This manual is intended for administrators and users of AXIS P3301 Fixed Dome Network Camera, and is applicable to firmware 5.40 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 beneficial, for developing shell scripts and applications. Later versions of this document will be posted to the Axis website, as required. See also the product’s online help, available via the web-based interface.

Every care has been taken in the preparation of this manual. 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.

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 http://www.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 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.

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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 (selected countries only)
• visit Axis Support at www.axis.com/techsup/
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AXIS P3301 Fixed Dome Network Camera

Hardware overview

Connectors

Hardware overview

**Caution**

To protect the product against power surges, a shielded network cable (STP) must be used between the product and the network switch. Ensure that the network switch is properly grounded.

Audio in (pink) – 3.5 mm input for a mono microphone, or a line-in mono signal (left channel is used from a stereo signal).

Audio out (green) – 3.5 mm output for audio (line level) that can be connected to a public address (PA) system or an active speaker with a built-in amplifier. A stereo connector must be used for the audio out.

Control button – The control button is used for:
- Connecting to an AXIS Video Hosting System service. See page 34. To connect, press and hold the button for about 1 second until the Status LED flashes green.
- Connecting to AXIS Internet Dynamic DNS Service. See page 34. To connect, press and hold the button for about 3 seconds.
- Resetting the product to factory default settings. See page 40.

Power connector – Mini DC connector

I/O connector

![I/O connector diagram]

**Note**

For technical specifications, see page 46.

I/O terminal connector – Use in applications for e.g. motion detection, event triggering, time lapse recording and alarm notifications. In addition to an auxiliary power and a GND pin, the I/O terminal 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, output buttons on the Live View page or by an Action Rule. The output will show as active (shown under System Options > Ports & Devices) if the alarm device is activated.

- **Digital input** – An alarm input for connecting devices that can toggle between an open and closed circuit, for example: PIRs, door/window contacts, glass break detectors, etc. When a signal is received the state changes and the input becomes active (shown under System Options > Ports & Devices).

<table>
<thead>
<tr>
<th>Function</th>
<th>Pin</th>
<th>Notes</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND</td>
<td>1</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>3.3 V DC Power</td>
<td>2</td>
<td>Can be used to power auxiliary equipment.</td>
<td>Max load = 50 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: This pin can only be used as power out.</td>
<td></td>
</tr>
<tr>
<td>Digital Input</td>
<td>3</td>
<td>Connect to GND to activate, or leave floating (unconnected) to deactivate.</td>
<td>0 to +40 V DC</td>
</tr>
<tr>
<td>Digital Output</td>
<td>4</td>
<td>Internal connection to ground 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.</td>
<td>Max load = 100 mA Max voltage = +40 V DC</td>
</tr>
</tbody>
</table>
Hardware overview

LED indicators

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network</td>
<td>Green</td>
<td>Steady for connection to a 100 MBit/s network. Flashes for network activity.</td>
</tr>
<tr>
<td></td>
<td>Amber</td>
<td>Steady for connection to a 10 MBit/s network. Flashes for network activity.</td>
</tr>
<tr>
<td></td>
<td>Unlit</td>
<td>No network connection.</td>
</tr>
<tr>
<td>Status</td>
<td>Green</td>
<td>Steady green for normal operation.</td>
</tr>
<tr>
<td></td>
<td>Amber</td>
<td>Steady during startup and when restoring settings.</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>Slow flash for failed upgrade.</td>
</tr>
<tr>
<td>Power</td>
<td>Green</td>
<td>Normal operation.</td>
</tr>
<tr>
<td></td>
<td>Amber</td>
<td>Flashes green/amber during firmware upgrade.</td>
</tr>
</tbody>
</table>

Note

- The Status LED can be configured to be unlit during normal operation. To configure, go to Setup > System Options > Ports & Devices > LED. See the online help for more information.
- The Status LED can be configured to flash while an event is active.
- The Status LED can be configured to flash for identifying the unit. This can be done under Setup > System Options > Maintenance.
Accessing the product

To install the Axis product, refer to the Installation Guide supplied with the product.

The product can be used with most operating systems and browsers. The recommended browsers are Internet Explorer with Windows, Safari with Macintosh and Firefox with other operating systems. See Technical Specifications, on page 46.

**Note**
- To view streaming video in Internet Explorer, allow installation of AXIS Media Control (AMC) when prompted.
- QuickTime™ is also supported for viewing H.264 streams and for audio.
- If your computer restricts the use of additional software components, the product can be configured to use a Java applet for viewing Motion JPEG.
- The Axis product includes (1) H.264 decoder license for viewing video streams and (1) AAC audio license. These licenses are automatically installed with AMC. The administrator can disable the installation of the decoders, to prevent installation of unlicensed copies.

Access from a browser

1. Start a browser (Internet Explorer, Firefox, Safari).
2. Enter the IP address or host name of the Axis product in the browser’s Location/Address field. To access the product from a Macintosh computer (Mac OS X), click on the Bonjour tab 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 more information on how to discover and assign an IP address, refer to the Installation Guide.
3. Enter your user name and password. If this is the first time the product is accessed, the root password must first be configured; for instructions see Set the root password, on page 8.
4. The product’s Live View page appears in your browser.

**Note**
The layout of the Live View page may have been customized to meet specific requirements. Consequently, some of the examples and functions featured here may differ from those displayed in your own Live View page.
Access 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, please see NAT traversal (port mapping) for IPv4, on page 35. See also AXIS Internet Dynamic DNS Service at www.axiscam.net For Technical notes on this and other topics, visit the Axis Support web at www.axis.com/techsup

Set the root password

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

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.

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

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

1. Click Create self-signed certificate.
2. Provide the requested information and click OK. The certificate is created and the password can now be set securely. All traffic to and from the product is encrypted from this point on.
3. Enter a password and then re-enter to confirm the spelling. Click OK. The password has now been configured.

Note

- 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 Reset to factory default settings, on page 40.
Accessing the product

The Live View page

If the Axis product has been customized to meet specific requirements, not all the items described below will appear in the Live View page. The following provides an overview of each available button.

Controls on the Live View page

- **The Stream Profile drop-down list allows you to select a customized or pre-programmed stream profile. Stream profiles are configured under Video & Audio > Stream Profiles. See Stream Profiles, on page 16.**

- **Click Pulse to activate the output for a defined period of time, such as switching on an external light for 20 seconds.**

- **Click the Active/Inactive buttons to manually start and stop a connected device — e.g. switch an external light on and off.**

- **The Manual Trigger button can trigger an event directly from the Live View page. The button is configured under Live View Config > Action Buttons.**

- **Click Snapshot to save a snapshot of the video image. Right-click the video image to save it in JPEG format on your computer. 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.**

- **The Audio clip drop-down list allows you to play an audio clip from the Live View page. Select the audio clip and click the Play button.**

**AXIS Media Control viewer toolbar**

The AXIS Media Control viewer toolbar is available in Internet Explorer only. See AXIS Media Control (AMC), on page 11 for more information. The toolbar displays the following buttons:
**AXIS P3301 Fixed Dome Network Camera**

**Accessing the product**

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. The location where the image is saved can be specified in the AMC Control Panel.

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. The location where the recording is saved can be specified in the AMC Control Panel.

**AMC Audio controls**

AMC audio buttons control the speakers and microphone connected to the client computer. The buttons are only visible when audio is enabled.

**Speaker button** — Click to turn the speakers on or off.

**Microphone button** — Click to mute or unmute the microphone. In Simplex - Network Camera speaker only mode, click this button to stop sending audio to the product.

Use the slider to control the volume of the speakers and the microphone.

**Half-duplex mode**

The **Talk/Listen** button is used to switch between sending and receiving audio. The button can be configured from the Audio tab in the AMC Control panel:

- **Push-To-Talk mode**: Click and hold the button to talk/send. Release the button to listen.
- **Toggle mode**: Click once to switch between talking and listening.

**Simplex – Network Camera speaker only mode**

To send audio, the **Talk** and **Microphone** buttons must both be enabled. Click either button to stop audio transmission.
Media streams

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

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

How to stream H.264

The video compression standard H.264 makes good use of bandwidth, and can provide high quality video streams at less than 1 Mbit/s.

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:

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicast RTP</td>
<td>This unicast method (RTP over UDP) is used for live unicast video, especially when it is important to always have an up-to-date video stream, even if some images are dropped.</td>
</tr>
<tr>
<td>RTP over RTSP</td>
<td>This unicast method (RTP tunneled over RTSP) is useful as it is relatively simple to configure firewalls to allow RTSP traffic.</td>
</tr>
<tr>
<td>RTP over RTSP over HTTP</td>
<td>This unicast method can be used to traverse firewalls. Firewalls are commonly configured to allow the HTTP protocol, thus allowing RTP to be tunneled.</td>
</tr>
<tr>
<td>Multicast RTP</td>
<td>This method (RTP over UDP) should be used for live multicast video. The video stream is always up-to-date, even if some images are dropped. Multicasting provides the most efficient usage of bandwidth when there are large numbers of clients viewing simultaneously. A multicast cannot however, pass a network router unless the router is configured to allow this. It is not possible to multicast over the Internet, for example. Note also that all multicast viewers count as one unicast viewer in the maximum total of 20 simultaneous connections.</td>
</tr>
</tbody>
</table>

Unicasting is used for video-on-demand transmission so that there is no video traffic on the network until a client connects and requests the stream. Note that there are a maximum of 20 simultaneous unicast connections.

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.

MJPEG

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.

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.
Media streams

The AMC Control Panel can be used to configure various video and audio 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 menu)
- Alternatively, right-click the video image in Internet Explorer and click Settings.

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, 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: `axrtsphttp://<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`
AXIS P3301 Fixed Dome Network Camera

Media streams

Note

- \(<\text{ip}>\) = IP address
- The Axis product supports QuickTime 6.5.1 and later.
- QuickTime adds 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.

Accessing audio streams

The Live View page provides access to audio through AXIS Media Control; in addition audio can be accessed in the following ways:

- VAPIX® Application Programming Interface (API) For more information, visit www.axis.com/developer
- Windows Media Player supports simplex audio. The following paths can be used:
  - Unicast via RTP: axrtpu://\(<\text{ip}>\)/axis-media/media.amp
  - Unicast via RTSP: axrtps://\(<\text{ip}>\)/axis-media/media.amp
  - Unicast via RTSP, tunneled via HTTP: axrtpshhttp://\(<\text{ip}>\)/axis-media/media.amp
  - Multicast: axrtpm://\(<\text{ip}>\)/axis-media/media.amp
- QuickTime™ supports G.711 and AAC audio encoding. The following paths can be used:
  - rtsp://\(<\text{ip}>\)/axis-media/media.amp
  - rtsp://\(<\text{ip}>\)/axis-media/media.3gp
- The Java applet supports simplex audio with G.711 encoding.
Setting up the product

The Axis product can be configured by users with administrator or operator rights. Click Setup in the top right-hand corner of the Live View page.

- Administrators have unrestricted access to all settings.
- Operators have access to all settings except System Options

See also the online help 📄.

Basic Setup

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

2. TCP/IP. See page 33.
3. Date & Time. See page 32.
5. Focus. See page 14

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

Focus Adjustment

The focus can be adjusted under Basic Setup > Focus. Follow the on-screen instructions to adjust the focus. For further information about focus, refer to the product’s Installation Guide.
**Video and Audio**

The video and audio settings can be used to optimize video and audio quality. You can configure the following:

- Video stream settings. See page 15.
- Stream profiles. See page 16.
- Camera settings. See page 16.
- Overlay image. See page 17.
- Privacy mask. See page 18.
- Audio settings. See page 18.
- Audio clips. See page 19.

**Video Stream**

You can define the following video stream settings from **Video & Audio > Video Stream**:

- Image. See page 15.
- H.264. See page 16.
- MJPEG. See page 16.

**Image**

You can modify the image resolution and compression, and rotate the image from the **Image** tab (**Video & Audio > Video Stream**). The image can also be mirrored from the **Image** tab.

Setting the compression level affects the image quality and bandwidth; the lower the compression, the higher the image quality with higher bandwidth requirements.
AXIS P3301 Fixed Dome Network Camera

**Video and Audio**

To avoid bandwidth problems on the network, you can limit the frame rate allowed to each viewer. The maximum frame rate can be set to Unlimited, or you can limit the frame rate to a value.

An image or text can be superimposed over the image as overlay. See *Overlay, on page 17*.

Save your settings before they can take effect.

**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 bit rates. An H.264 video stream consists of different types of frames such as I-frames, P-frames and B-frames. An I-frame is a complete image whereas P-frames and B-frames only contain the differences from previous/future frames.

The GOV length is the number of frames between two consecutive I-frames. Increasing the GOV length may save considerably on bandwidth requirements in some cases, but may also have an adverse affect on image quality.

The bit rate can be set as Variable Bit Rate (VBR) or Constant Bit Rate (CBR). VBR adjusts the bit rate according to the image complexity, using up more bandwidth for increased activity in the image, and less for lower image activity. CBR allows you to set a fixed Target bit rate that consumes a predictable amount of bandwidth. As the bit rate would usually need to increase for increased image activity, but in this case cannot, frame rate and image quality are affected negatively. To partly compensate for this, it is possible to prioritize either frame rate or image quality. Not setting a priority means that frame rate and image quality are equally affected. You must save your settings before they can take effect.

The current bit rate can be set to appear as text overlay. To do this, select the Include text check box option under Overlay Settings and enter the code \#b in the field.

**MJPEG**

Sometimes the image size is large due to low light 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 light. Limiting the frame size optimizes bandwidth and storage usage, but may give poor image quality. To prevent increased bandwidth and storage usage, the maximum frame size should be set to an optimal value.

**Stream Profiles**

There are four pre-programmed stream profiles available for quick set up. The settings for these can be adjusted. New customized profiles can also be created. Each profile has a descriptive name, indicating its purpose.

- The stream profiles can be accessed from the Stream profile drop-down list in the Live View page.
- To add, copy, modify, and remove stream profiles go to Video & Audio > Stream Profiles.
- To select the default stream profile go to Live View Config > Stream Profile and choose the profile from the drop-down list.

For more information see the online help on this page.

**Camera Settings**

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

**Image Appearance**

Increasing the Color level increases the color saturation. The value 100 gives maximum color saturation. The value 0 gives a black and white image.

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 light conditions. A lower setting reduces image noise, but the whole image will appear less sharp.
AXIS P3301 Fixed Dome Network Camera

Video and Audio

The Contrast changes the relative difference between light and dark. It can be adjusted using the slidebar.

White balance

White balance is used to make colors in the image appear the same regardless of the color temperature of the light source. The Axis product can be set to automatically identify the light source and compensate for its color. Alternatively, select the type of light source from the drop-down list. For a description of each available setting, see the online help.

Wide Dynamic Range (Dynamic Contrast)

Wide dynamic range (Dynamic Contrast) can improve the exposure when there is a considerable contrast between light and dark areas in the image. In intense backlight conditions, enable WDR. Disable WDR in low light conditions for optimal exposure.

Note

This setting is only possible when using automatic exposure control.

Exposure Settings

Configure the exposure settings to suit the image quality requirements in relation to lighting, frame rate and bandwidth considerations.

Exposure value – Click in the bar to fine-tune the exposure.

Exposure control – These settings is used to adapt to the amount of light used. Automatic is the default settings can be used in most situations. The shutter speed is automatically set to produce optimum image quality. Flicker-free 50 or 60 Hz is used to remove flicker which can be caused by fluorescent and other light sources. The Hold current option locks the current exposure settings.

Enable Backlight compensation – Enable this option if a bright spot of light, for example a light bulb, causes other areas in the image to appear too dark.

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 a predefined area.

Exposure priority – When Motion is prioritized and maximum Shutter time is set to a small value, motion blur in the image is minimized. This can be useful for recognition of moving objects such as people and vehicles. However, prioritizing motion may cause an increase in image noise, especially in low light situations. When Low noise is prioritized and Gain is set to a small value, image noise is minimized. The file size is reduced, which can be useful if storage space or bandwidth is limited. However, prioritizing low noise may result in a very dark image, especially in low light situations.

Iris adjustment

Select Enable automatic iris adjustment to automatically compensate for changing light conditions. This option is not available if a fixed iris is used.

Overlay

Overlays can be used to provide extra information and are superimposed over the video image. With overlay text it is possible to include date and time or view the current bit rate as overlay text.

To include the current bit rate as overlay text go to Video & Audio > Video Stream > Overlay Settings, select the Include text check box option, and enter the overlay code in the field. See the online help for supported formats.

Overlay image

An overlay image can be used to provide extra information, or to mask a part of the video image.

To use your own image, such as a logo, first upload the image to the Axis product. Go to Video & Audio > Overlay Image, click Browse to locate the file and then click Upload. The file can then be selected from the Use overlay image drop-down list.
Video and Audio

To place an overlay image at specific coordinates, go to Video & Audio > Video Stream and select the Include overlay image at coordinates check box option and enter the X and Y coordinates.

For more information see the online help.

Privacy Mask

A privacy mask is an area of solid color that prohibits users from viewing parts of the monitored area. Privacy masks cannot be bypassed via the VAPIX® Application Programming Interface (API).

The Privacy Mask List (Video & Audio > Privacy Mask) shows all the masks that are currently configured in the Axis product and indicates if they are enabled.

You can add a new mask, re-size the mask with the mouse, choose a color for the mask, and give the mask a name.

For more information, see the online help.

Audio Settings

The audio functionality for each video stream is enabled under Video & Audio > Video Stream > Audio.

Audio Channels

Select the type of audio transmission from the Audio mode drop-down list (Video & Audio > Audio Settings). The different types are:

Full duplex – Simultaneous two-way audio allowing you to transmit and receive audio (talk and listen) at the same time. There is no echo cancellation; if feedback loops appear, try moving the microphone or the speaker.

Half-duplex – Audio can be transmitted in both directions between the Axis product and the client computer, but only in one direction at a time. You must actively receive sound using the Talk/Listen button visible in the Live View page (see AXIS Media Control viewer toolbar). In Push-To-Talk mode, click and hold the button to speak and release it when done. In Toggle mode, click once to switch between speaking and listening. The Talk/Listen mode is configured from the Audio tab in the AMC control panel (see AXIS Media Control on page 11).

Simplex – speaker only – Audio is transmitted from the client to the Axis product and played by the speaker connected to the product. To send audio, the Talk and Microphone buttons in the AMC toolbar must both be enabled. Click either button to stop audio transmission.

Simplex – microphone only – Audio captured by the microphone connected to the Axis product is transmitted from the product to one or more clients.

For more information about these settings, please see the online help.

Audio Input

An external microphone or a line source can be connected to the product’s Audio-in connector. Configure the audio input settings under Video & Audio > Audio Settings.

Source – Select Microphone for an external microphone or Line for a Line in device, e.g. an audio mixer for multiple microphones or a microphone with a built-in amplifier.

Microphone power – The Enable microphone power option provides DC power for an external microphone. Microphone power should only be used with microphones that have no battery and when using the internal microphone. This setting should not be enabled when using a dynamic or battery powered microphone. Microphone power will not harm the microphone; if you are uncertain, try switching it off and on. To use a professional microphone requiring 48V phantom power, you need an external power supply and a balanced-unbalanced converter (audio transformer) in between.
Video and Audio

Input gain – Control the volume (dB Full Scale) of the audio input. If the sound is too low, choose a higher dB, to amplify the sound. If the sound is too high, choose a lower dB. The Level bar gives a visual representation of the audio signal level in dB relative to the full-scale input level.

- Green — the signal is at a good level.
- Yellow — the signal is becoming distorted.
- Red — the signal is distorted.

Encoding – Select digital audio encoding format.

- AAC requires a license for both encoding and decoding. AAC is the least complicated and most widely used codec. If achieving the best possible audio quality is a priority, AAC is the recommended codec to use. An AAC license is included in the Axis product.
- G711
- G726

Sample rate – The number of times per second the sound is sampled. A higher sample rate will provide better audio quality, but also requires a greater bandwidth.

Bit rate – Set the required bit rate depending on the selected encoding. A higher bit rate will give better audio quality. A lower bit rate may have latency or delay, but will require less bandwidth.

For more information about these settings, please see the online help.

Audio Output

An external speaker can be connected to the product’s Audio-out connector. The output can be used with high impedance headphones or connected to another amplifier with speakers.

Configure the audio output settings under Video & Audio > Audio Settings.

Output gain – Control the volume (dB Full Scale) of the line audio output. If the sound is too low, choose a higher dB. If the sound is too high, choose a lower dB.

Audio Clips

An audio clip is a sound file that can be played either when an event occurs or manually from the Live View page. Audio clips can be uploaded to the product or recorded by a microphone connected to the product.

You can add, play, download, modify and remove audio clips from Video & Audio > Audio Clips. For more information see the online help.

Note

Audio clips cannot be used if the product’s audio functionality is enabled. The audio functionality is enabled on the Audio tab under Video & Audio > Video Stream.
You can customize the Live View page and alter it to suit your requirements. It is possible to define the following features of the Live View page:

- Stream Profile. See page 16.
- Default Viewer for Browser. See page 20.
- Viewer Settings. See page 21.
- Action Buttons. These are the buttons described in Controls on the Live View page, on page 9.
- User Defined Links. See page 21.
- Output Buttons. See page 21.

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.
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Live View Config

<table>
<thead>
<tr>
<th>Browser</th>
<th>Viewer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows Internet Explorer</td>
<td>AMC</td>
<td>Recommended viewer in Internet Explorer (H.264/Motion JPEG)</td>
</tr>
<tr>
<td></td>
<td>QuickTime</td>
<td>H.264</td>
</tr>
<tr>
<td></td>
<td>Java applet</td>
<td>A slower imaging alternative to AMC (Motion JPEG). Requires one of the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>following installed on the client:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• JVM (J2SE) 1.4.2 or higher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• JRE (J2SE) 5.0 or higher</td>
</tr>
<tr>
<td></td>
<td>Still image</td>
<td>Displays still images only. Click the Refresh button in your browser to view a new image</td>
</tr>
<tr>
<td>Other browsers</td>
<td>Server Push</td>
<td>Recommended viewer for other browsers (Motion JPEG).</td>
</tr>
<tr>
<td></td>
<td>QuickTime</td>
<td>H.264</td>
</tr>
<tr>
<td></td>
<td>Java applet</td>
<td>A slower imaging alternative to Server Push (Motion JPEG only).</td>
</tr>
<tr>
<td></td>
<td>Still image</td>
<td>Displays still images only. Click the Refresh button in your browser to view a new image</td>
</tr>
</tbody>
</table>

For more information, please see the online help 🌐.

Viewer Settings

Options for the viewer are configured under Live View Config > Viewer Settings.

- The Show viewer toolbar option will 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.
- You can enable recording from the Live View page. The recordings are saved to the location specified in the AMC Control Panel. See AXIS Media Control (AMC), on page 11.

User Defined Links

To display user-defined links in the Live View page, 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

An output on the Axis product can be controlled directly from the Live View page, by enabling the display of output buttons. To display the output buttons in the Live View page, select the type of control to use for the port from the drop-down list under Live View Config > Output Buttons:

- Pulse activates the output for a defined period of time. The pulse time can be set as short as 1/100 second, and as long as 60 seconds
- Active/Inactive displays two buttons (on/off). The output ports must first be configured under System Options > Ports & Devices > I/O Ports. See I/O Ports, on page 38.
Detectors

Camera Tampering

Camera Tampering can generate an alarm whenever the camera is repositioned, or when the lens is covered, sprayed or severely defocused. To send an alarm, for example an email, an action rule must be set up.

To configure tampering:
1. Go to Detectors > Camera Tampering.
2. Set the Minimum duration, that is, the time that must elapse before an alarm is generated. This can help prevent false alarms for known conditions that affect the image.
3. Select Alarm for dark images if an alarm should be generated if lights are dimmed or turned off, or if the lens is sprayed, covered, or rendered severely out of focus.
4. Click Save.

To configure the product to send an alarm when tampering occurs:
1. Go to Events > Action Rules.
2. Click Add to set up a new action rule.
3. Enter a Name for the action rule.
4. Under Condition, select Detectors from the Trigger list.
5. Select Tampering from the list of detectors.
6. Optionally, select a schedule and set additional conditions.
7. Select the action. To send an email, select Send Notification and select a Recipient from the list of defined recipients.

Note
The While the rule is active option under Duration cannot be used with camera tampering, since camera tampering does not have a duration and once it has been triggered it will not automatically return to its untriggered state.

For more information on actions rules, see Events, on page 26.

Motion Detection

Motion detection is used to generate an alarm whenever movement occurs (or stops) in the view. Up to 10 Include and Exclude windows can be configured:

- Include windows — target specific areas within the whole video image
- Exclude windows — define areas within an Include window that should be ignored (areas outside Include windows are automatically ignored)


Note
Using the motion detection feature may decrease the product’s overall performance.
Set up motion detection

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 active window (window with red frame).

4. Adjust the Object Size, History and Sensitivity profile sliders (see 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.

**Motion detection parameters**

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Object Size</th>
<th>History</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Object size relative to window size.</td>
<td>Object memory length.</td>
<td>Difference in luminance between background and object.</td>
</tr>
<tr>
<td>High level (100%)</td>
<td>Only very large objects trigger motion detection.</td>
<td>An object that appears in the window triggers motion detection for a long time before it is considered as non-moving.</td>
<td>Ordinary colored objects on ordinary backgrounds trigger motion detection.</td>
</tr>
<tr>
<td>Medium level (50%)</td>
<td></td>
<td>A large difference in luminance is required to trigger motion detection.</td>
<td></td>
</tr>
<tr>
<td>Low level (0%)</td>
<td>Even very small objects trigger motion detection.</td>
<td>An object that appears in the window triggers motion detection only for a very short time before it is considered as non-moving.</td>
<td>Only very bright objects on a dark background trigger motion detection.</td>
</tr>
</tbody>
</table>
Detectors

<table>
<thead>
<tr>
<th>Recommended values</th>
<th>5–15%</th>
<th>60–90%</th>
<th>75–95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default values</td>
<td>15%</td>
<td>90%</td>
<td>90%</td>
</tr>
</tbody>
</table>

Tips:

- 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.
- If no objects should appear in the Include Window, select a high history level. This will cause motion detection to trigger as long as the object is present in the window.
- To only detect flashing light, select a low sensitivity. In other cases high sensitivity is recommended.

Audio detection

The Axis product can be configured to generate an alarm when audio rises above or falls below the threshold value. The threshold value can be set in the range 0–100 where 0 is the most sensitive and 100 the least sensitive.

1. Go to Detectors > Audio Detection.
2. Set the audio alarm level and click Save.
3. Go to Events > Action Rules and set up an action rule, see Setting Up an Action Rule, on page 26.

Detected audio is indicated by colored peaks in the Activity indicator. An event is triggered when detected audio rises above or falls below the threshold value, which is represented by the bar.
Applications

Third party applications can be uploaded to and installed on the Axis product. For information about available applications, downloads, trials and licenses, go to www.axis.com/applications

To upload an application, go to Applications > Overview, click Browse to locate the file and then click Upload Package. Click on the uploaded application's name to open the menu options Settings, License and About. For configuration instructions, please refer to the documentation provided with the application.

Most applications need a license to run. To install the license, select the License menu option. If the product is connected to the Internet, Automatic Installation appears in the web page. If the product is not connected to the Internet, go to www.axis.com/applications to acquire a License key. You will need a license code and the product’s serial number (found on the label and under System Options > Support > System Overview) to receive a license key.

Installed Applications lists installed applications with information about the version and the vendor, the status of the application (running or not running), and information about the license.

Use the Start and Stop buttons to start and stop the application.

To generate a log file for the application, select the application and click Log.

Note

It is recommended to run one application at a time. Avoid running applications when motion detection is active.
The Axis product can be configured to perform actions when different events occur, for example, start a recording when motion is detected. The set of conditions that defines how and when the action is triggered is called an Action Rule. The action rule will apply at specific periods called Schedules. It is possible to specify how often the action rule will recur. This is called Recurrences.

Available Action Rule triggers include:

- Detectors, for example audio detection and motion detection, see Detectors, on page 22
- Input Signal — when the product’s I/O port receives a signal from an external device, such as a smoke detector or switch
- Storage — when a storage device is available, locked or full
- System — when the product is started
- Time, see Recurrences, on page 27

Possible actions include:

- Output Port — activate an output to, for example, sound an alarm or lock a door
- Play Audio Clip
- Record Video — record video and save to a selected storage
- Send Images and Notifications — once recipients have been set up, a notification can be sent that an event has occurred
- Status LED

Convert Event Types to Action Rules

The internal Event Management system has been redesigned from firmware version 5.40. The legacy user Event Types in the camera will continue to work but will not be visible in the user interface of the camera. The Event Types need to be converted to Action rules to become visible in the user interface.

To convert Event Types to Action Rules go to Events > Action Rules and click Convert.

⚠️ Caution

This is not recommended when using a VMS based on the old Event Management System.

Setting Up an Action Rule

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

The following example describes how to set up an action rule to send an email if there is movement in the product’s field of view:

1. Go to Events > Action Rules and click Add.
2. Select the Enable rule option and enter a descriptive name for the rule.
3. Select Detectors from the Trigger drop-down list.
4. Select Motion Detection from the drop-down list. This option is only available if a motion detection window has been configured, see page 23.
5. Set one of the available pre-programmed time intervals from the Schedule drop-down list.
6. Select Send Notification from the Type drop-down list.
Events

7. Select where to send the notification from the Recipient drop-down list.

To add additional criteria, select the Additional conditions option. Add and select the desired options as described above. 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.

To copy, modify or remove an action rule, select the action rule in the Action Rule List and click Copy, Modify or Remove.

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.

Recipients

Recipients receive image files and notification messages. A recipient can be an FTP, HTTP or TCP server, a network share or an email address. TCP servers are used for notification messages only.

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.

Schedules

An action can be set up to occur on a schedule. Included in the list are predefined schedules for after and during office hours, weekdays or weekends.

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.

Recurrences

An action can be set up to recur a specific number of times in a period, for example every 2 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.
Events

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.
Recordings

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

- To start a continuous recording, see page 29.
- To set up action rules, see page 26.
- To access recordings, see Recording List, on page 29.
- To configure camera controlled storage, see Storage, on page 37.

Recording List

Recorded videos are listed on the Recordings > List page. The list shows each recording’s start date and time, duration and the event that triggered the recording.

To play or download a recording, follow these steps:

1. Go to Recordings > List.
2. Use the filter to narrow the list of recordings. Enter the desired filter criteria and click Filter. Some filters may take a long time to complete.
3. Select the recording.
4. Click Play to play the recording, or click Download to download the recording.

Multiple recordings can be downloaded at the same time. Select the recordings and click Download. The downloaded file is a zip file containing a minimum of three files, of which the Matroska (mkv) files are the actual recordings. The recordings are time-stamped with the date and time they were downloaded (that is, not the date the recordings were made).

Note

To play recordings in Windows Media Player, AXIS Matroska File Splitter must be installed. AXIS Matroska File Splitter can be downloaded from www.axis.com/techsup/software

For detailed recording and video information, select a recording and click Properties.

To remove a recording, select the recording and click Remove.

Continuous recording

The Axis product can be configured to continuously save video to a storage device. See Storage, on page 37 for more information about storage devices. To prevent the disk from becoming full, it is recommended to configure the disk to automatically remove old recordings see .

To start a continuous recording, follow these steps:

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

- **Viewer** - Access to the Live View page
- **Operator** - Access to the Live View page and to all settings except System Options
- **Administrator** - Unrestricted access to all settings; can add, modify and remove other users.

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.

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

The Axis product supports encrypted browsing using HTTPS. This is configured on the System Options > Security > HTTPS page.

A self-signed certificate can be used until a Certificate Authority-issued certificate has been obtained. Click Create self-signed certificate to install a self-signed certificate. Although self-signed certificates are free and offer some protection, true security is only implemented after the installation of a signed certificate issued by a Certificate Authority.

To obtain a signed certificate from an issuing Certificate Authority, click Create Certificate Request. When the signed certificate is returned, click Install signed certificate to import the certificate. The properties of any certificate request currently resident in the product or installed can be viewed by clicking Properties.

To enable HTTPS in the Axis product, the HTTPS Connection Policy must be set for each user group.

For more information, see the online help 📖.
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 authenticate themselves. The authentication is performed by a third-party entity called an authentication server, typically a RADIUS server, examples of which are FreeRADIUS and Microsoft Internet Authentication Service.

In Axis' implementation, the network device and the authentication server authenticate themselves with the help of digital certificates using EAP-TLS (Extensible Authentication Protocol - Transport Layer Security). The certificates are provided by an Certification Authority (CA). You need:

- a CA certificate to validate the identity of the authentication server
- a CA-signed client certificate and a private key to authenticate the network device.

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

1. Obtain a CA certificate, a client certificate and a client private key (contact your network administrator).
2. Go to Setup > System Options > Security > IEEE 802.1X and upload the CA certificate, the client certificate and the client private key.
3. Under Settings, select the EAPOL version, provide your EAP identity and private key password.
4. Check the box to enable IEEE 802.1X and click Save.

Certificates

- **CA Certificate**: The CA certificate is used to validate the identity of the authentication server. Enter the path to the certificate directly, or locate the file using the Browse button. Then click Upload. To remove a certificate, click Remove.
- **Client certificate**: The client certificate and private key are used to authenticate the network device. They can be uploaded as separate files or in one combined file (e.g. a PFX file or a PEM file). Use the Client private key field if uploading one combined file. For each file, enter the path to the file, or locate the file using the Browse button. Then click Upload. To remove a file, click Remove.

Settings

- **EAPOL version**: Select the EAPOL version (1 or 2) as used in your network switch.
- **EAP identity**: Enter the user identity (maximum 16 characters) associated with your certificate.
- **Private key password**: Enter the password (maximum 16 characters) for the private key.
- **Enable IEEE 802.1X**: Check the box to enable the IEEE 802.1X protocol.

Audio Support

Select Enable audio support to allow clients to retrieve audio streams from the Axis product. For information on how to configure audio settings, see Audio Settings, on page 18.

**Note**

Deselecting this option will disable audio globally in the Axis product, for configured events and profiles with audio as well.

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 34**.
  
  If using a host name for the NTP server, a DNS server must be configured. See **DNS Configuration, on page 34**.

- **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 & Audio** 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, which when allows you 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 40**) 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 IP address can be set using ARP and Ping. For instructions, see the product’s Installation Guide.

ARP/Ping is enabled by default. To disable, uncheck the box under **System Options > Network > TCP/IP > Basic**.

The ARP/Ping service is automatically disabled two minutes after the product is started, or as soon as an IP address is set. To reset the IP address, the product must be restarted to activate ARP/Ping for an additional two minutes.

Pinging the product is still possible when this service is disabled.
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System Options

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

AVHS is enabled by default. The settings are configured under System Options > Network > TCP/IP > Basic.

One-click enabled – Press the product’s control button (see Hardware overview, on page 4) 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 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.

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:

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.
AXIS P3301 Fixed Dome Network Camera

System Options

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 page 31.

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.

Note

- For NAT traversal to work, this must be supported by the router. The router must also support UPnP™.
- The router has many different names: “NAT router”, “Network router”, “Internet Gateway”, “Broadband router”, “Broadband sharing device” or “Home firewall" but the essential purpose of the device is the same.

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 the port number in the field. If no port is entered here, a port number is automatically selected when NAT traversal is enabled.

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.
AXIS P3301 Fixed Dome Network Camera

System Options

**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 send 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 the following types of traffic: live video, live audio, event/alarm traffic and management traffic.

**Note**
Live audio DSCP will be equal to live video DSCP if H.264 over RTSP is used.

**SMTP (email)**
To send email messages from the Axis product via SMTP (Simple Mail Transfer Protocol), an SMTP mail server must be set up. This is done under System Options > Network > SMTP (email).

Enter the host names or IP addresses and port numbers for the primary and secondary mail servers in the fields provided. A From email address is also required. If the mail server requires authentication, check Use authentication to log in to this server and enter the necessary information.

**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.

The Axis product can be configured to support SNMP on the System Options > Network > SNMP page.

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

**SNMP v1/v2** provides the lowest level of security. The community name can be specified as a password for read or read/write access to all supported SNMP devices. The default password for the Read community is public and the default password for the Write community is write.

**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.
AXIS P3301 Fixed Dome Network Camera

System Options

The following traps are available:

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

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 31. 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 Reset to factory default settings, on page 40.

**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/audio ports are automatically selected. For multicast streams, only certain IP addresses and port numbers should be used.

Select Always Multicast Video and/or Always Multicast Audio 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.

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

**Storage**

**Network Share**

Network share allows you to add network storage such as a NAS (Network Attached Storage) or any server that uses CIFS (Common Internet File System) and use them for storage of recordings.

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.
5. If required, select The share requires login and enter the user name and password.
6. Click Connect.
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 **Recording 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 **Recording Settings**.

### Ports & Devices

#### I/O Ports

The Axis product provides one input port and one output port for connection of external devices. For information on how to connect external devices, see **Connectors**, on page 4.

The I/O ports are configured under **System Options > Ports & Devices > I/O Ports**. The ports can be given descriptive names and their **Normal states** can be configured as **Open circuit** or **Grounded circuit**.

#### 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.

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

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 **Reset to factory default settings**, on page 40.

To identify the product or test the Status LED, click **Flash LED** under **Identify** and specify the duration in seconds, minutes or hours. This can be useful for identifying the product among other products installed in the same location.

For information about **firmware upgrade**, see **Upgrading the firmware**, on page 41.

### 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 41.
**System Options**

**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. Many of the captions are links to the proper Setup page.

**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 valid 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).

**Server Report** – Provides information about the product status in a pop-up window. The Access Log is automatically included in the Server Report.

You can view or download the server report. Downloading the server report creates a .zip file that contains a complete server report text file in UTF-8 format. Select the Include snapshot with default image settings option to include a snapshot of the product’s Live View that also shows the settings specified under Video Stream > Image > Image Appearance. The server report .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.

The log levels for the System Log and the Access Log are set under System Options > Support > Logs & Reports > Configuration. The Access Log can be configured to list all connections to the product (select Critical, Warnings & Info). If required, a different log level can be used when sending emails.
Axis P3301 Fixed Dome Network Camera

System Options

Advanced

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

⚠️ Caution
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. It is recommended to create a backup file before customizing the scripts. If a script causes problems, reset the product to its factory default settings, see page 40.

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

File Upload
Files, for example web pages 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. Help is available from the standard help pages.

To open Plain Config, go to System Options > Advanced > Plain Config.

Reset to factory default settings
This will reset all parameters, including the IP address, to the factory default settings:

1. Disconnect power from the product.
2. Press and hold the Control button and reconnect power (see Hardware overview, on page 4).
3. Keep the Control button pressed for about 15 seconds until the Status indicator flashes amber.
4. Release the Control button. The process is complete after about 1 minute (when the Status indicator turns green). The product has been reset to the factory default settings. The default IP address is 192.168.0.90
5. Re-assign the IP address.

It is also possible to reset parameters to factory default via the web interface. Go to Setup > System Options > Maintenance.
Troubleshooting

Checking the 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.

Upgrading the firmware

When you upgrade the product with the latest firmware from Axis website, the product receives the latest functionality available. Always read the upgrade instructions and release notes available with each new release, before upgrading the firmware.

To upgrade, follow these instructions:

1. Save the firmware file to your computer. The latest version of the firmware is available free of charge from Axis website at www.axis.com/techsup
2. Go to Setup > System Options > Maintenance in the products web pages.
3. Under Upgrade Server, click Browse and locate the file on your computer. Click Upgrade.

After starting the upgrade process, always wait at least 5–10 minutes before restarting the product, even if you suspect the upgrade has failed.

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

• 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.

Emergency recovery procedure

If power or network connection is lost during the upgrade, the process fails and the product becomes 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:
**Troubleshooting**

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

In Windows, type the following from a command/DOS prompt:

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

2. If the product does not reply within a few 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 appears, use the Browse button to select the upgrade file to use. Then click Load to restart the upgrade process.

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/techsup/

**Symptoms, possible causes and remedial actions**

### Problems setting the IP address

<table>
<thead>
<tr>
<th>When using ARP/Ping</th>
<th>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. See the Installation Guide for detailed instructions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The product is located on a different subnet</td>
<td>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.</td>
</tr>
<tr>
<td>The IP address is being used by another device</td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td>• If you receive: Reply from &lt;IP address&gt;: 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.</td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td>Possible IP address conflict with another device on the same subnet.</td>
<td>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.</td>
</tr>
<tr>
<td>The product cannot be accessed from a browser</td>
<td>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.</td>
</tr>
<tr>
<td>The IP address has been changed by DHCP</td>
<td>If the product and the client are on the same network, run AXIS IP Utility to locate the product. Identify the product using its model or serial number.</td>
</tr>
<tr>
<td></td>
<td>Move the Axis product to an isolated network, or to one with no DHCP or BOOTP server. Set the IP address again, using AXIS IP Utility or ARP/Ping (see the Installation Guide). Open the Setup pages and disabled DHCP in the TCP/IP settings. Return the product to the main network. The product now has a fixed IP address that will not change.</td>
</tr>
<tr>
<td>Certificate error when using IEEE 802.1X</td>
<td>For authentication to work properly, the date and time settings in the Axis product should be synchronized with an NTP server. See <em>Date &amp; Time</em>, on page 32.</td>
</tr>
</tbody>
</table>
AXIS P3301 Fixed Dome Network Camera

Troubleshooting

The product is accessible locally but not externally

<table>
<thead>
<tr>
<th>Router configuration</th>
<th>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 35. The router must support UPnP™.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firewall protection</td>
<td>Check the Internet firewall with your network administrator.</td>
</tr>
<tr>
<td>Default routers required</td>
<td>Check if you need to configure the router settings.</td>
</tr>
</tbody>
</table>

Problems with the H.264 format

<table>
<thead>
<tr>
<th>No H.264 displayed in the client</th>
<th>Check that the relevant H.264 connection methods and correct interface are enabled in the AMC Control Panel (streaming tab). See AXIS Media Control (AMC), on page 11.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In the AMC Control Panel, select the H.264 tab and click Set to default H.264 decoder.</td>
</tr>
<tr>
<td></td>
<td>Check that RTSP is enabled under System Options &gt; Network &gt; TCP/IP &gt; Advanced.</td>
</tr>
<tr>
<td>No multicast H.264 displayed in the client</td>
<td>Check with your network administrator that the multicast addresses used by the Axis product are valid for your network.</td>
</tr>
<tr>
<td>Multicast H.264 only accessible by local clients</td>
<td>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.</td>
</tr>
<tr>
<td>Poor rendering of H.264 images</td>
<td>Color depth set incorrectly on clients. Set to 16-bit or 32-bit color.</td>
</tr>
<tr>
<td></td>
<td>If text overlays are blurred, or if there are other rendering problems, you may need to enable Advanced Video Rendering from the Video tab in the AMC Control Panel.</td>
</tr>
<tr>
<td></td>
<td>Ensure that your graphics card is using the latest driver. The latest drivers can usually be downloaded from the manufacturer’s website.</td>
</tr>
<tr>
<td>Color saturation is different in H.264 and Motion JPEG</td>
<td>Modify the settings for your graphics adapter. Refer to the adapter's documentation for more information.</td>
</tr>
<tr>
<td>Lower frame rate than expected</td>
<td>Reduce the number of applications running on the client computer.</td>
</tr>
<tr>
<td></td>
<td>Limit the number of simultaneous viewers.</td>
</tr>
<tr>
<td></td>
<td>Check with the network administrator that there is enough bandwidth available.</td>
</tr>
<tr>
<td></td>
<td>Check in the AMC Control Panel (H.264 tag) that video processing is NOT set to Decode only key frames.</td>
</tr>
<tr>
<td></td>
<td>Lower the image resolution.</td>
</tr>
</tbody>
</table>

Why do I not get maximum frames per second?

See Performance considerations, on page 48.

Image degeneration

Decrease the GOV length. Go to Video & Audio > Video Stream and select the H.264 tab to modify the GOV length.

Status and Network indicator LEDs are flashing red rapidly

<table>
<thead>
<tr>
<th>Hardware failure</th>
<th>Contact your Axis reseller.</th>
</tr>
</thead>
</table>

Status indicator LED is flashing red and the product is inaccessible

<table>
<thead>
<tr>
<th>A firmware upgrade has been interrupted or the firmware has otherwise been damaged</th>
<th>See Emergency recovery procedure, on page 41.</th>
</tr>
</thead>
</table>
# Troubleshooting

<table>
<thead>
<tr>
<th>No images displayed on web page</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems with AXIS Media Control (Internet Explorer only)</td>
<td>Configure the Axis product to use a Java applet for updating video images in Internet Explorer. Go to Setup &gt; Live View Config and select Java applet under Default viewer.</td>
</tr>
<tr>
<td>Installation of additional ActiveX component restricted or prohibited</td>
<td></td>
</tr>
</tbody>
</table>

### Video and image problems, general

<table>
<thead>
<tr>
<th>Image too dark or too light</th>
<th>Check the video stream and camera settings under Setup &gt; Video &amp; Audio &gt; Video Stream and Setup &gt; Video &amp; Audio &gt; Camera Settings.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing images in uploads</td>
<td>This can occur when trying to use a larger image buffer than is actually available. Try lowering the frame rate or the upload period.</td>
</tr>
<tr>
<td>Slow image update</td>
<td>Configuring pre-buffers, motion detection, high-resolution images or high frame rates will affect the performance of the Axis product.</td>
</tr>
<tr>
<td>Poor performance</td>
<td>Poor performance may be caused by heavy network traffic, multiple users accessing the product, low performance clients, use of features such as motion detection, event handling or uploaded applications.</td>
</tr>
</tbody>
</table>

### Poor quality snapshot images

| Screen incorrectly configured on your computer | Configure your screen to show at least 65000 colors, that is, at least 16 bits. Using only 16 or 256 colors will produce dithering artifacts in the image. |

### Overlay image is not displayed

| Incorrect size or location of overlay image | The overlay image may have been positioned incorrectly or may be too large. See Overlay Image Settings in the online help for more information. |

### Privacy mask is not displayed

| Incorrect size or location of privacy mask | The privacy mask may have been positioned incorrectly or may be too large. |

### Browser freezes

| Firefox can sometimes freeze on a slow computer | Lower the image resolution |

### Problems uploading files

| Limited space | There is only limited space available for the upload of your own files. Delete existing files to free up space. |

### Motion Detection triggers unexpectedly

| Changes in luminance | Motion detection is based on changes in luminance in the image. This means that if there are sudden changes in the lighting, motion detection may trigger mistakenly. Lower the sensitivity setting to avoid problems with luminance. |
## Troubleshooting

<table>
<thead>
<tr>
<th>No audio</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect setup</td>
<td>Check the sound card in the computer. Ensure that mute is not selected and that the volume settings are correct.</td>
</tr>
<tr>
<td>No audio or very poor audio quality</td>
<td>Check that Enable audio support is selected under Setup &gt; System Options &gt; Security &gt; Audio Support.</td>
</tr>
<tr>
<td></td>
<td>Check that the correct Audio Input source is selected under Setup &gt; Video &amp; Audio &gt; Audio Settings.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Poor audio quality</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU overloaded</td>
<td>Reduce the number of listeners and viewers. Decrease image resolution and compression.</td>
</tr>
<tr>
<td>Unsynchronized audio and video</td>
<td>Synchronize the product’s date and time settings with an NTP server. Go to Setup &gt; System Options &gt; Date &amp; Time.</td>
</tr>
<tr>
<td>Distorted audio</td>
<td>Check that the correct Audio Input source is selected under Setup &gt; Video &amp; Audio &gt; Audio Settings.</td>
</tr>
<tr>
<td>Feedback loops</td>
<td>Feedback loops might appear in full-duplex mode. Try moving the microphone or the speaker, or use half-duplex mode instead.</td>
</tr>
</tbody>
</table>
## Technical Specifications

<table>
<thead>
<tr>
<th>Function/group</th>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Camera</strong></td>
<td>Models</td>
<td>AXIS P3301</td>
</tr>
<tr>
<td></td>
<td>Image sensor</td>
<td>Progressive scan RGB CMOS 1/4”</td>
</tr>
<tr>
<td></td>
<td>Lens</td>
<td>Varifocal 2.8 – 10 mm, F1.3, DC-iris</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Horizontal angle of view: 72° – 23°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vertical angle of view: 41° – 14°</td>
</tr>
<tr>
<td></td>
<td>Minimum illumination</td>
<td>1 lux, F1.3</td>
</tr>
<tr>
<td></td>
<td>Shutter time</td>
<td>1/20000 s to 1/4 s</td>
</tr>
<tr>
<td></td>
<td>Camera angle adjustment</td>
<td>Pan 360°, tilt 170°, rotation 340°</td>
</tr>
<tr>
<td><strong>Video</strong></td>
<td>Video compression</td>
<td>H.264 Baseline Profile (MPEG-4 Part 10/AVC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motion JPEG</td>
</tr>
<tr>
<td></td>
<td>Resolutions</td>
<td>640x480 to 160x120</td>
</tr>
<tr>
<td></td>
<td>Frame rate H.264</td>
<td>30 fps in all resolutions</td>
</tr>
<tr>
<td></td>
<td>Frame rate Motion JPEG</td>
<td>30 fps in all resolutions</td>
</tr>
<tr>
<td></td>
<td>Video streaming</td>
<td>Multi-stream H.264 and Motion JPEG: 3 simultaneous, individually configured streams in max. resolution at 30 fps; more streams in either compression if identical or limited in frame rate/resolution</td>
</tr>
<tr>
<td></td>
<td>Image settings</td>
<td>Compression, color, brightness, sharpness, contrast, white balance, exposure control, exposure zones, backlight compensation, fine tuning of behavior at low light, wide dynamic range — dynamic contrast. Rotation: 0°, 90°, 180°, 270°, including Corridor Format™ Mirroring of images, text and image overlay, privacy mask</td>
</tr>
<tr>
<td><strong>Audio</strong></td>
<td>Audio streaming</td>
<td>Two-way</td>
</tr>
<tr>
<td></td>
<td>Audio compression</td>
<td>AAC LC 8 kHz 32 kbit/s, 16 kHz 64 kbit/s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G.711 PCM 8 kHz 64 kbit/s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G.726 ADPCM 8 kHz 32 kbit/s or 24 kbit/s</td>
</tr>
<tr>
<td></td>
<td>Configurable bit rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Audio input/output</td>
<td>Built-in microphone, external microphone input or line input, line level output</td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td>Security</td>
<td>Password protection, IP address filtering, HTTPS encryption*, IEEE 802.1X network access control*, digest authentication, user access log *This product includes software developed by the Open SSL Project for use in the Open SSL Toolkit (<a href="http://www.openssl.org">www.openssl.org</a>)</td>
</tr>
<tr>
<td></td>
<td>Supported protocols</td>
<td>IPv4/IPv6, HTTP, HTTPS*, SSL/TLS*, QoS Layer 3 DiffServ, FTP, SMTP, Bonjour, UPnP, SNMPv1/v2c/v3(MIB-II), DNS, DynDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS *This product includes software developed by the Open SSL Project for use in the Open SSL Toolkit (<a href="http://www.openssl.org">www.openssl.org</a>)</td>
</tr>
</tbody>
</table>
### Technical Specifications

<table>
<thead>
<tr>
<th>Function/group</th>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Integration</strong></td>
<td>Application Programming Interface</td>
<td>Open API for software integration, including ONVIF, specification available at <a href="http://www.onvif.org">www.onvif.org</a>, as well as VAPIX® and AXIS Camera Application Platform from Axis Communications, specifications available at <a href="http://www.axis.com">www.axis.com</a>. Support for AXIS Video Hosting System (AVHS) with One-Click Camera Connection. Event trigger data in video stream. Embedded Linux operating system.</td>
</tr>
<tr>
<td><strong>Intelligent video</strong></td>
<td></td>
<td>Video motion detection, active tampering alarm, audio detection. Support for AXIS Camera Application Platform enabling installation of additional applications.</td>
</tr>
<tr>
<td><strong>Triggers</strong></td>
<td></td>
<td>Intelligent video, external input, on boot.</td>
</tr>
<tr>
<td><strong>Actions</strong></td>
<td></td>
<td>File upload via FTP, HTTP and email. Notification via email, HTTP and TCP. Video and audio recording to edge storage. External output activation. Play audio clip. Pre- and post alarm video buffering.</td>
</tr>
<tr>
<td><strong>Installation aids</strong></td>
<td></td>
<td>Pixel counter.</td>
</tr>
<tr>
<td><strong>General</strong></td>
<td>Casing</td>
<td>Polycarbonate transparent cover. Metal inner camera module with encapsulated electronics. Tamper-resistant plastic casing.</td>
</tr>
<tr>
<td><strong>Processor, memory</strong></td>
<td>ARTPEC-3, 128 MB RAM, 128 MB Flash</td>
<td></td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td></td>
<td>4.9 – 5.1 v DC max. 4.7 W. Power over Ethernet IEEE 802.3.af Class 2 (max. 4.7 W).</td>
</tr>
<tr>
<td><strong>Connectors</strong></td>
<td>RJ-45 10BASE-T/100BASE-TX PoE, DC jack</td>
<td>3.5 mm jack for mic in (max 80 mVpp) or line mono input (max 6.4 Vpp). 3.5 mm jack for line mono output (max 2.0 Vpp) to active speaker. Terminal block for 1 alarm input and 1 output.</td>
</tr>
<tr>
<td><strong>Edge storage</strong></td>
<td></td>
<td>Support for recording to network share (Network Attached Storage or file server).</td>
</tr>
<tr>
<td><strong>Operating conditions</strong></td>
<td></td>
<td>Temperature: 0 °C to 50 °C (32 °F to 122 °F). Humidity 20–80% RH (non-condensing).</td>
</tr>
</tbody>
</table>


AXIS P3301 Fixed Dome Network Camera

Technical Specifications

<table>
<thead>
<tr>
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<th>Item</th>
<th>Specifications</th>
</tr>
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<tbody>
<tr>
<td>Dimensions (HxWxD)</td>
<td>94 mm x 144 mm x 132 mm (3.7” x 5.7” x 5.2”)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>0.4 kg (0.9 lb.)</td>
<td></td>
</tr>
<tr>
<td>Included accessories</td>
<td>Mounting and connector kits, clear and smoked dome cover, Installation Guide, CD with User Manual, recording software, installation and management tools, Windows decoder 1–user license, smoked transparent cover</td>
<td></td>
</tr>
<tr>
<td>Video management software (not included)</td>
<td>AXIS Camera Station — Video management software for viewing and recording up to 50 cameras See <a href="http://www.axis.com/products/video/software/">www.axis.com/products/video/software/</a> for more software applications via partners</td>
<td></td>
</tr>
<tr>
<td>Optional accessories</td>
<td>AXIS T8412 Installation Display AXIS PoE Midspans AXIS P8221 Network I/O Audio Module AXIS Camera Management AXIS Pendant kit, mounting bracket</td>
<td></td>
</tr>
</tbody>
</table>

Performance considerations

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

The following factors are among the most important to consider:

- High image resolution and/or lower compression levels result in images containing more data. Bandwidth affected.
- Access by large numbers of Motion JPEG and/or unicast H.264 clients. Bandwidth affected.
- Simultaneous viewing of different streams (resolution, compression) by different clients. Effect on frame rate and bandwidth.
- Accessing Motion JPEG and H.264 video streams simultaneously. Frame rate and bandwidth affected.
- Heavy usage of event settings affect the product’s CPU load. Frame rate affected.
- Heavy network utilization due to poor infrastructure. Bandwidth affected.
- Viewing on poorly performing client computers lowers perceived performance. Frame rate affected.