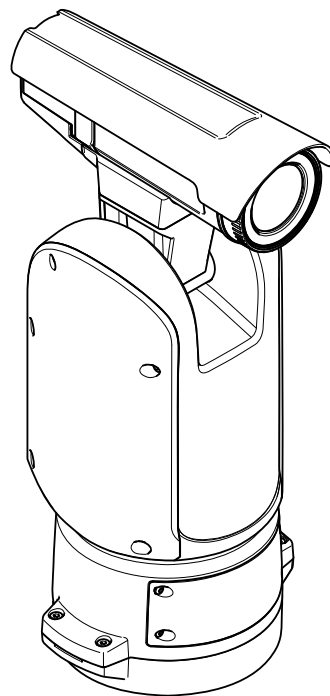


AXIS Q86 Series

AXIS Q8641-E PT Thermal Network Camera

AXIS Q8642-E PT Thermal Network Camera



About this document

This manual is intended for administrators and users of AXIS Q8641-E PT Thermal Network Camera and AXIS Q8642-E PT Thermal Network Camera, and is applicable to firmware 6.55 and later. It includes instructions for using and managing the product on your network. Previous experience of networking will be of use when using this product. Some knowledge of UNIX or Linux-based systems may also be useful when developing shell scripts and applications. Later versions of this document will be posted at www.axis.com. See also the product's built-in help, available through the web-based interface.

Legal considerations

Video surveillance can be regulated by laws that vary from country to country. Check the laws in your local region before using this product for surveillance purposes.

This product includes the following licences:

- one (1) H.264 decoder license

To purchase further licenses, contact your reseller.

This product is subject to export control regulations. You should always consult and comply with the regulations of the appropriate local export control authorities.

Liability

Every care has been taken in the preparation of this document. Please inform your local Axis office of any inaccuracies or omissions. Axis Communications AB cannot be held responsible for any technical or typographical errors and reserves the right to make changes to the product and manuals without prior notice. Axis Communications AB makes no warranty of any kind with regard to the material contained within this document, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Axis Communications AB shall not be liable nor responsible for incidental or consequential damages in connection with the furnishing, performance or use of this material. This product is only to be used for its intended purpose.

Intellectual property rights

Axis AB has intellectual property rights relating to technology embodied in the product described in this document. In particular, and without limitation, these intellectual property rights may include one or more of the patents listed at axis.com/patent.htm and one or more additional patents or pending patent applications in the US and other countries.

This product contains licensed third-party software. See the menu item "About" in the product's user interface for more information.

This product contains source code copyright Apple Computer, Inc., under the terms of Apple Public Source License 2.0 (see opensource.apple.com/apsl/). The source code is available from developer.apple.com/bonjour/

Equipment modifications

This equipment must be installed and used in strict accordance with the instructions given in the user documentation. This equipment contains no user-serviceable components. Unauthorized equipment changes or modifications will invalidate all applicable regulatory certifications and approvals.

Trademark acknowledgements


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Regulatory information

Europe

 This product complies with the applicable CE marking directives and harmonized standards:

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU. See *Electromagnetic compatibility (EMC)* on page 2.
- Low Voltage (LVD) Directive 2014/35/EU. See *Safety* on page 3.
- Restrictions of Hazardous Substances (RoHS) Directive 2011/65/EU. See *Disposal and recycling* on page 3.

A copy of the original declaration of conformity may be obtained from Axis Communications AB. See *Contact information* on page 3.

Electromagnetic compatibility (EMC)

This equipment has been designed and tested to fulfill applicable standards for:

- Radio frequency emission when installed according to the instructions and used in its intended environment.
- Immunity to electrical and electromagnetic phenomena when installed according to the instructions and used in its intended environment.

USA

This equipment has been tested using a shielded network cable (STP) and found to comply with the limits for 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. The product shall be connected using a shielded network cable (STP) that is properly grounded.

Canada

This digital apparatus complies with CAN ICES-3 (Class A). The product shall be connected using a shielded network cable (STP) that is properly grounded. Cet appareil numérique est conforme à la norme NMB ICES-3 (classe A). Le produit doit être connecté à l'aide d'un câble réseau blindé (STP) qui est correctement mis à la terre.

Europe

This digital equipment fulfills the requirements for RF emission according to the Class A limit of EN 55032. The product shall be connected using a shielded network cable (STP) that is properly grounded. Notice! This is a Class A product. In a domestic environment this product may cause RF interference, in which case the user may be required to take adequate measures.

This product fulfills the requirements for emission and immunity according to EN 50121-4 and IEC 62236-4 railway applications.

This product fulfills the requirements for immunity according to EN 61000-6-1 residential, commercial and light-industrial environments.

This product fulfills the requirements for immunity according to EN 61000-6-2 industrial environments.

This product fulfills the requirements for immunity according to EN 55024 office and commercial environments.

Australia/New Zealand

This digital equipment fulfills the requirements for RF emission according to the Class A limit of AS/NZS CISPR 32. The product shall be connected using a shielded network cable (STP) that is properly grounded. Notice! This is a Class A product. In a domestic environment this product may cause RF interference, in which case the user may be required to take adequate measures.

Japan

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。本製品は、シールドネットワークケーブル(STP)を使用して接続してください。また適切に接地してください。

Korea

이 기기는 업무용 환경에서 사용할 목적으로 적합성 평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의

우려가 있습니다. 적절히 접지된 STP (shielded twisted pair) 케이블을 사용하여 제품을 연결 하십시오.

Safety

For outdoor installation with 24 V AC power a grounding wire must be used, see the installation guide illustrations in this document.

This product complies with IEC/EN/UL 62368-1, safety of audio/video and IT equipment and IEC/EN/UL 60950-22, Safety of Information Technology Equipment. The product shall be grounded using both the protective earth wire in the power cable and the grounding braid. Make sure both ends of the protective earth wire and the grounding braid are in contact with their respective grounding surfaces.

The power supply used with this product shall fulfill the requirements for Safety Extra Low Voltage (SELV) according to clause 2.2 of IEC/UL 60950-1 or CEC/NEC Class 2 source of supply as defined in the Canadian Electrical Code, CSA C22.1 and National Electrical Code, ANSI/NFPA 70.

Battery

The Axis product uses a 3.0 V BR2032 lithium battery as the power supply for its internal real-time clock (RTC). Under normal conditions this battery will last for a minimum of five years.

Low battery power affects the operation of the RTC, causing it to reset at every power-up. When the battery needs replacing, a log message will appear in the product's server report. For more information about the server report, see the product's setup pages or contact Axis support.

The battery should not be replaced unless required, but if the battery does need replacing, contact Axis support at axis.com/support for assistance.

Lithium coin cell 3.0 V batteries contain 1,2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME), CAS no. 110-71-4.

⚠WARNING

- Risk of explosion if the battery is incorrectly replaced.
- Replace only with an identical battery or a battery which is recommended by Axis.
- Dispose of used batteries according to local regulations or the battery manufacturer's instructions.

Disposal and recycling

When this product has reached the end of its useful life, dispose of it according to local laws and regulations. For information about your nearest designated collection point, contact your local authority responsible for waste disposal. In accordance with local legislation, penalties may be applicable for incorrect disposal of this waste.

Europe



This symbol means that the product shall not be disposed of together with household or commercial waste. Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) is applicable in the European Union member states. To prevent potential harm to human health and the environment, the product must be disposed of in an approved and environmentally safe recycling process. For information about your nearest designated collection point, contact your local authority responsible for waste disposal. Businesses should contact the product supplier for information about how to dispose of this product correctly.

This product complies with the requirements of Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

China



This product complies with the requirements of SJ/T 11364-2014, Marking for the restriction of hazardous substances in electrical and electronic products.

有毒有害物质或元素						
部件名称	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电气实装部分	X	0	0	0	0	0

0: 表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。

Contact information

Axis Communications AB
Emdalavägen 14
223 69 Lund
Sweden

Tel: +46 46 272 18 00

Fax: +46 46 13 61 30

axis.com

Support

Should you require any technical assistance, please contact your Axis reseller. If your questions cannot be answered immediately, your reseller will forward your queries through the appropriate channels to ensure a rapid response. If you are connected to the Internet, you can:

- download user documentation and software updates
- find answers to resolved problems in the FAQ database. Search by product, category, or phrase
- report problems to Axis support staff by logging in to your private support area
- chat with Axis support staff
- visit Axis Support at axis.com/support

Warranty information

For information about Axis' product warranty and thereto related information, go to axis.com/warranty

Learn more!

Visit Axis learning center axis.com/academy for useful trainings, webinars, tutorials and guides.

AXIS Q86 Series

Table of Contents

Safety information	6
Hazard levels	6
Other message levels	6
Product overview	7
How to access the product	9
How to access the product from a browser	9
How to access the product from the Internet	9
How to set the root password	9
About the live view window	10
About media streams	13
About H.264 format	13
About MJPEG format	13
About AXIS Media Control (AMC)	13
Alternative methods of accessing the video stream	14
How to set up the product	15
How to perform a basic setup	15
About video settings	16
How to set up video streams	16
About stream profiles	19
About ONVIF media profiles	19
About camera settings	19
About overlays	20
How to configure the live view window	23
How to set default viewer for browsers	23
About viewer settings	23
About user-defined links	24
Output Buttons	24
About PTZ (Pan Tilt Zoom)	25
About preset positions	25
About guard tours	25
OSDI Zones	26
Advanced	26
About the control queue	27
About detectors	28
About shock detection	28
About motion detection	28
About applications	30
About application licenses	30
How to upload and start an application	30
Application Considerations	30
About events	31
How to set up action rules	31
How to add recipients	33
How to create schedules	35
How to set up recurrences	35
About recordings	36
How to find recordings	36
How to play recordings	36
How to export a video clip	37
About continuous recording	37
About languages	38
About system options	39
Security	39
Date & Time	41
Network	42
Storage	47
Ports & Devices	49
Maintenance	49
Support	50
Advanced	50
How to reset to factory default settings	51

AXIS Q86 Series

Table of Contents

Troubleshooting	52
How to check the current firmware	52
How to upgrade the firmware	52
Symptoms, possible causes and remedial actions	53
Specifications	56
LED Indicators	56
SD card slot	56
Buttons	56
Connectors	56
Performance considerations	58

AXIS Q86 Series

Safety information

Safety information

Hazard levels

▲DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

▲WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

▲CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates a situation which, if not avoided, could result in damage to property.

Other message levels

Important

Indicates significant information which is essential for the product to function correctly.

Note

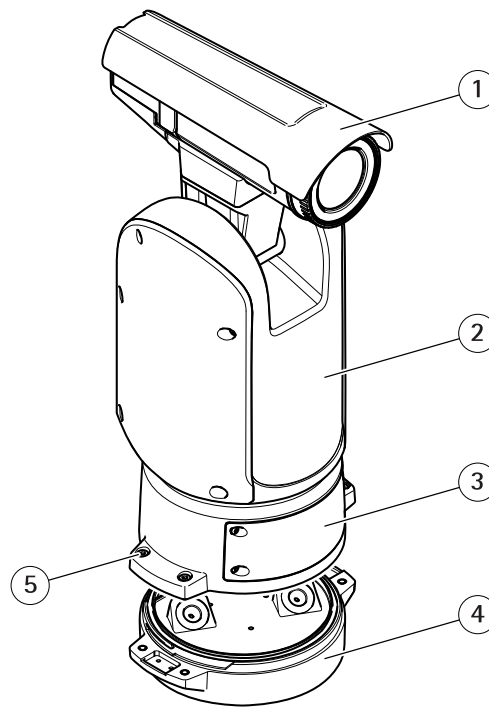
Indicates useful information which helps in getting the most out of the product.

AXIS Q86 Series

Product overview

Product overview

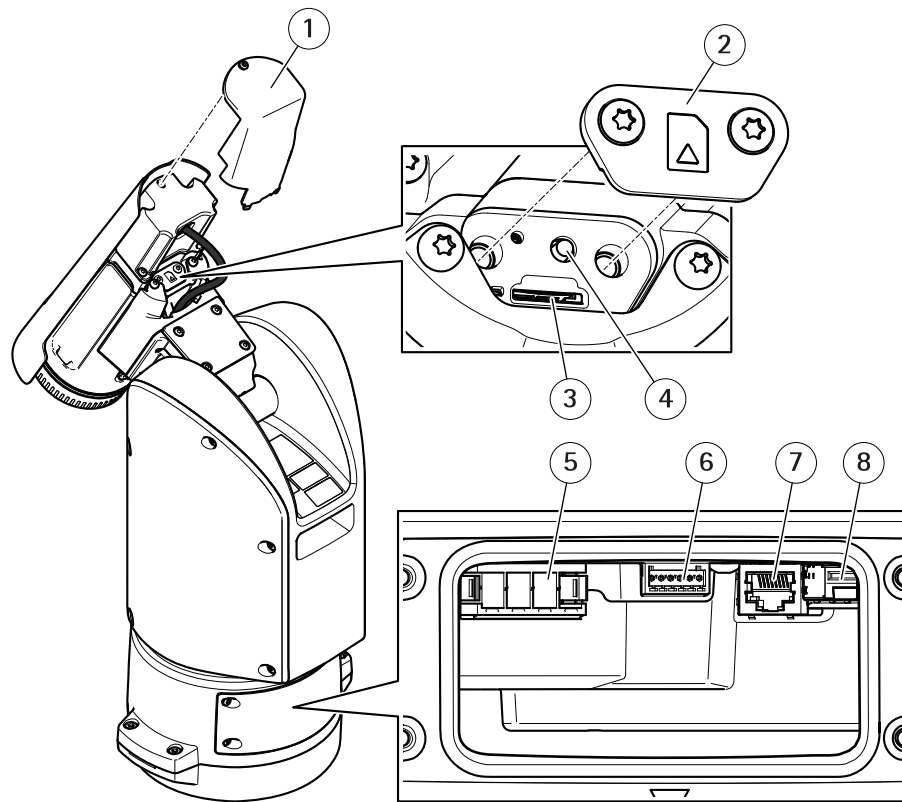
For specifications of the hardware components, see *Specifications on page 56*



- 1 Sunshield
- 2 Positioning camera
- 3 Lid
- 4 Base unit
- 5 Base unit screws

AXIS Q86 Series

Product overview



- 1 Back lid
- 2 SD card lid
- 3 SD card slot
- 4 Control button
- 5 Input power connector
- 6 I/O connector
- 7 RJ45 connector
- 8 SFP slot for SFP module (SFP module not included)

AXIS Q86 Series

How to access the product

How to access the product

To install the Axis product, see the Installation Guide supplied with the product.

The product can be used with most operating systems and browsers. We recommend the following browsers:

- Internet Explorer® with Windows®
- Safari® with OS X®
- Chrome™ or Firefox® with other operating systems.

To view streaming video in Internet Explorer, allow installation of AXIS Media Control (AMC) when prompted.

The Axis product includes one (1) H.264 decoder license for viewing video streams. The license is automatically installed with AMC. The administrator can disable the installation of the decoders to prevent installation of unlicensed copies.

Note

- QuickTime™ is also supported for viewing H.264 streams.

How to access the product from a browser

1. Start a web browser.
2. Enter the IP address or host name of the Axis product in the browser's address field.

To access the product from a Mac computer (OS X), go to Safari, click on Bonjour and select the product from the drop-down list.

If you do not know the IP address, use AXIS IP Utility to locate the product on the network. For information about how to discover and assign an IP address, see the document *Assign an IP Address and Access the Video Stream* on Axis Support web at axis.com/support

Note

To show Bonjour as a browser bookmark, go to Safari > Preferences.

3. Enter your username and password. If this is the first time the product is accessed, the root password must first be configured.
4. The product's live view page opens in your browser.

How to access the product from the Internet

Once connected, the Axis product is accessible on your local network (LAN). To access the product from the Internet you must configure your network router to allow incoming data traffic to the product. To do this, enable the NAT-traversal feature, which will attempt to automatically configure the router to allow access to the product. This is enabled from Setup > System Options > Network > TCP/IP Advanced.

For more information, see *NAT traversal (port mapping) for IPv4* on page 44.

For Technical notes on this and other topics, visit the Axis Support web at www.axis.com/support

See also AXIS Internet Dynamic DNS Service at www.axiscam.net

How to set the root password

To access the Axis product, you must set the password for the default administrator user **root**. This is done in the **Configure Root Password** dialog, which opens when the product is accessed for the first time.

AXIS Q86 Series

How to access the product

To prevent network eavesdropping, the root password can be set via an encrypted HTTPS connection, which requires an HTTPS certificate. HTTPS (Hypertext Transfer Protocol over SSL) is a protocol used to encrypt traffic between web browsers and servers. The HTTPS certificate ensures encrypted exchange of information. See *HTTPS on page 39*.

The default administrator user name `root` is permanent and cannot be deleted. If the password for root is lost, the product must be reset to the factory default settings. See *How to reset to factory default settings on page 51*.

To set the password via a standard HTTP connection, enter it directly in the dialog.

To set the password via an encrypted HTTPS connection, follow these steps:

1. Click **Use HTTPS**.

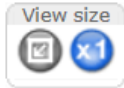
A temporary certificate (valid for one year) is created, enabling encryption of all traffic to and from the product, and the password can now be set securely.

2. Enter a password and then re-enter it to confirm the spelling.
3. Click **OK**. The password has now been configured.

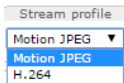
About the live view window

The controls and layout of the live view window may have been customized to meet specific installation requirements and user preferences. Consequently, some of the examples and functions featured here may differ from those displayed in your own live view window. The following provides an overview of each available control.

About the controls in the live view window



Click the **View size** buttons to show the image in full size (right button) or to scale down the image to fit the browser window (left button).



Select a stream profile for the live view window from the **Stream Profile** drop-down list. For information about how to configure stream profiles, see *page 19*.



Click the button activate the product's output port for a defined period of time. For information about how to enable and configure output buttons, see *page 24*. The output button name may differ depending on the name entered in the I/O Ports configuration.



Click the **On/Off** buttons to manually activate or inactive the product's output port. For information about how to enable and configure output buttons, see *page 24*.



Use the **Manual Trigger** button to trigger an action rule from the live view window. For information about how to configure and enable the button, see *About the manual trigger on page 10*.



Click **Snapshot** to save a snapshot of the video image. This button is primarily intended for use when the AXIS Media Control viewer toolbar is not available. Enable this button from **Live View Config > Action Buttons**.

About the manual trigger

The **Manual Trigger** is used to trigger an action rule from the Live View page. The manual trigger can for example be used to validate actions during product installation and configuration.

To configure the manual trigger:

AXIS Q86 Series

How to access the product

1. Go to **Setup > Events**.
2. Click **Add** to add a new action rule.
3. From the **Trigger** drop-down list, select **Input Signal**.
4. From the second drop-down list, select **Manual Trigger**.
5. Select the desired action and configure the other settings as required.

For more information about action rules, see *About events on page 31*.

To show the manual trigger buttons in the Live View page:

1. Go to **Setup > Live View Config**.
2. Under **Action Buttons**, select **Show manual trigger button**.

About the AXIS Media Control viewer toolbar

The AXIS Media Control viewer toolbar is available in Internet Explorer only. See *About AXIS Media Control (AMC) on page 13* for more information. The toolbar displays the following buttons:



The **Play** button connects to the Axis product and starts playing a media stream.



The **Stop** button stops the media stream.



The **Snapshot** button takes a snapshot of the video image.



Click the **View Full Screen** button and the video image will fill the entire screen. Press **ESC** (Escape) on the computer keyboard to cancel full screen view.



The **Record** button is used to record the current video stream on your computer. The location where the recording is saved can be specified in the AMC Control Panel. Enable this button from **Live View Config > Viewer Settings**.

About the PT controls

The live view window also displays Pan/Tilt controls. The administrator can enable/disable controls for specified users under **System Options > Security > Users**.

With the **PTZ Control Queue** enabled the time each user is in control of the PTZ settings is limited. Click the buttons to request or release control of the PTZ controls. The PTZ Control Queue is set up under **PTZ > Control Queue**.



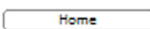
Click the **Emulate joystick mode** button and click in the image to move the camera view in the direction of the mouse pointer.



Click the **Center mode** button and click in the image to center the camera view on that position.



Click the **Ctrl panel** button to open the PTZ control panel which provides additional PTZ controls. User-defined buttons can also appear in the Control panel. See *About advanced PTZ settings on page 27*.



Click the **Home** button to go to the Home preset position. See *About preset positions on page 25*.

Pan and Tilt bars – Use the arrows to pan and tilt the camera view, or click on a position on the bar to steer the camera view to that position.

AXIS Q86 Series

How to access the product

The PTZ controls can be disabled under **PTZ > Advanced > Controls**, see *About advanced PTZ settings on page 27*.

AXIS Q86 Series

About media streams

About media streams

The Axis product provides several video stream formats. Your requirements and the properties of your network will determine the type you use.

The live view window in the product provides access to H.264 and Motion JPEG video streams, and to the list of available stream profiles. Other applications and clients can access video streams directly, without going via the live view window.

About H.264 format

H.264 can, without compromising image quality, reduce the size of a digital video file by more than 80% compared with the Motion JPEG format and as much as 50% more than the MPEG-4 standard. This means that much less network bandwidth and storage space are required for a video file. Or seen another way, much higher video quality can be achieved for a given bit rate.

Deciding which combination of protocols and methods to use depends on your viewing requirements, and on the properties of your network. The available options in AXIS Media Control are:

AXIS Media Control negotiates with the Axis product to determine the transport protocol to use. The order of priority, listed in the AMC Control Panel, can be changed and the options disabled, to suit specific requirements.

Note

H.264 is licensed technology. The Axis product includes one H.264 viewing client license. Installing additional unlicensed copies of the client is prohibited. To purchase additional licenses, contact your Axis reseller.

About MJPEG format

This format uses standard JPEG still images for the video stream. These images are then displayed and updated at a rate sufficient to create a stream that shows constantly updated motion.

The Motion JPEG stream uses considerable amounts of bandwidth, but provides excellent image quality and access to every image contained in the stream. The recommended method of accessing Motion JPEG live video from the Axis product is to use the AXIS Media Control in Internet Explorer in Windows.

About AXIS Media Control (AMC)

AXIS Media Control (AMC) in Internet Explorer in Windows is the recommended method of accessing live video from the Axis product.

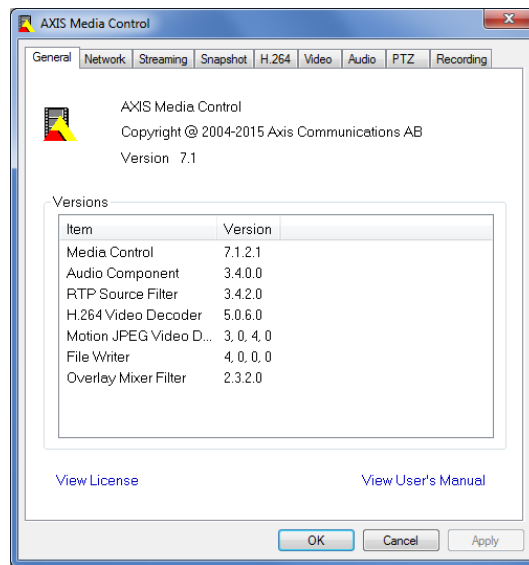
The AMC Control Panel can be used to configure various video settings. Please see the AXIS Media Control User's Manual for more information.

The AMC Control Panel is automatically installed on first use, after which it can be configured. Open the AMC Control Panel from:

- Windows Control Panel (from the Start screen or Start menu)
- Alternatively, right-click the video image in Internet Explorer and click **Settings**.

AXIS Q86 Series

About media streams



Alternative methods of accessing the video stream

You can also access video and images from the Axis product in the following ways:

- **Motion JPEG server push** (if supported by the client, Chrome or Firefox, for example). This option maintains an open HTTP connection to the browser and sends data as and when required, for as long as required.
- **Still JPEG images in a browser**. Enter the path `http://<ip>/axis-cgi/jpg/image.cgi`
- **Windows Media Player**. This requires AXIS Media Control and the H.264 decoder to be installed. The following paths can be used:
 - Unicast via RTP: `axrtpu://<ip>/axis-media/media.amp`
 - Unicast via RTSP: `axrtsp://<ip>/axis-media/media.amp`
 - Unicast via RTSP, tunneled via HTTP: `axrtsphhttp://<ip>/axis-media/media.amp`
 - Multicast: `axrtpm://<ip>/axis-media/media.amp`
- **QuickTime™**. The following paths can be used:
 - `rtsp://<ip>/axis-media/media.amp`
 - `rtsp://<ip>/axis-media/media.3gp`

Note

- `<ip>`= IP address
- The Axis product supports QuickTime 6.5.1 and later.
- QuickTime may add latency to the video stream.
- It may be possible to use other players to view the H.264 stream using the paths above, although Axis does not guarantee this.


AXIS Q86 Series

How to set up the product

How to set up the product

The Axis product can be configured by users with administrator or operator rights. To open the product's setup pages, click **Setup** in the top right-hand corner of the live view window.

- Administrators have unrestricted access to all settings.
- Operators have restricted access to settings, see *Users on page 39*

See also the online help  .

How to perform a basic setup

Basic Setup provides shortcuts to the settings that should be made before using the Axis product:

1. Users. See *page 39*.
2. TCP/IP. See *page 42*.
3. Date & Time. See *page 41*.
4. Video Stream. See *page 16*.

The Basic Setup menu can be disabled from **System Options > Security > Users**.

AXIS Q86 Series

About video settings

About video settings

It is possible to configure the following video features in your Axis product:

- Video stream. See *page 16*.
- Stream profiles. See *page 19*.
- ONVIF Media Profiles. See *page 19*.
- Camera settings. See *page 19*.
- Overlay image. See *page 20*.

How to set up video streams

To set up the product's video streams, go to **Video > Video Stream**.

The video stream settings are divided into the following tabs:

- Image. See *page 16*.
- H.264. See *page 17*.
- Zipstream. See *page 18*.
- MJPEG. See *page 18*.

About the pixel counter

The pixel counter shows the number of pixels in an area of the image. The pixel counter is useful in situations where there is a specific size requirement, for example for object identification.

The pixel counter can be used:

- When setting up a video stream, see *How to set up video streams on page 16*. Under **Preview**, click **Open** and select the **Show pixel counter** option to enable the rectangle in the image. Use the mouse to move and resize the rectangle, or enter the number of pixels in the **Width** and **Height** fields and click **Apply**.
- When accessing the Live View page in Internet Explorer with AXIS Media Control (AMC) in Windows. Right-click in the image and select **Pixel counter**. Use the mouse to move and resize the rectangle.

Image

The default image settings can be configured under **Video > Video Stream**. Select the **Image** tab.

The following settings are available:

- **Resolution**. Select the default resolution.
- **Compression**. The compression level affects the image quality, bandwidth and file size of saved images; the lower the compression, the higher the image quality with higher bandwidth requirements and larger file sizes.
- **Rotate image**. If required, the image can be rotated.
- **Maximum frame rate**. To avoid bandwidth problems, the frame rate allowed to each viewer can be **Limited** to a fixed amount. Alternatively, the frame rate can be set as **Unlimited**, which means the Axis product always delivers the highest frame rate possible under the current conditions.
- **Overlay settings**. See *About overlay text on page 20*.

AXIS Q86 Series

About video settings

Click **Save** to apply the new settings.

About H.264

H.264, also known as MPEG-4 Part 10/AVC, is a video compression standard that provides high quality video streams at low bitrates. An H.264 video stream consists of different types of frames such as I-frames and P-frames. An I-frame is a complete image, whereas P-frames only contain the differences from previous frames.

About GOP length

A Group of Pictures (GOP) contains one I-frame followed by a number of P-frames. The GOP length is the number of frames between two I-frames.

Equal values for GOP length and frame rate result in one GOP per second. A higher GOP length value results in more small-sized P-frames and fewer large-sized I-frames while keeping the same frame rate. In other words, a high GOP-length value saves bandwidth, but the video quality may decrease. A low GOP-length value increases the video quality but requires more bandwidth.

About H.264 profiles

The Axis product supports the following H.264 profile(s):

- **Baseline:** Use the Baseline profile if the client does not support CABAC entropy coding.
- **Main:** The Main profile uses CABAC and provides a better compression with maintained video quality. It requires a larger amount of processing power to decode than the Baseline profile.
- **High:** The High profile provides a higher compression than both Main and Baseline profiles, but requires more processing power to decode. High profile supports 8x8 blocks, which reduces the bitrate further compared to the Main profile.

About bitrate control

Bitrate control is useful to make sure the video streaming does not take up too much bandwidth.

The built-in bitrate control can be combined with Zipstream, see *About Zipstream on page 18*. We recommend using a high bitrate limit to enable the full potential of Zipstream.

About variable bitrate

Variable bitrate (VBR) adjusts the bitrate according to the image complexity. When the activity in the scene increases, VBR adjusts the bitrate according to the complexity, using up more bandwidth for increased activity in the scene, and less for lower scene activity. Variable bitrate is suitable if there is a surplus in bandwidth, where the increased bitrate may not be an issue.

About maximum bitrate

If you have limited bandwidth, we recommend Maximum bit rate (MBR). MBR allows you to set a target bitrate to control the bandwidth consumption. The target value limits the bitrate, but it maintains a flexibility to be able to prioritize a continuous video stream. Consequently, the frame rate might need to go down and the image quality might decrease. To partly compensate for this, you can select which variable shall be prioritized. Not setting a priority means that frame rate and image quality are equally affected.

How to set an H.264 profile

1. To change the settings for all H.264 streams that do not use a stream profile, go to **Video > Video Stream > H.264**.
2. To increase or decrease the number of frames per GOP, set the **GOP length**.
3. Select one of the H.264 profiles.
4. Select one of the following:
 - **Variable bit rate**

AXIS Q86 Series

About video settings

- Maximum bit rate
5. If you select **Maximum bit rate**, select which variable to prioritize in the **Priority** drop-down list.
 6. Click **Save**.

How to include current bitrate in a text overlay

1. Go to **Video > Video Stream > Overlay Settings**.
2. In the **Include text** field enter #b.
3. Click **Save**.

About Zipstream

Axis' Zipstream Technology is a bitrate reduction technology optimized for video surveillance. Zipstream reduces the average bitrate in the H.264 stream by removing unnecessary data, which makes it possible to stream higher resolutions, reduce storage cost or keep recordings for a longer time.

To reduce the average bitrate, Zipstream reduces the bitrate in areas of the image that are less interesting from a video surveillance perspective, for example the background. Image details that are important for forensic video analysis, for example faces and license plates, are encoded with a higher bitrate.

Axis' Zipstream Technology for H.264 conforms to the H.264 standard and is compatible with third-party clients and VMS solutions that decode H.264 video.

Recommended use of bitrate reduction

Zipstream offers a number of bitrate reduction presets, from Low to Extreme. **Low** bitrate reduction is enabled by default and is safe to use in all applications while still reducing the bitrate.

We recommend using the **Extreme** bitrate reduction to maximize storage time for cloud-connected cameras or cameras using edge storage. This setting is suitable to combine with motion detection triggering and variable bitrate (VBR) where the bitrate is allowed to adapt to changes in complexity in the scene.

How to save bandwidth and storage using Zipstream

The bitrate controller built into the product can be combined with Zipstream to ensure a maximum bitrate (MBR) limit. We recommend using VBR or MBR with a high bitrate limit to enable the full potential of Zipstream.

To further save bandwidth go to **Setup > Video > Video Stream** and do one or more of the following:

- Go to the **Image** tab and set a low **Maximum frame rate** value.
- Go to the **H.264** tab and set a high **GOP length** value.
- Go to the **Zipstream** tab and select **Extreme H.264** bitrate reduction.
- Go to the **Zipstream** tab. Enable **Dynamic GOP** and set a high **Max dynamic GOP length** value.

Always verify that the video stream meets the quality requirements for your surveillance purposes after changing the video stream settings.

About MJPEG settings

Sometimes the image size is large due to low dynamic or complex scenery. Adjusting the maximum frame size helps to control the bandwidth and storage used by the Motion JPEG video stream in these situations. Setting the frame size to the **Default** setting provides consistently good image quality at the expense of increased bandwidth and storage usage in low dynamic. Limiting the frame size optimizes bandwidth and storage usage, but may result in poor image quality.

About stream profiles

A stream profile is a set of predefined stream settings including resolution, compression, frame rate and overlay settings. Stream profiles can be used:

- When setting up recording using action rules. See *About events on page 31*.
- When setting up continuous recording. See *About continuous recording on page 37*.
- In the Live View page – select the stream profile from the **Stream profile** drop-down list.

To create a new profile or modify an existing profile, go to **Setup > Video > Stream Profiles**.

To select a default stream profile for the Live View page, go to **Setup > Live View Config**.

About ONVIF media profiles

An ONVIF media profile consists of a set of configurations that can be used to change media stream settings. ONVIF media profiles can be used by a client to configure media stream properties.

The **ONVIF Media Profiles** page lists all preconfigured profiles. These profiles are included in the product for quick setup. You can add, modify or remove ONVIF media profiles from this page.

About camera settings

The **Video > Camera Settings** page provides access to advanced image settings for the Axis product.

About image appearance

To change Image Appearance go to the menus under **Setup > Video > Camera Settings**.

The image **Brightness** can be adjusted in the range 0–100, where a higher value produces a brighter image.

Increasing the **Sharpness** can increase bandwidth usage. A sharper image might increase image noise especially in low dynamic conditions. A lower setting reduces image noise, but the whole image will appear less sharp.

The **Contrast** changes the relative difference in thermal radiation. It can be adjusted using the slider.

About image correction

To change these settings go to **Setup > Video > Camera Settings**.

About Electronic Image Stabilization (EIS)

When monitoring an environment that is subject to vibrations such as a train station, or when the camera is mounted on a pole, images may appear unsteady. To automatically improve image stability, select **Electronic image stabilization (EIS)** from **Video & Audio > Camera Settings**.

About exposure settings

Configure the exposure settings to suit the image quality requirements in relation to temperature variations in the scene.

Automatic gain control – This setting is used to automatically adjust the gain to an appropriate range, the weaker the image signal, the stronger the gain. Select the **Linear** or **Equalization** automatic gain control method. The latter uses a histogram equalization method, which adjusts the gain dynamically by distributing the most frequent intensity values.

Exposure zones – This settings determines which part of the image is used to calculate the exposure. For most situations, the **Auto** setting can be used. For particular requirement, select **Defined** and then click **Edit** and select one of the predefined areas.

AXIS Q86 Series

About video settings

Gain – Gain is the amount of amplification applied to an image signal. More gain means more contrast and more details but also more noise. The max gain value is set for all scenes, but affects primarily low contrast scenes controlling the amount of allowed noise in the image, which in turn also limits the contrast.

About overlays

Overlays are superimposed over the video stream. They are used to provide extra information during recordings, such as a timestamp, or during product installation and configuration.

About overlay text


An overlay text can include the current date and time, or a text string. When using a text string, so-called modifiers can be used to display, for example, the current bit rate or the current frame rate.

You can choose between the following text overlay sizes:

Size	Text height	Background height
Small	10 pixels	20 pixels
Medium	16 pixels	28 pixels
Large	21 pixels	36 pixels

It is also possible to display text when an action rule is triggered, see *How to include overlay text in an action rule*.

How to include overlay text

1. Go to **Video > Video Stream** and select the **Image** tab.
2. To include date and time, select **Include date** and **Include time**.
3. To include a text string, select **Include text** and enter the text in the field. Modifiers can be used, see *File Naming & Date/Time Formats* in the online help .
4. Select size, color, and placement of the text string.
5. Click **Save**.

To modify the date and time format, go to **System Options > Date & Time**. See *Date & Time on page 41*.

How to include overlay text in an action rule

Example

To display the text "Motion detected" when motion is detected, enter #D in the **Include text** field and enter "Motion detected" in the **Text** field when setting up the action rule.

1. Go to **Video > Video Stream** and select the **Image** tab.
2. Under **Overlay Settings**, select **Include text**.
3. Enter the modifier #D. When the rule is triggered, #D is replaced by the text specified in the action rule.
Additional text in this field will be displayed also when the action rule is not active.
4. Go to **Events > Action Rules** and create your action rule.
5. From the **Actions** list, select **Overlay Text**.
6. Enter the text to display in the **Text** field.
7. Specify the **Duration**. The text can be displayed while the rule is active or for a fixed number of seconds.

How to display the pan or tilt position as a text overlay

It may be useful to retrieve, for instance from a recorded video, the pan or tilt position (in degrees) in which an event has taken place. This can be obtained by including the position in the image as a text overlay, using a modifier. To display the pan position as a text overlay:

1. Go to **Setup > Video > Video Stream**.
2. Under **Overlay settings**, select **Include text**.
Enter #x to show the pan position.
Enter #y to show the tilt position.
3. Configure the optional size, color and position of the text overlay.
4. Click **Save**.
5. Go to the **Live View** page to confirm the setting.

About overlay images

An overlay image is a static image superimposed over the video stream. The image, for example a company logo, is first uploaded to the Axis product and then used to provide extra information or to mask a part of the image.


Image specifications:

- The uploaded image should be a Windows 24-bit BMP image with maximum 250 colors.
- The image width and height, in pixels, must be exactly divisible by four.
- If you combine a text overlay with an image overlay, the text overlay always takes precedence over the overlay image in height. A text overlay always stretches across the whole video image which means you cannot shrink the overlay strip to make room for an image. For information about the different text overlay heights, see *About overlay text*.

Since it is static, the position and size of an overlay image remains the same regardless of resolution and pan or tilt movements.

How to upload an overlay image

1. Go to **Video > Overlay Image**.
2. Click **Browse** and browse to the file.
3. Click **Upload**.
4. The **Transparency Settings** page is now displayed:
 - To make a color in the overlay image transparent, select **Use transparency** and enter the RGB hexadecimal value for the color. Example: To make white transparent, enter FFFFFFFF.

For more examples of hexadecimal values, see the online help .
 - To scale the image automatically, select **Scale with resolution**. The image will be scaled down to fit the resolution used by the Axis product.
5. Click **Save**.

How to include an overlay image

1. Go to **Video > Overlay Image**.
2. Select the image to use from the **Use overlay image** list and click **Save**.
3. Go to **Video > Video Stream** and select the **Image** tab.

AXIS Q86 Series

About video settings

4. Under **Overlay Settings**, select **Include overlay image at the coordinates**.
5. To control the image's position, enter the X (horizontal) and Y (vertical) coordinates. The $X=0$ and $Y=0$ position is the top left corner. If a part of the image is positioned outside the video image, the overlay image will be moved so that the whole image is visible.
6. Click **Save**.

AXIS Q86 Series

How to configure the live view window

How to configure the live view window

You can configure the following items for your live view window:

- **Stream Profile.** See *page 19*.
- **Default Viewer** for browsers. See *page 23*.
- **Viewer Settings.** See *page 23*.
- **Action Buttons.** See *page 10*.
- **User Defined Links.** See *page 24*.
- **Output Buttons.** See *page 24*.

How to set default viewer for browsers

From **Live View Config > Default Viewer** select the default method for viewing video images in your browser. The product attempts to show the video images in the selected video format and viewer. If this is not possible, the product overrides the settings and selects the best available combination.

Browser	Viewer	Description
Windows Internet Explorer	AMC	Recommended viewer in Internet Explorer (H.264/Motion JPEG).
	QuickTime	H.264.
	Still image	Displays still images only. Click the Refresh button in your browser to view a new image.
Other browsers	Server Push	Recommended viewer for other browsers (Motion JPEG).
	QuickTime	H.264.
	Still image	Displays still images only. Click the Refresh button in your browser to view a new image.

For more information, please see the online help .

About viewer settings

To configure options for the viewer, go to **Live View Config > Viewer Settings**.

- Select **Show viewer toolbar** to display the AXIS Media Control (AMC) or the QuickTime viewer toolbar under the video image in your browser.
- **H.264 decoder installation.** The administrator can disable installation of the H.264 decoder included with AXIS Media Control. This is used to prevent installation of unlicensed copies. Further decoder licenses can be purchased from your Axis reseller.
- Select **Show crosshair in PTZ joystick mode** to enable a cross that will indicate the center of the image in PTZ joystick mode.
- Select **Use PTZ joystick mode as default** to enable joystick mode. The mode can be changed temporarily from the PTZ control panel.
- Select **Enable recording button** to enable recording from the Live View page. This button is available when using the AMC viewer. The recordings are saved to the location specified in the AMC Control Panel. See *About AXIS Media Control (AMC) on page 13*.

AXIS Q86 Series

How to configure the live view window

About user-defined links

To display user-defined links in the live view window, select the **Show custom link** option, give the link a name and then enter the URL to link to. When defining a web link do not remove the 'http://' from the URL address. Custom links can be used to run scripts or activate external devices connected to the product, or they can link to a web page. Custom links defined as cgi links will run the script in the background, in a hidden frame. Defining the link as a web link will open the link in a new window.

Output Buttons

External I/O devices connected to the Axis product's output ports can be controlled directly from the Live View page.

To display output buttons in the Live View page:

1. Go to **Setup > Live View Config**.
2. Under **Output Buttons**, select the type of control to use:
 - **Pulse** activates the output for a defined period of time. The pulse time can be set from 1/100 second to 60 seconds.
 - **Active/Inactive** displays two buttons, one for each action.

To configure the active and inactive states, go to **System Options > Ports & Devices > I/O Ports** and set the port's **Normal state**.

For more information about I/O ports, see *I/O Ports on page 49*.

AXIS Q86 Series

About PTZ (Pan Tilt Zoom)

About PTZ (Pan Tilt Zoom)

About preset positions

A preset position is a saved view that can be used to quickly steer the camera to a specific position. A preset position consists of the following values:

- Pan and tilt positions

How to access the preset positions

Preset positions can be accessed in several ways:

- By selecting the preset from the PTZ Preset drop-down list in the Live View Page.
- When setting up action rules. See *page 31*.
- When setting up guard tours. See *page 25*.

How to add a preset position

1. Go to Setup > PTZ > Preset Positions.
2. Click in the image or use the controls to steer the camera view to the desired position.
3. Write a name in the Current position field.
4. If required, select Use current position as Home.
5. Click Add to save the preset position.

How to include the preset position name in an overlay text

1. Go to Video.
2. Select Include text.
3. Write the modifier #P in the field.
4. Click Save.

How to set the home position

The Home position is readily accessible by clicking the Home button on the live view window and in the Preset Positions setup window.

To set a customized home position, select Use current position as Home when adding a preset position. The user-defined home position will have (H) added, for example, Entrance (H). The default Home position, called "Home", will still be available.

About guard tours

A guard tour displays the video stream from different preset positions either in a predetermined or random order, and for configurable periods of time. Once started, a guard tour continues to run until stopped, even when there are no clients (web browsers) viewing the images.

How to create a guard tour

1. Go to Setup > PTZ > Guard Tour.
2. Click Add.

AXIS Q86 Series

About PTZ (Pan Tilt Zoom)

3. Type a name.
4. Specify the pause length between runs.
5. Select a preset position from the drop-down list and click **Add**.
6. For each preset position, enter the **View Time** in seconds or minutes.
7. Specify the **View Order** of the preset positions, or select **Random view order**.
8. Click **Save**.

How to edit a guard tour

1. Go to **Setup > PTZ > Guard Tour**.
2. Select the guard tour in the **Guard Tour List**.
3. Click **Modify**.


How to delete a guard tour

1. Go to **Setup > PTZ > Guard Tour**.
2. Select the guard tour in the **Guard Tour List**.
3. Click **Remove**.

OSDI Zones

On-Screen Direction Indicator (OSDI) zones can be included in the overlay text (see *About overlay text on page 20*) to aid the user to navigate the Axis product. Each OSDI zone is set up with coordinates and a descriptive name.

OSDI zones are set up under **PTZ > OSDI Zones**. The Axis product uses the coordinates of the center of the view to set the lower left and upper right zone areas. First navigate to where you would like the lowermost left point of the OSDI zone to be located. Click **Get** to set the coordinates. Proceed to where the upper right point of zone should be located and click **Get**. Give the zone a descriptive name and click **OK**.

To include the name of the OSDI zone in the overlay text, go to **Video < Video Stream < Overlay Settings**. Check the **Include text** box and enter the modifier #L in the field. For more information about modifiers, see *File Naming & Date/Time Formats* in the online help .

Advanced

About driver-specific settings

The Device Settings window displays driver specific settings. The appearance of this window can vary depending on the driver installed. Options that can be configured include:

- Driver Specific Settings for Video Source
- Mechanical Limits for Moving Video Source
- Extended Driver Specific Settings for Video Source

For download and installation information about PTZ drivers for your Axis product please visit www.axis.com/support

Extended driver specific settings

You can configure several parameters:

AXIS Q86 Series

About PTZ (Pan Tilt Zoom)

- **Image Freeze Mode** – Select **Presets** to freeze the video stream while the camera changes the preset position. Select **All** to freeze the video stream while the camera changes the preset position or when pan/tilt is operated manually. Select **Off** to disable the image freeze mode.
- **Move Speed** – Enter a value for the pan/tilt speed.

For any changes to take effect, click **Save**.

About advanced PTZ settings

Advanced PTZ settings can be configured under **PTZ > Advanced > Controls**.

The **Panel Shortcut Command Buttons** list shows the user-defined buttons that can be accessed from the Live View page's **Ctrl panel**. These buttons can be used to provide direct access to commands issued using the VAPIX® application programming interface. Click **Add** to add a new shortcut command button.

The following PTZ controls are enabled by default:

- Pan control
- Tilt control


To disable specific controls, deselect the options under **Enable/Disable controls**.

Note

Disabling PTZ controls will not affect preset positions. For example, if the tilt control is disabled, the product can still move to preset positions that require a tilt movement.

About the control queue

Note

- The administrator can enable and disable PTZ controls for selected users.
- To identify different users in the viewer group, cookies must be enabled on the client.
- The **Control queue polltime** is measured in seconds. For more information see the online help .

The administrator can set up a queue for PTZ controllers from **PTZ > Control Queue**. Once set up, the **PTZ Control Queue** buttons appear in the live view window offering one viewer exclusive control for a limited period of time. Other users will be placed in queue.

A user who belongs to a group (see *Users on page 39*) with a higher PTZ priority can go before other users in the queue and take control of the product. The order of priority is as follows:

1. **Administrator** – An administrator takes over PTZ control regardless of who is first in queue. The administrator will be removed from the queue 60 seconds after the last PTZ control command.
2. **Event** – The Axis product can be configured to go to a preset position when triggered by an alarm (see *About events on page 37*). The event will immediately be placed first in the queue except when an administrator is in control.
3. **Operator** – Same as administrator but with lower priority
4. **Guard Tour** – A guard tour (see *page 25*) has PTZ control for an indefinite period of time. It may be overridden by an operator, event or administrator. The guard tour will resume when higher priority groups leave the queue.
5. **Viewer** – Multiple viewers must wait for their turn. The viewer has 60 seconds PTZ control before control is passed on to the next viewer in queue.

About detectors

About shock detection

Enable **Shock Detection** from the **Detectors** menu. Shock detection is used, for example, to generate an alarm if the product is hit by an object or if the product is tampered with.

Use the **Shock sensitivity** slider to adjust the sensitivity level at which the product should send an alarm. Low sensitivity value implies that the product will generate an alarm only if the hit is powerful. A high sensitivity value implies that the product will generate an alarm even with mild tampering.

About motion detection

Motion detection is used to generate an alarm whenever movement starts or stops in the camera view.

Motion detection is configured by defining up to 10 Include and Exclude windows:

- **Include windows** – define areas where motion should be detected
- **Exclude windows** – define areas within an Include window that should be ignored (areas outside Include windows are automatically ignored).

For instructions, see *How to set up motion detection windows on page 28*.

To control the number of motion detection alarms, the parameters **Object Size**, **History** and **Sensitivity** can be adjusted. See *About motion detection parameters on page 28*.

Once motion detection windows are configured, the Axis product can be configured to perform actions when motion is detected. Possible actions include uploading images and start recording. For more information, see *How to set up action rules on page 31*.

Note

- Using the motion detection feature may decrease the product's overall performance.
- The position of the Motion Detection Window is relative to the orientation of the Camera. Changing the orientation of the camera will also change the position of the Motion Detection Window.

How to set up motion detection windows

To set up a motion detection Include Window, follow these instructions:

1. Go to **Detectors > Motion Detection**.
2. Select the **Configure Included Windows** option and click **New**. Select the new window in the list of windows and enter a descriptive name.
3. Adjust the size (drag the bottom right-hand corner) and the position (click on the text at the top and drag to the desired position) of the window.
4. Adjust the **Object Size**, **History** and **Sensitivity** profile sliders (see *About motion detection parameters* for details). Any detected motion within an active window is indicated by red peaks in the **Activity window**.
5. Click **Save**.

To exclude parts of the include window, select the **Configure Excluded Windows** and position the exclude window within the include window.

To delete an include or exclude window, select the window in the list of windows and click **Del**.

About motion detection parameters

The parameters controlling motion detection are described in the table below:

AXIS Q86 Series

About detectors

Parameter	Object Size	History	Sensitivity
High level (100%)	Only very large objects trigger motion detection.	An object that appears in the window triggers motion detection for a long time before it is considered as non-moving.	Small variations in thermal radiation between object and background will trigger the motion detection.
Low level (0%)	Even very small objects trigger motion detection.	An object that appears in the window triggers motion detection only for a very short time before it is considered as non-moving.	Large variations in thermal radiation between object and background will trigger motion detection
Default values	Low	High	High

Note

- To trigger on small objects or movements, use several small motion detection windows rather than one large window, and select a low object size.
- To avoid triggering on small objects, select a high object size.
- While monitoring an area where moving objects are not expected, select a high history level. This will cause motion detection to trigger as long as the object is present in the window.

AXIS Q86 Series

About applications

About applications

AXIS Camera Application Platform (ACAP) is an open platform that enables third parties to develop analytics and other applications for Axis products. To find out more about available applications, downloads, trials and licenses, go to axis.com/applications

To find the user manuals for Axis applications, go to axis.com

Note

- Several applications can run at the same time but some applications might not be compatible with each other. Certain combinations of applications might require too much processing power or memory resources when run in parallel. Verify that the applications work together before deployment.

About application licenses

Some applications need a license to run. Licenses can be installed in two ways:

- Automatic installation – requires access to the Internet
- Manual installation – obtain the license key from the application vendor and upload the key to the Axis product

To request a license, the Axis product serial number (S/N) is required. The serial number can be found on the product label and under **System Options > Support > System Overview**.

How to upload and start an application

To upload and start an application:

1. Go to **Setup > Applications**.
2. Under **Upload Application**, click **Browse**. Locate the application file and click **Upload Package**.
3. Install the license (if applicable). For instructions, see the documentation provided by the application vendor.
4. Start the application. Go to **Applications**, select the application in the list of installed applications and click **Start**.
5. Configure the application. For instructions, see the documentation provided by the application vendor.

Note

- Applications can be uploaded by product administrators.
- Applications and licenses can be installed on multiple products at the same time using AXIS Camera Management, version 3.10 and later.

To generate a log file for the application, go to **Applications**. Select the application and click **Log**.

Application Considerations

If an application is upgraded, application settings, including the license, will be removed. The license must be reinstalled and the application reconfigured.

If the Axis product's firmware is upgraded, uploaded applications and their settings will remain unchanged, although this is not guaranteed by Axis Communications. Note that the application must be supported by the new firmware. For information about firmware upgrades, see *How to upgrade the firmware on page 52*.

If the Axis product is restarted, running applications will restart automatically.

If the Axis product is restored or reset to factory default, uploaded applications and their settings are removed. For information about restoring the Axis product, see *Maintenance on page 49*. For information about factory default, see *How to reset to factory default settings on page 51*.

About events

About events

The event pages allow you to configure your product to perform actions when different events occur. For example, the product can start a recording or send an email notification when motion is detected. The set of conditions that defines how and when the action is triggered is called an action rule.

How to set up action rules

An action rule defines the conditions that must be met for the product to perform an action, for example record video or send an email notification. If multiple conditions are defined, all of them must be met to trigger the action.

For more information about available triggers and actions, see *About triggers on page 31* and *About actions on page 33*.

The following example describes how to set up an action rule to record video to a network share if there is movement in the camera's field of view.

How to set up motion detection and add a network share:

1. Go to **Applications** to start and configure AXIS Video Motion Detection. See the online help.
It's also possible to go to **Detectors > Motion Detection** and configure a motion detection window. See the online help.
2. Go to **System Options > Storage** and set up the network share. See *page 48*.


How to set up the action rule:

1. Go to **Events > Action Rules** and click **Add**.
2. Select **Enable rule** and enter a descriptive name for the rule.
3. Select **Applications** from the **Trigger** drop-down list and then select **VMD**.
It's also possible to select **Detectors** from the **Trigger** drop-down list, then select **Motion Detection** and then select the motion detection window.
4. Optionally, select a **Schedule** and **Additional conditions**. See below.
5. Under **Actions**, select **Record Video** from the **Type** drop-down list.
6. Select a **Stream profile** and configure the **Duration** settings as described below.
7. Select **Network Share** from the **Storage** drop-down list.

To use more than one trigger for the action rule, select **Additional conditions** and click **Add** to add additional triggers. When using additional conditions, all conditions must be met to trigger the action.

To prevent an action from being triggered repeatedly, a **Wait at least** time can be set. Enter the time in hours, minutes and seconds, during which the trigger should be ignored before the action rule can be activated again.

The recording **Duration** of some actions can be set to include time immediately before and after the event. Select **Pre-trigger time** and/or **Post-trigger time** and enter the number of seconds. When **While the rule is active** is enabled and the action is triggered again during the post-trigger time, the recording time will be extended with another post-trigger time period.

For more information, see the online help .

About triggers

Available action rule **triggers** and **conditions** include:

- **Applications** – Use installed applications to trigger the rule. See *About applications on page 30*.

AXIS Q86 Series

About events

- **Detectors**
 - **Live Stream Accessed** – Trigger the rule when any stream is accessed and during edge storage playback. This can for example be used to send notifications.
 - **Motion Detection** – Trigger the rule when motion is detected. See *About motion detection on page 28*.
 - **Shock Detection** – Trigger the rule when the Axis product detects it has been tilted or hit. See *About shock detection on page 28*.
- **Hardware**
 - **Network** – Trigger the rule if network connection is lost or restored. This can for example be used to start recording to the SD card.
 - **Temperature** – Trigger the rule if the temperature falls outside or inside the operating range of the product. This can for example be used to send maintenance notifications.
- **Input Signal**
 - **Digital Input Port** – Trigger the rule when an I/O port receives a signal from a connected device. See *I/O Ports on page 49*.
 - **Manual Trigger** – Trigger the rule using the **Manual Trigger** button in the Live View page. See *About the controls in the live view window on page 10*. This can for example be used to validate actions during product installation and configuration.
 - **Virtual Inputs** – can be used by a VMS (Video Management System) to trigger actions. Virtual inputs can, for example, be connected to buttons in the VMS user interface.
- **PTZ**
 - **Moving** – Trigger the rule when the camera view moves due to a PTZ operation. This can for example be used as an additional condition to prevent an action rule triggered by motion detection to record video while the camera view moves due to a PTZ operation.
 - **Preset Reached** – Trigger the rule when the camera stops at a preset position. This can be for example be used with the Send Images action to upload images from the preset position.
 - **Ready** – Trigger the rule when the PTZ functionality is ready to be used. This can for example be used to steer the camera to a specific preset position when the product is started.
- **Storage**
 - **Disruption** – Trigger the rule if storage problems are detected, for example if the storage device is unavailable, removed, full, locked or if other read or write problems occur. This can for example be used to send maintenance notifications.
 - **Recording** – Triggers the rule when the Axis product records to the storage device. The recording status trigger can be used to notify the operator, for example by flashing LED lights, if the product has started or stopped to record to the storage device. Note that, this trigger can be used only for edge storage recording status.
- **System**
 - **System Ready** – Trigger the rule when the product has been started and all services are running. This can for example be used to send a notification when the product restarts.
- **Time**
 - **Recurrence** – Trigger the rule periodically. See *How to set up recurrences on page 35*. This can for example be used to upload an image every 5 minutes.
 - **Use Schedule** – Trigger the rule according to the selected schedule. See *How to create schedules on page 35*.

AXIS Q86 Series

About events

About actions

You can configure several actions:

- **Output Port** – Activate an I/O port to control an external device.
- **Overlay Text** – Display an overlay text. See *How to include overlay text in an action rule on page 20*.
- **PTZ Control**
 - **Preset Position** – Go to a preset position.
 - **Guard Tour** – Start a guard tour. See *About guard tours on page 25*.
- **Record Video** – Record video to a selected storage.
- **Send Images** – Send images to a recipient.
- **Send Notification** – Send a notification message to a recipient.
- **Send SNMP Trap** – Send an SNMP trap message to the operator. Make sure that SNMP is enabled and configured under **System Options > Network > SNMP**.
- **Send Video Clip** – Send a video clip to a recipient.

How to add recipients

The product can send media files and messages to notify users about events. Before the product can send media files or notification messages, you must define one or more recipients. For information about available options, see *About recipient types on page 33*.

To add a recipient:

1. Go to **Events > Recipients** and click **Add**.
2. Enter a descriptive name.
3. Select a recipient **Type**.
4. Enter the information needed for the recipient type.
5. Click **Test** to test the connection to the recipient.
6. Click **OK**.

About recipient types

The following recipient types are available:

Recipient types	Use with action	Notes
Email	Send Images Send Notification Send Video Clip	An email recipient can contain multiple email addresses.
FTP	Send Images Send Video Clip	

AXIS Q86 Series

About events

SFTP	Send Images Send Video Clip	Encrypted file transfer using SSH File Transport Protocol (SFTP). SFTP is a more secure method than FTP but file transfer might be slower, especially for large files such as high resolution video. Specify login information for the SFTP server and the server's public key MD5 fingerprint (32 hexadecimal digits). The SFTP recipient supports SFTP servers using SSH-2 with RSA and DSA host key types. RSA is the preferred method. To use DSA, disable the RSA key on the SFTP server.
HTTP	Send Images Send Notification Send Video Clip	
HTTPS	Send Images Send Notification Send Video Clip	Encrypted file transfer using HyperText Transfer Protocol Secure (HTTPS). Specify login information for the HTTPS server and validate the server's certificate. If there is a proxy between the Axis product and the HTTPS server, also specify the proxy settings.
Network Share	Send Images Send Video Clip	A network share can also be used as a storage device for recorded video. Go System Options > Storage to configure a network share before setting up a continuous recording or an action rule to record video. For more information about storage devices, see <i>Storage on page 47</i> .
TCP	Send Notification	

How to set up email recipients

Email recipients can be configured by selecting one of the listed email providers, or by specifying the SMTP server, port and authentication used by, for example, a corporate email server.

Note

Some email providers have security filters that prevent users from receiving or viewing large attachments, from receiving scheduled emails and similar. Check the email provider's security policy to avoid delivery problems and locked email accounts.

To set up an email recipient using one of the listed providers:

1. Go to **Events > Recipients** and click **Add**.
2. Enter a **Name** and select **Email** from the **Type** list.
3. Enter the email addresses to send emails to in the **To** field. Use commas to separate multiple addresses.
4. Select the email provider from the **Provider** list.
5. Enter the user ID and password for the email account.
6. Click **Test** to send a test email.

To set up an email recipient using for example a corporate email server, follow the instructions above but select **User defined as Provider**. Enter the email address to appear as sender in the **From** field. Select **Advanced settings** and specify the SMTP server address, port and authentication method. Optionally, select **Use encryption** to send emails over an encrypted connection. The server certificate can be validated using the certificates available in the Axis product. For information on how to upload certificates, see *About certificates on page 40*.

About events

How to create schedules

Schedules can be used as action rule triggers or as additional conditions, for example to record video if motion is detected outside office hours. Use one of the predefined schedules or create a new schedule as described below.

To create a new schedule:

1. Go to **Events > Schedules** and click **Add**.
2. Enter a descriptive name and the information needed for a daily, weekly, monthly or yearly schedule.
3. Click **OK**.

To use the schedule in an action rule, select the schedule from the **Schedule** drop-down list in the **Action Rule Setup** page.

How to set up recurrences

Recurrences are used to trigger action rules repeatedly, for example every 5 minutes or every hour.

To set up a recurrence:

1. Go to **Events > Recurrences** and click **Add**.
2. Enter a descriptive name and recurrence pattern.
3. Click **OK**.

To use the recurrence in an action rule, first select **Time** from the **Trigger** drop-down list in the **Action Rule Setup** page and then select the recurrence from the second drop-down list.

To modify or remove recurrences, select the recurrence in the **Recurrences List** and click **Modify** or **Remove**.

About recordings

The Axis product can be configured to record video continuously or according to an action rule:

- To start a continuous recording, see *page 37*.
- To set up action rules, see *page 31*.
- To access recordings, see *How to find recordings on page 36*.
- To play recordings, see *How to play recordings on page 36*.
- To export a recording as a video clip, see *How to export a video clip on page 37*.
- To configure camera controlled storage, see *Storage on page 47*.

How to find recordings

Recordings stored on the SD card or network share can be accessed from the **Recordings > List** page. The page lists all recordings on the storage device and shows each recording's start date and time, duration and the event that triggered the recording.

Note

The recording's start date and time is set according to the Axis product's date and time settings. If the Axis product is configured to use a time zone different from the local time zone, make sure to configure the **Recording time** filters according to the product's time zone. Date and time settings are configured under **System Options > Date & Time**, see *Date & Time on page 41*.

To find a recording, follow these steps:

1. Go to **Recordings > List**.
2. To reduce the number of recordings displayed, select the desired options under **Filter**:
 - Recording time** – List recordings that started between the **From** and **To** times.
 - Event** – List recordings that were triggered by a specific event. Select **continuous** to list continuous recordings.
 - Storage** – List recordings from a specific storage device.
 - Sort** – Specify how recordings should be sorted in the list.
 - Results** – Specify the maximum number of recordings to display.
3. To apply the filters, click the **Filter** button. Some filters may take a long time to complete.
4. The recordings are displayed in the **Recording** list.

To play a recording, select the recording and click **Play**. See also *How to play recordings on page 36*.

To view detailed information about a recording, select the recording and click **Properties**.

To export a recording or a part of a recording as a video clip, select the recording and click **Export**. See also *How to export a video clip on page 37*.

To remove a recording from the storage device, select the recording and click **Remove**.

How to play recordings

Recordings on the SD card or network share can be played directly from the Axis product's web pages.

AXIS Q86 Series

About recordings

To play a recording, follow these steps:

1. Go to **Recordings > List**.
2. To reduce the number of recordings displayed, select the desired options under **Filter** and click the **Filter** button to apply the filters. See also *How to find recordings on page 36*.
3. Select the recording and click **Play**. The recording will be played in a new browser window.

How to export a video clip

Recordings on the SD card or network share can be exported as video clips. You can export a complete recording or a part of a recording.

Note

The exported recording is a Matroska video file (.mkv). To play the recording in Windows Media Player, AXIS Matroska File Splitter must be installed. AXIS Matroska File Splitter can be downloaded from www.axis.com/support/downloads

To export a video clip, follow these steps:

1. Go to **Recordings > List**.
2. To reduce the number of recordings displayed, select the desired options under **Filter** and click the **Filter** button to apply the filters. See also *How to find recordings on page 36*.
3. Select the recording and click **Export**. The **Export Recording** dialog opens.
4. By default, the complete recording is selected. To export a part of the recording, modify the start and stop times.
5. Optionally, enter a file name for the recording.
6. Click **Export**.

Note

Recordings can also be exported from the playback window.

About continuous recording

The Axis product can be configured to continuously save video to a storage device. For information about storage devices, see *Storage on page 47*. To prevent the disk from becoming full, it is recommended to configure the disk to automatically remove old recordings.

If a new stream profile is selected while a recording is ongoing, the recording will be stopped and saved in the recording list and a new recording with the new stream profile will start. All previous continuous recordings will remain in the recording list until they are removed manually or through automatic removal of old recordings.

To start a continuous recording, follow these steps:

1. Go to **Recordings > Continuous**.
2. Select **Enabled**.
3. Select the type of storage device from the **Storage** list.
4. Select a **Stream profile** to use for continuous recordings.
5. Click **Save** to save and start the recording.

AXIS Q86 Series

About languages

About languages

Multiple languages can be installed in the Axis product. All web pages including the online help will be displayed in the selected language. To switch languages, go to **Setup > Languages** and first upload the new language file. Browse and locate the file and click the **Upload Language** button. Select the new language from the list and click **Save**.

Note

- Resetting the product to factory default settings will erase any uploaded language files and reset the product language to English.
- Clicking the **Restore** button on the Maintenance page will not affect the language.
- A firmware upgrade will not affect the language used. However if you have uploaded a new language to the product and later upgrade the firmware, it may happen that the translation no longer matches the product's web pages. In this case, upload an updated language file.
- A language already installed in the product will be replaced when a current or a later version of the language file is uploaded.

AXIS Q86 Series

About system options

About system options

Security

Users

User access control is enabled by default and can be configured under **System Options > Security > Users**. An administrator can set up other users by giving them user names and passwords. It is also possible to allow anonymous viewer login, which means that anybody may access the Live View page.

The user list displays authorized users and user groups (access levels):

- Viewers have access to the Live View page
- Operators have access to all settings except:
- Administrators have unrestricted access to all settings. The administrator can add, modify and remove other users.

Note

Note that when the option **Encrypted & unencrypted** is selected, the webserver will encrypt the password. This is the default option for a new unit or a unit reset to factory default settings.

Under **HTTP/RTSP Password Settings**, select the type of password to allow. You may need to allow unencrypted passwords if there are viewing clients that do not support encryption, or if you upgraded the firmware and existing clients support encryption but need to log in again and be configured to use this functionality.

Under **User Settings**, select the **Enable anonymous viewer login** option to allow anonymous users access to the Live View page.

Select the **Enable anonymous PTZ control login** to allow anonymous users access to the PTZ controls.

Deselect the **Enable Basic Setup** option to hide the Basic Setup menu. Basic Setup provides quick access to settings that should be made before using the Axis product.

ONVIF

ONVIF (Open Network Video Interface Forum) is a global interface standard that makes it easier for end users, integrators, consultants, and manufacturers to take advantage of the possibilities offered by network video technology. ONVIF enables interoperability between different vendor products, increased flexibility, reduced cost and future-proof systems.

By creating a user you automatically enable ONVIF communication. Use the user name and password with all ONVIF communication with the product. For more information see www.onvif.org

IP Address Filter

IP address filtering is enabled on the **System Options > Security > IP Address Filter** page. Once enabled, the listed IP address are allowed or denied access to the Axis product. Select **Allow** or **Deny** from the list and click **Apply** to enable IP address filtering.

The administrator can add up to 256 IP address entries to the list (a single entry can contain multiple IP addresses).

HTTPS

HTTPS (HyperText Transfer Protocol over Secure Socket Layer, or HTTP over SSL) is a web protocol providing encrypted browsing. HTTPS can also be used by users and clients to verify that the correct device is being accessed. The security level provided by HTTPS is considered adequate for most commercial exchanges.

The Axis product can be configured to require HTTPS when users from different user groups (administrator, operator, viewer) log in.

To use HTTPS, an HTTPS certificate must first be installed. Go to **System Options > Security > Certificates** to install and manage certificates. See *About certificates on page 40*.

AXIS Q86 Series

About system options

To enable HTTPS on the Axis product:

1. Go to **System Options > Security > HTTPS**
2. Select an HTTPS certificate from the list of installed certificates.
3. Optionally, click **Ciphers** and select the encryption algorithms to use for SSL.
4. Set the **HTTPS Connection Policy** for the different user groups.
5. Click **Save** to enable the settings.

To access the Axis product via the desired protocol, in the address field in a browser, enter `https://` for the HTTPS protocol and `http://` for the HTTP protocol.

The HTTPS port can be changed on the **System Options > Network > TCP/IP > Advanced** page.

IEEE 802.1X

IEEE 802.1X is a standard for port-based Network Admission Control providing secure authentication of wired and wireless network devices. IEEE 802.1X is based on EAP (Extensible Authentication Protocol).

To access a network protected by IEEE 802.1X, devices must be authenticated. The authentication is performed by an authentication server, typically a **RADIUS** server, examples of which are FreeRADIUS and Microsoft Internet Authentication Service.

In Axis implementation, the Axis product and the authentication server identify themselves with digital certificates using EAP-TLS (Extensible Authentication Protocol - Transport Layer Security). The certificates are provided by a **Certification Authority (CA)**. You need:

- a CA certificate to authenticate the authentication server.
- a CA-signed client certificate to authenticate the Axis product.

To create and install certificates, go to **System Options > Security > Certificates**. See *About certificates on page 40*.

To allow the product to access a network protected by IEEE 802.1X:

1. Go to **System Options > Security > IEEE 802.1X**.
2. Select a **CA Certificate** and a **Client Certificate** from the lists of installed certificates.
3. Under **Settings**, select the EAPOL version and provide the EAP identity associated with the client certificate.
4. Check the box to enable IEEE 802.1X and click **Save**.

Note

For authentication to work properly, the date and time settings in the Axis product should be synchronized with an NTP server. See *Date & Time on page 41*.

About certificates

Certificates are used to authenticate devices on a network. Typical applications include encrypted web browsing (HTTPS), network protection via IEEE 802.1X and secure upload of images and notification messages for example via email. Two types of certificates can be used with the Axis product:

Server/Client certificates – To authenticate the Axis product. A **Server/Client** certificate can be self-signed or issued by a Certificate Authority (CA). A self-signed certificate offers limited protection and can be used before a CA-issued certificate has been obtained.

CA certificates – To authenticate peer certificates, for example the certificate of an authentication server in case the Axis product is connected to an IEEE 802.1X protected network. The Axis product is shipped with several preinstalled CA certificates.

AXIS Q86 Series

About system options

Note

- If the product is reset to factory default, all certificates, except preinstalled CA certificates, will be deleted.
- If the product is reset to factory default, all preinstalled CA certificates that have been deleted will be reinstalled.

How to create a self-signed certificate

1. Go to Setup > System Options > Security > Certificates.
2. Click Create self-signed certificate and provide the requested information.

How to create and install a CA-signed certificate

1. Create a self-signed certificate, see *How to create a self-signed certificate on page 41*.
2. Go to Setup > System Options > Security > Certificates.
3. Click Create certificate signing request and provide the requested information.
4. Copy the PEM-formatted request and send to the CA of your choice.
5. When the signed certificate is returned, click Install certificate and upload the certificate.

How to install additional CA certificates

1. Go to Setup > System Options > Security > Certificates.
2. Click Install certificate and upload the certificate.

Date & Time


The Axis product's date and time settings are configured under System Options > Date & Time.

Current Server Time displays the current date and time (24h clock). The time can be displayed in 12h clock in the text overlay (see below).

To change the date and time settings, select the preferred Time mode under New Server Time:

- **Synchronize with computer time** – Sets date and time according to the computer's clock. With this option, date and time are set once and will not be updated automatically.
- **Synchronize with NTP Server** – Obtains date and time from an NTP server. With this option, date and time settings are updated continuously. For information on NTP settings, see *NTP Configuration on page 44*.
If using a host name for the NTP server, a DNS server must be configured. See *DNS Configuration on page 43*.
- **Set manually** – Allows you to manually set date and time.

If using an NTP server, select your Time zone from the drop-down list. If required, check **Automatically adjust for daylight saving time changes**.

The Date & Time Format Used in Images is the date and time format displayed as a text overlay in the video stream. Use the predefined formats or see *File Naming & Date/Time Formats* in the online help  for information on how to create custom date and time formats. To include date and time in the overlay text, go to Video and select **Include date** and **Include time**.

Network

Basic TCP/IP Settings

The Axis product supports IP version 4 and IP version 6. Both versions can be enabled simultaneously, and at least one version must always be enabled.

IPv4 Address Configuration

By default, the Axis product is set to use IPv4 (IP version 4) and to obtain the IP address automatically via DHCP. The IPv4 settings are configured under **System Options > Network > TCP/IP > Basic**.

DHCP (Dynamic Host Configuration Protocol) allows network administrators to centrally manage and automate the assignment of IP addresses. DHCP should only be enabled if using dynamic IP address notification, or if the DHCP can update a DNS server. It is then possible to access the Axis product by name (host name).

If DHCP is enabled and the product cannot be accessed, run **AXIS IP Utility** to search the network for connected Axis products, or reset the product to the factory default settings (see *page 51*) and then perform the installation again.

To use a static IP address, check **Use the following IP address** and specify the IP address, subnet mask and default router.

IPv6 Address Configuration

If IPv6 (IP version 6) is enabled, the Axis product will receive an IP address according to the configuration in the network router.

To enable IPv6, go to **System Options > Network > TCP/IP > Basic**. Other settings for IPv6 should be configured in the network router.

ARP/Ping

The product's IP address can be assigned using ARP and Ping. For instructions, see *Assign IP Address Using ARP/Ping on page 42*.

The ARP/Ping service is enabled by default but is automatically disabled two minutes after the product is started, or as soon as an IP address is assigned. To re-assign IP address using ARP/Ping, the product must be restarted to enable ARP/Ping for an additional two minutes.

To disable the service, go to **System Options > Network > TCP/IP > Basic** and clear the option **Enable ARP/Ping setting of IP address**.

Pinging the product is still possible when the service is disabled.

Assign IP Address Using ARP/Ping

The product's IP address can be assigned using ARP/Ping. The command must be issued within 2 minutes of connecting power.

1. Acquire a free static IP address on the same network segment as the computer.
2. Locate the serial number (S/N) on the product label.
3. Open a command prompt and enter the following commands:

Linux/Unix syntax

```
arp -s <IP address> <serial number> temp  
ping -s 408 <IP address>
```

Linux/Unix example

```
arp -s 192.168.0.125 00:40:8c:18:10:00 temp  
ping -s 408 192.168.0.125
```

Windows syntax (this may require that you run the command prompt as an administrator)

```
arp -s <IP address> <serial number>
```

AXIS Q86 Series

About system options

```
ping -l 408 -t <IP address>
```

Windows example (this may require that you run the command prompt as an administrator)

```
arp -s 192.168.0.125 00-40-8c-18-10-00  
ping -l 408 -t 192.168.0.125
```

4. Check that the network cable is connected and then restart the product by disconnecting and reconnecting power.
5. Close the command prompt when the product responds with `Reply from 192.168.0.125:...` or similar.
6. Open a browser and type `http://<IP address>` in the Location/Address field.

For other methods of assigning the IP address, see the document *Assign an IP Address and Access the Video Stream* on Axis Support web at www.axis.com/support

Note

- To open a command prompt in Windows, open the **Start** menu and type `cmd` in the **Run/Search** field.
- To use the ARP command in Windows 8/Windows 7/Windows Vista, right-click the command prompt icon and select **Run as administrator**.
- To open a command prompt in Mac OS X, open the **Terminal** utility from **Application > Utilities**.

AXIS Video Hosting System (AVHS)

AVHS used in conjunction with an AVHS service, provides easy and secure Internet access to live and recorded video accessible from any location. For more information and help to find a local AVHS Service Provider go to www.axis.com/hosting

The AVHS settings are configured under **System Options > Network > TCP IP > Basic**. The possibility to connect to an AVHS service is enabled by default. To disable, clear the **Enable AVHS** box.

One-click enabled – Press and hold the product's control button (see *Product overview on page 7*) for about 3 seconds to connect to an AVHS service over the Internet. Once registered, **Always** will be enabled and the Axis product stays connected to the AVHS service. If the product is not registered within 24 hours from when the button is pressed, the product will disconnect from the AVHS service.

Always – The Axis product will constantly attempt to connect to the AVHS service over the Internet. Once registered, the product will stay connected to the service. This option can be used when the product is already installed and it is not convenient or possible to use the one-click installation.

AXIS Internet Dynamic DNS Service

AXIS Internet Dynamic DNS Service assigns a host name for easy access to the product. For more information, see www.axiscam.net

To register the Axis product with AXIS Internet Dynamic DNS Service, go to **System Options > Network > TCP/IP > Basic**. Under **Services**, click the **AXIS Internet Dynamic DNS Service Settings** button (requires access to the Internet). The domain name currently registered at AXIS Internet Dynamic DNS service for the product can at any time be removed.

Note

AXIS Internet Dynamic DNS Service requires IPv4.

Advanced TCP/IP Settings

DNS Configuration

DNS (Domain Name Service) provides the translation of host names to IP addresses. The DNS settings are configured under **System Options > Network > TCP/IP > Advanced**.

Select **Obtain DNS server address via DHCP** to use the DNS settings provided by the DHCP server.

To make manual settings, select **Use the following DNS server address** and specify the following:

AXIS Q86 Series

About system options

Domain name – Enter the domain(s) to search for the host name used by the Axis product. Multiple domains can be separated by semicolons. The host name is always the first part of a fully qualified domain name, for example, `myserver` is the host name in the fully qualified domain name `myserver.mycompany.com` where `mycompany.com` is the domain name.

Primary/Secondary DNS server – Enter the IP addresses of the primary and secondary DNS servers. The secondary DNS server is optional and will be used if the primary is unavailable.

NTP Configuration

NTP (Network Time Protocol) is used to synchronize the clock times of devices in a network. The NTP settings are configured under **System Options > Network > TCP/IP > Advanced**.

Select **Obtain NTP server address via DHCP** to use the NTP settings provided by the DHCP server.

To make manual settings, select **Use the following NTP server address** and enter the host name or IP address of the NTP server.


Host Name Configuration

The Axis product can be accessed using a host name instead of an IP address. The host name is usually the same as the assigned DNS name. The host name is configured under **System Options > Network > TCP/IP > Advanced**.

Select **Obtain host name via IPv4 DHCP** to use host name provided by the DHCP server running on IPv4.

Select **Use the host name** to set the host name manually.

Select **Enable dynamic DNS updates** to dynamically update local DNS servers whenever the Axis product's IP address changes.

For more information, see the online help .

Link-Local IPv4 Address

Link-Local Address is enabled by default and assigns the Axis product an additional IP address which can be used to access the product from other hosts on the same segment on the local network. The product can have a Link-Local IP and a static or DHCP-supplied IP address at the same time.

This function can be disabled under **System Options > Network > TCP/IP > Advanced**.

HTTP

The HTTP port used by the Axis product can be changed under **System Options > Network > TCP/IP > Advanced**. In addition to the default setting, which is 80, any port in the range 1024–65535 can be used.

HTTPS

The HTTPS port used by the Axis product can be changed under **System Options > Network > TCP/IP > Advanced**. In addition to the default setting, which is 443, any port in the range 1024–65535 can be used.

To enable HTTPS, go to **System Options > Security > HTTPS**. For more information, see *HTTPS on page 39*.

NAT traversal (port mapping) for IPv4

A network router allows devices on a private network (LAN) to share a single connection to the Internet. This is done by forwarding network traffic from the private network to the "outside", that is, the Internet. Security on the private network (LAN) is increased since most routers are pre-configured to stop attempts to access the private network (LAN) from the public network (Internet).

Use **NAT traversal** when the Axis product is located on an intranet (LAN) and you wish to make it available from the other (WAN) side of a NAT router. With NAT traversal properly configured, all HTTP traffic to an external HTTP port in the NAT router is forwarded to the product.

NAT traversal is configured under **System Options > Network > TCP/IP > Advanced**.

AXIS Q86 Series

About system options

Note

- For NAT traversal to work, this must be supported by the router. The router must also support UPnP®.
- In this context, router refers to any network routing device such as a NAT router, Network router, Internet Gateway, Broadband router, Broadband sharing device, or a software such as a firewall.

Enable/Disable – When enabled, the Axis product attempts to configure port mapping in a NAT router on your network, using UPnP. Note that UPnP must be enabled in the product (see **System Options > Network > UPnP**).

Use manually selected NAT router – Select this option to manually select a NAT router and enter the IP address for the router in the field. If no router is specified, the product automatically searches for NAT routers on your network. If more than one router is found, the default router is selected.

Alternative HTTP port – Select this option to manually define an external HTTP port. Enter a port in the range 1024–65535. If the port field is empty or contains the default setting, which is 0, a port number is automatically selected when enabling NAT traversal.

Note

- An alternative HTTP port can be used or be active even if NAT traversal is disabled. This is useful if your NAT router does not support UPnP and you need to manually configure port forwarding in the NAT router.
- If you attempt to manually enter a port that is already in use, another available port is automatically selected.
- When the port is selected automatically it is displayed in this field. To change this, enter a new port number and click **Save**.

FTP

The FTP server running in the Axis product enables upload of new firmware, user applications, etc. The FTP server can be disabled under **System Options > Network > TCP/IP > Advanced**.

Note

This FTP server has nothing to do with the product's ability to transfer images via FTP to other locations and servers.

RTSP


The RTSP server running in the Axis product allows a connecting client to start an H.264 stream. The RTSP port number can be changed under **System Options > Network > TCP/IP > Advanced**. The default port is 554.

Note

H.264 video streams will not be available if the RTSP server is disabled.

SOCKS

SOCKS is a networking proxy protocol. The Axis product can be configured to use a SOCKS server to reach networks on the other side of a firewall or proxy server. This functionality is useful if the Axis product is located on a local network behind a firewall, and notifications, uploads, alarms, etc need to be sent to a destination outside the local network (for example the Internet).

SOCKS is configured under **System Options > Network > SOCKS**. For more information, see the online help .

QoS (Quality of Service)

QoS (Quality of Service) guarantees a certain level of a specified resource to selected traffic on a network. A QoS-aware network prioritizes network traffic and provides a greater network reliability by controlling the amount of bandwidth an application may use.

The QoS settings are configured under **System Options > Network > QoS**. Using DSCP (Differentiated Services Codepoint) values, the Axis product can mark different types of traffic.

SNMP

The Simple Network Management Protocol (SNMP) allows remote management of network devices. An SNMP community is the group of devices and management station running SNMP. Community names are used to identify groups.

AXIS Q86 Series

About system options

AXIS Video MIB (Management Information Base) for video hardware can be used to monitor Axis-specific, hardware-related issues that may need administrative attention. For more information about AXIS Video MIB and to download MIB files, go to www.axis.com/support

To enable and configure SNMP in the Axis product, go to the **System Options > Network > SNMP** page.

Depending on the level of security required, select the version on SNMP to use.

Traps are used by the Axis product to send messages to a management system on important events and status changes. Check **Enable traps** and enter the IP address where the trap message should be sent and the **Trap community** that should receive the message.

Note

If HTTPS is enabled, SNMP v1 and SNMP v2c should be disabled.

Traps for SNMP v1/v2 are used by the Axis product to send messages to a management system on important events and status changes. Check **Enable traps** and enter the IP address where the trap message should be sent and the **Trap community** that should receive the message.

The following traps are available:

- Cold start
- Warm start
- Link up
- Authentication failed

Note

All AXIS Video MIB traps are enabled when SNMP v1/v2c traps are enabled. It is not possible to turn on or off specific traps.

SNMP v3 provides encryption and secure passwords. To use traps with SNMP v3, an SNMP v3 management application is required.

To use SNMP v3, HTTPS must be enabled, see *HTTPS on page 39*. To enable SNMP v3, check the box and provide the initial user password.

Note

The initial password can only be set once. If the password is lost, the Axis product must be reset to factory default, see *How to reset to factory default settings on page 51*.

UPnP

The Axis product includes support for UPnP®. UPnP is enabled by default and the product is automatically detected by operating systems and clients that support this protocol.

UPnP can be disabled under **System Options > Network > UPnP**.

RTP/H.264

The RTP port range and multicast settings are configured under **System Options > Network > RTP**.

The RTP port range defines the range of ports from which the video ports are automatically selected. For multicast streams, only certain IP addresses and port numbers should be used.

Select **Always Multicast Video** to start multicast streaming without opening an RTSP session.

Bonjour

The Axis product includes support for Bonjour. Bonjour is enabled by default and the product is automatically detected by operating systems and clients that support this protocol.

AXIS Q86 Series

About system options

Bonjour can be disabled under **System Options > Network > Bonjour**.

Storage

About SD cards

NOTICE

To prevent data corruption, the SD card should be unmounted before removal.

Note

For SD card recommendations see www.axis.com

The Axis product supports microSD/microSDHC/microSDXC cards.

The following SD card file systems are supported:

- **ext4** – recommended due to its resilience against data loss if the card is ejected or if there is abrupt power loss. To access data stored on the card from the Windows operating system, a third-party ext4 driver or application is required.
- **vFAT** – supported by most operating systems for personal computers.

The SD card is managed on the **System Options > Storage** page. Click **SD Card** to open **Storage Management**.

If the card's status shows as failed, click **Check disk** to see if the problem can be found and then try **Repair**. This option is only available for SD cards with ext4. For SD cards with vFAT, use a card reader or computer to troubleshoot the card.

To avoid filling the card, it is recommended to remove recordings continuously. Under **General Settings**, select **Remove recordings older than** and select the number of days or weeks.

To stop writing to the card and protect recordings from being removed, select **Lock** under **General Settings**.

How to mount and unmount the SD card

NOTICE

To prevent corruption of recordings, the SD card should always be unmounted before it is ejected.

The SD card is automatically mounted when the card is inserted into the Axis product or when the product is started. A manual mount is only required if the card has been unmounted and not ejected and re-inserted.

To unmount the SD card:

1. Open the Axis product's webpages and go to **Setup > System Options > Storage**.
2. Click **SD Card**.
3. Click **Unmount**.
4. The card can now be removed.

How to format the SD card

NOTICE

Formatting the SD card will remove all data and recordings stored on the card.

Important

If autoformat is enabled, only use new or empty SD cards. Any data stored on the card will be lost when the card is inserted into the Axis product.

AXIS Q86 Series

About system options

An SD card inserted into the product can be manually formatted to one of the supported file systems. To manually format the SD card, follow these steps:

1. Insert the SD card in the SD card slot.
2. Open the Axis product's webpages and go to **Setup > System Options > Storage**.
3. Click **SD Card**.
4. Click **Format** and select the desired file system.
5. Click **OK** to start formatting the card.

How to encrypt SD card data

To prevent unauthorized individuals and systems from accessing recorded video, the SD card content can be encrypted. Encryption can only be enabled when the card is unmounted. After enabling encryption, the SD card must be formatted so that no unencrypted data remains on the card. The card must also be mounted before it can be used.

To encrypt the SD card content:

1. Open the Axis product's webpages and go to **Setup > System Options > Storage**.
2. Click **SD Card** to open **Storage Management**.
3. If the SD card is mounted, click **Unmount** to unmount the card.
4. Click **Encrypt**.
5. Select **Enable SD card encryption** and enter a passphrase.
6. Back in **Storage Management**, click **Format** to format the SD card.
7. Click **Mount** to mount the SD card.

It is possible to change the passphrase without reformatting the card. Open **Storage Management**, click **Encrypt** and enter the old and new passphrases. The passphrase can only be changed when the card is mounted. Changing the passphrase does not disrupt ongoing recordings.

To disable encryption, unmount the SD card and follow the steps above but clear the **Enable SD card encryption** option. The card must be formatted and mounted when encryption has been disabled.

Network Share

Network share allows you to add network storage such as a NAS (network-attached storage). The NAS shall be dedicated for recordings and data from the Axis products connected to the network. For information about reference NAS devices, go to www.axis.com/products/axis-companion/support-and-documentation

Note

For NAS recommendations see www.axis.com

To add a network share:

1. Go to **System Options > Storage**.
2. Click **Network Share**.
3. Enter the IP address, DNS or Bonjour name to the host server in the **Host** field.
4. Enter the name of the share in the **Share** field. Sub folders cannot be used.
5. If required, select **The share requires login** and enter the user name and password.
6. Click **Connect**.

AXIS Q86 Series

About system options

To clear all recordings and data from the Axis product's folder on the designated share, click **Clear** under **Storage Tools**.

To avoid filling the share, it is recommended to remove recordings continuously. Under **General Settings**, select **Remove recordings older than** and select the number of days or weeks.

To stop writing to the share and protect recordings from being removed, select **Lock** under **General Settings**.

Ports & Devices

I/O Ports

The Axis product provides four configurable input and output ports for connection of external devices. For information about how to connect external devices, see *Connectors on page 56*.

To configure the I/O ports, go to **System Options > Ports & Devices > I/O Ports**. Each port can function as input or output:

- **Input as Open circuit** – The input becomes active when the circuit is grounded by, for example, a REX device. It remains inactive as long as its normal state equals its current status.
- **Input as Grounded circuit** – The input becomes active when the circuit is opened by for example a monitor.
- **Output as Open circuit** – The output port is in a non-conductive state when its current status is open circuit. The current status of an output port can be changed by, for example, an action rule.
- **Output as Grounded circuit** – The output port is in a conductive state when its current status is grounded circuit.

COM Port

The Axis product has one RS-485/RS-422 serial port. The port supports the following modes:

- **Generic HTTP** allows the Axis product to receive data and send commands via HTTP.
- **Pan Tilt Zoom** is used to control a PTZ device. The PTZ device requires a driver. See for more information. Drivers can be downloaded from www.axis.com
- **Generic TCP/IP** allows the Axis product to receive data and send commands via TCP/IP.

Select the desired **Port Type** from the drop-down list. For more information, see the online help .

Port Status

The list on the **System Options > Ports & Devices > Port Status** page shows the status of the product's input and output ports.

Maintenance

The Axis product provides several maintenance functions. These are available under **System Options > Maintenance**.

Click **Restart** to perform a correct restart if the Axis product is not behaving as expected. This will not affect any of the current settings.

Note

A restart clears all entries in the Server Report.

Click **Restore** to reset most settings to the factory default values. The following settings are not affected:

- the boot protocol (DHCP or static)
- the static IP address
- the default router

AXIS Q86 Series

About system options

- the subnet mask
- the system time
- the IEEE 802.1X settings

Note

If the Axis product is restored, uploaded applications and their settings are removed.

Click **Default** to reset all settings, including the IP address, to the factory default values. This button should be used with caution. The Axis product can also be reset to factory default using the control button, see *How to reset to factory default settings on page 51*.

For information about firmware upgrade, see *How to upgrade the firmware on page 52*.

Support

Support Overview

The **System Options > Support > Support Overview** page provides information on troubleshooting and contact information, should you require technical assistance.

See also *Troubleshooting on page 52*.

System Overview

To get an overview of the Axis product's status and settings, go to **System Options > Support > System Overview**. Information that can be found here includes firmware version, IP address, network and security settings, event settings, image settings and recent log items.

Logs & Reports

The **System Options > Support > Logs & Reports** page generates logs and reports useful for system analysis and troubleshooting. If contacting Axis Support, please provide a server report with your query.

System Log – Provides information about system events.

Access Log – Lists all failed attempts to access the product. The access log can also be configured to list all connections to the product (see below).

View Server Report – Provides information about the product status in a pop-up window. The access log is automatically included in the server report.

Download Server Report – Creates a .zip file that contains a complete server report text file in UTF-8 format. Select the **Include snapshot from Live View** option to include a snapshot of the product's Live View. The .zip file should always be included when contacting support.

Parameter List – Shows the product's parameters and their current settings. This may prove useful when troubleshooting or when contacting Axis Support.

Connection List – Lists all clients that are currently accessing media streams.

Crash Report – Generates an archive with debugging information. The report takes several minutes to generate.

Advanced

Scripting

Scripting allows experienced users to customize and use their own scripts.

AXIS Q86 Series

About system options

NOTICE

Improper use may cause unexpected behavior and loss of contact with the Axis product.

Axis strongly recommends that you do not use this function unless you understand the consequences. Axis Support does not provide assistance for problems with customized scripts.

To open the Script Editor, go to **System Options > Advanced > Scripting**. If a script causes problems, reset the product to its factory default settings, see *page 51*.

For more information, see www.axis.com/developer

File Upload

Files, for example webpages and images, can be uploaded to the Axis product and used as custom settings. To upload a file, go to **System Options > Advanced > File Upload**.

Uploaded files are accessed through `http://<ip address>/local/<user>/<file name>` where <user> is the selected user group (viewer, operator or administrator) for the uploaded file.

Plain Config

Plain Config is for advanced users with experience of Axis product configuration. Most parameters can be set and modified from this page.

To open Plain Config, go to **System Options > Advanced > Plain Config**. Axis Support does not provide assistance with this feature.

How to reset to factory default settings

⚠CAUTION

Risk of injury. The product has moving parts. Always disconnect the product from the power supply before carrying out maintenance on the product.

Important

Reset to factory default should be used with caution. A reset to factory default resets all settings, including the IP address, to the factory default values.

See the *Product overview on page 7* before you reset. To reset the product to the factory default settings:

1. Disconnect power from the product.
2. Loosen the back lid screw and remove the back lid.
3. Loosen the SD card lid screws and remove the SD card lid.
4. Press and hold the control button and reconnect power.
5. Keep the control button pressed for 15–30 seconds until the status LED indicator flashes amber.
6. Release the control button. The process is complete when the status LED indicator turns green. The product has been reset to the factory default settings. If no DHCP server is available on the network, the default IP address is 192.168.0.90
7. Attach the SD card lid and tighten the screws (torque 1.0 Nm).
8. Attach the back lid and tighten the screw (torque 1.0 Nm).
9. Using the installation and management software tools, assign an IP address, set the password, and access the video stream.

The installation and management software tools are available from the support pages at www.axis.com/support

Troubleshooting

How to check the current firmware

Firmware is software that determines the functionality of network devices. One of your first actions when troubleshooting a problem should be to check the current firmware version. The latest version may contain a correction that fixes your particular problem. The current firmware version in the Axis product is displayed in the page **Setup > Basic Setup** and in **Setup > About**.

How to upgrade the firmware

Important

- Your dealer reserves the right to charge for any repair attributable to faulty upgrade by the user.
- Preconfigured and customized settings are saved when the firmware is upgraded (providing the features are available in the new firmware) although this is not guaranteed by Axis Communications AB.

Note

- After the upgrade process has completed, the product restarts automatically. If you restart the product manually after the upgrade, wait 10 minutes even if you suspect that the upgrade has failed.
- When you upgrade the Axis product with the latest firmware, the product receives the latest functionality available. Always read the upgrade instructions and release notes available with each new release before upgrading the firmware.

1. Download the latest firmware file to your computer, available free of charge at www.axis.com/support
2. Go to **Setup > System Options > Maintenance** in the product's webpages.
3. Under **Upgrade Server**, click **Browse** and locate the file on your computer.
4. Click **Upgrade**.
5. Wait approximately 10 minutes while the product is being upgraded and restarted. Then access the product.
6. Go to **Setup > Basic Setup** to verify the firmware upgrade.

AXIS Camera Management can be used for multiple upgrades. See www.axis.com for more information.

Emergency Recovery Procedure

If power or network connection is lost during the upgrade, the process fails and the product may become unresponsive. Flashing red Status indicator indicates a failed upgrade. To recover the product, follow the steps below. The serial number is found on the product's label.

1. In **UNIX/Linux**, type the following from the command line:

```
arp -s <IP address> <serial number> temp  
ping -l 408 <IP address>
```

In **Windows**, type the following from a command/DOS prompt (this may require that you run the command prompt as an administrator):

```
arp -s <IP address> <serial number>  
ping -l 408 -t <IP address>
```

2. If the product does not reply in 30 seconds, restart it and wait for a reply. Press CTRL+C to stop Ping.
3. Open a browser and type in the product's IP address. In the page that opens, use the **Browse** button to select the upgrade file to use. Then click **Load** to restart the upgrade process.

AXIS Q86 Series

Troubleshooting

4. After the upgrade is complete (1–10 minutes), the product automatically restarts and shows a steady green on the Status indicator.
5. Reinstall the product, referring to the Installation Guide.

If the emergency recovery procedure does not get the product up and running again, contact Axis support at www.axis.com/support

Symptoms, possible causes and remedial actions

Problems upgrading the firmware

Firmware upgrade failure If the firmware upgrade fails, the product reloads the previous firmware. Check the firmware file and try again.

Problems setting the IP address

When using ARP/Ping Try the installation again. The IP address must be set within two minutes after power has been applied to the product. Ensure the Ping length is set to 408. For instructions, see *Assign IP Address Using ARP/Ping on page 42*.

The product is located on a different subnet If the IP address intended for the product and the IP address of the computer used to access the product are located on different subnets, you will not be able to set the IP address. Contact your network administrator to obtain an IP address.

The IP address is being used by another device Disconnect the Axis product from the network. Run the Ping command (in a Command/DOS window, type `ping` and the IP address of the product):

- If you receive: `Reply from <IP address>: bytes=32; time=10...` this means that the IP address may already be in use by another device on the network. Obtain a new IP address from the network administrator and reinstall the product.
- If you receive: `Request timed out`, this means that the IP address is available for use with the Axis product. Check all cabling and reinstall the product.

Possible IP address conflict with another device on the same subnet The static IP address in the Axis product is used before the DHCP server sets a dynamic address. This means that if the same default static IP address is also used by another device, there may be problems accessing the product.

The product cannot be accessed from a browser

Cannot log in When HTTPS is enabled, ensure that the correct protocol (HTTP or HTTPS) is used when attempting to log in. You may need to manually type `http` or `https` in the browser's address field.

If the password for the user `root` is lost, the product must be reset to the factory default settings. See *How to reset to factory default settings on page 51*.

The IP address has been changed by DHCP IP addresses obtained from a DHCP server are dynamic and may change. If the IP address has been changed, use AXIS IP Utility or AXIS Camera Management to locate the product on the network. Identify the product using its model or serial number, or by the DNS name (if the name has been configured).

If required, a static IP address can be assigned manually. For instructions, see the document *Assign an IP Address and Access the Video Stream on Axis Support web at www.axis.com/support*.

Certificate error when using IEEE 802.1X For authentication to work properly, the date and time settings in the Axis product should be synchronized with an NTP server. See *Date & Time on page 41*.

The product is accessible locally but not externally

Router configuration To configure your router to allow incoming data traffic to the Axis product, enable the NAT-traversal feature which will attempt to automatically configure the router to allow access to the Axis product, see *NAT traversal (port mapping) for IPv4 on page 44*. The router must support UPnP®.

AXIS Q86 Series

Troubleshooting

Firewall protection	Check the Internet firewall with your network administrator.
Default routers required	Check if you need to configure the router settings from System Options > Network > TCP/IP > Basic .

Problems with streaming H.264

Problems with AXIS Media Control (<i>Internet Explorer only</i>)	To enable the updating of video images in Internet Explorer, set the browser to allow ActiveX controls. Also, make sure that AXIS Media Control is installed on your computer.
No H.264 displayed in the client	Check that the relevant H.264 connection methods and correct interface are enabled in the AMC Control Panel (streaming tab). See <i>About AXIS Media Control (AMC) on page 13</i> . In the AMC Control Panel, select the H.264 tab and click Set to default H.264 decoder . Check that RTSP is enabled under System Options > Network > TCP/IP > Advanced .
Multicast H.264 only accessible by local clients	Check if your router supports multicasting, or if the router settings between the client and the product need to be configured. The TTL (Time To Live) value may need to be increased.
No multicast H.264 displayed in the client	Check with your network administrator that the multicast addresses used by the Axis product are valid for your network. Check with your network administrator to see if there is a firewall preventing viewing.
Poor rendering of H.264 images	Ensure that your graphics card is using the latest driver. The latest drivers can usually be downloaded from the manufacturer's website.
Lower frame rate than expected	See <i>Performance considerations on page 58</i> . Reduce the number of applications running on the client computer. Limit the number of simultaneous viewers. Check with the network administrator that there is enough bandwidth available. Check in the AMC Control Panel (H.264 tag) that video processing is not set to Decode only key frames . Lower the image resolution.

Video and image problems, general

Image unsatisfactory	Check the video stream and camera settings under Setup > Video > Video Stream and Setup > Video > Camera Settings .
----------------------	---

Motion Detection triggers unexpectedly

Changes in thermal radiation	Motion detection is based on changes in thermal radiation in the image. This means that if there are sudden changes in the ambient temperature, motion detection may trigger mistakenly. Lower the sensitivity setting to avoid problems with thermal radiation.
------------------------------	--

Storage and disk management problems

Storage disruption	A storage disruption alarm is sent if a storage device is unavailable, removed, full, locked or if other read or write problems occur. To identify the source of the problem, check the System Log under System Options > Support > Logs & Reports . Depending on the problem, it might be necessary to re-mount the storage device.
--------------------	--

For information on how to set up a storage disruption alarm, see *About events on page 31*.

AXIS Q86 Series

Troubleshooting

Video cannot be recorded Check that the SD card is not write protected (that is, read only).
SD card cannot be mounted Reformat the SD card and then click Mount.

NOTICE

Formatting the card will remove all content, including all recordings, from the SD card.

Product does not function

The ambient temperature is too low. Certain hardware functions are suspended. Wait until the product is sufficiently heated.

The product does not start and the camera is no longer accessible. Remove power from the product. Wait for 10 minutes, then reapply power.

AXIS Q86 Series

Specifications

Specifications

To find the latest version of the product's datasheet, go to axis.com > product > Support & Documentation.

LED Indicators

Status LED	Indication
Unlit	Connection and normal operation.
Green	Connection and normal operation.
Amber	Steady during startup. Flashes during firmware upgrade or reset to factory default.
Amber/Red	Flashes amber/red if network connection is unavailable or lost.
Red	Firmware upgrade failure.

SD card slot

⚠ CAUTION

Risk of injury. The product has moving parts. Always disconnect the product from the power supply before carrying out maintenance on the product.

NOTICE

- Risk of damage to SD card. Do not use sharp tools, metal objects, or excessive force when inserting or removing the SD card. Use your fingers to insert and remove the card.
- Risk of data loss and corrupted recordings. Do not remove the SD card while the product is running. Disconnect power or unmount the SD card from the product's webpage before removal.

This product supports microSD/microSDHC/microSDXC cards (not included).

For SD card recommendations, see axis.com

Buttons

Control button

For location of the control button, see *Product overview on page 7*.

The control button is used for:

- Resetting the product to factory default settings. See *page 51*.
- Connecting to an AXIS Video Hosting System service. See *page 43*. To connect, press and hold the button for about 3 seconds until the Status LED flashes green.
- Connecting to AXIS Internet Dynamic DNS Service. See *page 43*. To connect, press and hold the button for about 3 seconds.

Connectors

Network connector

RJ45 Ethernet connector.

SFP connector.

AXIS Q86 Series

Specifications

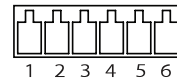
I/O connectors

Use the I/O connector with external devices in combination with, for example, tampering alarms, motion detection, event triggering, and alarm notifications. In addition to the 0 V DC reference point and power (DC output), the I/O connector provides the interface to:

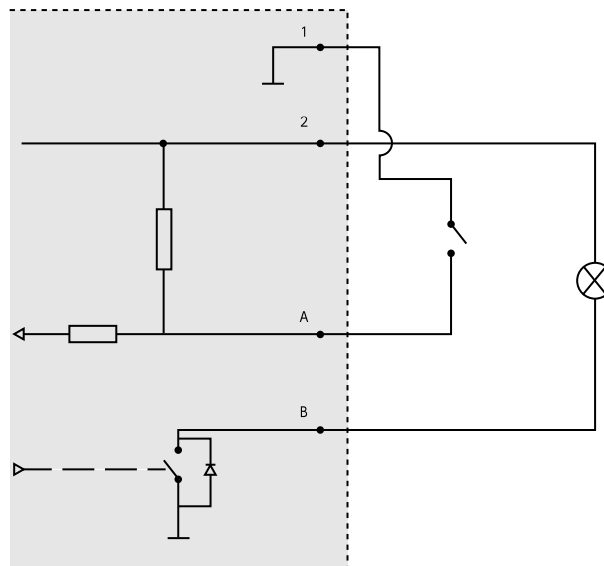
Digital output – For connecting external devices such as relays and LEDs. Connected devices can be activated by the VAPIX® Application Programming Interface or in the product's webpage.

Digital input – For connecting devices that can toggle between an open and closed circuit, for example PIR sensors, door/window contacts, and glass break detectors.

6-pin configurable terminal block



Function	Pin	Notes	Specifications
0 V DC (-)	1	DC ground	0 V DC
DC output	2	Can be used to power auxiliary equipment. Note: This pin can only be used as power out.	12 V DC Max load = 50 mA
Configurable (Input or Output)	3–6	Digital input – Connect to pin 1 to activate, or leave floating (unconnected) to deactivate.	0 to max 30 V DC
		Digital output – Connected to pin 1 when activated, floating (unconnected) when deactivated. If used with an inductive load, e.g. a relay, a diode must be connected in parallel with the load, for protection against voltage transients.	0 to max 30 V DC, open drain, 100 mA



- 1 0 V DC (-)
- 2 DC output 12 V, max 50 mA
- A I/O configured as input
- B I/O configured as output

AXIS Q86 Series

Specifications

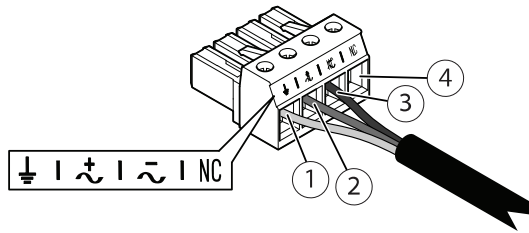
Power connector

4-pin terminal block for power input.

24 V AC/DC power connector

NOTICE

This section is valid for products powered by 24 V AC and 24 V DC only.



Position	24 V AC	24 V DC
1	Protective earth	Protective earth
2	24 V AC Phase	+ 24 V
3	24 V AC Neutral	0 V
4	Not connected	Not connected

Performance considerations

When setting up your system, it is important to consider how various settings and situations affect the performance. Some factors affect the amount of bandwidth (the bitrate) required, others can affect the frame rate, and some affect both. If the load on the CPU reaches its maximum, this also affects the frame rate.

The following factors are the most important to consider:

- High image resolution or lower compression levels result in images containing more data which in turn affects the bandwidth.
- Access by large numbers of Motion JPEG or unicast H.264 clients affects the bandwidth.
- Simultaneous viewing of different streams (resolution, compression) by different clients affects both frame rate and bandwidth.

Use identical streams wherever possible to maintain a high frame rate. Stream profiles can be used to ensure that streams are identical.

- Accessing Motion JPEG and H.264 video streams simultaneously affects both frame rate and bandwidth.
- Heavy usage of event settings affects the product's CPU load which in turn affects the frame rate.
- Using HTTPS may reduce frame rate, in particular if streaming Motion JPEG.
- Heavy network utilization due to poor infrastructure affects the bandwidth.
- Viewing on poorly performing client computers lowers perceived performance and affects frame rate.
- Running multiple AXIS Camera Application Platform (ACAP) applications simultaneously may affect the frame rate and the general performance.

