking area.

**Macros** – Custom controls for your RoboTRAK system. These include presets.

When you use a preset macro, the video camera stops following the IR camera. The IR camera continues to follow the lanyard, and the video camera goes to the preset. Select Resume Tracking to go back to normal tracking behavior.

Note
Although the system is pre-configured with preset macros, these only work if the video camera has been configured with the presets.

Standby control – Put the IR camera in standby, or return it to its active state. This may also control the video camera's state, depending on how the system is configured.

Pan/tilt reset – For use in the event of a motor calibration error (blinking yellow light). This can happen if the IR camera is jostled during installation.
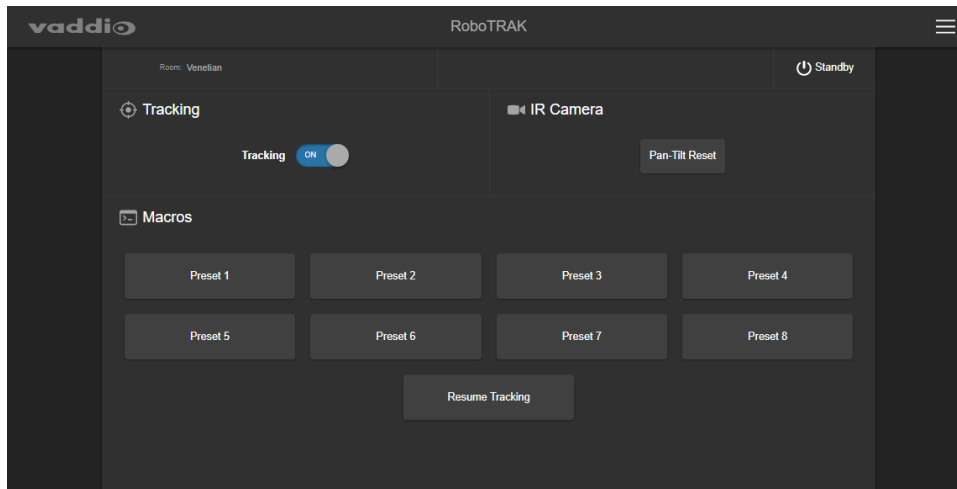
If your room AV system uses a third-party control device, the controls will not match this screen shot.

Lanyard Status Light

The ring on the lanyard's center button is a status light that aims the light to the sides, so you can see it while wearing the lanyard.

- Blue – The lanyard is active; the IR LEDs in the ribbon are on and can be tracked
- Blinking yellow – The battery is too low to power the IR LEDs; no camera tracking possible
- Green or flashing green every 5 seconds – Charging

If the ring is dark, this can mean several things.

If the lanyard is...	And the button's behavior is...	It means...
Not connected to the charger	Lights up blue when pressed	The lanyard is ready for use.
	Flashes yellow twice when pressed	The battery is too low to power the IR LEDs.
	Remains dark when pressed	The battery is completely discharged, or the recessed battery disconnect switch is off (farther from the connector for the charging cable).
Connected to the charger	Lights up green if the lanyard is disconnected and reconnected	The battery is fully charged.
	Remains dark if the lanyard is disconnected and reconnected	The recessed battery disconnect is off and no charging has occurred.

Quick Reference: How the Cameras Behave

If the cameras are doing this...	It means...
Both cameras are pointed in the same direction. They are not moving. The light on the IR camera is green.	The system is ready to track. To start tracking, turn on your lanyard by pressing the center button. If it does not illuminate, check the recessed battery disconnect switch – the raised part should be closer to the connector for the charging cable.
Both cameras are moving together, and the light on the IR camera is green.	The system is tracking.
The cameras are pointed in different directions. The lights on both cameras are blue.	The video camera is on a camera preset or tracking mode is turned off.
The IR camera pans and its light blinks green. The video camera does not move.	The IR camera is searching for the IR signal from the lanyard ribbon. Check to be sure nothing is covering or obscuring the lanyard ribbon – especially in the back, if you turn away from the camera. The entire length of the ribbon contains IR sources. A lanyard with a back loop extension is available for presenters whose hair, head covering, or clothing may otherwise cover the lanyard ribbon.
After the IR camera searches, its light turns green and the video camera follows its movements.	The IR camera found the lanyard when it searched, and it is tracking again.
After the IR camera searches, its light turns green. Both cameras move to the home position and stop.	The IR camera did not find the lanyard when it searched. The cameras are now "parked" at the home position and ready to track. This happens when you turn off the lanyard.
The IR camera's light is blinking blue.	The IR camera is unable to communicate with the video camera. Contact your AV team for help.

Tips for Handling and Storing the Lanyard

Please handle the lanyard with care. Both the medallion and the ribbon contain electronic components that can be damaged if handled roughly.

- When you take off the lanyard, slip it over your head rather than using the safety clasp.
- Do not bend the lanyard ribbon where it joins the medallion.
- Coil the ribbon loosely. Pinching or creasing it will damage it.
- Connect the lanyard to its charging cable at the end of each day.

Telnet Serial Command API

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

Requirements

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

Usage notes

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

Getting More Information

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

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

Typographical Conventions

- { x | y | z } – Choose x, y, or z.
- <variable> – Substitute the desired value here.
- < x - y > – Valid range of values is x through y.
- [parameter] – Parameter is not required.

About Controlling the Video Camera via Telnet

A Telnet session with the RoboTRAK IR camera does not provide communication to the video camera, except in the case of commands that instruct the IR camera to send a command to the video camera. The video camera can be controlled separately via Telnet; however, tracking should be disabled whenever you control the video camera directly.

Refer to the video camera's manual for information about the commands available.

Commands to Avoid

Do not send the following commands to the video camera while the IR camera is in tracking mode:
- Camera pan or tilt commands – the video camera will only respond momentarily, as the IR camera may send tracking coordinates several times per second.
- Preset recall commands – turn off tracking on the IR camera, or invoke the preset from the IR camera (`camera slave1 preset recall` command to go to a preset.

Camera Commands

The following camera commands are available:

- camera master ccu
- camera master led
- camera slave1 preset recall
- camera master tracking
- camera master standby
- camera master standby config peripheral

These commands affect only the specified camera.

camera master tracking

Stop or start tracking mode. Tracking mode should be off (stopped) for direct operation of the video camera.

Synopsis	camera master tracking { get | pause | resume | stop }	
Options	`get`	Returns the camera's current tracking state (on or off)
	`pause`	Pauses tracking without changing the positions of the cameras
	`stop`	Halts tracking and parks the cameras at their home positions
	`resume`	Starts tracking

Example	`> camera master tracking stop`
	`OK`
	`>`
	
	Takes the system out of tracking mode.
	
	`> camera master tracking get`
	`tracking:  off`
	`OK`
	`>`
	
	Returns the current state of tracking.	

camera slave1 preset recall

Recalls the RoboTRAK system's video camera to the specified preset. The video camera only responds to this command if it has stored the specified preset.

When the video camera's presets are accessed via the IR camera, it moves to the preset but the IR camera continues to track.

Presets are stored in the video camera and can be accessed from the IR camera while tracking is paused. Refer to the API information in the video camera's manual for details on storing presets.

Up to 16 presets are available through the Telnet API. In the IR camera's web interface, eight video camera presets are available. Twelve presets are available from the video camera's web interface.

Synopsis	camera slave1 preset recall <1..16>	
Options	<1..16>	Moves the video camera to the specified preset position.

Example	`> camera slave1 preset recall 3`
	`OK`
	`>`
	
	Moves the video camera to preset 3 (if stored).	

camera master ccu

Returns or sets the value for the IR (master) camera's AGC gain. This value can be increased if the system is in a large room where it is not possible to zoom in far enough to set up an optimal IR camera lanyard shot. The AGC gain setting is also available through the IR camera's web interface.

Synopsis	camera master ccu [get | set] agc_gain	
Options	`get agc_gain`	Returns the current AGC gain value.
	`set agc_gain <1..48>`	Sets the AGC gain value to an integer in the range of 1 to 48.

Example	`> camera master ccu get agc_gain`
	`AGC gain       18`
	`OK`
	`>`	

camera master led

Set or change the behavior of the IR camera's status light.

To set the behavior of the video camera's status light, you will need to send the `camera led` command directly to the video camera, or change this setting in its web interface.

Synopsis	camera master led { get | off | on }	
Options	`get`	Returns the status light's current state (on or off).
	`off`	Disables the status light.
	`on`	Enables the status light.

Examples	`> camera master led off`
	`OK`
	`>`
	
	Disables the status light. When the LED is off, you cannot tell by looking at the camera whether it is active.
	
	`> camera master led get`
	`led:   on`
	`OK`
	`>`
	
	Returns the current state of the status light.	

camera master standby

Gets or sets the IR camera's standby state.

To control whether the video camera goes to standby mode when the IR camera does, use the command [camera master standby config peripheral](#).

Synopsis	camera master standby [get | on | off | toggle]	
Options	`get`	Returns the current standby status for the IR camera.
	`on`	Places the IR camera in standby mode.
	`off`	Brings the IR camera out of standby, making it active.
	`toggle`	Changes the IR camera's standby state - if it was in standby mode, `toggle` makes it active, and vice-versa.

Examples	`> camera master standby on`
	`OK`
	`>`
	
	Places the IR camera in standby mode.	

	`> camera master standby get`
	`standby:      off`
	`OK`
	`>`
	
	Returns the IR camera's current standby state – standby is off, meaning the camera is active.	

camera master standby config peripheral

Returns or sets the standby behavior for the RoboTRAK system's video camera.

Synopsis	camera master standby config peripheral [get	on	off	toggle]	
Options	`get`	Returns the current standby configuration for the video camera.
	`on`	Sets the video camera to go to standby mode when the IR camera goes to standby.
	`off`	Sets the video camera to remain active when the IR camera goes to standby.
	`toggle`	Changes the video camera's standby behavior - if its previous standby configuration was `on`, the `toggle` parameter changes it to `off`.

Examples	`> camera master standby config peripheral on`
	`OK`
	`>`
	
	Sets the video camera to go to standby mode when the IR camera does so.	

	`> camera master standby config peripheral get`
	`peripheral:    on`
	`OK`
	`>`
	
	Returns the standby configuration for the video camera. In this example, it is currently set to go to standby when the IR camera does so.	

Communication and Control Commands

The following communication-related commands are available:
- network settings get
- streaming settings get
- streaming ip enable
- trigger

The `network settings get` command works for any Vaddio camera that you send it to.

The `streaming` commands work for any Vaddio camera with streaming capability.

The `trigger` command works for the IR camera.

network settings get

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

Synopsis	network settings get

Example	`> network settings get`
	`Name            eth0:WAN`
	`MAC Address     D8:80:39:9A:BA:14`
	`IP Address      10.30.20.74`
	`Netmask         255.255.255.0`
	`VLAN            Disabled`
	`Gateway         10.30.20.1`
	`Hostname        vaddio-robotrak-D8-80-39-9A-BA-14`
	`OK`
	`>`

streaming settings get

Returns the IP streaming settings for the IR camera. Go to the Streaming page of the camera's web interface to manage these settings.

Synopsis	streaming settings get
Example	```> streaming settings get
IP Custom_Frame_Rate 15
IP Custom_Resolution 480p
IP Enabled   true
IP MTU   1400
IP Port   554
IP Preset_Quality   High Quality (Best)
IP Preset_Resolution 480p
IP Protocol   RTSP
IP URL   vaddio-robotrak-stream
IP Video_Mode   preset
OK
>```

streaming ip enable

Set or change the state of IP streaming.

Synopsis	streaming ip enable { get | on | off | toggle }	
Options	`get`	Returns the current state of IP streaming.
	`on`	Enables IP streaming.
	`off`	Disables IP streaming.
	`toggle`	Changes the state of IP streaming.
Example	```> streaming ip enable on

> OK```

Enables IP streaming.

```> streaming ip enable get
enabled: true
> OK```

Returns the current state of IP streaming. | |

trigger

Runs the macro associated with the specified trigger state.

The macro must exist, and it must be possible to execute it successfully. For example, if the macro sends the video camera to a preset, the preset must be stored on the video camera.

Synopsis	trigger < 1..50 > { on | off }	
Options	`on`	Activates the specified trigger. If the trigger's on state is associated with a video camera preset, this is equivalent to recalling the preset.
	`off`	Turns off the specified trigger.

Example	`trigger 3 on`
	`OK`
	`>`
	
	Runs the macro associated with trigger 3 turning on.	

Maintenance and Troubleshooting Commands

The following commands are available for maintenance and troubleshooting:
- network ping
- version
- camera master recalibrate
- camera master sensor get
- system reboot
- system factory-reset

The `network`, `system`, and `version` commands work for any Vaddio camera you send them to.

The `camera master` commands are for the IR camera only.

network ping

Sends an ICMP ECHO_REQUEST to the specified IP address.

Synopsis	network ping [count <count>] [size <size>] <destination-ip>	
Options	`count`	The number of ECHO_REQUEST packets to send. If this is not specified, the default is five packets.
	`size`	The size of each ECHO_REQUEST packet. If this is not specified, the default is 56 bytes.
	<destination-ip>	The IP address where the ECHO_REQUEST packets will be sent.
Examples	`network ping 192.168.1.1` Sends five ECHO_REQUEST packets of 56 bytes each to the host at 192.168.1.1.	
	`network ping count 10 size 100 192.168.1.1` Sends 10 ECHO_REQUEST packets of 100 bytes each to the host at 192.168.1.1.	

version

Returns the current firmware version.

Synopsis	version
Example	**version** Commit: d033ddb2378357a871011eb820706dcaa64ec0e2 Sensor Version: 01.00 System version: RoboTRAK 3.0.0 OK >

camera master recalibrate

Executes a pan-tilt reset. Use this command to clear a motor fault, if one occurs. The recalibration takes a few seconds.

This command is for the RoboTRAK IR camera only. It is not used for the system's video camera.

Synopsis	camera master recalibrate
Example	> camera master recalibrate OK >

camera master sensor get

Returns information that identifies which distance configuration files to use with your camera.

Synopsis	camera master sensor get
Example	``` > camera master sensor get "Hi_SC210" > ```

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	**system reboot** Reboots the system immediately.	
	system reboot 30 Reboots the system in 30 seconds.	

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. If either the hardware or the software value is `on`, the camera will do a factory reset on the next reboot.
	`on`	Enables factory reset on reboot.
	`off`	Disables factory reset on reboot.
Examples	**system factory-reset get** Returns the factory reset status in this form: ``` > system factory-reset get factory-reset (software): off factory-reset (hardware): off OK > ``` The software value shows whether the most recent `system factory-reset` command (if one has been received) specified on or off. The hardware value reads the rear panel DIP switches and returns the status `on` if they are all in the down position.	
	system factory-reset on Enables factory reset upon reboot. Returns current status in this form: ``` factory-reset (software): on factory-reset (hardware): off ```	

Telnet Information and Session Management Commands

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

- history
- help
- exit

help

Displays an overview of the CLI syntax.

Synopsis	help
Example	`help`

history

Returns the most recently issued commands from the current Telnet session.

Synopsis	history <limit>	
Options	<limit>	Integer value specifying the maximum number of commands to return.

Examples	`history`
	
	Displays the current command buffer.
	
	`history 5`
	
	Sets the history command buffer to remember the last 5 unique entries.	

Additional information	You can navigate the command history using the up and down arrow keys. This command supports the expansion functionality from which previous commands can be recalled from within a single session. History expansion is performed immediately after a complete line is read. Examples of history expansion: * `!!` Substitute the last command line. * `!4` Substitute the 4th command line (absolute as per 'history' command) * `!-3` Substitute the command line entered 3 lines before (relative)	

exit

Ends the command session and then closes the socket.

Synopsis	exit
Example	`exit`

Troubleshooting and Care

Stuff happens – we get it. When the system doesn't act as you expect, check these things first:
- For details on camera interactions during normal use, see How the Cameras Behave.
- For status lights, see Camera Status Light and Lanyard Status Light.
- For issues with tracking, see the diagnostic tables in Dealing with Stray IR and Testing and Fine-Tuning.

If these don't reveal the cause of the issue, use this table to determine whether it's time to call Vaddio Technical Support.

Fault Isolation

What is it doing?	Possible causes	Check and correct
Nothing. The lights on the cameras are off.	No power to the cameras	Check the cables: ■ Power cable from the PoE splitter ■ Cat-5 cable from the PoE+ power injector to the splitter
		Check the wall outlet to see if it powers another item such as a cell phone charger.
		Possible hardware issue: ■ PoE splitter ■ PoE+ power injector ■ Camera Contact Vaddio Technical Support.
Can't access the IR camera's web interface	The camera is not at the specified IP address or using the specified hostname.	Be sure you have entered the IP address or hostname correctly.
Can't view the stream from the IR camera.	Streaming is not enabled.	Enable streaming on the Streaming page in the web interface.
IR camera can't find the video camera	Cameras are not paired	Enter or update the video camera's hostname (or static IP address) on the Pairing page. Ensure that the video camera is connected to the network.
Video camera does not respond to preset requests from the IR camera	The requested preset has not been saved on the video camera	Take the system out of tracking mode. Then use the video camera's IR remote or web interface to save the desired presets.
Video camera does not zoom while tracking	This is normal.	

Corrective Actions

To correct a motor calibration fault:

The RoboTRAK IR camera's pan and tilt motors can occasionally go out of calibration – for example, if the camera is jostled during operation. To recalibrate the motors, select Pan-Tilt Reset. This button is also available on the operator's page of the web interface.

To reboot the camera:

This can help if the camera stops responding as you expect. In the System Utilities section, select Reboot.

To restore factory default settings:

Occasionally it's easiest to just start over. To restore the original factory settings…select Restore Factory Settings.

Caution
Factory reset will erase camera pairing information and the room configuration that you loaded, and overwrite everything else you have customized. Following this operation, you will need to configure and tune the system.

Getting Help

HELP PAGE

If you can't resolve an issue using your superior troubleshooting skills (and maybe the Troubleshooting information in this manual), we are here to help.

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

Your technical support representative may ask you to download the event log from the Diagnostics page.

Note
The event log may include large numbers of internal events even when no errors have occurred. Rebooting generates over 100 log entries.

Operation, Storage, and Care

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

Keep this system 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
- Dry environments with an excess of static discharge
- Outside a spacecraft during or after launch

Do not attempt to take any component of this system apart. There are no user-serviceable parts inside.

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