



# Spectra® Enhanced 7 Series IR Look-Up PTZ Cameras Operations Manual



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## Table of Contents

Important Notices .....	5
Regulatory Notices .....	5
Radio and Television Interference .....	5
Warranty Statement .....	5
Legal Notice .....	5
Audio Notice .....	5
Video Quality Caution .....	5
Frame Rate Notice Regarding User Selected Options .....	5
Open Source Software .....	6
Power Source .....	6
Korean Class A EMC .....	6
ESD Warning .....	6
Accessing the Camera .....	7
Accessing Camera Settings .....	7
Understanding the Camera Configuration Sequence .....	7
Accessing the Live Video Page .....	8
Selecting Live View Controls .....	8
Understanding the Focus Calibration Process .....	8
Running Patterns, Scans, Presets, and Preset Tours .....	9
PTZ Controls .....	9
Focus, Zoom, Brightness, and Wiper* controls .....	9
Viewing, Pan/Tilt, Streaming, and Snapshot Controls .....	9
Using the System Menu .....	11
Configuring General Settings .....	11
Configuring Time Settings .....	11
Configuring GPS Settings .....	11
Generating a System Log .....	11
Restarting the Camera .....	11
Restoring All Camera Defaults .....	12
Backing Up and Restoring Settings .....	12
Backing Up Camera Settings .....	12
Restoring Camera Settings from a Backup .....	12
Updating Firmware .....	12
Configuring OSDi Overlays .....	13
Snapshot Viewer .....	14
Configuring Storage Management .....	14
Viewing Device Information .....	14
Using Settings and Actions .....	14
Configuring Encryption of Local Storage .....	14
Configuring Local Recording .....	14
Exporting a Recording .....	15

Viewing Diagnostics .....	15
Viewing Client Connections .....	15
Viewing Temperature Information .....	15
Viewing Power Information .....	15
Using the Network & Security Menu .....	16
Understanding General Network Settings .....	16
Network Hostname .....	16
Port Settings .....	16
Network Interface .....	16
Accessing Users and Security .....	18
Managing Users and Security .....	18
Configuring Local Users .....	18
Setting Security/Authentication .....	18
Configuring TLS .....	19
Configuring Traffic Shaping .....	19
Configuring 802.1x Security .....	20
Configuring SNMP .....	20
Configuring SNMP V2c .....	20
Configuring SNMP V3 .....	20
Configuring Firewall Settings .....	21
Using the Imaging Menu .....	21
Restoring Imaging Settings .....	21
Configuring General Settings .....	21
Image Enhancement .....	21
Digital Processing .....	22
Configuring Exposure Settings .....	22
Configuring WDR Settings .....	22
Enabling and Disabling Image Stabilization .....	22
Configuring Day/Night Mode .....	23
Configuring IR Illumination .....	23
Configuring Focus/Zoom Settings .....	23
Setting White Balance .....	24
Using Window Blanking .....	24
Configuring Options in the PTZ Menu .....	25
Configuring Positioning .....	25
Configuring a Preset .....	26
Configuring a Preset Tour .....	26
Configuring Pan/Tilt/Zoom Patterns .....	27
Configuring Pan/Tilt/Zoom Scans .....	28
Configuring Pan/Tilt/Zoom Zones .....	28
Configuring Pelco Camera Link .....	29
Using the A/V Streams Menu .....	29

Selecting Preset Video Configurations .....	29
Configuring Presets .....	30
Configuring Custom Video Streams .....	30
Configuring Audio .....	31
Enabling Echo Mitigation .....	32
Managing RTP Settings .....	32
Setting Static Multicast Addresses .....	32
Setting the Maximum Transfer Unit Size (TCP/IP) .....	33
Configuring Smart Compression .....	33
Configuring Long-Term Rate Control .....	34
Using the Events Menu .....	35
Configuring Sources .....	35
Configuring an Alarm Event Source .....	35
Configuring an Analytic Event Source .....	35
Configuring a Timer Event Source .....	36
Configuring a System Event Source .....	36
Configuring a Park Action Event Source .....	36
Configuring a Network Loss Event Source .....	36
Deleting an Event Source .....	37
Configuring Handlers .....	37
Configuring an Event Handler: Send Email .....	37
Configuring an Event Handler: Upload JPEG to FTP Server .....	37
Configuring an Event Handler: Write JPEG to SD Card .....	38
Configuring an Event Handler: Run Pattern .....	38
Configuring an Event Handler: Go to Preset .....	39
Configuring an Event Handler: Run Tour .....	39
Configuring an Event Handler: Run Scan .....	39
Configuring an Event Handler: Wiper* .....	40
Configuring an Event Handler: Open/Close Relay .....	40
Configuring an Event Handler: Display Overlay .....	40
Configuring an Event Handler: Play Audio .....	41
Configuring an Event Handler: Write Recording to SD Card .....	41
Configuring an Event Handler: Upload Recording to FTP Server .....	42
Deleting an Event Handler .....	42
Analytic Configuration .....	42
Configuring Basic Analytics .....	42
Configuring Enhanced Analytics .....	43
Event Stream .....	48
Contacting Pelco for Troubleshooting .....	49

## Important Notices

### Regulatory Notices

This device complies with Part 15 of the **FCC Rules**. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

#### Radio and Television Interference

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15 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 own expense.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission's rules.

#### CAN ICES-3 (A)/NMB-3(A)

### Warranty Statement

For information about Pelco's product warranty and thereto related information, refer to [www.pelco.com/warranty](http://www.pelco.com/warranty).

### Legal Notice

SOME PELCO EQUIPMENT CONTAINS, AND THE SOFTWARE ENABLES, AUDIO/VISUAL AND RECORDING CAPABILITIES, THE IMPROPER USE OF WHICH MAY SUBJECT YOU TO CIVIL AND CRIMINAL PENALTIES. APPLICABLE LAWS REGARDING THE USE OF SUCH CAPABILITIES VARY BETWEEN JURISDICTIONS AND MAY REQUIRE, AMONG OTHER THINGS, EXPRESS WRITTEN CONSENT FROM RECORDED SUBJECTS. YOU ARE SOLELY RESPONSIBLE FOR INSURING STRICT COMPLIANCE WITH SUCH LAWS AND FOR STRICT ADHERENCE TO ANY/ALL RIGHTS OF PRIVACY AND PERSONALTY. USE OF THIS EQUIPMENT AND/OR SOFTWARE FOR ILLEGAL SURVEILLANCE OR MONITORING SHALL BE DEEMED UNAUTHORIZED USE IN VIOLATION OF THE END USER SOFTWARE AGREEMENT AND RESULT IN THE IMMEDIATE TERMINATION OF YOUR LICENSE RIGHTS THEREUNDER.

### Audio Notice

Improper use of audio/visual recording equipment may subject you to civil and criminal penalties. Applicable laws regarding the use of such capabilities vary between jurisdictions and may require, among other things, express written consent from the recorded subjects. You are solely responsible for insuring strict compliance with such laws and for strict adherence to any/all rights of privacy and personality.

### Video Quality Caution

#### Frame Rate Notice Regarding User Selected Options

Pelco systems are capable of providing high quality video for both live viewing and playback. However, the systems can be used in lower quality modes, which can degrade picture quality, to allow for a slower rate of data transfer and to reduce the amount of video data stored. The picture quality can be degraded by either

lowering the resolution, reducing the picture rate, or both. A picture degraded by having a reduced resolution may result in an image that is less clear or even indiscernible. A picture degraded by reducing the picture rate has fewer frames per second, which can result in images that appear to jump or move more quickly than normal during playback. Lower frame rates may result in a key event not being recorded by the system. Judgment as to the suitability of the products for users' purposes is solely the users' responsibility. Users shall determine the suitability of the products for their own intended application, picture rate and picture quality. In the event users intend to use the video for evidentiary purposes in a judicial proceeding or otherwise, users should consult with their attorney regarding any particular requirements for such use.

### Open Source Software

This product includes certain open source or other software originated from third parties that is subject to the GNU General Public License (GPL), GNU Library/Lesser General Public License (LGPL) and different and/or additional copyright licenses, disclaimers, and notices. The exact terms of GPL, LGPL, and some other licenses are provided to you with this product. Please refer to the exact terms of the GPL and LGPL at <http://www.fsf.org> (Free Software Foundation) or <http://www.opensource.org> (Open Source Initiative) regarding your rights under said license. You may obtain a complete corresponding machine-readable copy of the source code of such software under the GPL or LGPL by sending your request to [digitalsupport@pelco.com](mailto:digitalsupport@pelco.com); the subject line should read Source Code Request. You will then receive an email with a link for you to download the source code. This offer is valid for a period of three (3) years from the date of the distribution of this product by Pelco.

### Power Source

This product is intended to be supplied by a Listed Power Adapter or DC power source marked "L.P.S." (or "Limited Power Source"), rated according to the camera specification document. If you need further assistance with purchasing the power source, please contact Pelco, Inc. for further information.

### Korean Class A EMC

이 기기는 업무용 (A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시길 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

### ESD Warning



**Warning:** This product is sensitive to Electrostatic Discharge (ESD). To avoid ESD damage to this product, use ESD safe practices during installation. Before touching, adjusting or handling this product, correctly attach an ESD wrist strap to your wrist and appropriately discharge your body and tools. For more information about ESD control and safe handling practices of electronics, please refer to ANSI/ESD S20.20-1999 or contact the Electrostatic Discharge Association ([www.esda.org](http://www.esda.org)).

## Accessing the Camera



**Note:** For security purposes, it is required that you create a user account when you access the camera for the first time. In its out-of-the-box configuration, the camera has no user name and password assigned. In this state the camera does not allow for video to stream or configurations to change. It is required that you set an administrative user name and password at this time. Creation of an administrative user changes the state of the camera to its “operational mode,” where credentials must be provided in order to view live video or change its configuration. This first user configuration can also be done in VxToolbox software.

There is no provision for recovering a forgotten administrator user name or password. The camera can be restored to its out-of-the-box, no user name and password configuration by powering down, depressing the Factory Defaults button, and holding the button down for at least four seconds while powering the camera back up.

Once the camera is powered back up the user will be prompted to create a username and password.

The recommended browsers for your camera are Mozilla® Firefox®, Google Chrome™, or Microsoft™ Edge™ for Microsoft® Windows® operating systems; and Firefox for Mac® operating systems. For supported browser versions, refer to the Specification Sheet for your product.

1. Open a web browser.
2. Type the camera's IP address or host name in your browser's address bar and then click Enter.



**Note:** You can obtain your camera's IP address or access the camera using VxToolbox software.

3. If a user name and password exist, a log in dialog box appears. Otherwise a user creation dialog box appears, and the user will be required to create an administrative user to proceed.

## Accessing Camera Settings

Access to camera settings is determined by user permissions. If you do not have access to camera settings, the **Settings** option will not appear in the top-center of the Live View window.

1. Click the gear symbol at the top center of the viewing window.
2. Click the setting you want to change. Place your mouse pointer over any menu on the page to reveal submenus.

## Understanding the Camera Configuration Sequence

After the camera is installed and power is applied, the camera undergoes a configuration sequence, taking approximately 30-seconds to complete. The camera will come online after the configuration sequence is complete.



**Note:** If the camera connected to a network without a DHCP server and DHCP is enabled, the configuration sequence can take up to two minutes to complete.

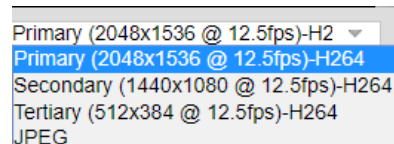
## Accessing the Live Video Page

The live video page provides access to video streams, an initial Focus Calibration Process, and, where applicable, to PTZ controls.

By default, the camera does not have any pre-configured users. When a user is added to the system, that user must login before accessing the *Live View*. After logging in, the user will have access to the *Live View* from that point forward.

## Selecting Live View Controls

Viewable controls are based on device model and user permissions. Use the drop-down menu to select the **Primary**, **Secondary**, and **Tertiary** streams from the live view. The **JPEG** stream is a predefined low resolution, low frame rate JPEG stream. JPEG is helpful for users with bandwidth or processing limitations that could cause a high resolution, high frame rate video stream to pause or pixelate.




**Caution:** Streams must be configured to use the H264 compression standard. Streams with any other compression standard will not be available for selection. If the secondary or tertiary stream has not been configured, they will not be available for selection. Video streams can be configured under the *A/V Streams Menu*. Only H264 streams are supported for full-resolution streaming. If the user selects H265 or MJPEG as their encoding, the stream is also not available on the Live View.

## Understanding the Focus Calibration Process

To achieve superior focus functionality, Spectra Enhanced Series 7 cameras now implement a focus database which caches focus values that the camera calculates at different pan and tilt and zoom positions. With valid focus values, the camera can more quickly achieve focus the next time the camera returns near to that area and to that zoom. The camera will always be learning and updating the focus database, so the more the camera is used, the faster it's overall focus ability will be.

To initially seed the focus database, there is a calibration process that takes about one hour and will pan and tilt through the visible space at mid zoom level. These values provide a starting point for the focus algorithm for calculating focus at different zoom levels. Eventually, the focus database will store valid focus values through the visible space at multiple zoom levels, providing superior focus functionality.

For a camera that has not been calibrated, there is a suggestion on the live video page that will prompt you to consider calibrating the camera. The prompt enables you to go to the Focus page in the Imaging Tab. If the camera has been fully calibrated, the live video page looks like it did before.

On the Focus page, you can start or stop the calibration, and there is a progress bar. If you stop the calibration process for any reason, you can resume it from where it left off (even if there was a reboot or "soft" restore factory defaults in between). The only ways to clear the current calibration data and start over are to select the Clear Calibration Data button or complete a "hard" restore factory defaults.



Action	Impact on Focus Calibration Database
Reboot	Calibration is not impacted. Calibration can resume where it left off if it had been stopped, and the focus database is not touched.
Soft Restore Factory Defaults	The focus database is not impacted, but the percent complete could change if there were some times in the calibration process where it couldn't focus. The camera would presume that calibration would need to resume from the first place it finds an invalid focus value.
Hard Restore Factory Defaults	Removes the focus database.

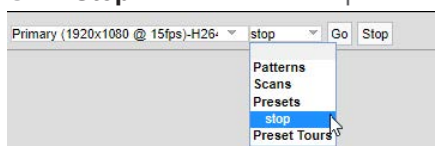
## Running Patterns, Scans, Presets, and Preset Tours

- Click to select the preset name from the *Patterns*, *Scans*, *Presets*, or *Preset Tours* list.



**Note:** Only preconfigured patterns are available for selection. Go to the *PTZ* menu to configure patterns, scans, presets, and tours.

- Click **Go** to run the preset.
- Click **Stop** to discontinue the preset.



## PTZ Controls

PTZ Controls are based on camera model and user permissions.

### Focus, Zoom, Brightness, and Wiper\* controls

\*Only on supported models.



From left to right, the sliders represent:

- Zoom:** Set the zoom position (The blue area is digital zoom and it is only present if digital zoom is enabled under the PTZ menu).



**Note:** You can also use the mouse scroll wheel to zoom in and out.

- Focus:** Set focus position.
- Brightness:** Click and hold to close the iris and darken the image.
- Wiper:** Click this button to trigger the wiper. Three wipes will be made.

### Viewing, Pan/Tilt, Streaming, and Snapshot Controls



**Note:** PTZ controls are available only after you have logged in to the camera.



From left to right, the icons represent:

- **Resize Viewing Area:** Allows you to zoom in on an area of interest. Click the icon and then draw a box to designate the area in which you want to center the camera's field of view and zoom in.
- **Center Viewing Area:** Engages click-to-center functionality. Click the icon and then click to select the location in which you want to center the camera's field of view.
- **Pan and Tilt:** Engages pan and tilt functions. Click the icon, and then click and drag the mouse within the video stream to pan and tilt the camera.
- **Pixel Counter:** Enables tool on the viewer to calculate pixels in the area of the adjustable box.
- **Open Stream in New Window:** Opens the video stream in an independent window.
- **Take a Snapshot:** Captures a still image from the video stream and saves as a JPEG file.

## Using the System Menu

The System menu provides access to the **General Settings**, **Backup and Restore**, **Firmware**, **OSDi**, **Snapshot Viewer**, **Storage Management**, and **Diagnostics** pages.

### Configuring General Settings

1. **Device Name:** Configure the name for your device. Names can contain up to 63 alphanumeric characters. At least one character in the host name must be a letter.
2. **Enable LEDs:** Enable or turn off LED camera lights.
3. **Power Priority:** Select a priority power supply as either 24v or Power over Ethernet (PoE).
4. Click **Save**.

### Configuring Time Settings

You can set your camera to discover a network time server (NTP) automatically, manually provide the address of your network time server, or select no time server.

1. Click **System**, and then click **General Settings**.
2. Click to select your time server setting:
  - **Auto:** Allows your camera to discover and synchronize with your network time server (over IPv4 or IPv6).
  - **Manual:** Requires you to provide the address of your network time server.
  - **None:** Camera date format defaults to mm/dd/1970.
3. Click to select the *Time Zone*.
4. Click **Save**.

### Configuring GPS Settings

Use the GPS Settings option to establish the camera's GPS location.

1. Manually enter the *Latitude*, *Longitude*, and *Elevation* of the camera.
2. Click **Save**.

### Generating a System Log

If technical difficulties occur, a system log might help Pelco Product Support troubleshoot problems with your camera. You can contact Pelco Product Support at 1-800-289-9100 (USA and Canada) or +1-559-292-1981 (international).

1. Click **System**, and then click **General Settings**.
2. Click **Generate System Log**.
3. Select the location in which to save the log file.
4. Click **Save**.

### Restarting the Camera

If you are recording video from your camera, restarting the camera will cause a gap in video recording. It is important that you schedule maintenance before restarting the camera.

1. Click **System**, and then click **General Settings**.
2. Click **Reboot Camera**.

### Restoring All Camera Defaults

If necessary, you can reset your camera settings to the factory defaults.

1. Click **System**, and then click **General Settings**.
2. Click **Restore All Camera Defaults**.
3. Click **Hard** or **Soft Restore**.
  - **Soft Restore** will reset the camera back to factory defaults with the exception of network settings. All user settings and customizations will be lost and cannot be recovered.
  - **Hard Restore** will reset the camera back to factory defaults. All user settings and customizations and network settings will be lost and cannot be recovered.
4. Click **Upload and Restore** to restart and restore you camera's settings.

### Backing Up and Restoring Settings

You can create a backup file of your device's configuration so that if you accidentally change a setting or need to recover from a factory reset, you can revert back to this saved configuration. Camera backup files are stored in bin format.



**Note:** The restore feature is not intended to automatically configure multiple devices or to recover settings following a firmware upgrade.

### Backing Up Camera Settings

1. Click **System**, and then click **Backup and Restore**.
2. Click **Generate Backup File**.
3. Click **Download Now**, and then specify the directory in which to save your backup file.
4. Click **OK** to save the backup file.

### Restoring Camera Settings from a Backup

1. Click **System**, and then click **Backup and Restore**.
2. Click **Browse**, click the desired backup file, and then click **Open**.
3. Click **OK**.
4. Click **Choose File**, and then locate the device's backup file.
5. Click **Upload and Restore** to restart the camera and restore the camera settings.

### Updating Firmware

Click **System**, and then click **Firmware** to access System Information and perform Firmware Updates.

System Information includes read-only fields for the firmware version, hardware version, model number, and serial number of the camera. This information is typically required by Pelco Product Support for troubleshooting purposes.

The camera firmware can be upgraded or downgraded.

1. Click **Browse** to select the firmware you would like to upgrade/downgrade (ppm file).
2. Click **Upload**.



**Note:** Upgrading to version 3.3.x.x firmware requires user(s) to exist on the camera. Otherwise, the firmware update will fail.

## Configuring OSDi Overlays

The OSDi (Intelligent On Screen Display) feature allows the camera to show pertinent information as an overlay within the field of view. Depending on your camera and model, you can define up to four overlay rules.

If using the Current Zone Label overlay, and multiple zones are in the field of view, the camera will display the labels in order of size, smallest to largest; if all zones in the field of view are the same size, the camera will display zone labels in order of creation, oldest to newest.

The camera will display the label in the active zone until the camera's field of view moves outside the zone. You can set the Duration of the display as Indefinite or, alternatively, you can define a number of seconds for the Current Zone Label to be displayed.

1. Go to the *OSDi* page from the *System* menu.
2. Hover in the viewing window to display **Upper Left, Upper Center, Upper Right, Middle Left, Middle Center, Middle Right, Lower Left, Lower Center, Lower Right** buttons. Click the button representing the location in which you want to display the overlay.
3. Use the *Overlay Type* pull-down menu to choose between the following overlay types:
  - **Plain Text:** Enter a plain text string of your choice.
  - **Camera Name:** Display the camera's name.
  - **Camera Name/Date/Time:** Display the camera's name, date, and time.
  - **Date/Time:** Display the camera's date and time.
  - **Date:** Display the camera's date.
  - **Time:** Display the camera's time.
  - **Event Source:** Display an event source on the overlay using a pre-defined Event Source and associated Handler. Under the Steps to Enable Overlay section, click the Manage Handlers or Manage Sources link. This will take you to the Handlers and Sources page under the Events tab in which you can establish or change the settings for Event Source.
  - **PTZ Position:** Display the current PTZ Position in the format of Pan°/Tilt° ZoomX Direction. You can set the Duration of the display as Indefinite or, alternatively, you can define a number of seconds for the PTZ Position to be displayed on the overlay after movement stops.
  - **Acquired PTZ Preset:** Display the name of a PTZ Preset as defined in the PTZ Preset Settings. This will only display as long as the preset is acquired by the camera. You can set the Duration of the display as Indefinite or, alternatively, you can define a number of seconds for the PTZ Preset Name to be displayed after the Preset is acquired.
  - **Current Zone Label:** Display the label of the current zone. If a Current Zone Label has not been defined, select the Manage Zones link to go to the PTZ Zones tab where you can establish or create new zones. Under the Duration section, you can select the option to display the current zone label indefinitely or establish a specific length of time (in seconds) for which to display the current zone label.
  - **Image:** Select an Image File to display by clicking Choose File and traversing to the local directory in which your image file is stored.
4. Click **Save**.

## Snapshot Viewer

The Snapshot Viewer page displays a list of snapshots saved to the SD card when a “Write JPEG to SD Card” event handler is activated. Video is saved to the SD card when a Write Recording to SD Card handler is activated. The saved video segments can be downloaded from the Snapshot Viewer page.

1. Click to select the viewing option: *Select Visible*, *Deselect Visible*, *Select All*, *Deselect All*, *Delete Selected*, *Download Selected*, or *Refresh List*.
2. Use the **Search** box to find the snapshot of your choice on the SD card.
3. Click the **Show** drop-down menu, and then click to select the number of files to show per page. The default setting is 15, however up to 100 snapshots can be displayed. Maneuver through the snapshots or pages using the arrow buttons (<, <<, >, >>).

## Configuring Storage Management

Click **System**, and then click **Storage Management** to access and/or manage Device Information, Settings and Actions, Local Recording, and Export Recordings.

### Viewing Device Information

Device Information provides information for the SD card. The following information will be displayed when an SD Card is properly installed:

- **Device Type:** SD Card
- **Free Space:** Expressed in MB
- **Total Size:** Expressed in MB
- **Status:** Ready to begin recording



**Note:** If there is no SD card in the camera or it was not properly installed, the Status will display "There is no media in the SD card."

### Using Settings and Actions

- **Device Format:** displays the device format with the option to reformat the device.
- **SD Allocation:** Use the slider bar to establish how much storage to allocate between **Edge** and **Clip** storage.

## Configuring Encryption of Local Storage

Media card encryption status can be viewed and configured if an SD card is being used in the camera.

1. If the SD card being used is encrypted on another device, provide the encryption password and click **Mount** for encryption to the new device.
2. To reformat the SD card with a new password, enter a new password and click **Reformat Encryption**.



**Note:** Data will be deleted during this process. Take caution before proceeding.

## Configuring Local Recording

The number of hours of video you can store on the SD card is established with recording bit limits. A bit rate limit below 1.5 Mbps allows a maximum of 48 hours of video at 30 fps regardless of resolution. You can increase the maximum available hours of storage by decreasing the frame rate.



**Note:** Disabling Local Recording will impact “Write Recording to SD Card” or “Upload Recording to FTP Server” event handlers if they are configured.

### Exporting a Recording

1. Enter the *Start Date* and *Start Time* as well as the *End Date* and *End Time* manually into the *Date/Time* fields or use the calendar icons to set dates and times.  
A menu will show the range of recordings available for export based on your specified dates and times.
2. Click **Export**.



**Note:** Exports are limited to 15-minute clips.

### Viewing Diagnostics

Click **System**, and then click **Diagnostics** to get information on Power, Client Connections and Temperature.

#### Viewing Client Connections

Client Connections displays the number of active streams by Client Address, Stream type, and Duration.

#### Viewing Temperature Information

The Temperature setting displays the current processor temperature along with a graphical display of the Maximum, Minimum, and Average Processor Temperature (C°) for the current session and historical sessions.

#### Viewing Power Information

The current Input Voltage and Power Usage statistics are displayed within the Power section of the Diagnostics display. Maximum, Minimum, and Average Input Voltage (mV) and Power Usage (mW) statistics are graphically displayed for the current session and historical sessions.

## Using the Network & Security Menu

The *Network & Security* menu provides access for configuring *Network* settings, *Users & Security*, *TLS*, *Traffic Shaping*, *802.1x*, *SNMP*, and *Firewall*. You have the option of changing ports and adding firewall rules. By default, your device receives an address over DHCP, and all other network features are disabled.

## Understanding General Network Settings

### Network Hostname

You can configure a hostname for your camera containing up to 63 alphanumeric characters. At least one character in the host name must be a letter.

### Port Settings

Port settings determine the ports over which users communicate with the camera.

**HTTP:** Do not change the HTTP when connecting to a Pelco video management system (VMS); doing so might prevent you from viewing or recording video from your imaging camera. The default HTTP port is 80.



**Note:** Do not change the HTTP port when connecting to a legacy Pelco video management system, as this may prevent you from viewing or recording video from your imaging device.

**HTTPS:** Set TLS to Optional or Required and install a security certificate before altering the HTTPS port. The default HTTPS port is 443.

**RTSP:** Cameras communicate with video management systems over RTSP. Do not change the RTSP port. The default RTSP port is 554.

### Network Interface

#### Link Settings

Set Network Link speeds by selecting either 1000Mb or 100Mb. Click the Auto Negotiation Box to have the camera set the link speed based on the network port settings if also supported by the switch.

#### IPv4 Settings

By default, cameras are configured to obtain network settings over DHCP. If a DHCP server is not available, the camera defaults to an address of 192.168.0.20 on a 255.255.255 subnet. If 192.168.0.20 is already in use on the network, the camera will increment the address by one until it finds an unused address (for example, 192.168.0.21 if 192.168.0.20 is in use).

Set DHCP to Off to configure a static address and manually set the subnet mask, gateway, and DNS Server settings.

#### IPv6 Settings

(Optional): Your camera supports IPv6 configurations in conjunction with IPv4; the device does not support IPv6-only network deployments. The camera will accept up to sixteen IPv6 addresses, three IPv6 DNS servers, and three IPv6 gateways.

There are two configuration modes for IPv6 address assignment:

- **Auto:** Enables automatic configuration using router advertisement. Additional configuration can be provided over DHCPv6 (if available on your network). Selecting **Auto** still allows you to manually configure additional address, DNS servers, and gateways.



- **Manual Only:** Provides a link-local address for the device, and it requires you to manually configure all other IPv6 address settings for the camera. Manually specified addresses require a prefix and must be input in the format *prefix/IPv6Address*. The camera will reject addresses that do not contain prefix information.



### Notes:

- Cameras do not accept multicast, localhost, or undefined IPv6 addresses.
- Manually specified DNS servers are not validated by the camera and supersede automatically discovered DNS servers; verify your DNS addresses before saving IPv6 settings.
- Manually specified gateways must be on the same network as the camera's IPv6 addresses. Behavior for a gateway that is not on the same network as the camera's IPv6 addresses is undefined.
- Some video management systems (VMS), including some Pelco systems, do not support connections to cameras and encoders over IPv6.

## Accessing Users and Security

To manage user accounts and establish how your camera authenticates users (locally or remotely) click **Network & Security**, and then click **Users & Security**. This gives you the options for User Management and Security authentication.

### Managing Users and Security

Initially, the camera authentication is closed for viewing and configuring without a user name and password. No user accounts exist in the default factory state. Once the Admin role is created and Local Mode User Management is enabled, your camera will authenticate local user accounts.

If you are a user with Admin permissions, you can configure, edit, and delete local user accounts at any time. When authenticating users locally, you will assign a role to each individual user. User permissions are governed by the role assigned to them. When authenticating users remotely, users will be assigned roles based on their CN and DN assignments.

Your camera supports the following four roles:

- **Admins:** Can access and change all camera settings. They can use all functionality of the camera. They can configure, edit, and delete local user accounts at any time.
- **Managers:** Can access and change all settings, except user permissions. Managers are also unable to restore factory default settings.
- **Operators:** Can view video, use PTZ functions (where available), and use the API. Can view video and have access to the Live View page controls.
- **Viewers:** Can view video and use the API.

### Configuring Local Users

1. Click **Network & Security**, and then click **Users & Security**.
2. Click **New User** or select the user whose permissions and settings you want to edit.
3. Click to select an **Access Level** for the user.
4. Provide a user name between 2 and 32 alphanumeric characters for the user. User names are not case-sensitive and are saved in lowercase characters.
5. Provide a password between 4 and 64 alphanumeric characters for the user. Passwords are case-sensitive.
6. Re-type your password in the appropriate box to confirm your password.
7. Click **Save**.

### Setting Security/Authentication

Security settings for the Pelco API and RTSP/JPEG include a choice of Open Authentication or Closed/Require Authentication:

- **Pelco API:** Changes whether credentials are required when accessing the device via the Pelco API. The *Open Authentication* setting leaves your camera open to various intrusions and is not recommended.
- **RTSP/JPEG:** Changes whether credentials are required when streaming video via RTSP or JPEG pull. The *Open Authentication* setting leaves your camera open to various intrusions and is not recommended.

A user must be created before the security settings can be changed.

## Configuring TLS

TLS Configuration lets you set the TLS mode to either disabled, optional, or required. You must install or generate a certificate before enabling HTTPS.

The TLS settings page includes TLS configuration modes and certificate generation. The camera can generate a certificate signing request (CSR) that can be sent to a certificate authority for a signature (for example, VeriSign®), or it can generate a self-signed certificate using the Generate Self-Signed Certificate option.

1. Select **TLS** from the **Network** menu.
2. If no certificate has been installed, install or generate one now:
  - a. Select the appropriate certificate installation method: Generate Self-signed Certificate, Generate Certificate Request, or Upload Certificate.  
 Upload Certificate should only be used if you have already generated a certificate using Generate Certificate Request.
  - b. Enter information requested in the Certificate area.
  - c. Click **Generate Certificate** or **Upload** or **Cancel**.
3. Select your TLS mode:
  - **Disabled:** Disables HTTPS communications with the device.
  - **Optional:** Requires that you install a signed TLS certificate and enables HTTPS access to the camera; however, the camera will still be available over HTTP.
  - **Required:** Requires that you install a signed TLS certificate and enables HTTPS access to the device only. There will be no availability to the camera over HTTP.
4. Click **Save**.

## Configuring Traffic Shaping

You can use the traffic shaping function if the frame rate at your client is significantly lower than you would expect from the camera.

Your camera can produce large I-frames, resulting in a traffic burst within each group of pictures as the camera transmits the frame; if your network infrastructure does not have the speed or buffering capacity to smooth out the traffic, you might experience slow or jittery video. From the Traffic Shaping page, you can control the average transmission rate over a 2 ms period and limit traffic bursts coming from the camera to help you prevent frame losses at your client resulting from traffic bursts produced by the camera. Use this function if the frame rate at your client is significantly lower than you would expect from the camera.



**Note:** Limiting the transmission rate might increase video latency. The setting also limits all of the video data coming from the camera. For this reason, set the limit to more than the video bit rate times the number of connections to the camera that are receiving the data.

1. Click **Network & Security**, and then click **Traffic Shaping**.
2. Enable **Traffic Shaping** with or without bursts, depending on your need.
  - **Disabled:** Camera will send data at full network hardware link speed (for example: 100 Mbps or 1 Gbps).

- **Enabled:** Camera will limit the rate at which it sends data. In this setting, the “averaging period” (the period over which the rate limit is valid) is 1 ms. The rate limit for this setting is 12.5 Mbps < R < 100 Mbps.
  - **Enabled with Bursts:** This advanced setting allows you to specify the maximum burst size that the camera can send at the hardware link speed. This balances video latency with the transmission rate.
3. Set the average transmission rate period in Mbps.
  4. If you enabled traffic shaping with bursts, set the maximum size of bursts coming from the camera in kilobytes.
  5. Click **Save**.

### Configuring 802.1x Security

By default, 802.1x security is off. Cameras support EAP-MD5, EAP-TLS, EAP-TTLS, and EAP-PEAP protocols.

1. Click to select **On** for 802.1x port security.
2. Click to select the (EAP) method from the *Protocol* drop-down menu.
3. Provide the authentication information for the EAP method you selected.
4. Click **Save**.

### Configuring SNMP

Your camera supports No SNMP Server, SNMP V2c, and SNMP V3. The MIB file for your camera is available at [www.pelco.com](http://www.pelco.com).

#### Configuring SNMP V2c

1. Go to **Network & Security**, and then click **SNMP**.
2. Click **SNMP V2c**.
3. Provide the community string for your SNMP manager. The default community string is “public.”
4. Provide the *Read/Write Community String*.
5. Fill in the IP address of the host server.
6. Fill in the *Community String*.
7. Click to select the network protocol (NTCIP, Kapsch)
8. Click **Save**.

#### Configuring SNMP V3

1. Click **Network & Security**, and then click **SNMP**.
2. Click **SNMP V3**.
3. Enter the SNMP user name the camera will use to authenticate with the SNMP server.
4. Click to select the encryption algorithm for authentication from the *Authentication* drop-down menu. If using MD5 or SHA authentication methods, enter your authentication code in the box provided.
5. Click to select the privacy protocol setting from the *Privacy* drop-down menu. If using DES or AES protocols, enter your privacy key in the box provided.
6. Enter the host name or IP address of your trap server in the *Address* box under *Trap Configuration*.

7. Click to select the network protocol (NTCIP, Kapsch).
8. Click **Save**.

## Configuring Firewall Settings

1. Click **Network & Security**, and then click **Firewall**.
2. Click *Off*, *Allow*, or *Deny* from the *Mode* drop-down menu.
  - **Off**: The default setting is Off. Disables Firewall Configuration.
  - **Allow**: Allows all IP addresses entered to view the camera.
  - **Deny**: Denies all IP address entered to view the camera.
3. Type up to 10 IP addresses in CIDR format in the boxes provided.



**Note:** Incorrect configuration of these IP addresses can result in being locked out of the camera. All IP addresses entered will either be allowed or denied. You cannot allow some IP addresses and deny others.

4. Click **Save**.

## Using the Imaging Menu

The Imaging menu provides **Image Enhancement**, **Digital Processing**, **Exposure**, **WDR**, **Day/Night transition**, **Focus**, **White Balance**, and **Window Blanking** capabilities.

## Restoring Imaging Settings

The *Imaging* menu contains buttons that allow you to restore your camera's imaging settings.

- Use *Restore Settings to Defaults* to reset your camera's settings to their factory defaults on the current webpage.
- Use *Restore All Imaging Settings* to reset all of your camera's imaging settings to their factory defaults.

## Configuring General Settings

General Settings control Image Enhancement and Digital Processing features.

### Image Enhancement

#### Noise Reduction

Noise Reduction adjusts for video noise in the scene.

- **Off**: The camera does not compensate for video noise.
- **Normal**: Adjusts for noise in low-light scenes.
- **High**: Adjusts for a greater amount of noise in low-light scenes.

#### Defog Mode

The Defog Mode feature allows you to make the subject appear clearer when the surrounding area of the subject is foggy and low contrast. Choose **High**, **Medium**, **Low**, or **Off** for this mode. Low is used for slightly hazy conditions with a minimal amount of correction. High is used for foggier conditions and maximizes the amount of correction.

### Digital Processing

Digital Processing settings adjust the color and detail of captured video. The availability of settings might change based on your camera model.

- **Quick Setup:** Contains presets for digital processing settings. You can use any of the quick setup modes as a starting point for custom settings. Changing sharpness, saturation, contrast, or brightness settings automatically engages the Custom mode.
  - **Normal:** A baseline for sharpness, saturation, contrast, and brightness. All the settings are set to default.
  - **Vivid:** A setting that enhances color quality, lightens whites, and darkens blacks.
  - **Custom:** Allows you to set your own, unique image quality settings.
- **Sharpness:** Controls the clarity of detail in the scene. Increasing video sharpness increases video noise.
- **Saturation:** Controls the intensity of colors in the scene.
- **Contrast:** Controls the gradation between the darkest and lightest portions of the scene.
- **Brightness:** Controls the lighting detail of the scene.

### Configuring Exposure Settings

Exposure settings help ensure that video contains an adequate level of detail and contrast between light and dark values.

1. Select **Exposure** from the *Imaging* menu.
2. Select your camera's *Exposure Mode* to be used; Frame Rate, Low Noise, or Manual.
3. Set the Max Exposure Time (msec) that the imaging sensor is exposed to light. Decreasing the maximum exposure time reduces motion blurring; increasing the maximum exposure time could help capture more detailed still images in low light.
4. Set the Max Gain, depending on the exposure mode you selected. Increasing the gain allows for better sensitivity in low-light scenes, but also increases video noise.

### Configuring WDR Settings

Wide Dynamic Range attempts to compensate and even the brightness of a scene when a portion of your camera's picture is bright, and part is dark.

WDR can be turned **Off**, set to **Normal**, or set to **High**. Normal WDR or High WDR is enabled based upon the maximum framerate.

Optional: Click the **Change Settings** link to navigate to the *A/V Streams* page where *Maximum Frame Rate* and *Aspect Ratio* settings can be established.



**Note:** Enabling High WDR is only recommended for scenes needing greater than 120 dB dynamic range. You will see increased noise artifacts in the mid-tones at elevated temperatures.

### Enabling and Disabling Image Stabilization

Image Stabilization (Optical or Electronic depending on the model) attempts to compensate for vibrations that interfere with your camera and video output. Enable it by choosing **On** or disable it by choosing **Off**.



**Note:** High WDR and Image Stabilization cannot be used at the same time.



**Note:** Digital Zoom and Image Stabilization cannot be used at the same time.

### Configuring Day/Night Mode

**Day/Night Mode:** Controls the IR cut filter, determining whether or not your camera captures color (day) or black and white (night) video. You can set the *Day/Night* position manually, but it is recommended that you engage the auto mode if lighting around your camera is expected to change drastically at any time.

1. Set your *Day/Night Mode*.
  - **Auto:** Engages day or night mode based on the *Transition Level* setting; this allows you to capture color video (Day) when enough light is available, and automatically switch to black and white video (Night) when light is unavailable.
  - **Manual/Position:** Requires you to choose a **Day** or **Night** mode. Day captures color video; Night captures grayscale video.
2. (Optional) Set your camera's *Transition Level*, determining when the camera switches from **Day** to **Night** mode. Lighter settings cause the camera to change modes at higher lux values.
3. (Optional) Set the *Transition Detect Time*, determining the frequency at which the device checks for adequate light to transition to day mode or night mode.

### Configuring IR Illumination

1. Set the IR Illuminator mode to **Auto**, **Manual** (only available if you have selected *Day/Night Manual Mode*), or **Off**. If using manual mode, adjust the *IR Range (%)*.



**Note:** IR Range is a percentage of the distance to the target, so 100% IR Range is the full tele setting, 0% is full wide. For maximum power, use 100% IR Range.

### Configuring Focus/Zoom Settings

Focus Calibration takes about an hour, and you are encouraged to calibrate your camera when you first access the live video page.

- **Start Focus Calibration:** Starts the Focus Calibration Process. This process takes about an hour.
- **Stop Focus Calibration:** Stops the Focus Calibration Process. If you stop the calibration process, you can resume it where you left off (even if there was a reboot or "soft" restoring factory defaults in between).
- **Progress Bar:** Shows the percentage of progress made in the calibration process.
- **Clear Calibration Data:** Allows you to clear the current calibration data and start over if needed. This clears the focus database. The only other way to clear the database is a "hard" restore factory defaults.

Focus Settings affect your camera's focusing behaviors. If you set all focus behavior settings to Off, you must manually focus your camera.

- **Auto:** Automatically back-focuses the camera on the subject in the center of the scene.
- **Manual:** Locks the camera's focus at a specified position. Manual focus is recommended only for indoor applications with a single, unchanging light source or when using analytics.
- **Sure Focus:** When set to On, causes your camera to auto focus when pan, tilt, and zoom (PTZ) operations are complete or if the IR cut filter changes state. When your camera achieves an auto focus lock, auto focus is turned off and the focal position will remain until the next PTZ operation. If

30 seconds pass without an auto focus lock, your camera will retain its focal position until the next PTZ action.

- **Laser Focus (only on supported models):**
  - **Off:** Laser Focus is off and standard Autofocus is enabled.
  - **Auto:** Utilizes the built in laser to determine the object distance at the center of the image, and uses this as a reference point to start performing a quick Auto focus scan to find optimal focus.
  - **Priority:** Uses the built in laser to determine the object distance at the center of the image, and sets a typical or expected focus position relative to this distance.
- **Min Focus Distance (m):** Default setting of 10m (meters) improves low light auto focus. Change the Min Focus Distance (m) to an expected minimum distance that the camera will need to focus on.
- **Setting Zoom:** Use the slider bar to adjust the zoom magnification.

### Setting White Balance

Each Sensor has its own white balance settings. Auto mode is the default setting for each sensor. Selecting Manual mode allows you to adjust white balance settings for the sensor.

1. Click **Imaging**, and then click **White Balance**.
2. Select a white balance mode:
  - **Auto:** The recommended setting for most lighting conditions. It has a color temperature range from 7,500K to 2,500K. It can be used to properly white balance scenes illuminated by daylight to warm white sources.
  - **Auto Tracking White (ATW):** Has the largest color temperature range.
  - **Cool White:** A fixed white balance mode for cooler (more blue) sources such as true daylight, daylight fluorescent, white light LEDs, or metal halide sources.
  - **Warm White:** A fixed white balance mode for warmer (more yellow) sources such as incandescent, tungsten-halogen, warm white compact florescent, or LED lighting.
  - **Manual:** Allows manual adjustment of the red and blue range; this may be helpful in areas where lighting does not change, such as inside a casino or mall. Move the Red and Blue sliders to change color levels.

### Using Window Blanking

Window Blanking is used to conceal user-defined privacy areas. A blanked area appears on the screen as a solid gray window. The camera can handle up to eight blanked windows as long as the total blanked area does not exceed 50 percent of the field of view.



**Note:** Window-blanking regions will not scale proportionally with changes in zoom. Set the zoom level for the camera before defining window-blanking regions.

1. To enable Window Blanking, click **On**.
2. If you receive a *Calibration Incomplete* message, perform the following:
  - a. Click **Calibration**.
  - b. Click to center on an object to be covered, and then click **OK**.
  - c. Use your cursor to draw the region to be blanked, and then click **OK**.
  - d. Redraw the same region to be blanked, and then click **OK**.  
You should now see the *Calibration Completed* message.



- e. Click **Done**.
3. If necessary, maneuver the video preview to find the region you want to blank.
4. Drag the mouse across the video area that you want to blank. Select an existing blanking region to delete or edit its size and position. You have the option of drawing up to eight window blanking levels. Each window will be designated with a unique color.
5. **Secure Blanking** ensures maximum privacy by blanking the entire screen during positional moves. It is On by default.
6. Display the *Edit Window* to display each blanking window you have set. Select a window in the *Edit Window* or in the *Preview Display* to move or resize the blanking window.

## Configuring Options in the PTZ Menu

The PTZ Menu provides configuration options for *Positioning*, *Presets*, *Preset Tours*, *Patterns*, *Scans*, *PTZ Zones*, and *Pelco Camera Link*.


### Configuring Positioning

1. From the *PTZ* menu, click **Positioning**.
2. Enable *Digital Zoom* by clicking **On**. Click to select **Off** to enable optical zoom.



**Note:** Digital Zoom and Image Stabilization cannot be used at the same time.

3. Click to select **On** to enable the *Freeze Frame* control. Freeze Frame is a technique that stops the moving image of the film and holds it motionless on screen.
4. Select the *Pan/Tilt Speed Control* type:
  - **A: Linear:** Pan and tilt speeds accelerate at a fixed rate.
  - **B: Exponential:** Pan and tilt speeds accelerate at a rate corresponding to the length of time for which a user engages pan and tilt controls; the longer a user engages pan and tilt controls, the faster the camera will pan and tilt.
  - **Proportional Velocity:** Automatically reduces pan and tilt speeds proportional to the camera's zoom level.
  - **Auto Flip:** Allows the camera to rotate 180 degrees when the tilt is pointing straight down (e.g. -90 degrees tilt angle).
  - **PTZ Resume:** Allows the dome to recover the last PTZ action requested before the camera loses power. The camera will resume the previous action upon start-up.
  - **Max Pan/Tilt Speed:** The numeric values that can be selected using the slider bar represents a percentage of the maximum pan and tilt speed. Values range from 10 to 100. For example, setting the slider to 50 for 50% tells the camera to pan and tilt at half the speed.
  - **Max Zoom Speed:** The numeric values that can be selected using the slider bar represents a percentage of the maximum zoom speed. Values range from 10 to 100. For example, setting the slider to 50 for 50% tells the camera to zoom at half the speed.
5. Use the *Pan Center Point* to determine the zero point for pan operations. Setting a new center point automatically adjusts Pan Limit Stop settings to account for the new center point.

- To determine the current center point, click **Go To Pan Center Point**.
  - To establish a new pattern center point, use the cursor or joystick to pan to the new center point location, and then click **Set New Pattern Center Point**.
  - Click **Restore Default Center Point** to restore the camera's default center position.
6. Set *Limit Stops* to limit the range of motion for your camera. Pan and tilt limit values are provided in degrees.
- a. Click **Start Configuring Limits**.
-  **Note:** During configuration, limits are disabled on the camera. You must complete the configuration process before limits will be enabled.
- b. Configure the left and right pan limits and the top and bottom tilt limits. You can type a value, in degrees, for each limit, or click **Get Current Pan/Tilt** to retrieve the current value from the video preview window.
  - c. Click **Save Limits**.
  - d. To remove all limits on the camera and restore default values, click **Remove Limits**.
7. Click **Save**.

### Configuring a Preset

A preset is a camera position that you can configure and call as a single command, allowing users to quickly move the camera to common positions.

To establish a new preset:

1. Click **PTZ**, and then click **Presets**.
2. In the *Presets* window, click **New**, or click to select the preset to edit.
3. Type a name for the preset.
4. Click to select the *Focus Lock* mode:
  - **On:** The camera's focus settings are saved with the preset, and are called with the preset. This ensures that the camera uses the expected focal point any time the preset is selected.
  - **Off:** The preset does not retain focus settings. This mode requires the camera to use current focus setting when the preset is selected.

If an operator has changed the focus of the camera before the preset is selected, it is possible that the camera will be out of focus when the camera displays the preset position later. Turn on Focus Lock to avoid this problem.

5. Position the camera using the pan and tilt controls.
6. Adjust the zoom and focus controls as necessary.
7. Click **Save**.
8. To delete a preset, click to select the preset in the *Presets* area, and then click **Delete Preset**.

### Configuring a Preset Tour

You must configure presets before adding them to a preset tour. A preset tour is a series of presets through which your camera will cycle. You can configure the length of time for which the camera will remain at each preset position in the tour.

1. Click **New** or click to select the preset tour you want to edit.
2. Provide a name for the tour.
3. For each preset to add to the tour:
  - a. Click and drag the preset to the *Smart Tour Setup* section of the page.
  - b. Set the dwell time for the preset. Dwell time is the length of time (in minutes or seconds) the camera will remain at a preset position before engaging the next preset in the tour.
  - c. Set the transition speed for the preset.
4. Click **>>** in the *Transition preview* area to review the tour.
5. Click **Save**.
6. To delete a tour, click to highlight the tour in the *Tours* area, and then click **Delete Tour**.

### Configuring Pan/Tilt/Zoom Patterns

A pattern uses the path of motion recorded by the operator during configuration of the pattern.


This is different from a *Preset Tour* in that a preset tour begins at one spot and ends at another, using the most direct path between them.

1. To create a new PTZ pattern:
  - a. Click **New**.
  - b. In the *Create New Pattern* dialog box, type in a name for the pattern.
  - c. Click **Create Pattern**, and then click **Start Recording**.
  - d. If appropriate, add a *Scan*, a *Preset*, or a *Preset Tour* as part of the pattern.
  - e. When appropriate, in the *PTZ Patterns* task bar, click **Stop**.
2. To run an existing PTZ pattern:
  - a. Click to select the name of the existing pattern from the list in the *PTZ Patterns* area.
  - b. Click **Run** to start the pattern.
  - c. Click **Stop** to stop the pattern.
  - d. If necessary, click **Re-record** to record over the current configuration, and then click **OK** in the confirmation dialog box.
3. If appropriate, rename an existing pattern:
  - a. Click to select the name of the existing pattern from the list in the *PTZ Patterns* area.
  - b. Type the new name into the *Name* field in the *Rename Pattern* dialog box.
  - c. Click **Save**.
4. If appropriate, delete an existing pattern:
  - a. Click to select the name of the existing pattern from the list in the *PTZ Patterns* area.
  - b. Click **Delete**.
  - c. Click **OK** in the confirmation dialog box.

## Configuring Pan/Tilt/Zoom Scans

A Scan is a pan movement between two limits at a defined speed and a defined dwell time (pause) at each frame.

- When configured with limits, when a limit is reached the Scan will bounce back in the other direction, to the other limit, to start the pan movement again. It will continue until interrupted by a manual movement or a stop.
  - A Scan can be started at any tilt angle, and will maintain that tilt angle throughout the pan Scan.
1. To create a new PTZ Scan:
    - a. Click **New**.
    - b. In the **New Scan** area of the window, type in a name for the scan.
    - c. (Optional) Type in a value for the **Left Pan Limit**, and then click **Save as Left Pan Limit**.
    - d. (Optional) Type in a value for the **Right Pan Limit**, and then click **Save as Right Pan Limit**.
    - e. Type in a **Speed** in Degrees/Seconds.
    - f. Type in a **Dwell Time** in Seconds.
    - g. You can include a pattern, preset, or preset tour in the Scan. At the lower left corner of the page, click to select a pattern, preset, or preset tour from the drop-down menu. Click **Start** to start the scan. Click the adjacent **Stop** button to end the scan.
  2. To edit an existing scan:
    - a. Click to select the scan from the **PTZ Scans** area.
    - b. In the **Scan Name** field, type in the name for the scan to edit.
    - c. (Optional) Type in a value for the Left Pan Limit, and then click **Save as Left Pan Limit**.
    - d. (Optional) Type in a value for the Right Pan Limit, and then click **Save as Right Pan Limit**.
 



**Note:** Scan limits are optional. Scan limits will be disabled if the Left and Right Pan limits are set to the same value.
    - e. Type in a **Speed** in Degrees/Seconds.
    - f. Type in a **Dwell Time** in Seconds.
    - g. You can include a pattern, preset, or preset tour in the Scan. At the lower left corner of the page, click to select a pattern, preset, or preset tour from the drop-down menu. Click **Start** to start the scan. Click the adjacent **Stop** button to end the scan.
  3. To run an existing scan:
    - a. Click to select the scan from the **PTZ Scans** area.
    - b. Click **Run**.
    - c. When appropriate, click **Stop**.
  4. If appropriate, delete an existing scan:
    - a. Click to select the scan from the **PTZ Scans** area.
    - b. Click **Delete**.

## Configuring Pan/Tilt/Zoom Zones

From the PTZ Zones page, you can create zones. When the camera is in view of a zone, the zone name will appear as an Intelligent On Screen Display (OSD). Click **Manage OSDi Settings** to configure the

*Current Zone Label* on the *OSDi* page and enable this feature.

1. To create a new PTZ Zone:
  - a. Click **New Zone**.
  - b. In the *New Zone* area of the window, type in a *Zone Name*.
  - c. Use the pan, tilt, and zoom controls to select the *Zone Position*.
  - d. Click **Save**.
2. To edit an existing zone:
  - a. Click to select the zone from the *PTZ Zones* area.
  - b. Make the changes in the *Edit Zone* area.
  - c. Click **Save**.
3. If appropriate, delete an existing zone:
  - a. Click to select the zone from the *PTZ Zones* area.
  - b. Click **Delete Zone**.

### Configuring Pelco Camera Link

The Pelco Camera Link automatically tracks objects of interest. You can link Pelco's Optera™ and a nearby, mounted Spectra Enhanced camera. Optera provides seamless panoramic coverage for total situational awareness while the Spectra Enhanced with 30x optical zoom provides detail and automatic object tracking.

When Auto tracking is enabled, Pelco Camera Link acts as an automatic PTZ operator. Pelco Camera Link uses the analytic information from Optera™ to enable point and zoom so the camera will follow moving objects in the scene.

To setup Pelco Camera Link:

1. Establish a connection with Optera by specifying the address and credentials of the Optera system. Enter the IP Address, Username, and Password.
2. Alternatively, you can click the **Advanced** button to specify the IP Address, Username, Password, SSL/TLS, and HTTP Port parameters.
3. Click **Connect** to link the camera with the Optera system.
4. Click **Disconnect** to disconnect the link between the camera and the Optera system.
5. Configure the Optera Analytics by clicking **Go to Optera Analytics™ Page**. Once you are at the *Pelco Camera Link* configuration page, you can establish a connection by activating and enabling '2-Camera Tracking' as an Optera Analytic profile, and then return to this page and refresh.
6. Calibrate the connected cameras by clicking the **Calibrate** button. Doing so will calibrate the connected cameras so that they know where they are relative to one another.

### Using the A/V Streams Menu

The A/V Streams menu provides access to *Video Preset Configurations*, *Video Configurations*, *Audio Configurations*, *RTP Settings*, and *Smart Compression* settings for your device's video and audio streams.

### Selecting Preset Video Configurations

The Video Presets page contains fully-configured video configurations, offering a balance between video performance and bandwidth. These presets can also be used as a starting point for a custom video

configuration. Video preset configurations can vary depending on the camera model.

### Configuring Presets

**Current Configuration (custom):** This box displays user specified (custom settings) for primary, secondary, and tertiary streams. Click **Video Configuration**, and then click **Custom** to establish custom video stream configurations.

Alternatively, click to select your desired *Preset Configurations* of **High**, **Medium**, or **Low**, and then click **Save**.



**Note:** *Preset Configuration* details are displayed in the user interface next to the desired profile.

Preset Configurations include:

- **High:** Primary Stream H264, 30 IPS, 1920x1080, 6000 kbps | Secondary Stream H264, 30 IPS, 1920x1080, 6000 kbps | Tertiary Stream H264, 30 IPS, 640x360, 1250 kbps
- **Medium:** Primary Stream H264, 15 IPS, 1920x1080, 3850 kbps | Secondary Stream H264, 15 IPS, 1920x1080, 3850 kbps | Tertiary Stream H264, 15 IPS, 640x360, 900 kbps
- **Low:** Primary Stream H264, 15 IPS, 1280x720, 2400 kbps | Secondary Stream H264, 10 IPS, 1280x720, 2050 kbps | Tertiary Stream H264, 10 IPS, 640x360, 600 kbps

### Configuring Custom Video Streams

Custom Video Stream Configuration contains settings for customizing your camera's primary, secondary, and tertiary video streams. Each stream can be configured independently, although the Aspect Ratio and Maximum Frame Rate settings will limit the options available for the remaining setting and depending on the processing demands of your stream settings.

By default, all fields under Video Configuration are populated with settings from your Video Presets. You can clear all fields or use the default settings as a starting point for your custom stream.

1. Set the Maximum Frame Rate and Aspect Ratio settings.
  - **Maximum Frame Rate:** The maximum number of video frames contained per second. Higher values result in higher quality video with less flicker but consume more bandwidth.
  - **Aspect Ratio:** The ratio of height to width of the video frame.
2. Configure the following video stream settings:
  - **Stream Name:** This setting is typically Primary, Secondary, or Tertiary, however you can enter any stream name of your choosing.
  - **Enable:** This setting provides the ability to turn any stream ON or OFF. Select Enable from the drop down menu to turn the stream on or Disable to turn it off.
  - **Compression Standards:** Available compression standards include MJPEG, H.264, and H.265.
    - **H264:** Compression standard used in high-definition video players such as Blu-ray™ and HD-DVD. H.264 is the most processor-intensive compression.
    - **H.265:** An improvement of H.264 that provides better compression efficiency while improving image quality and lowering processor workload.
    - **MJPEG:** Provides the least impact on the camera's processor, but it requires the most bandwidth.
  - **Resolution:** The quality of the video stream, rendered in pixels for both width and height. Higher values result in greater video quality but consume more bandwidth.

- **Image Rate:** The number of frames per second (fps) available for the video stream configuration. Available image rates depend upon the model of the device that you are using.
- **Bit Rate:** The quality of the video stream, rendered in kilobits per second. Higher values result in greater video quality but consume more bandwidth.
- **I-Frame Interval:** Determines the number of partial frames that occur between intra-coded frames (I-frames) in your video stream. I-frames are complete images, used as a reference for change. Following an I-frame, the camera will capture and encode only video data in the scene differing from the I-frame until the next I-frame.



**Note:** The I-Frame Interval setting is only available for H.264 and H.265 video streams. Increasing the I-frame interval can improve video compression rates and reduce the size of video data; however, higher values are recommended only for highly-reliable networks.

- **Profile:** Defines the subset of bit stream features in an H.264 or H.265 stream, which includes color reproduction and additional video compression. It is important to select a profile that is compatible with your recording device(s) in order to ensure that your camera's video stream can be decoded and viewed.
- **Main:** An intermediate profile with a moderate compression ratio. This profile is compatible with most recorders and uses fewer bits to compress video than the baseline profile. The main profile supports I-frames, P-frames, and B-frames.
- **High:** A complex profile with a high compression ratio. This is the primary profile for high-definition television applications. The high profile supports I-frames, P-frames, and B-frames.
- **QoS (DSCP) Codepoint:** A mechanism for prioritizing network traffic. This setting is available with H.264 and H.265 compression standards. Your network must be QoS-aware to take advantage of this setting.
- **Endura Signing:** Endura signing is a technology designed to prevent the tampering of video and ensure video authenticity for use in legal proceedings. Only exported video is validated in the Pelco export player when the user clicks on the "Authenticate" button. Live View is not validated. This setting is available only with H.264 and MJPEG compression standards.
- **Rate Control:** Determines the bit rate and quality of each frame in the H.264 or H.265 video stream. Rate control settings are a compromise between image quality and the resources required for video storage. The availability of rate control settings depends upon the model of the camera that you are using.
- **CBR:** The constant bit rate (CBR) streams video at a fixed number of bits per second. CBR uses the full capacity of the bit rate setting for scenes with or without motion. Video is always streamed at the user bit rate setting.
- **CVBR:** The constrained variable bit rate (CVBR) provides high-quality video and long recording time of variable bit rate while limiting variations in recording capacity consumption.



**Note:** When you change video stream configuration settings, the camera automatically adjusts the bit rate. Choosing a bit rate below the camera's automatic setting might reduce video quality and limit stream configuration options.

## Configuring Audio

You can only enable audio through the primary video stream.

Audio is disabled by default, but you can enable and configure audio streams from the Audio Configuration page.

Audio and video might not be synchronized when viewing the primary stream through a Web browser. You might experience up to a 3-second delay in video when viewing the primary stream with audio enabled.



**Note:** Improper use of audio/visual recording equipment may subject you to civil and criminal penalties. Applicable laws regarding the use of such capabilities vary between jurisdictions and may require, among other things, express written consent from the recorded subjects. You are solely responsible for ensuring strict compliance with such laws and for strict adherence to any/all rights of privacy and personality.

1. Click **A/V Streams**, and then click **Audio Configuration**.
2. Enable Audio.
3. Click to select your sample rate. The sample rate is the quality of the audio stream (measured in hertz per second).
4. Click to select the encoding method (PCMU, PCMA, or PCM16 Encoding).
5. Set the Input Level. Input sensitivity is measured on a scale from 0 to 100 (low to high).



**Note:** If the camera is installed in a noisy environment or the connected microphone has a built-in line amplifier, you should lower audio sensitivity.

6. Click **Save**.

### Enabling Echo Mitigation

Echo mitigation is used to prevent echo sounds when using Audio In and Audio Out at the same time when the input and output are in close proximity to one another.

1. Adjust the delay time between the audio input and output as necessary.
2. Adjust the Detect Volume Level slider to reduce or increase the sound level that is picked up from the line input (e.g. microphone).

### Managing RTP Settings

The RTP Settings page provides access to advanced multicast and MTU (TCP/IP) settings.

#### Setting Static Multicast Addresses

A multicast stream sends video data to multiple users from the same transmission. Each multicast user connecting to the camera consumes no additional processing power.

You can set static multicast addresses and ports for all of your camera's multicast streams (primary, secondary, tertiary, audio).

Default, automatically-assigned multicast addresses are confined to the 239.x.x.x block in a scheme matching your IP address and network settings; you can determine the automatically-assigned multicast address(es) for your camera from the RTP page.

1. Click **A/V Streams**, and then click **RTP Settings**.
2. Enter static multicast addresses and ports for your streams as necessary.
3. Set the *Time to Live (TTL)* for each stream; this is the number of routers the stream can pass through before it expires.
4. Determine whether or not to *Always Multicast* this stream. This setting eliminates the need for a client to connect to the camera to initiate a stream; when enabled, the camera begins sending the multicast stream when it starts up, without requiring initiation from a client.
5. Click **Save**.



### Setting the Maximum Transfer Unit Size (TCP/IP)

You can adjust the maximum transfer unit size to adjust to your network's constraints. Changing the MTU setting will require your camera to restart. This could take several minutes.

1. Set the *Max Transfer Unit* size.
2. Click **Save** or **Save and Reboot Camera**, depending on your camera.

### Configuring Smart Compression

Pelco Smart Compression Technology lowers bandwidth and storage requirements while retaining image quality and critical information for forensic purposes. Benefits include reduced storage capacity requirements and high resolution.

To work correctly, gathering bitrate statistics requires the date and time to be set correctly. If you have not set your time zone, you will receive an "Inaccurate Date and Time" message. Date and time can be set in General Settings.

Prior to establishing settings for Pelco Smart Compression, use A/V Streams to configure the video and audio streams for the camera.

1. Click **Settings**, and then click **Short-Term Graph**.
2. Click to select the *Smart Compression Level*.

The Smart Compression level allows you additional control to balance video quality versus bit rate. The smart compression settings determine how aggressively the camera will drop the bit rate on easily compressed scenes and how aggressively it will adjust image processing settings to make the scene more compressible. If the scene is difficult to compress (high motion, high noise), the camera will use the full bit rate allowed by the stream bit rate settings. The "off" and "low" settings will have a similar, minor effect on the image; the "medium" and "high" settings will have correspondingly more effect on the image and greater savings on storage.

- Off—no bitrate reduction
  - Low—no visible effect on video quality in most scenes
  - Medium—visible effect on video quality in some scenes
  - High—video degraded in many scenes
3. (Optional) Enable Dynamic GoP Length. If you want to place an upper limit on the Dynamic GoP length, set the Optimal Maximum GoP Length for each stream.



**Note:** The option to establish the Dynamic GoP Length is enabled when compression levels are set to Low, Medium, or High.

4. (Optional) Set the maximum GoP length for your streams if you want to impose an upper limit on the dynamic GoP setting.

By enabling a dynamic Group of Pictures (GoP), the number of I-frames are automatically reduced in scenes with minimal motion. Based on the complexity of scenes and the amount of motion occurring, such as in a storage room that has limited activity, up to 70% bandwidth savings can be achieved.

Dynamic GOP allows the camera to update picture groups depending on scene composition and motion. A dynamic GoP can further reduce bit rates produced by the camera by allowing the camera to increase the GOP length when there is little action in the scene.

For each video stream, you can enable Dynamic GoP Length as well as establish an Optional Maximum GoP Length. GoP length will change dynamically based on variable conditions that your camera might be monitoring.



**Note:** Dynamic or long GoP lengths may cause compatibility issues with some video management systems (VMS). Ensure your VMS supports dynamic GoP settings before enabling this setting.

### Configuring Long-Term Rate Control

Set Long-Term Rate Control if you must ensure storage does not exceed a specific size.

1. After ensuring the date and time have been set on the camera, run the camera for multiple days which should represent multiple times the length of the observation period you will be using.
2. On the Pelco *Smart Compression* page, click **Long-Term Rate Control**.
3. Click to select the **Video Stream** to which you will apply the settings.
4. Click to select the *Bitrate Units*: either **total kbps** or **Gbytes/day**.
5. In the *Long-Term Rate Controls* area:
  - a. Enable the Controls.



**Note:** You can disable the Controls at any time.

- b. Use the slider bar to select the **Average Bitrate Limit**, type in a value, or click **Copy to Slider**.
  - c. Use the slider bar to select the *Observation Period in Days*, or type in a value.
6. Click **Save**.
  7. To view the *Long-Term Graph* for either stream:
    - a. Click **Primary Video Stream** or **Secondary Video Stream** at the top of the page.
    - b. Click to select the *Bitrate Units*: either **total kbps** or **Gbytes/day**.
    - c. To the right of the *Long-Term Graph* title, click **Update**.

The graph helps you understand how much storage the camera will use.
    - d. If appropriate, click **Delete Long-Term Data** for [Secondary or Primary, whichever is selected].

## Using the Events Menu

The **Events** menu contains settings for camera events and analytics, and includes **Source**, **Handlers**, **Analytic Configuration**, and **Event Stream** pages.

An event is a user-defined occurrence, consisting of a source and a handler. A source defines the trigger for an event; a handler defines the action your camera will take when the event source occurs. When configuring a source, you can link the source to multiple handlers, providing multiple outcomes for the event. When configuring a Handler, you can link the handler to multiple sources, providing a single outcome for multiple events.

Analytics are specialized event sources that are triggered by the user-defined behaviors or scenarios occurring within your camera's field of view. Analytics are compatible with VideoXpert™ or third-party systems that support events using ONVIF or Pelco's API. The analytic behaviors available for your camera are dependent on your model and firmware version.

There is also an analytic you can configure called 2 Camera Tracking. This analytic is tied to Pelco Camera Link, a technology feature that requires two different types of Pelco Cameras (e.g. Optera and a Pelco Enhanced Series PTZ camera) to set up.

## Configuring Sources

An event source defines the trigger for an event, something that must occur before your camera takes action (defined by a handler). Event Sources that can be configured include Alarm, Analytics, Timer, System, and Network Loss events.

### Configuring an Alarm Event Source

An alarm source triggers an event upon a signal from external signaling devices, such as a door contact or a motion detector.

1. Click **Events**, and then click **Sources**.
2. Click **New Source**, or click to select the existing source to edit.
3. Type a name, between 2 and 23 alphanumeric characters, for the event source in the **Name** field.
4. Click to select **Alarm** from the source **Type**. This alarm will be triggered when an event occurs.
5. Set the dwell time for the alarm between 1 and 25 seconds. Dwell time is the amount of time that the source will remain active during an alarm event.
6. Click to select the polarity of your alarm input (normally open or normally closed).
7. Click either **True** or **False** from the **Supervised** drop-down menu.
8. (Optional) If available, click to select the handler(s) that you want to associate with this source. Handlers are configured from the **Events** menu *Handlers* page.
9. Click **Save**.

### Configuring an Analytic Event Source

An analytic event source triggers an event when a behavior defined by a video analytic occurs.

1. Click **Events**, and then click **Sources**.
2. Click **New Source**, or click to select the existing source to edit.
3. Type a name, between 2 and 23 alphanumeric characters, for the event source in the **Name** field.
4. Click to select **Analytics** from the source **Type**.

5. (Optional) If available, click to select the handler(s) that you want to associate with this source. Handlers are configured from the **Events** tab *Handlers* page.
6. Click **Save**.

### Configuring a Timer Event Source

A timer event source triggers an event at specified intervals of time.

1. Click **Events**, and then click **Sources**.
2. Click **New Source**, or click to select the existing source to edit.
3. Type a name, between 2 and 23 alphanumeric characters, for the event source in the *Name* field.
4. Click to select **Timer** from the source *Type*.
5. Configure the frequency of the event, including the units of time available, in the pull-down menu.
6. (Optional) If available, select the handler(s) that you want to associate with this source. Handlers are configured from the **Events** tab *Handler* page.
7. Click **Save**.

### Configuring a System Event Source

A system source triggers an event when your camera boots.

1. Click **Events**, and then click **Sources**.
2. Click **New Source**, or click to select the existing source to edit.
3. Type a name, between 2 and 23 alphanumeric characters, for the event source in the *Name* field.
4. Select **System** from the source *Type*.
5. (Optional) If available, select the handler(s) that you want to associate with this source. Handlers are configured from the **Events** tab *Handler* page.
6. Click **Save**.

### Configuring a Park Action Event Source

A park action event source triggers an event if the camera is inactive for a specified period of time.

1. Click **New Source**, or select the source you want to edit.
2. Type a name, between 2 and 23 alphanumeric characters, for the event source in the *Name* field.
3. Click **Park Action** from the *Type* menu.
4. Configure the dwell time (the amount of inactivity before the event handler starts). Dwell time must be greater than 30 seconds.
5. (Optional) If available, select the handler(s) that you want to associate with this source. Handlers are configured from the **Events** tab *Handler* page.
6. Click **Save**.

### Configuring a Network Loss Event Source

Network Loss Event Source triggers an event if the connection to a network is lost.

1. Click **New Source**, or select the source you want to edit.
2. Type a name, between 2 and 23 alphanumeric characters, for the event source in the *Name* field.
3. Click **Network Loss** from the *Type* menu.
4. Enter the IPv4 IP address that will be monitored for ping requests.

5. Establish the frequency, in minutes, which the network device is contacted.
6. Click **Save**.

### Deleting an Event Source

1. Click **Events**, and then click **Sources**.
2. Click to select the source that you want to delete.
3. Click **Delete** to remove the event source.

### Configuring Handlers

Event handlers are the actions that your camera takes when an event source occurs. Event **Handlers** that can be configured include *Send Email*, *Upload JPEG to FTP Server*, *Write JPEG to SD Card*, *Open/Close Relay*, *Display Overlay*, *Play Audio*, *Write Recording to SD Card*, and *Upload Recording to FTP Server* when an event occurs. The availability of handlers might change based on your camera model.

#### Configuring an Event Handler: Send Email

The Send Email event handler sends an email from your camera when a source event is triggered.



**Note:** You must have provided your camera with the address of an SMTP mail server on the **System, General Settings** page for your camera to send email notification for events.

1. Click **Events**, and then click **Handlers**.
2. Click **New Handler**, or click to select the handler to reconfigure.
3. Type a name, between 2 and 23 alphanumeric characters, for the event handler in the **Name** field.
4. Click to select the *Send Email* handler Type.
5. Provide the necessary information for your email in the **To**, **From**, **Subject**, and **Message** boxes.
6. (Optional) Click to select the *JPEG Snapshot* box to send a JPEG snapshot as an attachment to the email.
7. (Optional) Click to select the *Attach Raw Event Data* box to include in the email extra data about the event. For example, click to select this box if the event is triggered by an alarm and you want to receive data about the state, time, or type of alarm.
8. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
9. (Optional) Click to select one or more sources that will trigger this event handler.
10. Click **Save**.

#### Configuring an Event Handler: Upload JPEG to FTP Server

This event handler captures and uploads a JPEG to an FTP server when an event source is triggered. JPEG files are named according to the date and time at which they are recorded; although, you can determine the order of factors in the date-and-time file name.

1. Click **Events**, and then click **Handlers**.
2. Click **New Handler**, or click to select the handler to reconfigure.
3. Type a name, between 2 and 23 alphanumeric characters, for the event source in the **Name** field.
4. Click to select the **Upload JPEG to FTP Server** handler Type.
5. Type the address of your FTP server in the **Server** field.

6. Type the credentials the camera will use to authenticate with the FTP server; the *User Name* must be between 1 and 32 alphanumeric characters, and the *Password* must be between 4 and 16 alphanumeric characters.
7. Type the path in which to store JPEG files on your FTP server in the *Base Path* field.
8. Click to select the *File Name* for your JPEG snapshots. JPEG files are named according to the date and time at which they are recorded. The selection is simply the format of the date and time stamp.
9. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
10. (Optional) Click to select one or more sources that will trigger this event handler. Sources are configured from the **Events** tab, *Sources* page.
11. Click **Save**.

### Configuring an Event Handler: Write JPEG to SD Card

This event handler captures and uploads a JPEG to an SD Card when an event source is triggered. JPEG files are named according to the date and time at which they are recorded; although, you can determine the order of factors in the date-and-time file name.

1. Click **Events**, and then click **Handlers**.
2. Click **New**, or click to select the handler to reconfigure.
3. Type a name, between 2 and 23 alphanumeric characters, for the event source in the *Name* field.
4. Select the *Upload JPEG to SD Card* handler Type.
5. Select the *File Name* for your JPEG snapshots. JPEG files are named according to the date and time at which they are recorded. The selection is simply the format of the date and time stamp.
6. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
7. (Optional) Click to select one or more sources that will trigger this event handler. Sources are configured from the **Events** tab, *Sources* page.
8. Click **Save**.

### Configuring an Event Handler: Run Pattern

This event handler runs a selected pattern.

1. Click **New Handler**, or click to select the handler to reconfigure.
2. Type a name, between 2 and 23 alphanumeric characters, for the event handler in the *Name* field.
3. Click to select the *Run Pattern* handler type.
4. Click to select a pattern from the drop-down menu.
5. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
6. (Optional) Click to select one or more sources that you want to trigger this event handler. Sources are configured from the **Events** tab, *Sources* page.
7. Click **Save**.

### Configuring an Event Handler: Go to Preset

You must define a preset before you can create a Go to Preset event handler. Presets are configured from the **Imaging** tab *Preset* page.

The Go to Preset handler activates a camera preset when a source event occurs.

1. Click **New Handler**, or click to select the handler to reconfigure.
2. Type a name, between 2 and 23 alphanumeric characters, for the event handler in the *Name* field.
3. Click to select the *Go to Preset* handler type.
4. Click to select a preset from the *Preset* drop-down menu.
5. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
6. (Optional) If available, click to select the source(s) that you want to trigger this event handler. Sources are configured from the **Events** tab, *Sources* page.
7. Click **Save**.

### Configuring an Event Handler: Run Tour

You must define a Preset Tour before you can create a Run Tour event handler. Preset tours are configured from the **Imaging** tab *Preset Tours* page.

1. Click **New Handler**, or click to select the handler to reconfigure.
2. Type a name, between 2 and 23 alphanumeric characters, for the event handler in the *Name* field.
3. Select the *Run Tour* handler type.
4. Select a tour from the *Tour* drop-down menu.
5. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
6. (Optional) Click to select one or more sources that will trigger this event handler. Sources are configured from the **Events** tab, *Sources* page.
7. Click **Save**.

### Configuring an Event Handler: Run Scan

This event handler runs a preset scan when an event source is triggered. You must define a Scan before you can create a Run Scan event handler. Scans are configured from the **Imaging** tab *Scans* page.

1. Click **New Handler**, or click to select the handler to reconfigure.
2. Type a name, between 2 and 23 alphanumeric characters, for the event handler in the *Name* field.
3. Select the *Run Scan* handler type.
4. Select the scan from the pull-down menu.
5. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
6. (Optional) Select one or more sources that you want to trigger this event handler. Sources are configured from the **Events** tab, *Sources* page.
7. Click **Save**.

### Configuring an Event Handler: Wiper\*

\*Only on supported models.

The Wiper handler will trigger the wiper when a source event occurs.

1. Click **Events**, and then click **Handlers**.
2. Click **New Handler**, or click to select the handler to reconfigure.
3. Type a name, between 2 and 23 alphanumeric characters, for the event handler in the **Name** field.
4. Click to select the **Wiper handler** type.
5. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
6. (Optional) Click to select one or more sources that will trigger this event handler. Sources are configured from the **Events** tab, **Sources** page.
7. Click **Save**.

### Configuring an Event Handler: Open/Close Relay

The Open/Close handler opens or closes a relay when a source event occurs.

1. Click **Events**, and then click **Handlers**.
2. Click **New Handler**, or click to select the handler to reconfigure.
3. Type a name, between 2 and 23 alphanumeric characters, for the event handler in the **Name** field.
4. Click to select the **Open/Close Relay** handler type.
5. Click to select the individual relay you want to trigger when an event occurs from the **Relay** handler Type.
6. Click to select the **Relay Mode: Pulse or Trigger**.
7. Use the **On Time** controls to set the amount of time the relay will remain open, up to 200 seconds.
8. Use the **Off Time** controls to set the amount of time the relay will remain closed, up to 200 seconds.
9. Set the **Pulse Count** for the relay. The pulse count is the number of relay pulses (number of on and off cycles).
10. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
11. (Optional) Click to select one or more sources that will trigger this event handler. Sources are configured from the **Events** tab, **Sources** page.
12. Click **Save**.

### Configuring an Event Handler: Display Overlay

This event handler displays an OSDi of the source name when any connected source is triggered.

The Display Overlay event handler displays an OSDi of the source name when any connected source is triggered. When using the Event Source overlay and the Display Overlay handler, the camera will push any connected event sources to the OSDi when triggered.



**Note:** Overlay configuration settings are available on the OSDi page.



1. Click **New Handler**, or click to select the handler to reconfigure.
2. Type a name, between 2 and 23 alphanumeric characters, for the event source in the *Name* field.
3. Click to select the **Display Overlay** handler *Type*.
4. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
5. (Optional) Click to select one or more sources that will trigger this event handler. Sources are configured from the **Events** tab, *Sources* page.
6. Click **Save**.

### Configuring an Event Handler: Play Audio

1. Click **New Handler**, or click to select the handler to reconfigure.
2. Type a name, between 2 and 23 alphanumeric characters, for the event source in the *Name* field.
3. Click to select the **Play Audio** handler *Type*.
4. Click **Browse**, and then click to select a valid .WAV file to be played when the event occurs.
5. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
6. (Optional) Click to select one or more sources that will trigger this event handler. Sources are configured from the **Events** tab, *Sources* page.
7. Click **Save**.

### Configuring an Event Handler: Write Recording to SD Card

This event handler captures and uploads a video to an SD Card when an event source is triggered. Video files are named according to the date and time at which they are recorded; although, you can determine the order of factors in the date-and-time file name.



**Note:** These video clips can be downloaded from Snapshot Viewer page.

1. Click **New Handler**, or click to select the handler to reconfigure.
2. Type a name, between 2 and 23 alphanumeric characters, for the event source in the *Name* field.
3. Click to select the **Write Recording to SD Card** handler *Type*.
4. Enter *Pre-Event Buffer* duration, *Post-Event Buffer* duration, and *Size Limit* for the Recording to be written for the SD Card.
5. Click to select the *File Name* for your video recording. JPEG files are named according to the date and time at which they are recorded. The selection is simply the format of the date and time stamp.
6. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
7. (Optional) Click to select one or more sources that will trigger this event handler. Sources are configured from the **Events** tab, *Sources* page.
8. Click **Save**.

## Configuring an Event Handler: Upload Recording to FTP Server

This event handler captures and uploads a recording to an FTP server when an event source is triggered. Recording files are named according to the date and time at which they are recorded; although, you can determine the order of factors in the date-and-time filename.

1. Click **New Handler**, or click to select the handler to reconfigure.
2. Type a name, between 2 and 23 alphanumeric characters, for the event source in the **Name** field.
3. Select the **Upload Recording to FTP Server** handler Type.
4. Provide the address of your FTP server in the **Server** box.
5. Provide the credentials the camera will use to authenticate with the FTP server; the **User Name** must be between 1 and 32 alphanumeric characters, and the **Password** must be between 4 and 16 alphanumeric characters.
6. Provide the path in which to store video files on your FTP server in the **Base Path** box.
7. Select the **File Name** for your video recording.
8. (Optional) Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
9. (Optional) Click to select one or more sources that will trigger this event handler. Sources are configured from the **Events** tab, **Sources** page.
10. Select **Save**.

## Deleting an Event Handler

1. Click **Events**, and then click **Handlers**.
2. Select the handler that you want to delete.
3. Click **Delete**.

## Analytic Configuration

The Analytic Configuration page allows you to analyze the camera's field of view to detect and trigger events or alarms when specific activity occurs.

Multiple analytic behaviors can be configured. However the complexity of active behaviors and zones per behavior may increase the processing load on your camera. Once configured, your camera will monitor your defined zones for activity violating the parameters of the behavior. You can view analytic events through your camera's event stream. However, analytic alarms are only transmitted through Pelco's API, and are therefore only available with compatible VMS systems or through direct integration.

You can configure multiple analytic behaviors. Each analytic behavior has its own settings, and many analytic behaviors also require you to configure zones that the camera will monitor for activity. The analytic behaviors available to your camera are dependent on your model and firmware version.

## Configuring Basic Analytics

The Basic menu contains *Motion Detection*, *Edit Mask*, and *Sabotage Detection* functions.

## Configuring Motion Detection



**Note:** Motion Detection requires a mask to be drawn to indicate where the camera should look for motion. Use the *Edit Mask* controls to setup the mask.

1. Check **Enabled**.
2. Enter an *Event logging (profile) name*.
3. Establish an alarm priority by clicking *Alarm Severity* of **Minor**, **Normal**, **Major**, or **Critical**.
4. Choose a *Sensitivity* level of **Low**, **Medium**, or **High** to establish what amount of change in motion within the camera's field view that triggers a handler behavior.
5. Use the slider bar or text input box to set the *Threshold %* in how much motion needs to occur in order to trigger the alarm.

### Configuring Edit Mask Mode

1. Click the *Edit Mask* mode option to **Draw** or **Erase** zones of the mask.
2. Click a **Rectangle** or **Paintbrush** (line) drawing *Tool*.
3. Use the mouse cursor to Draw the mask or Erase sections of the mask.
  - Revert back to a previous state by selecting **Undo**.
  - Selecting **Redo** will reverse the Undo action.
4. Click **Save**.

### Configuring Sabotage Detection

1. Check **Enabled**.
2. Establish the sensitivity to motion that will trigger a handler behavior by choosing from **Low**, **Medium**, or **High**.
3. Enter an *Event logging (profile) name*.
4. Establish an alarm priority by clicking *Alarm Severity* of **Minor**, **Normal**, **Major**, or **Critical**.
5. Click **Save**.

### Configuring Enhanced Analytics

The Enhanced analytic configuration menu contains *Scene Settings*, *Select Behaviors*, *Drawing Tools*, a *Zone list*, and *Zone settings*.

#### Configuring the Scene Settings

Depending on the chosen Select Behavior, one or more of the following Scene Settings will be available.

Scene Settings is only available if you have configured a preset. Clicking the **Manage Presets** link will direct you to the *Presets PTZ* tab where you can create or edit camera presets.

To configure the scene settings:

1. Click to select a *Camera preset*.
2. Click to select a *Scene Type* of indoor or outdoor.
3. Choose a **Still** or **Noisy** background based on the expected amount of background movement in the scene. A stable background with few moving objects should be set to Still. A busy background, with many moving objects should be set to Noisy.
4. Use the *Fine tuning* option to define zone violation sensitivity. Available settings include **Conservative**, **Normal**, or **Aggressive**. The Conservative setting is the least sensitive setting, reducing the number of false alarms, but might prevent the camera from detecting zone violations. The Aggressive setting is the most sensitive setting, detecting all suspect violations, but might cause the camera to trigger more false alarms.

5. Establish the **Sensitivity** or relative amount of motion, between 1 (low) and 10 (high), that will trigger a behavior. The higher the setting, the greater the chance for false alarms; lower settings will reduce the chance of false alarms but might result in missed violations.
6. **Consistency** helps trigger a behavior when an object moves into the frame from a consistent direction. The sensitivity detection can be set from 0 (low) to 10 (high).
7. The **Calibration** function will show as **Not Completed** or **Completed**. If calibration is Not Completed, click **Calibrate Scene**. This will open a separate **Calibrate Scene** page.
8. Click **Set height**. This will bring up a blue square. Place the blue square over an object at a distance and set the **Real-world height** of the object in either feet or meters.
9. Click **Set width**. Two yellow lines appear. Measure the width of a far object using the line denoted by "Width of a far object" and the width of a near object using the line denoted by "Width of near object".
10. Click **Return to Main**.

The Calibration shows as **Completed**.

### Applying Select Behaviors

Select Behaviors define the attributes of a scene within the field of view of your camera and provide context for analytic behaviors. Select Behaviors include *Abandoned Object*, *Adaptive Motion*, *AutoTracker*, *Directional Motion*, *Loitering Detection*, *Object Counting*, *Object Removal*, and *Stopped Vehicle*.

Each analytic behavior contains settings determining the conditions under which events are triggered. The settings available are dependent on the analytic behavior that you are configuring.

- **Activate Behavior:** Activates the chosen select behavior.
- **Enable advanced options:** Advanced options are only available for certain Select Behaviors.

The Advanced options include:

- **Sensitivity:** Overrides the global Profile sensitivity setting for the selected behavior, defining the relative amount of motion, between 1 (low) and 10 (high) that will trigger an event or alarm. Sensitivity is an advanced option for some behaviors.
- **Object speed:** Adjusts for speed if the scene is configured to track moving objects at a slower or faster rate than actual speed.

### Using Zone Settings

You can establish the conditions under the Zone Settings section to determine which events are triggered for a Select Behavior. The availability of settings depends on the chosen Select Behavior.



**Note:** AutoTracker has its own behavior-specific settings as described in the [Using AutoTracker Zone Settings](#) section.

- **Name:** Type a name of your choosing for the selected Zone.
- **Enable Alarm:** Enables a zone alarm. Analytic events for the zone will appear in the event stream when viewing Live View and will trigger Event Handlers if the Analytic Event source is enabled.
- **Alarm Severity:** Sets the alarm priority as Minor, Normal, Major, or Critical.
- **Dwell time:** Defines the amount of time that an alarm will remain active when an alarm-triggering object exits the field of view or the zone. Dwell time can be set between 10 to 300 seconds.
- **Object Counting:** Determines the number of objects entering into a zone that will trigger an alarm.
- **Delay before alarm:** Defines the amount of time an object must remain in a zone before triggering an alarm.

- **Direction:** Determines the direction of motion a zone should track. Events will be triggered only when your camera detects motion in the specified direction.
- **Sensitivity:** Overrides the global Profile sensitivity setting for the selected behavior, defining the relative amount of motion, between 1 (low) and 10 (high) that will trigger an event or alarm. Sensitivity is an advanced option for some behaviors.
- **Object Speed:** Adjusts for speed if the scene is configured to track moving objects at a slower or faster rate than actual speed. Object Speed defines the relative speed, between 1 (low) and 10 (high), that will trigger an event or alarm.
- **Zone Sensitivity:** Defines the relative amount of motion within the selected zone that will trigger an event or alarm. Zone sensitivity can be set at a lower or higher setting than the overall sensitivity setting for the rest of the scene or the Profile sensitivity setting for the selected behavior.
- **Edit Mask:** Specifies which areas within the camera view to ignore so that alerts are triggered only if there is motion in the unmasked part of the video feed.

### Using AutoTracker Behavior-Specific Settings

- **Name:** Type a name of your choosing for the selected Zone.
- **Sensitivity:** Overrides the global Profile sensitivity setting for the selected behavior, defining the relative amount of motion, between 1 (low) and 10 (high) that will trigger an event or alarm. Auto sets the sensitivity level from 1 to 10 automatically according to the amount of motion detected in a scene. Select **Manual** to set a user-defined sensitivity level from 1 to 10.
- **Dwell time:** Defines the amount of time that an alarm will remain active when an alarm-triggering object exits the field of view or the zone. Dwell time can be set between 10 to 300 seconds.
- **Follow Options:** Determines whether an object is tracked only within the current field of view or beyond. Choose Unlimited to continue to follow an object even when it moves beyond the present field of view. Choose Limit to current view to follow the object only while it is within the present field of view.
- **Camera Placement:** Defines the vertical height of the camera's location relative to the area being monitored.
- **Unit:** Defines the unit of measurement as either Meters or Feet.
- **Optimize Zoom Settings for Objects of this Type:** Defines the type of object to be tracked.
- **Average Width:** Defines the average width of objects to track.
- **Average Height:** Defines the average height of objects to track.

### Using Drawing Tools

When configuring a zone-based analytic behavior, you can draw zones by clicking one of the zone-drawing tools and then clicking within the scene to draw the zone. The availability of zone drawing tools is dependent on the analytic behavior you are configuring. Drawing tools include:

- **Rectangle** Tracks objects in a defined rectangular zone and triggers an alarm if the objects move in the same direction as defined.
- **Polygon:** Tracks objects in a defined zone and triggers an alarm if the objects move in the same direction as defined.
- **Line:** Tracks objects that cross a line and triggers an alarm if the objects move in the same direction as defined.
- **Rectangular Excluded Zone:** Ignores objects inside a defined rectangular zone.
- **Polygon Excluded Zone:** Ignores objects inside a defined zone.

- **Set Object Size filters:** Allows the user to set the minimum and maximum object size for a zone. Objects that fall outside these limits will not be detected.
- (AutoTracker Only) **Display Size:** Sets the relative size of a tracked object in comparison to the surrounding scene and maintains the size of the object within the scene.

### Using the Zone List

A zone drawn with any of the Drawing Tools will appear in the **Zone list** section.

1. Click to select the zone from the list that you wish to configure.
2. Click **Save** to activate the **Zone Settings** options for that particular zone.
3. Click **X** to delete the zone from the **Zone list**.

### Using AutoTracker Zone Settings

You can establish the conditions under the Zone Settings section to determine which events are triggered for a Select Behavior. The availability of settings depends on the chosen Select Behavior.

- **Name:** Type a name of your choosing for the selected Zone.
- **Direction:** Determines the direction of motion a zone should track. Events will only be triggered when your camera detects motion in the specified direction.
- **Enable Alarm:** Enables a zone alarm. Analytic events for the zone will appear in the event stream when viewing live video, and trigger event handlers if the Analytic Event source is enabled.
- **Alarm severity:** Defines the severity of alarms triggered. Alarm severity helps you and other users prioritize alarms.
- **Alarm at:** Determines the number of objects entered into a zone that will trigger an alarm.
- **Zone Sensitivity:** Defines the relative amount of motion within the selected zone that will trigger an event or alarm. Zone sensitivity can be set at a lower or higher setting than the overall sensitivity setting for the rest of the scene or the Profile sensitivity setting for the selected behavior.
- **Delay before alarm:** Defines the amount of time an object must remain in a zone before triggering an alarm.

### Using Select Behaviors—Ideal Situations

The following sections describes the function of each Select Behavior and the ideal situation in which to use it.

#### Using Abandoned Object

The Abandoned Object behavior detects objects placed within a defined zone and triggers an alarm if objects remain in the zone longer than the user-defined time allows.

Ideal Scene Setup for Abandoned Object: An airport terminal is a typical installation for the Abandoned Object behavior. This behavior can also detect objects left behind at an ATM, signaling possible card skimming.

#### Using Adaptive Motion

The Adaptive Motion behavior detects and tracks objects that enter a scene and then triggers an alarm when the objects enter a user-defined zone.

The Adaptive Motion behavior is designed to work indoors and outdoors to track a few moving objects in uncrowded fields of view. The behavior learns the background scene over time and adjusts to changing conditions like snow, fog, wind, and rain.

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity.

The ideal scene for Adaptive Motion behavior is one with light traffic and a clean background. If heavy traffic or a busy background is unavoidable, place zones in a relatively stable area.

Avoid crowded scenes where people move in all directions or stand in place for long periods of time.



**Note:** Objects that are very small might not be classified as the correct object type. This could result in false alarms or alarms not being triggered. If objects appear too small in the scene, zoom in on the particular zone of interest or move the camera closer to the zone of interest to increase the relative size of the objects in the scene.

### Using Auto Tracker

The AutoTracker behavior detects and tracks movement in the camera's field of view. When the AutoTracker behavior is configured, the system automatically pans and tilts to follow the moving object until the object stops or exits the monitored area.

When advanced options are enabled for AutoTracker behaviors, any excluded zones that you have previously created within the scene are disabled. You can create additional excluded zones, but the zones will remain exclusive to the behavior within the selected profile.

The ideal scene for the AutoTracker behavior contains light traffic and a clean background. If heavy traffic or a busy background is unavoidable, place zones relatively stable areas.

Avoid crowded scenes where people move in all directions or stand in place for long periods of time.

### Directional Motion

The Directional Motion behavior generates an alarm in a high traffic area when a person or object moves in a specified direction. Examples of typical installations for this behavior include airports, entrances and exits, and vehicle traffic through tunnels.

- In an airport installation, cameras observe passengers boarding a plane in a terminal. If a person moves in the opposite direction of the normal flow of traffic, an alarm triggers.
- In a tunnel installation, an operator wants to observe traffic flow. If a car enters a tunnel through an exit, an alarm alerts the operator to activate the traffic signals to stop all traffic in the tunnel.
- In an entrance or exit installation, a camera is pointed at an exit door. If a person tries to enter through the exit door, an alarm triggers.

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity. The width of the object you want to detect should be at least one-tenth of the total width of the scene. To achieve increased accuracy in a crowded scene, set the width of the object to one-sixth of the total width of the scene.

The ideal scene selection for the Directional Motion behavior contains light traffic with all people and objects moving in the same direction, minimal obstructions, and a clean background; however, the behavior can be used in settings that do not meet all of these requirements. If heavy traffic or a busy background is unavoidable, place zones in a relatively stable area.

Avoid crowded scenes in which people move in all directions or stand in one place for long periods of time.

### Using Loitering Detection

The Loitering Detection behavior identifies when people or vehicles remain in a defined zone longer than the user-defined time allows. This behavior is effective in real-time notification of suspicious behavior around ATMs, stairwells, and school grounds.

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity.

The ideal scene for Loitering Detection behavior is one with light traffic and a clean background. If heavy traffic or a busy background is unavoidable, place the user-defined zone in a relatively stable area.

Avoid crowded scenes where people move in all directions or stand in one place for long periods of time.

### Using Object Counting

The Object Counting behavior counts the number of objects that enter a user-defined zone. This behavior can be used to count people at a store entrance/exit or inside a store where the traffic is light. It might also be used to monitor vehicle traffic on highways, local streets and roads, parking lots, and garages.

The ideal scene for the Object Counting behavior contains light traffic, minimal obstructions, and a clean background. If heavy traffic or a busy background is unavoidable, place zones (polygon or line) in relatively stable areas.

A one-directional motion scene (for example, a vertical hallway) is preferable. Avoid crowded scenes in which people or objects move in all directions or remain in place for long periods of time.

### Using Object Removal

The Object Removal analytic behavior triggers an alarm if an object is removed from a user-defined zone. It is ideal for detecting the removal of high-value objects, such as a painting from a wall or a statue from a pedestal.

Install the camera in a high position looking down on the scene. The monitored object should occupy a quarter of the camera scene, and the field of view should be as wide as possible.

The ideal scene selection for the Object Removal behavior is a clean background with stable lighting and minimal obstruction.

### Using Stopped Vehicle

The Stopped Vehicle behavior detects vehicles stopped near a sensitive area, and sets an alarm if the vehicle is present for longer than a user-specified period of time. This behavior is ideal for parking enforcement, identifying suspicious parking, finding traffic lane breakdowns, and spotting vehicles waiting at gates.

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activities.

The ideal scene for the Stopped Vehicle analytic behavior contains light traffic in which vehicles are continually moving, there are minimal scene obstructions, and the background is clean. If heavy traffic or a busy background is unavoidable, place monitoring zones relatively stable areas.

Avoid crowded scenes where people or objects remain in place for long periods of time.

## Event Stream

The *Event Stream* displays a list of alerts triggered by an active analytic behavior. The alert includes a screen capture, the profile that was triggered, and the zone in which the event was detected.



## Contacting Pelco for Troubleshooting

For further instructions, contact Pelco Product Support at 1-800-289-9100 (USA and Canada) or +1-559-292-1981 (international) for assistance. Have the serial number available when calling.

Do not try to repair the unit yourself. Leave maintenance and repairs to qualified technical personnel only.



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