AXIS 231D+/232D+

Network Dome Camera

User's Manual

2   About This Document

This manual is intended for administrators and users of the AXIS 231D+/232D+ Network Dome Camera, and is applicable for software release 4.35. It includes instructions for using and managing the AXIS 231D+/232D+ on your network. Previous experience of networking will be of use when installing and using this product. Some knowledge of UNIX or Linux-based systems would 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.

Intellectual Property Rights

Axis AB has intellectual property rights relating to technology embodied in the product described in this document. In particular, and without limitation, these intellectual property rights may include one or more of the patents listed at http://www.axis.com/patent.htm and one or more additional patents or pending patent applications in the US and other countries.
This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit: http://www.openssl.org/

Legal Considerations

Camera surveillance can be prohibited by laws that vary from country to country. Check the laws in your local region before using this product for surveillance purposes. This product includes one (1) MPEG-4 decoder license. To purchase further licenses, contact your reseller.

Electromagnetic Compatibility (EMC)

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Re-orient or relocate the receiving antenna. Increase the separation between the equipment and receiver. Connect the equipment to an outlet on a different circuit to the receiver. Consult your dealer or an experienced radio/TV technician for help. Shielded (STP) network cables must be used with this unit to ensure compliance with EMC standards.

USA - This equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his/her own expense will be required to take whatever measures may be required to correct the interference.

Canada - This Class A digital apparatus complies with Canadian ICES-003.

Europe - $C\mskip-3mu\epsilon$ This digital equipment fulfills the requirements for radiated emission according to limit A of EN55022/1998, and the requirements for immunity according to EN55024/1998 residential, commercial, and light industry. Warning! This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Japan - This is a class A product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

Australia - This electronic device meets the requirements of the Radio communications (Electromagnetic Compatibility) Standard 1998 AS/NZS 3548. Warning! This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Liability

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WEEE Directive

The European Union has enacted a Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE Directive). This directive is applicable in the European Union member states.

The WEEE marking on this product (see right) or its documentation indicates that the product must not be disposed of together with household waste. To prevent possible harm to human health and/or the environment, the product must be disposed of in an approved and environmentally safe recycling process. For further information on how to dispose of this product correctly, contact the product supplier, or the local authority responsible for waste disposal in your area.

Business users should contact the product supplier for information on how to dispose of this product correctly. This product should not be mixed with other commercial waste.

Axis Customer Services

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 firmware updates
• find answers to resolved problems in the FAQ database. Search by product, category, or phrases
• report problems to Axis support staff by logging in to your private support area
• visit the Axis Support Web at www.axis.com/techsup/

Safety Notice - Battery Replacement

The AXIS 231D+/232D+ uses a 3.0V CR2032 Lithium battery as the power supply for its internal real-time clock (RTC). This battery will, under normal conditions, last for a minimum of 5 years. Low battery power affects the operation of the RTC, causing it to reset at every power-up. A log message will appear when battery replacement is required.

The battery should not be replaced unless required!

If the battery does need replacing, please observe the following points:

Caution!

• Danger of Explosion if battery is incorrectly replaced
• Replace only with the same or equivalent battery, as recommended by the manufacturer.
• Dispose of used batteries according to the manufacturer's instructions.

Table of contents

AXIS 231D+/232D+

Ideal for demanding surveillance and remote monitoring applications, the AXIS 231D+/232D+ Network Dome Camera features precise pan/tilt/zoom control, superior quality Motion JPEG and MPEG-4 video, advanced event management functionality, 4 alarm inputs/4 alarm outputs (for e.g. door sensors, alarm bells), 20 preset positions and sequence mode (guard tour). With security features such as HTTPS and IP address filtering, the AXIS AXIS 231D+/232D+ is perfect for professional security installations.

Up to 20 viewers can access the camera simultaneously when using Motion JPEG and MPEG-4 unicast. Video can be viewed in 5 resolutions (up to 4CIF), image compression is configurable.

The AXIS 231D+/232D+ has a built-in Web server, providing full access to all features through the use of a standard Web browser. The built-in scripting tool allows basic applications to be created, providing basic surveillance solutions. For advanced functionality, the Network Dome Camera can be integrated via the use of AXIS HTTP API. For more information, refer to http://www.axis.com/developer

Axis products are supported by the industry's largest base of application software for managing and recording video, and integrating alarm and access control systems.

AXIS 232D+

The AXIS 232D+ Network Dome Camera is a day and night camera with an IR cut filter which enables the camera to capture color video in light conditions down to 0.3 lux, and black and white video in conditions down to 0.005 lux. The IR-cut filter can be automatically enabled/disabled according to the current light conditions or manually enabled/disabled from the internal web pages.

Hardware Description

Network Connector- After completion of the startup and self test routines, the Network and Power Indicators on the network connector flashes as follows:

| Indicator	Color	Description	
Network	Green	Flashes for network activity	
	Red	Flashes rapid red for hardware error	*Detail - network connector:*
	None	No connection	Power Indicator
Power	Green	Normal operation	
	Amber	Flashes green/amber during upgrade and when connecting to AXIS Internet Dynamic DNS Service	Network Indicator

Control Button - Press this button to restore the factory default settings, as described in *Resetting to Factory Default Settings, on page 41* or for installation as described in the provided AXIS 231D+/232D+ Installation Guide and also available from the Axis Web site at http://www.axis.com.

The **Serial Number (S/N)** is located on the label on the unit.

Network Connector - The AXIS 231D+/232D+ connects to the network via a standard RJ45 connector. Supporting NWAY, the AXIS 231D+/232D+ detects the speed of the local network segment (10BaseT/100BaseTX Ethernet).

Connection Module - The connection module provides the physical interface to 4 transistor outputs, 4 digital inputs and is the connection point for AC power. See *Connection Module, on page 42.*

For instructions on how to install the AXIS 231D+/232D+, please refer to the Installation Guide which is supplied with the product in printed format or in PDF format from the Axis Web site at http://www.axis.com
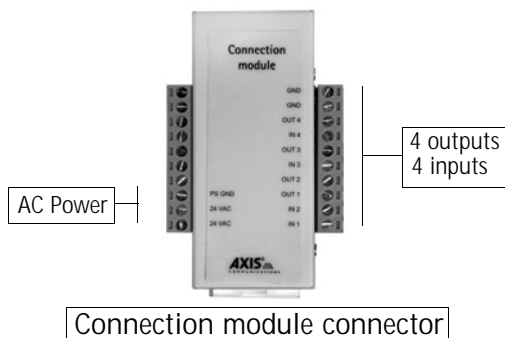
Using the Network Dome Camera

This document includes instructions for using and managing the AXIS 231D+/232D+.
Instructions on how to install the AXIS 231D+/232D+ on your network are provided in the
AXIS 231D+/232D+ Installation guide which is available on the Axis Web site. The AXIS
231D+/232D+ can be used with most standard operating systems and supports Microsoft
Internet Explorer 6.x or later, Netscape 7.x or later and Mozilla 1.4 or later.

Accessing the AXIS 231D+/232D+

1. Start a Web browser (Internet Explorer, Mozilla, Netscape Navigator).

2. Enter the IP address or host name
   of the AXIS 231D+/232D+ in the
   Location/Address field of your
   Web browser.

3. Enter the user name and password set by the administrator.

4. A video image is displayed in your Web browser.
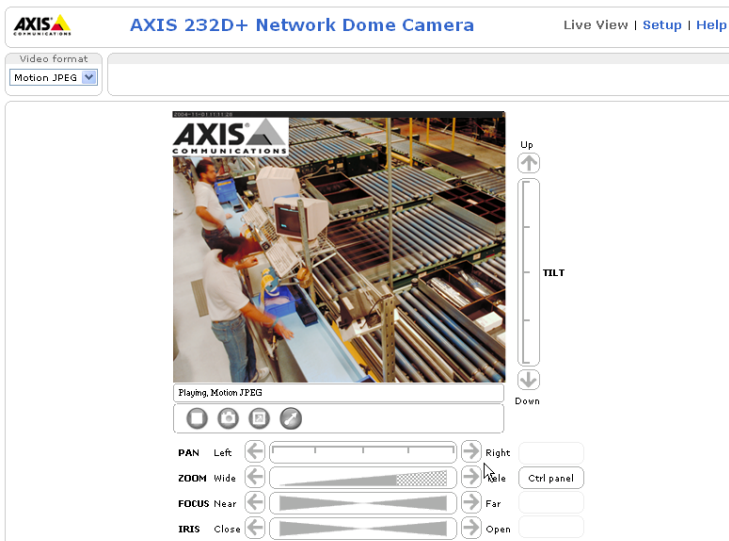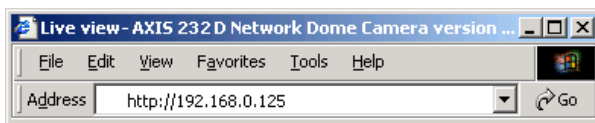
Note: • To be able to view streaming video in Microsoft Internet Explorer, you must set your Web browser to allow
ActiveX controls. If your working environment restricts the use of additional software components, you can
configure the AXIS 231D+/232D+ to use a Java applet for updating images. Please refer to the online help
files for more information.
   • User functions in the AXIS 231D+/232D+ may have been customized to meet the specific requirements of
the application. Consequently, many of the examples and functions in this section may differ from those
displayed in your Live View page.

If the AXIS 231D+/232D+ has been customized, the buttons and other items described below will be displayed accordingly on the Live View page. The following provides an overview of each button:
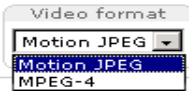
The Video Format drop-down list allows the video format on the Live View page to be temporarily changed.

The **Output buttons** control an output directly from the **Live View** page. These buttons are configured under **Setup** > **Live View Config** > **Layout**.

Pulse - click this button to activate the port for a defined period of time, e.g. to switch on a light for 20 seconds.
Active/Inactive - click these buttons to manually start and stop a connected device, e.g. switch a light on/off.

These buttons start/stop the **Sequence Mode**. This mode is created in **Setup** > **Live View Config** > **Sequence mode** and automatically displays the view from preset positions at set intervals.

The **Action buttons** trigger an action directly from the **Live View** page. These buttons are configured under **Setup** > **Live View Config** > **Layout**. Click these buttons to manually start and stop events.

Use the **Snapshot** button to capture a snapshot of the image currently being displayed in the window. Right-click on the image to save it in JPEG format on your computer.
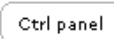
Click the **Ctrl panel** button to access the following buttons:

- **Auto focus**: Automatically adjusts the image focus.
- **Auto iris**: Automatically adjusts the amount of light reaching the image sensor for best image results.
- **Backlight comp**: Enabling backlight compensation makes the subject clearer if the image background is too bright, or if the subject is too dark.
- **IR cut filter** (AXIS 232D+ only) - when set to off, the camera will be able to "see" infrared light, e.g. at night, thus making the image clearer. The image is shown in black & white when the IR cut filter is off. Set to **Auto** to automatically turn the filter off when the available visible light falls below the minimum requirement.
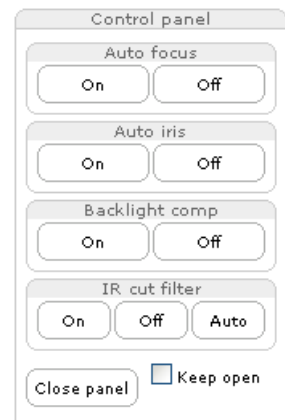
Note: There are different buttons in the Control Panel depending on the computer's operating system but the descriptions and functionality are the same.

The **AMC viewer toolbar** (AXIS Media Control) is available from **Microsoft Internet Explorer only** and displays the following buttons:

The **Play/Stop** buttons start and stop the live video stream.

The **Snapshot** button takes a snapshot of the currently displayed image. The Snapshot function and the target directory for saving snapshots can be configured from AMC (AXIS Media Control), which is available from the Windows Control Panel (Internet Explorer only).

Click the **View Full Screen** button and the video image will fill the entire screen area. No other windows will be visible. Press **Esc** (Escape) on the computer keyboard to cancel full screen view.

Click the **Set emulated joystick mode** button and click in the image to move the camera in the desired direction

Click the **Center** button and the camera view will center on the position that was clicked. The location to move to has a definite position, e.g. 'position x,y.

Pan/Tilt/Zoom Controls
The Live View page also displays the Pan/Tilt/Zoom controls. The administrator can enable/disable the control for specified users under **System Options** > **Security** > **Users** > **User List**.
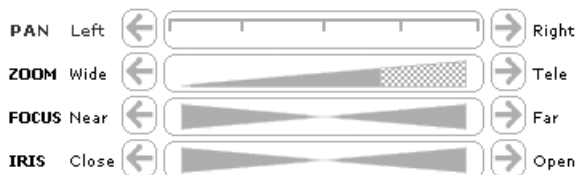
Pan/Tilt/Zoom Control Queue
The time the user is in control of the PTZ settings is limited and a queue of users has been set up. Use the buttons to request or release control of the Pan/Tilt/Zoom controllers.

The Pan/Tilt/Zoom Control Queue is set up by the administrator under:
Dome Configuration > **Advanced** > **PTZ Control Queue**. For more information on using Pan/Tilt/Zoom controls, please see page 25.

AXIS 295 Video Surveillance Joystick
The AXIS 295 is a USB device that gives responsive and accurate control of the pan, tilt, zoom functionality. On installation, the joystick is automatically detected by AXIS Media Control where the 12 buttons can be programmed for a customized video surveillance system. For more information, please visit the Axis Website at http://www.axis.com

Video Streams

The AXIS 231D+/232D+ provides several different image and video stream formats. The type to use depends on your requirements and on the properties of your network.

The Live View page in the AXIS 231D+/232D+ provides access to Motion JPEG and MPEG-4 video streams, as well as to single JPEG images. Other applications and clients can also access these video streams/images directly, without going via the Live View page.

Stream Types

Motion JPEG
This format uses standard JPEG still images in 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 also provides excellent image quality and access to each and every individual image contained in the stream.

Note also that multiple clients accessing Motion JPEG streams can use different image settings.

MPEG-4
This is a video compression standard that makes good use of bandwidth, and which can provide high quality video streams at less than 1 Mbit/s.

Notes: • MPEG-4 is licensed technology. The AXIS 231D+/232D+ includes one viewing client license. Installing additional unlicensed copies of the viewing client is prohibited. To purchase additional licenses, contact your Axis reseller.
• All clients viewing the MPEG-4 stream must use the same image settings.

The MPEG-4 standard provides scope for a large range of different coding tools for use by various applications in different situations, and the AXIS 231D+/232D+ provides certain subsets of these tools. These are represented as **Video object types**, which are selected for use with different viewing clients. The supported video object types are:

• **Simple** - sets the coding type to H.263, as used by e.g. QuickTime™.
• **Advanced Simple** - sets the coding type to MPEG-4 Part 2, as used by AMC (AXIS Media Control)

When using MPEG-4 it is also possible to control the bit rate, which in turn allows the amount of bandwidth usage to be controlled. CBR (constant bit rate) is used to achieve a specific bit rate by varying the quality of the MPEG-4 stream. When using VBR (variable bit rate), the quality of the video stream is kept as constant as possible, at the cost of a varying bit rate.

MPEG-4 protocols and communication methods

To deliver live streaming video over IP networks, various combinations of transport protocols and broadcast methods are employed.

- RTP (Realtime Transport Protocol) is a protocol that allows programs to manage the real-time transmission of multimedia data, via unicast or multicast.

- RTSP (Real Time Streaming Protocol) serves as a control protocol, to negotiate which transport protocol to use for the stream. RTSP is thus used by a viewing client to start a unicast session, see below.

- UDP (User Datagram Protocol) is a communications protocol that offers limited service for exchanging data in a network that uses the Internet Protocol (IP). UDP is an alternative to the Transmission Control Protocol (TCP). The advantage of UDP is that it is not required to deliver all data and may drop network packets when there is e.g. network congestion. This is suitable for live video, as there is no point in re-transmitting old information that will not be displayed anyway.

- Unicasting is communication between a single sender and a single receiver over a network. This means that the video stream goes independently to each user, and each user gets their own stream. A benefit of unicasting is that if one stream fails, it only affects one user.

- Multicast is bandwidth-conserving technology that reduces bandwidth usage by simultaneously delivering a single stream of information to multiple network recipients. This technology is used primarily on delimited networks (intranets), as each user needs an uninterrupted data flow and should not rely on network routers.

How to stream MPEG-4

Deciding on the combination of protocols and methods to use depends on your viewing requirements, and on the properties of your network.

RTP+RTSP
This method (actually RTP over UDP and RTSP over TCP) should be your first consideration for live video, especially when it is important to always have an up-to-date video stream, even if some images do get dropped. This can be configured as multicast or unicast.

Multicasting provides the most efficient usage of bandwidth, especially when there are large numbers of clients viewing simultaneously. Note however, that a multicast broadcast cannot pass a network router unless the router is configured to allow this. It is thus not possible to multicast over e.g. the Internet.

Unicasting should be used for video-on-demand broadcasting. However, if more and more unicast clients connect simultaneously, the server will at some point become overloaded. There is also a maximum of 20 simultaneous viewers to be considered.

RTP/RTSP
This unicast method is RTP tunneled over RTSP. This can be used to exploit the fact that it is relatively simple to configure firewalls to allow RTSP traffic.

RTP/RTSP/HTTP or RTP/RTSP/HTTPS
These two methods can also be used to traverse firewalls. Firewalls are commonly configured to allow the HTTP protocol, thus allowing RTP to be tunneled.

The AXIS Media Control

The recommended method of accessing live video (MPEG-4 and/or Motion JPEG) from the AXIS 231D+/232D+ is to use the AXIS Media Control (AMC) in Microsoft Internet Explorer in Windows. This ActiveX component is automatically installed on first use, after which it can be configured by opening the AMC Control Panel applet from the Windows Control Panel. Alternatively, right-click the video image in Internet Explorer.

Other methods of accessing the video stream

Video/images from the AXIS 231D+/232D+ can also be accessed in the following ways:

- If supported by the client, the AXIS 231D+/232D+ can use Motion JPEG server push to display video. This option maintains an open HTTP connection to the browser and sends data as and when required, for as long as required.
- As single JPEG images in a browser. Enter e.g. the path: http://<ip>/axis-cgi/jpg/image.cgi?resolution=CIF
- Windows Media Player. This requires AMC and the MPEG-4 decoder to be installed. The paths that can be used are listed below, in the order of preference.
    - Unicast via RTP: axrtpu://<ip>/mpeg4/media.amp
    - Unicast via RTSP: axrtsp://<ip>/mpeg4/media.amp
    - Unicast via RTSP, tunneled via HTTP: axrtsphttp://<ip>/mpeg4/media.amp
    - Unicast via RTSP, tunneled via HTTPS: axrtsphttps://<ip>/mpeg4/media.amp
    - Multicast: axrtpm://<ip>/mpeg4/media.amp

Other MPEG-4 clients

Although it may be possible to use other clients to view the MPEG-4 stream, this is not guaranteed by Axis. For some other clients, e.g. QuickTime™ the Video Object Type must be set to *Simple*. It may also be necessary to adjust the advanced MPEG-4 settings.To assess the video stream from e.g. QuickTime™ the following path can be used:

rtsp://<ip>/mpeg4/1/media.amp

This path is for all supported methods, and the client will negotiate with the network camera to determine exactly which transport protocol to use.

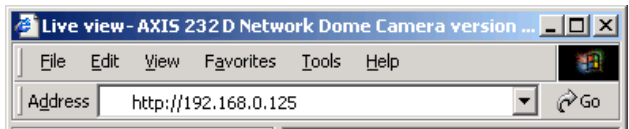Notes: <ip> = IP address

Configuring the Network Dome Camera

This section describes how to configure the AXIS 231D+/232D+ and is intended for the product **administrator** who has unrestricted access to all Setup tools and **Operator** who has access to Video & Image, Live View Config and Event Configuration. See the section on *Security*, on page 33 for more information on user access control.
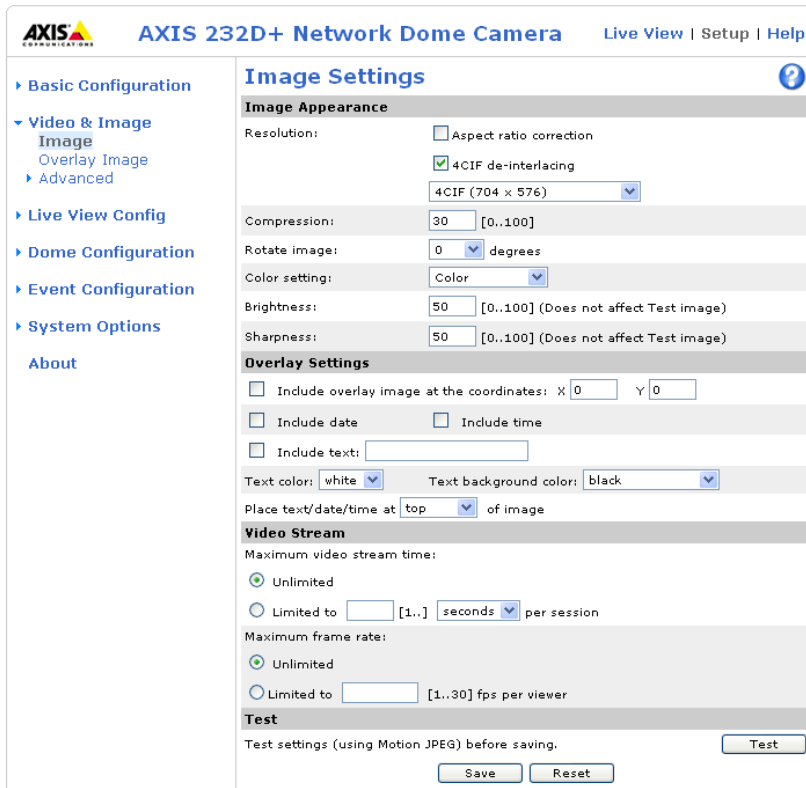
The AXIS 231D+/232D+ is configured under **Setup** from a standard browser.

Accessing the Setup Tools

Follow the instructions below to access the Setup Tools from a Web browser.

1. Start the Web browser and enter the IP address or domain name of the AXIS 231D+/232D+ in the location/address field.

2. The **Live View** page is now displayed. Click **Setup** to display the **Setup** configuration tools.

Overview of the Setup Tools

Setup Configuration

Video & Image Settings

The following descriptions offer examples of the available features in the AXIS 231D+/232D+. For details of each setting, please refer to the online help files which are available from each page. Click 🔵 to access the help files.

Image Settings
To optimize the video images according to your requirements, modify the following settings under **Image Appearance**. Each setting is described in the online help files 🔵

All configuration of images and overlays will affect the performance of the network camera, depending on the usage and the available bandwidth.

- High resolution generates larger files
- Lower compression improves image quality, but generates larger files
- Black & White uses less bandwidth than Color
- Rotating the image 90 or 270 degrees will lower the maximum frame rate

See also the specifications for frame rates and bandwidth in *General performance considerations*, on page 50.

Overlay Settings

Use these settings to include an image as an overlay, and/or the date and time, along with text of your own.

Text overlays are all included on one line at the top or bottom of the video image. Image overlays can be placed anywhere in the video image.

To upload an overlay image, see below.

Example: If there is information in a monitored area that you do not wish to disclose, you can mask it out by placing an overlay image on top. Setting the overlay image anywhere in the video image using coordinates allows precision detail masking.
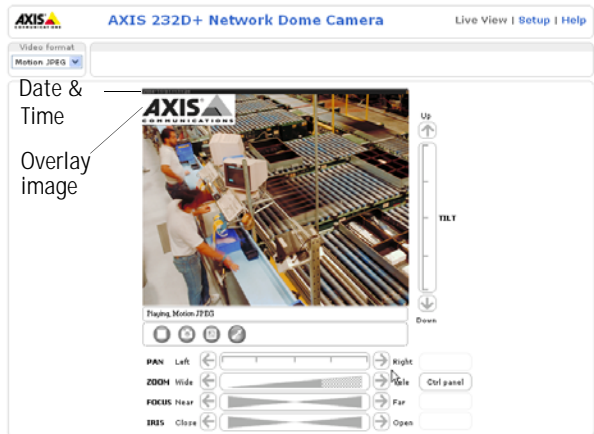
Video Stream

The **Maximum video stream time** can be set as *Unlimited*, or a **maximum stream time** per session in seconds, minutes or hours can be defined. When the set time has expired, a new stream can be started by refreshing the page in the Web browser. Note that the maximum video stream time does not apply to clients connecting via multicast.

To avoid bandwidth problems on the network, the **frame rate** allowed to each viewer can also be limited. Select either *Unlimited* or define a maximum frame rate per viewer.

For a preview of the image and overlay settings before saving, click **Test**. When you are satisfied with the settings, click **Save**.

Please use the online help files 🅰 for more information.

Overlay Image Settings

An overlay image is an image included in the video image. This might, for example, be your own company logo. Follow these instructions to upload and use an overlay image:

1. Go to **Setup** > **Video & Image** > **Overlay Image**.

2. To upload the file (a logo or image) to the AXIS 231D+/232D+, click the **Browse** button and locate it on your computer or server.

3. Click the **Upload** button and follow the on-screen instructions.

4. The image is now available in the **Use overlay image** drop-down list.

5. Click **Save**.

6. Go to **Setup** > **Video & Image** and modify the parameters under **Overlay Settings**.

Overlay image requirements		Overlay image limitations
Image Formats	Image Size	• If the image overlay and text overlay are larger than the video image, no overlay will be displayed. When also using a text overlay, this will occupy 16 pixels in height and as many in width as the video image.
• Windows 24-bit BMP (full color) • Windows 4-bit BMP (16 colors) • OS/2 4-bit BMP (16 colors)	The height and width of the overlay image in pixels must be exactly divisible by 4.	• If the overlay is initially positioned so that part of it is outside the video image, it will be relocated so that it appears over the video image, i.e. the entire image is always displayed.
		• The maximum overlay image size supported by the AXIS 231D+/232D+ is the same as the maximum image resolution. See Technical Specifications, on page 46.

Advanced Camera Settings

To optimize the lighting settings according to your requirements, modify the following settings under **Lighting Conditions**:

- White balance - the white balancing system in the AXIS 231D+/232D+ can automatically detect white in the image and intelligently use this as a reference for other colors.
- Exposure control - this setting is used to adapt to the amount/type of light being used. **Allow slow shutter** can be enabled/disabled when the exposure control is set to Automatic.
- IR cut filter (AXIS 232D+ only)- when the IR cut filter is set to OFF, the camera will be able to 'see' infrared light, e.g. at night, thus making the image clearer. The image is shown in black & white when the IR cut filter is off.
  Note: If set to Auto, the camera will automatically switch between IR cut filter ON and OFF, according to the current lighting conditions. This is only possible when the iris is set to Auto Iris, and the exposure control is set to Automatic.
- Backlight compensation - this setting is used to make the subject appear clearer, e.g. against a bright background.

Image Settings

- Auto focus enabled (default setting).
- Sensitivity - sets the speed of the auto focus. **High** is used when focusing on objects that move frequently. **Low** improves the stability of the focus.

Note: In certain situations, the white balancing system will not operate effectively. Problems may occur if the image contains no white color at all, or if the dominant color is not white. In these circumstances, the white balance may incorrectly be based on another visible color in the image, and colors may become distorted. A pale background picture with reddish or blue foreground objects is very symptomatic of this condition. In such cases it is recommended that a fixed white balance setting is selected.

Please use the online help files 🔵 for more information.

MPEG-4 Settings

Tools for adjusting the MPEG-4 settings and for controlling the video bit rate.

The MPEG-4 standard provides many different coding tools for various applications in different situations. As most MPEG-4 clients do not support all of these tools, it is usual to instead define and use subsets for different clients or groups of clients. These settings allow you to define the type of viewing client to use.

Adjusting the maximum bit rate and setting it to variable or constant is a good way of controlling the bandwidth used by the MPEG-4 video stream.

For more information on these advanced settings, please see the online help files 🔵

Live View Config

Layout

These are the tools for deciding the layout of the Live View page.

The layout can be set in 3 ways:

- Use Axis look - the layout is unchanged.
- Use custom settings - modify the default page with your own colors, images etc. Click the **Configure** button and see the following page.
- Own Home Page - Upload and use your own custom made page as the default web page. Click the **Configure** button and see the following page.

The other settings on this page concern which other features to include, e.g. buttons and links. See page 21 for more information.

Customizing the default page

The appearance of the default AXIS 231D+/232D+ Live View page can be customized to suit your own requirements, or you can upload and use your own home page. To upload your own files, click the **Upload/Remove** button and see the description below.

Note that the setup address is:

http://<ip address>/operator/basic.shtml

Upload Own Web Files

Your own web files, background picture, color etc. must first be uploaded to the AXIS 231D+/232D+ in order to be available for selection in the **Custom Settings setup** dialog. Once uploaded, the files are shown in the drop-down list.

1. Enter the path to the file, e.g. a file located on your workstation or click the **Browse** button.

2. Select the user level for the uploaded file. Setting the user access level means that you have complete control over which pages can be viewed by which users.

3. When the path is shown correctly in the text field, click the **Upload** button.

All uploaded files are shown in the list in the lower section of the page. To remove a file, check the box provided next to it and then click the **Remove** button.

- To use your uploaded file, click the radio button and select the file from the drop-down list by **Own:**
- To use an external file located somewhere other than in the AXIS 231D+/232D+, click the radio button and enter the URL by **External:**

Own Home Page

To use a previously uploaded web page as the default page, check the checkbox, select the page from the drop-down list and click OK.

User Defined Links

User defined links can be CGI links or web links. Once configured, the link(s) will appear on the **Live View** page.

To set up a **web link**, select the **Use as web link** radio button, enter a descriptive name and enter the URL in the provided field. Click **Save** and the link will appear on the **Live View** page.

User defined **CGI links** can be used to issue HTTP API requests, e.g. PTZ commands.

Example:

1. Check **Show Custom Link 1**

2. Enter a descriptive name, e.g. CAM START.

3. Select the **Use as cgi link** radio button and enter the cgi link in the field:
   http://192.168.0.125/axis-cgi/com/ptz.cgi?continuouspantiltmove=30,-30

User Defined Links

4. Check **Show Custom Link 2**.

5. Enter a descriptive name, e.g. CAM STOP.

6. Select the **Use as cgi link** radio button and enter the cgi link in the field:
   http://192.168.0.125/axis-cgi/com/ptz.cgi?continuouspantiltmove=0,0

7. These links will appear in the web interface and can be used to control the AXIS 231D+/232D+.

For more information on the Axis HTTP API, see the Support / Developer pages on the Axis Web site at http://www.axis.com.

Please use the online help files 🕐 for more information.

For more information on the Axis HTTP API, see the Support / Developer pages on the Axis Web site at http://www.axis.com. See also the section on PTZ, on page 25.

Action Buttons

These buttons can be used to manually trigger and stop an event from the Live View page. The snapshot button allows you to take a snapshot of the video stream and save it to a computer.

Output Buttons

These buttons are used to control the outputs on the AXIS 231D+/232D+ and thus the equipment connected to them, e.g. to switch a light on or off:

• The Pulse button activates the port for a defined period
• Active/Inactive displays 2 buttons, one for each action (on/off)

Default Video Format

Select the default video format to use on the Live View page. Checking the box for **Show video format selection** displays a drop-down list on the Live View page allowing you to temporarily change the format.

When using MPEG-4 as the video format, the default viewer is AXIS Media Control with Internet Explorer.

Note: It is also possible to view Motion JPEG when MPEG-4 is chosen as default and vice versa.

Default Viewer

From the drop-down lists, select the default method for viewing video images for your browser. The camera will attempt to show the video images in the selected video format and viewer. If this is not possible, the camera will override the settings and select the best available combination.

Browser	Viewer	Description
Windows Internet Explorer	AMC	Recommended viewer in Windows Internet Explorer (MPEG-4 /Motion JPEG).
	QuickTime	MPEG-4 only.
	Java applet	A slower imaging alternative to AMC. Requires one of the following installed on the client: • JVM (J2SE) 1.4.2 or higher • JRE (J2SE) 5.0 or higher
	Still image	Displays still images only. Hit the Refresh button in your browser to view a new image.
Other browsers	Server Push	Recommended viewer for other browsers (Motion JPEG).
	QuickTime	MPEG-4 only.
	Java applet	A slower imaging alternative to Server Push (Motion JPEG only).
	Still image	Displays still images only. Hit the Refresh button in your browser to view a new image.

AMC (AXIS Media Control) Settings

Checking the **Show viewer toolbar box** displays the AMC toolbar under the video stream.

By checking the **Enable MPEG-4 decoder installation** box, it is also possible for the Administrator to enable or disable the installation of the MPEG-4 decoder. This is used to prevent the installation of unlicensed copies. Further decoder licenses can be purchased from your Axis dealer.

Check the **Show crosshair in PTZ joystick mode** checkbox to indicate the center of the image when viewing the video stream in PTZ joystick mode.

HTML Examples

You can add live video from your AXIS 231D+/232D+ to your own web site. The video server can send Motion-JPEG or MPEG-4 images to up to 20 simultaneous connections, although an administrator can restrict this to fewer. This does not affect or include the number of multicast viewers.

Enter the **Image Type**, **Image size** and other settings to suit your web page and click **Update**.

External Video

An external video source is a source originating from some other Axis device on the network. The images from these sources can be displayed just as if they were produced by the AXIS 231D+/232D+.

The External Video Source list shows all of the external video sources currently configured. The information displayed is the source's name and the path to the video stream. Up to 20 external video sources can be configured.

Working with External Video Sources
1. To add a new video source, click the Add button. This opens the External Video Source Setup dialog, which is used to make all the necessary settings.

2. To modify an existing video source, select it and click the Modify button.

3. To delete an external video source, select it and click the Remove button.

Sequence Mode

Sequence Mode is a configuration that automatically displays the view from multiple, previously defined Preset Positions (see *Dome Configuration*, on page 27 and the online help).

This is useful for e.g. security personnel viewing a surveillance system that constantly rotates through the selected preset positions, in the listed order, or randomly.

To set up sequence mode, simply select the desired preset positions and enter the number of seconds or minutes to display each position for. Each position can be displayed for up to 59 minutes.

Pan Tilt Zoom Controls

The controls available for Pan Tilt Zoom (PTZ) are displayed on the Live View page by default. The administrator can enable/disable the controls for specified users.

Source / Preset positions

Tilt bar

PTZ controls

- the Pan bar - moves the camera to the right and left
- the Tilt bar - tips the camera up and down
- the Zoom bar - zooms the view in and out
- the Focus bar - adjusts the focus
- the Iris bar - adjusts the brightness of the image

Clicking on the bars themselves or on the arrows at the end of the bars will move the camera to a new position.

Each position on the bar (see right) represents a defined position in the camera's range of movement, with the center of the bar representing the point midway between the two extremes of movement.

Clicking a position directly on the bar moves the camera directly to the new position in one smooth movement. Clicking on the arrows at the ends of a bar causes a stepped, incremental change.

Click-in-image
The PTZ device can also be controlled using **click-in-image** movement, which can also be of relative or absolute type.

Absolute click-in-image movement means that the camera view will center on the absolute position that was clicked.

Relative click-in-image movement can be used when using the AXIS Media Control with Microsoft Internet Explorer. By clicking and holding the mouse button down in the image, the PTZ device moves the camera in that direction, relative to the center of the image. The further from the center the image is clicked, the greater the movement.

Focus and Iris Controls
The Focus and Iris (image brightness) can be adjusted manually by using the control bars, or they can be set for automatic adjustment, by clicking the **Auto Iris** and **Auto Focus** buttons.

Preset Positions
These presets are selected from the drop-down **Source** list on the Live View page and will move and/or zoom the camera to a pre-defined position, i.e. to cover an area of particular interest. Events can also be configured to go to preset positions when triggered. For information on setting up preset positions, please see *Dome Configuration*, on page 27 and the online help.

PTZ Control Queue
This indicates that PTZ queueing has been enabled. This means that the time the user is in control of the PTZ device is limited and that a user queue has been set up. Use the buttons to request or release control of the PTZ controls. For information on how to set up the control queue, please see *PTZ Control Queue* on page 28 and the online help.

Using CGI links to control PTZ devices
User-defined CGI links on the Live View page can be used to issue HTTP API requests, e.g. PTZ commands. These links are configured in the Live View Layout settings, see page 21.

Dome Configuration

Preset Positions - a preset position is a pre-defined camera view than can be used to quickly move the camera to a specific location.

From **Preset Position Setup**, use the Pan, Tilt and Zoom (PTZ) controls to steer the camera to the required position. When satisfied with the camera's position, enter a descriptive name. The camera position, iris and focus settings are then saved as a preset position.

The position can be assumed at any time, by selecting the preset's name from the Preset positions drop-down list. Preset positions can be selected in **Live View**, from **events**, in **Sequence mode** and in the **Guard Tour**.

One position can be set as the **Home** position, which is readily accessible by clicking on the **H** button in both the Preset Position Setup window and the Live View window. The position's name will have (H) added, e.g. Office Entrance (H).
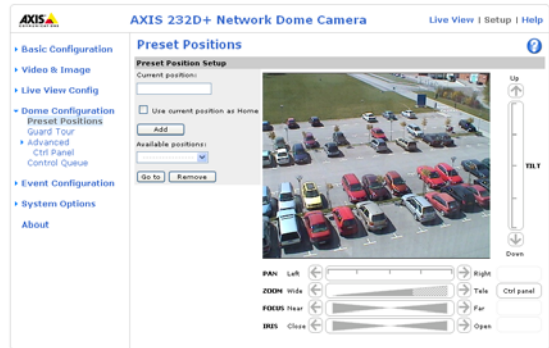
Guard Tour
A guard tour displays the video streams from different preset positions from cameras in the system, one-by-one, in a pre-determined order or randomly, and for configurable time periods. Once the preset position has been set, and added to the guard tour, the following settings can be made:

- View Time in seconds or minutes
- Move Speed - sets the speed of the Pan/Tilt movements to the preset position
- View Order (or Random)

Pan Tilt Zoom
For an overview of Pan Tilt Zoom controls, see page 25.

Limits
Define the **pan**, **tilt**, **zoom** and **focus** limits for the AXIS 231D+/232D+. Movements to the left and right, up and down can be restricted to narrow the area under surveillance. The near focus limit can be set to avoid focusing on objects too close to the camera.

Note: Once a limit has been saved, this position can not be exceeded by the AXIS 231D+/232D+ unless the values have been reset and saved to a greater value first (i.e. reset the default values of the mechanical restrictions).

Move speed sets the speed of the camera's Pan/Tilt movements. The default setting is maximum speed.

Advanced

Control Queue - The administrator can set up a queue for the PTZ controllers. Once set up, the PTZ Control Queue buttons will appear on the Live View page offering one viewer exclusive control for a limited amount of time. Other users will be placed in the queue.

PTZ Control Queue on Live View page

Please use the online help files 🔵 for more information.

Event Configuration

This section describes how to configure the AXIS 231D+/232D+ for alarm handling. The AXIS 231D+/232D+ can be configured to perform certain actions when certain types of events occur.

Event type	A set of parameters describing how and when the Network Dome Camera is to perform certain actions	
Triggered Event page 30	the circumstances that start an event	e.g. at a signal from an external device, such as a door switch or a motion sensor
Scheduled Event page 32	the circumstances that start an event	e.g. at a pre-programmed time
Action	what occurs when the event triggers	e.g. uploaded video images to an FTP server, email notification, etc.

Event Servers

Event Servers are used, e.g. for receiving uploaded image files and/or notification messages. To set up Event server connections in your AXIS 231D+/232D+, go to **Setup > Event Configuration > Event Servers** and enter the required information according to the selected server type.

Server type	Purpose	Requires information
FTP Server	• used for uploading saved images	• Descriptive name of your choice • User Name and Password (to FTP server) • Upload path e.g. images/ • Port number e.g. port 21 • Use passive mode if there is a firewall between the AXIS 231D+/232D+ and the FTP server
HTTP Server	• used for notification messages • used for uploading saved images	• Descriptive name of your choice • URL • User Name and Password (to HTTP server) • Proxy address/Proxy port (if required) • Proxy User Name and Password (if required)
TCP Server	• used for notification messages	• Descriptive name of your choice • User Name and Password (to TCP server) • Port number e.g. port 80

For details on each setting, please refer to the online help files 🕐 which are available from each web page.

Note: Pre-trigger and Post-trigger buffers will be lost if the connection to the event server fails.

When the setup is complete, the connection can be tested by clicking the **Test** button (the connection test will take approximately 10 seconds).

Event Types

An **Event Type** is a set of parameters describing how and when the Network Dome Camera is to perform certain actions.

Example: If a door is opened, and an event has been configured to act on this, the Network Dome Camera can e.g. record and save video images to an FTP server or send a notification email to a pre-configured email address with a pre-configured message. Video images can be sent as an attachment with the email.
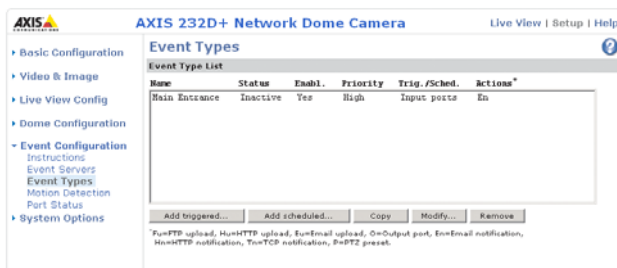
Triggered Event

A Triggered event is activated from, e.g:

- a switch (doorbell) connected to an input port on the Network Dome Camera
- lost signal from the camera
- a manually activated action e.g. from an action button in the web interface
- on restart (reboot) after e.g. power loss

How to set up a triggered event

This example describes how to set the Network Dome Camera to upload images when the main door is opened:

1. Click **Add triggered** on the **Event types** page.
2. Enter a descriptive **name** for the event, e.g. Main door.
3. Set the **priority** - High, Normal or Low (see online help files).
4. Set the **Respond to Trigger**... parameters when the event is to be active, e.g. only after office hours
5. Select the trigger alternative from the **Triggered by**... drop-down list, e.g. an Input port with a connected sensor if the door is opened.
6. Set the **When Triggered**... parameters i.e. set what the Network Dome Camera is to do if the main door is opened e.g. upload images to an FTP server.
7. Click **OK** to save the Event in the Event Types list.

Please use the online help files ❷ for descriptions of each available option.

Pre-trigger and Post-trigger buffers
This function is very useful when checking to see what happened immediately before and after a trigger, e.g. 2 minutes before and after a door has been opened.

Go to **Event Types** > **Add Triggered...** > **When Triggered...** **and** check the **Upload images** checkbox to expand the web page with the available options.

Buffer size - up to 9 MB buffer. The maximum length of time of the pre-/post-buffer depends on the image size and selected frame rate.

Triggered Event Type Setup

General
Name: New Event
Priority: Normal

Respond to Trigger...
○ Always
○ Only during time frame ☐ Sun ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☐ Sat
Start time: 00:00 Duration: 00:00 (max 168:00 hours)
○ Never (event type disabled)

Triggered by...

When Triggered...
☐ Upload images
☐ Activate output port
☐ Send email notification
☐ Send HTTP notification to
☐ Send TCP notification to
☐ Go to PTZ preset:

OK   Cancel

Include pre-trigger buffer - images stored internally in the server from the time immediately preceding the trigger. Check the box to enable the pre-trigger buffer, enter the desired length of time and specify the required image frequency.

Include post-trigger buffer - contains images from the time immediately after the trigger. Configure as for pre-trigger.

Note: If the pre- or post-buffer is too large for the internal memory, the frame rate will be reduced and individual images may be missing. If this occurs, an entry will be created in the unit's log file.

Continue image upload (unbuffered) - enable the upload of images for a fixed length of time. Specify the length of time for the uploaded recording, in seconds, minutes or hours, or for as long as the trigger is active. Finally, set the desired image frequency to the maximum (the maximum available) or to a specified frame rate. The frame rate will be the best possible, but might not be as high as specified, especially if uploading via a slow connection.

Scheduled Event
A **Scheduled event** can be activated at pre-set times, in a repeating pattern on selected weekdays.

How to set up a scheduled event
This example describes how to set the Network Dome Camera to send an email notification with saved images from at a set time:

1. Click **Add scheduled** on the **Event types** page.

2. Enter a descriptive **name** for the event, e.g. Scheduled email.

3. Set the **priority** (High, Normal or Low).

4. Set the **Activation Time** parameters (24h clock) when the event is to be active, e.g. start on Fridays at 18.00 with a duration of 62 hours.

5. Set the **When Activated...** parameters i.e. set what the Network Dome Camera is to do at the specified time e.g. send uploaded images to an email address.

6. Click **OK** to save the Event in the Event Types list.

Please use the online help files 📧 for descriptions of each available option.

Port Status

Under **Event Configuration** > **Port Status** there is a list that shows the status for the connected inputs and outputs of the AXIS 231D+/232D+ for the benefit of the Operator who cannot access the System Options section.

Example: If the Normal state for a push button (e.g. doorbell) connected to an input is set to **Open circuit** - as long as the button is not pushed, the state is **inactive**. If the push button is pushed, the state of the input changes to **active**.

System Options

Security

User access control is enabled by default, the administrator sets the root password on first access. Other users are authorized with user names and passwords, or the administrator can choose to allow anonymous viewer login to the Live View page, as described below:

Users - the user list displays the authorized users and access levels:

User	Description
Viewer	Provides the lowest level of access, which only allows the user access to the Live View page.
Operator	An Operator can view the Live View page, create and modify event types and adjust certain other settings. The Operator does not have access to the Systems Options configuration pages.
Administrator	An administrator has unrestricted access to the Setup Tools and can determine the registration of all other users.

User Settings - check the corresponding checkboxes to enable:

- **Anonymous viewer login** - allows any viewer direct access to the Live View page.
- **Anonymous PTZ control login** - allows any viewer access to the Pan/Tilt/Zoom controllers on the Live View page.

IP Address Filtering

Allowed IP Addresses. The administrator can add up to 256 IP addresses to this list. If the IP address filtering checkbox is checked, the AXIS 231D+/232D+ will only allow access to requests coming from the IP addresses in the list.

The users from these IP addresses need to be specified in the user list with the appropriate access rights (User, Operator or Administrator).

Referrals . to prevent unauthorized sources from including the video stream from the AXIS 231D+/232D+ into external Web pages, check the Referrals checkbox and enter the IP address or Host name of the computer that hosts the Web pages with the included video stream. Several IP addresses/host names can be defined and are separated by semicolons(;)

Notes:
- If the referrals feature is enabled and you wish to also allow normal access to the Live View page, the product's own IP address or host name must be added to the list of allowed referrers.
- Restricting referrers has no effect on an MPEG-4 video stream. To restrict an MPEG-4 stream, IP address filtering must be enabled.
- Restricting referrers is of greatest value when <u>not</u> using IP address filtering. If IP address filtering is used, then the allowed referrers are automatically restricted to those allowed IP addresses.

HTTPS

For greater security, the AXIS 231D+/232D+ can be configured to use HTTPS (Hypertext Transfer Protocol over SSL (Secure Socket Layer)). That is, all communication that would otherwise go via HTTP will instead go via an encrypted HTTPS connection.

Certificate - to use HTTPS for communication with the AXIS 231D+/232D+, a **Certificate** must be created using one of the following methods:

- A self-signed certificate can be created in the network camera, but this does not guarantee the same level of security as an official certificate.

- An official certificate issued by a CA (Certificate Authority). A CA issues and manages security credentials and public keys for message encryption.

    1. Click either **Create self-signed certificate** or **Create Certificate Request** and enter the required information in the provided fields.

    2. Click **OK**.

    3. **Create self-signed certificate** generates and installs a certificate which will be displayed under **Installed Certificate**.
       Create Certificate Request generates a PEM formatted request which you copy and send to a CA for signing. When the signed certificate is returned, click **Install signed certificate...** to install the certificate in the AXIS 231D+/232D+.

    4. Set the **HTTPS Connection Policy** for the administrator, Operator and Viewer to enable HTTPS connection (set to HTTP by default)

Please refer to the home page of your preferred CA for information on where to send the request etc. For more information, please refer to the online help files

Date & Time

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

New Server Time . Select your time zone from the drop-down list and check the daylight saving time changes, if desired.

From the **Time Mode** section, select the preferred method to use for setting the time:

- **Synchronize with computer time** - sets the time from the clock on your computer.
- **Synchronize with NTP Server** - the network camera will obtain the time from an NTP server every 60 minutes. Specify the **NTP server**'s IP address or host name.

Note: Note that if using a host name for the NTP server, a DNS server must be configured under TCP/IP settings. See **Network** > **Advanced TCP/IP Settings** below.

- **Set manually** - this option allows you to manually set the time and date.

Date & Time Format Used in Images . specify the formats for the date and time (12h or 24h) displayed in the Live View video streams.

Use the predefined formats or use your own custom date and time formats. See **Advanced File Naming & Date/Time Formats** in the help files 🕐 for information on how to create your own file formats.

Network - Basic TCP/IP Settings

IP Address Configuration. the IP address of the AXIS 231D+/232D+ can be set automatically via DHCP, or a fixed IP address can be set manually. DHCP is enabled by default. To use a fixed IP address, you must also enter the correct subnet mask and default router.

Notes: • DHCP is a protocol for automatic IP address assignment on a network. IP address assignment via DHCP may lead to the situation where the IP address changes and you lose contact. Configure the options for notification of IP address change (under Services) to receive notification from the network camera when the IP address changes.

• Alternatively, if your DHCP server can update a DNS server, you can access the AXIS 231D+/232D+ by host name which is always the same, regardless of the IP address.

For more information, please refer to the online help files

Services

Options for notification of IP address change . if the IP Address of the AXIS 231D+/232D+ is changed e.g. automatically by DHCP, you can choose to be notified of the change. Click Settings... and enter the required information.

AXIS Internet Dynamic DNS Service . If the AXIS 231D+/232D+ Network Dome Camera has been registered with the Axis Internet Dynamic DNS service and the IP address for the product changes, the service is updated to reflect the change. Check the box to enable/disable automatic updates.

The domain name currently registered at the Axis Internet Dynamic DNS service for your product can at any time be removed. To do this click Settings... and follow the instructions.

For more information, please refer to the online help files

Network - Advanced TCP/IP Settings

DNS Configuration

DNS (Domain Name Service) provides the translation of host names to IP addresses on your network.

Obtain DNS server address via DHCP - automatically use the DNS server settings provided by the DHCP server. Click the View button to see the current settings.

Use the following DNS server address - enter the desired DNS server by specifying the following:

Domain name - enter the domain(s) to search for the host name used by the AXIS 231D+/232D+. Multiple domains can be separated by semicolons (;). The host name is always the first part of a Fully Qualified Domain Name, e.g. **myserver** is the host name in the Fully Qualified Domain Name **myserver.mycompany.com** where mycompany.com is the Domain name.

DNS servers - enter the IP addresses of the primary and secondary DNS servers.

Host Name Configuration

The AXIS 231D+/232D+ can be accessed using a host name, instead of an IP address. The host name is usually the same as the assigned DNS Name. It is always the first part of a Fully Qualified Domain Name and is always one word, with no period. For example, myserver is the host name in the Fully Qualified Domain Name myserver.mycompany.com.

The **enable dynamic DNS updates** allows you to alias a dynamic IP address to a static host name, allowing your computer to be more easily accessed from various locations on the Internet. Outside users can always access your server using the associated DNS name regardless of the WAN IP. The DNS server used by the user and/or the DNS server responsible for the domain in use must support RFC2136 and allow updates from the AXIS 231D+/232D+.

The **TTL (Time To Live)** value determines how long (in seconds) the reply from the DNS server should be remembered when checking that the domain name for the registered IP address is still valid. For more information, please see the online help

Link-Local Address

This is enabled by default and assigns the AXIS 231D+/232D+ an additional IP address for use with UPnP™. The AXIS 231D+/232D+ can have both a Link-Local IP and a static/DHCP-supplied IP address at the same time - these will not affect each other.

HTTP
The default HTTP port number (80) can be changed to any port within the range 1024-65535. This is useful for e.g. simple port mapping.

RTSP

The RTSP protocol allows a connecting client to start an MPEG-4 stream. Enter the RTSP port number to use. The default setting is 554.

Network Traffic

The default setting is **Auto-negotiate** which means that the correct speed is automatically selected. If necessary, you can set the connection speed by selecting it from the drop-down list.

Maximum bandwidth - Specify, in Mbit/s or kbit/s, the maximum bandwidth that the network camera is allowed to use on your network. This is a useful function when connecting your network camera to busy or heavily loaded networks. The default setting is **Unlimited**.

Note: When using MPEG-4 as the video format, remember that setting a maximum bandwidth value here may create problems for individual video streams if the maximum value is less than the sum of the bit rates set for the video streams.

For more information, please see the online help

SOCKS

SOCKS is a networking proxy protocol. The AXIS 231D+/232D+ can be configured to use a SOCKS server to reach networks on the other side of a firewall/proxy server. This functionality is useful if the AXIS 231D+/232D+ is located on a local network behind a firewall, but notifications, uploads, alarms, etc., need to be sent to a destination outside the local network (e.g. to the Internet).

SMTP (email)

(Simple Mail Transfer Protocol) Enter the host names or addresses for your primary and secondary mail servers in the fields provided to enable event and error email messages from the AXIS 231D+/232D+ to predefined addresses, via SMTP.

UPnP™

(Universal Plug and Play) The AXIS 231D+/232D+ includes support for UPnP™ in Windows ME and Windows XP. UPnP™ is enabled by default.

Note: UPnP must be installed on your workstation. To do this, open the Control Panel from the **Start Menu** and select **Add/Remove Programs**. Select **Add/Remove Windows Components** and open the **Networking Services** section. Click **Details** and then select **UPnP** as the service to add. Refer to the Windows help files for more information.

RTP (Multicast)/MPEG-4

These settings are the IP address, port number, and Time-To-Live value to use for the video stream(s) in multicast MPEG-4 format. Only certain IP addresses and port numbers should be used for multicast streams. For more information, please see the online help.

Ports & devices - I/O Ports

The pinout, interface support and the control and monitoring functions are described in the section on the *Connection Module*, on page 42.

Maintenance

- **Restart** - The unit is restarted without changing any of the settings. Use this method if the unit is not behaving as expected.
- **Restore** - The unit is restarted and most current settings are reset to factory default values. The settings that will not be reset are as follows:
    - the boot protocol (DHCP or static)
    - the static IP address
    - the default router
    - the subnet mask
    - the system time
- **Default** - The default button should be used with caution. Pressing this will return all of the network camera's settings to the factory default values (including the IP address).

Dome Status - Click the Test button to check the camera and dome mechanics for errors. Contact Axis Customer Services if you receive an error message as the result of this test.

Upgrade Server - See *Support*, on page 40.

Backup - To take a backup of all of the parameters, and any user-defined scripts, click this button. If necessary, it is then possible to return to a previous configuration if settings are changed and there is unexpected behavior.

Restore - click the **Browse** button to locate the saved backup file (see above) and then click the **Restore** button. The settings will be restored to the previous configuration.

Note: Backup and Restore can only be used on the same unit running the same firmware. This feature is not intended for multi-configurations or for firmware upgrades.

Support

The **support overview** page provides valuable information on troubleshooting and contact information, should you require technical assistance.

Logs & Reports - when contacting Axis support, please be sure to provide a valid Server Report with your query.

View Information - The **Log** report and the **Parameter List** also provide valuable information for troubleshooting and when contacting Axis' support service.

Configuration:

Log Level for Log Files - from the drop-down list, select the level of information to be added to the Log file

Log Level for Email - from the drop-down list, select the level of information to send as email and enter the destination email address.

Advanced

Scripting is an advanced function that provides the possibility to customize and use scripts. This function is a very powerful tool.

Caution!

Improper use may cause unexpected behavior or even cause loss of contact with the unit. If a script does cause problems, reset the unit to its factory default settings. A backup file may be of use to return the unit to its latest configuration).

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

For more information, please visit the Developer pages at www.axis.com/developer

Plain Config - this function is for the advanced user with experience of Axis network camera configuration. All parameters can be set and modified from this page. Help is available from the standard help pages.

About

Third Party Software Licenses - click View licenses for a list of the licensed software used in the AXIS 231D+/232D+ Network Dome Camera.

Resetting to Factory Default Settings

To reset the AXIS 231D+/232D+ to the original default settings, go to the **System Options** > **Maintenance** web page (described in *Maintenance*, on page 39) or use the control button on the AXIS 231D+/232D+ as described below:

Using the Control Button

Follow the instructions below to reset the AXIS 231D+/232D+ to factory default settings using the Control Button.

1. Switch off the AXIS 231D+/232D+ by disconnecting the power.

2. Press and hold the Control button while you reconnect the power.

   Control button

3. Keep the Control button pressed until the **Power Indicator** flashes amber (this may take up to 15 seconds).

   Power Indicator

   Network Indicator

4. Release the Control button.

5. When the Power Indicator changes to green (may take up to 1 minute), the process is complete and the AXIS 231D+/232D+ has been reset.
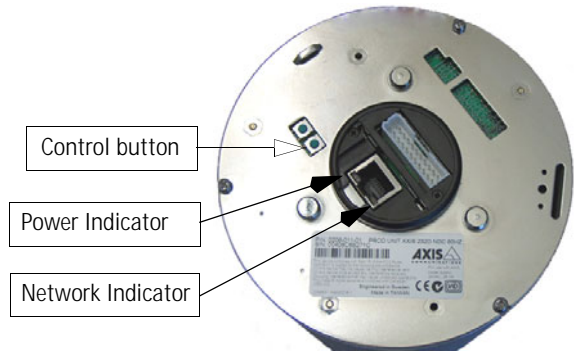
Connection Module

This section describes the pinout provided by the Connection module consisting of:

- 4 transistor outputs
- 4 digital inputs
- power and GND (ground)

not used

24V AC Power

4 transistor outputs
4 digital inputs
(see table below)
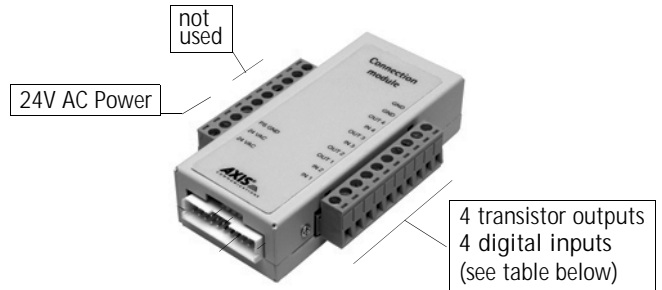
The inputs/outputs are used in applications for, e.g. event triggering, time lapse recording, alarm notification via email, picture storage to FTP locations.

- **Input** - e.g. a doorbell. If the doorbell is pressed, the **state** changes, and the input will be active (shown under **Event Configuration** > **Port Status**).
- **Output** - e.g. an alarm device that can be activated from Output buttons from the **Live View** page or as an action to an **Event Type**. The output will show as **active** (under **Event Configuration** > **Port Status**), if the alarm device is activated.
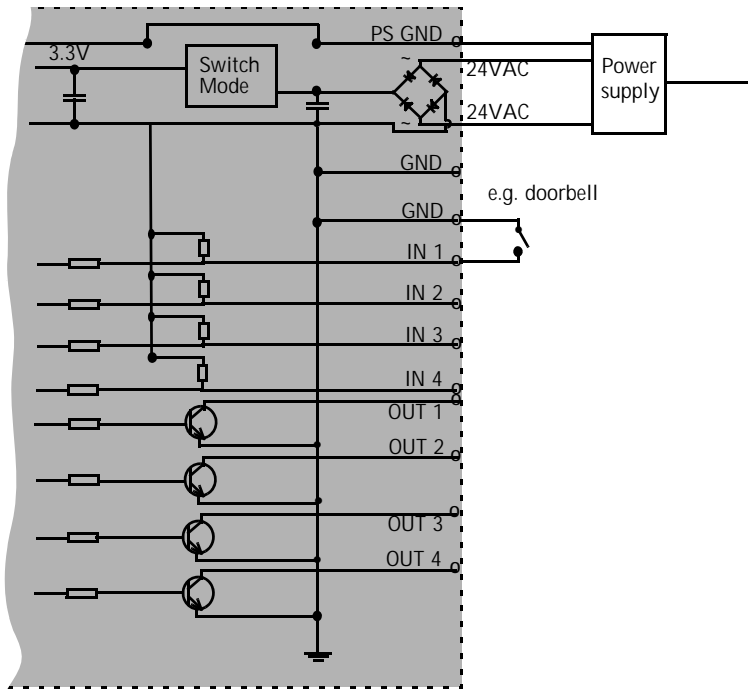
Connection Module Pinout

Function	Description	Function	Description
n/a	not used	GND	ground
n/a	not used	GND	ground
n/a	not used	Transistor Output 4	See below
n/a	not used	Digital Input 4	See below
n/a	not used	Transistor Output 3	See below
n/a	not used	Digital Input 3	See below
n/a	not used	Transistor Output 2	See below
PS GND	ground	Transistor Output 1	See below
24 VAC	24 VAC	Digital Input 2	See below
24 VAC	24 VAC	Digital Input 1	See below

> **Digital Input** (1-4)- connect to GND to activate or leave floating (unconnected) to deactivate
>
> **Transistor Output** (1-4)- Max. load 100mA, max. voltage 24V DC. An open-collector NPN transistor with the emitter connected to pin 2 (GND). If used with an external relay, a diode must be connected in parallel with the load for protection against any voltage transients.

1. Loosen the corresponding screw on top of the pin (see the table above to determine which pin to use).
2. Push the cable into the connector and secure it by fastening the screw.

Schematic Diagram - AXIS 231D+/232D+ I/O connectors and power

Note: Unmarked I/O connectors on the connection module can not be used.

Troubleshooting

Checking the Firmware

One of your first actions when troubleshooting a problem should be to check the currently installed firmware version. The latest version may contain a correction that fixes your particular problem. See the support section at **http://www.axis.com/techsup** for information on the latest available firmware version. The current software version in your AXIS 231D+/232D+ is available from the product Web pages under **Setup** > **Basic Configuration**.

Updating the Firmware

The firmware is software that determines the functionality of the AXIS 231D+/232D+. When you upgrade to the latest available firmware from the Axis Web site, your Axis product will receive the latest available functionality. Always read the upgrade instructions and release notes available with each new release, before upgrading the firmware.

New firmware can be uploaded to the AXIS 231D+/232D+ over the network.

Note: Preconfigured and customized settings will be retained for use when the new firmware is running (providing that the features are available in the new firmware) although this is not guaranteed by Axis Communications.

1. Save the firmware file to your computer. The latest version of the AXIS 231D+/232D+ firmware is available free of charge from the Axis Web site at **http://www.axis.com/techsup** or from your local distributor.
2. Go to **Setup** > **System Options** > **Maintenance** in the AXIS 231D+/232D+ Web pages.
3. In the **Upgrade Server** section and browse to the desired firmware file on your computer. Click **Upgrade**.

Notes: After starting the process, you should always wait at least 20 minutes before restarting the AXIS 231D+/232D+, even if you suspect the procedure has failed.

Your dealer reserves the right to charge for any repair attributable to faulty updating by the user.

Emergency Recovery Procedure

If power or the network connection to the AXIS 231D+/232D+ is lost during the upgrade, the process will fail and the unit will become unresponsive. A flashing red Network LED indicates a failed upgrade. To recover the unit, follow the steps below. The serial number is found on the label on the product casing.

1. **Unix/Linux** - From the command line, type the following:
   arp -s <IP address of AXIS 231D+/232D+> <Serial number> temp
   ping -s 408 <IP address of AXIS 231D+/232D+>

   Windows - From a command/DOS prompt, type the following:
   arp -s <IP address of AXIS 231D+/232D+> <Serial number>
   ping -l 408 -t <IP address of AXIS 231D+/232D+>

Note: the **ping** -l command is the lower-case letter (L)

2. If the unit 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 AXIS 231D+/232D+'s IP address. In the page that appears, use the **Browse** button to select the upgrade file to use, e.g. axis231d.bin or axis232d.bin. Then click the **Load** button to restart the upgrade process.
4. After the upgrade has completed (1-10 minutes), the unit will automatically restart and show a steady green on the Power LED and flashing green or amber on the Network LED.
5. Reinstall the AXIS 231D+/232D+.

If the emergency recovery procedure does not get the AXIS 231D+/232D+ up and running again, please contact Axis support at www.axis.com/techsup/

Support

If you contact Axis Customer Services, please help us help you resolve your problems expediently by providing a server report, log file and a brief description of the problem.

Server Report - go to **Setup > System Options > Support Overview**. The server report contains important information about the server and its software, as well as a list of the current parameters.

Log file - go to **Setup > System Options > Logs & Reports**. The Log file records events within the unit since the last restart of the system and can prove a useful diagnostic tool for troubleshooting.

Symptoms, Possible Causes and Remedial Actions

Problems setting the IP address

Using ARP Ping	The IP address must be set within two minutes after the power has been applied to the AXIS 231D+/232D+, restart the server and try again. Also, make sure the ping length is set to 408. See the ARP ping description in the installation section.
The AXIS 231D+/232D+ is located on a different subnet.	If the IP address intended for the AXIS 231D+/232D+ and the IP address of your computer are located on different subnets, you will not be able to set the IP address. Contact your network administrator for an IP address on the same subnet as the computer you are performing the installation from.
The IP address is being used by another device	**Disconnect the power from the AXIS 231D+/232D+.** Run the Ping command (in a Command/DOS window, type **ping** and the **IP address** of the unit). If you receive: **Reply from <IP address>: bytes = 32; time = 10 ms.....** - this means that the IP address may already be in use by another device on your network. You must obtain a new IP address and reinstall the unit. If you receive: **Request timed out** - this means that the IP address is available for use with your AXIS 231D+/232D+. In this case, check all cabling and reinstall the unit.

The AXIS 231D+/232D+ cannot be accessed from a Web browser

Cannot log in.	If the AXIS 231D+/232D+ has been configured to use HTTPS, check that the protocol in the URL used to access the unit is correct. You may need to type this in manually (i.e. http or https) in the browser's address field.
The IP address has been changed by DHCP	1) Move the AXIS 231D+/232D+ to an isolated network or to one with no DHCP or BOOTP server. Set the IP address again, using AXIS IP Utility or the ARP Ping command. 2) Access the unit and disable BOOTP and DHCP in the TCP/IP settings. Return the unit to the main network. The unit now has a fixed IP address that will not change. 3) As an alternative to 2), if dynamic IP address via DHCP or BOOTP is required, select the required service and then configure IP address change notification from the network settings. Return the unit to the main network. The unit will now have a dynamic IP address, but will notify you if the address changes.
Other networking problems	Test the network cable by connecting it to another network device, then Ping that device from your workstation. See instructions above.

Cannot send notifications, uploads, alarms, etc, to a destination outside the local network

Firewall protection	The AXIS 231D+/232D+ can be configured to use a SOCKS server to reach networks on the other side of a firewall/proxy server. See *SOCKS*, on page 38 for more information.

Your AXIS 231D+/232D+ is accessible locally, but not externally

Firewall protection	Check the Internet firewall with your system administrator.
Default routers required	Check if you need to configure the default router settings.
The Internet site is too heavily loaded	Use a script running on your web server to relay images from the AXIS 231D+/232D+ to the Internet.

The Power indicator is not constantly lit

Faulty power supply	Verify that you are using the correct power supply.
A firmware upgrade has been interrupted or the firmware has in some other way been damaged.	A rescue firmware is running in the product. First, set the IP address using AXIS IP utility or ARP and Ping, Then, from a Web browser, access the unit and upgrade the latest firmware to the product, see *Updating the Firmware*, on page 44.

No images are displayed in the Web interface

Problem with AMC (*Internet Explorer only*)	To enable the updating of images in Microsoft Internet Explorer, set your Web browser to allow ActiveX controls. Also, make sure that AXIS Media Control (AMC) component is installed on your workstation.
Installation of additional ActiveX component restricted or prohibited	Configure yourAXIS 231D+/232D+ to use a Java applet for updating the images under Live View Config > Layout > Default Viewer for Internet Explorer. See help files for more information.

Video Image Problems

Image too dark or too light.	See the help files on Video & Image Settings
Problems uploading own files	There is only limited space available for the upload of your own files. Try deleting one or more existing files, to free up space.
Missing images in uploads	This can occur when trying to use a larger image buffer than is actually available. Try lowering the frame rate or the upload period.
Slow image update	Configuring, e.g. pre-buffers, hi-res images, high frame rate etc will reduce the performance of the AXIS 231D+/232D+.
Slow performance	Slow performance may be caused by e.g. heavy network traffic, many users with access to unit, low performing client, use of features such as Event handling., Image rotation.

Bad snapshot images

Display incorrectly configured on your workstation	In Display Properties, configure your display to show at least 65000 colors, i.e. at least 16-bit. Using only 16 or 256 colors on your display will produce dithering artifacts in the image.

Problems with the MPEG-4 format

Lower frame rate than expected.	Check with the administrator that there is enough bandwidth available. Check also the settings for bit rate control, in the Video & Image > Advanced > MPEG-4 settings. Using an inappropriate video object type can also affect the frame rate. See the online help for more information.
	Check in the AMC control panel applet (MPEG-4 tab) that video processing is not set to Decode only I frames.
	Lower the image resolution.
	Reduce the number of applications running on the client computer.
No MPEG-4 displayed in the client.	Check that the correct network interface is selected in the AMC control panel applet (network tab).
	Check that the relevant MPEG-4 connection methods are enabled in the AMC control panel applet (network tab).
	In the AMC control applet, select the MPEG-4 tab and click the button Set to default MPEG-4 decoder.
No multicast MPEG-4 displayed in the client.	Check with your network administrator that the multicast addresses used by the AXIS 231D+/232D+ are valid for your network.
	Check with your network administrator to see if there is a firewall preventing viewing.
Multicast MPEG-4 only accessible by local clients.	Check if your router supports multicasting, or if the router settings between the client and the server need to be configured. The TTL (Time To Live) value may need to be increased.
Poor rendering of MPEG-4 images.	Color depth set incorrectly on clients. Set to 16-bit or 32-bit color.

Unexpected PTZ behavior

Problem with hardware	Go to System Options > Maintenance > Dome Status and click Test to test the camera and dome mechanics for errors. Contact Axis Customer Services if you receive an error message as the result of this test.

For additional assistance, please contact your reseller or check the product's support pages on the Axis Website at http://www.axis.com/techsup

Technical Specifications

Item	Specification
Models	• AXIS 231D+ Network Dome Camera • AXIS 232D+ Network Dome Camera with Day/Night functionality
Video compression	• Motion-JPEG, as well as single snapshot JPEG images. User-controlled compression level. • MPEG-4 Part2 (ISO/IEC 14496-2), Profiles: ASP and SP
Resolutions	• 4CIF, 2CIF Expanded, 2CIF, CIF, QCIF • Maximum 768x576 (PAL) 704x480 (NTSC) • Minimum 176x144 (PAL) 160x120 (NTSC)
Frame rates (NTSC/PAL)	• Motion JPEG: up to 30/25 fps in all resolutions • MPEG-4: up to 21/17 fps at 4CIF/2CIFxp up to 30/25 fps at 2CIF/CIF/QCIF
Video streaming	• Simultaneous Motion JPEG and MPEG-4 • Controllable frame rate and total bandwidth • Constant and variable bit rate (MPEG-4)
Image settings	• Compression levels: 11 (Motion JPEG), 23 (MPEG-4) • Rotation: 90°, 180°, 270° • Aspect ratio correction • Color and black/white • Overlays: time, date, text, image

Video	• Equal to 470 TVL (NTSC) / 460 TVL (PAL) analog video
	• Frame rate up to 25/30 frames per second
	• Shutter (AXIS 231D+):
	  0.3 lux at F1.4 (30 IRE): Slow shutter mode
	  0.7 lux at F1.4, 1/60 sec: 30 fps (NTSC)
	  0.7 lux at F1.4, 1/50 sec: 25 fps (PAL)
	• Shutter (AXIS 232D+):
	  Color: 0.3 lux at F1.4 (30 IRE): Slow shutter mode
	  Color: 0.7 lux at F1.4, 1/60 sec: 30 fps (NTSC)
	  Color: 0.7 lux at F1.4, 1/50 sec: 25 fps (PAL)
	  B/W: 0.005 lux at F1.4 (30 IRE): Slow shutter mode

Pan/Tilt/Zoom	• PTZ speed: Pan: 360° endless, max. speed 360°/s Tilt: 0°- 90°, max. speed 360°/s Zoom: 18x optical, 12x digital (216x in total) 20 preset positions Guard tour Control queue
Security	• Multiple user levels with password protection • IP address filtering • HTTPS encryption
Users	• 20 simultaneous viewers • Unlimited users using MPEG-4 multicast • PTZ control queuing capability

Item	Specification
Alarm and event management	• Events triggered by external inputs or according to set schedule • Image uploads via FTP, email and HTTP • Event notification via TCP, email, HTTP and external outputs • Pre- and post-alarm buffer of 9 MB (approx. 4 min CIF video at 4 fps)
Connectors	• Ethernet 10BaseT/100BaseTX, RJ-45 • 4 alarm inputs, 4 outputs
Processors and memory	• CPU: ETRAX-100 LX 32-bit • Video processing and compression: ARTPEC-2 chip • RAM - 32MB • Flash memory - 8 MB
Power	Power supply (indoor) included: • In: 230/110V AC 50/60Hz • Out: 24V AC 1.5A
Operating conditions	• Temperature: 5°C (41°F) to 50°C (122°F) • Humidity: 20-80% RHG
System integration support	• API for software integration available at www.axis.com includes HTTP API, AXIS Media Control SDK • Event trigger data in video stream • Embedded scripting • Embedded operating system: Linux 2.4
Minimum web browsing requirements	• Pentium III 500 MHz or higher or equivalent AMD • 128 MB RAM • AGP graphics card, DirectDraw, 32 MB video RAM • Windows: 2003 Server, XP, 2000 • DirectX 9.0 or later • Internet Explorer 6.x or later • For other operating systems and browsers, see www.axis.com/techsup
Supported protocols	HTTP, HTTPS, SSL/TLS*, TCP, RTSP, RTP, UDP, IGMP, RTCP, SMTP, FTP, DHCP, UPnP, ARP, DNS, DynDNS, SOCKS *This product includes software developed by the Open SSL Project for use in the Open SSL Tool kit. See www.openssl.org

Approvals - EMC	• EN55022:1998 Class A
	• EN55024:1998
	• EN61000-3-2:2000
	• EN61000-3-3:2000 • VCCI Class A
	       • C-Tick AS/NZS 3548, Class A
	       • FCC Subpart B, Class A

Approvals - Safety	• EN60065-7 • UL, CSA (Power supply)
Dimensions	• Height: 8.9" (225 mm) • Width: 5.7" (144 mm) • Weight: 4 lbs. (1.8 kg) excluding power supply & connection module
Complimentary Software	• AXIS Media Control (AMC) - ActiveX component software required for Microsoft Internet Explorer, installed automatically on first use • Optional: AXIS IP Utility - Windows installation
MPEG-4 licensing	License for one MPEG-4 encoder and one MPEG-4 decoder included. Additional licenses available from Axis dealers

General performance considerations

When setting 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 will 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 resolutions and/or lower compression levels result in larger images. Bandwidth affected.
- Access by large numbers of Motion JPEG and/or unicast MPEG-4 clients. Bandwidth affected.
- Simultaneous viewing of different streams (resolution, compression, etc.) by different clients. Frame rate and bandwidth affected.
- Accessing both Motion JPEG and MPEG-4 video streams simultaneously. Frame rate and bandwidth affected.
- Heavy usage of event settings affects the CPU load. Frame rate affected.
- Heavy network utilization due to poor infrastructure. Bandwidth affected.
- Viewing on poorly performing client PC's lowers perceived performance. Frame rate affected.

Optimizing your system

To see the bandwidth and frame rate currently required by the video stream, the AXIS 231D+/232D+ provides a tool that can be used to display these values directly in the video image.

To do this, special format strings are added as part of a text overlay. Simply add **#r** (average frame rate in fps) and/or **#b** (average bandwidth in Kbps) bandwidth in Kbps) to the overlay.

Overlay Settings

☐ Include overlay image at the coordinates:

☑ Include date   ☑ Include tim

☑ Include text: #r #b

For detailed instructions, please see the online help for **Video & Image** > **Overlay Settings**, and the help for **File Naming & Date/Time Formats**.

Important!

- The figures displayed here are the values as delivered by the server. If other restrictions are currently in force, (e.g. bandwidth limitation) these values might not correspond to those actually received by the client.
- For Motion JPEG, these values will only be accurate as long as no frame rate limit has been specified.

Frame rates - Motion JPEG

The following test results show the frame rates in frames/second (fps) for Motion JPEG streams from the AXIS 231D+/232D+, using a compression level of 50%. Note that these values are guidelines only - actual values may vary.

	fps (PAL)	fps (NTSC)
4CIF	25/30	25/30
2CIF expanded	25/30	25/30
2CIF	25/30	25/30
CIF	25/30	25/30
QCIF	25/30	25/30

Frame rates - MPEG-4

The following test results show the frame rates in frames/second (fps) for MPEG-4 streams from the AXIS 231D+/232D+. Note that these values are guidelines only - actual values may vary.

The MPEG-4 test conditions:

- Compression level = 50%
- Video Object Type = Advanced Simple
- GOV structure = IP*

	fps (PAL)	fps (NTSC)
4CIF	17/21	17/21
2CIF expanded	17/21	17/21
2CIF	25/30	25/30
CIF	25/30	25/30
QCIF	25/30	25/30

*Note that setting the GOV structure to use "I-frames only" will increase the frame rate.

Bandwidth

As there are many factors affecting bandwidth, it is very difficult to predict the required amounts. The settings that affect bandwidth are:

- the image resolution
- the image compression
- the frame rate
- the MPEG-4 object type
- the MPEG-4 GOV structure

There are also factors in the monitored scene that will affect the bandwidth. These are:

- the amount of motion
- the image's complexity
- the lighting conditions.

For MPEG-4, if there is only limited bandwidth available, and if this is more important than the image quality, using a constant bit rate (CBR) is recommended. Use a variable bit rate (VBR) if the image quality needs to be maintained at a higher level. If supported on the network, consider also using MPEG-4 multicasting, as the bandwidth consumption will be much lower.

Index

A
Accessing the video stream 14
Action Buttons 9
Action buttons 22
Active/Inactive 9, 22
ActiveX Controls 8
Administrator 15, 33
Advanced TCP/IP settings 37
Alarm 29, 42
AMC 10, 14

B
Backlight Compensation 18
Backup 39
Bandwidth 11, 51
Buffer Size 31
Buffers 31

C
CGI links 21, 26
Click-in-image 26
Connection Module 42
Constant bit rate 11
Control Button 7, 41
Customize 20

D
Date & Time 34
Default Viewer 23
DNS configuration 37

E
Emergency recovery 45
Event 29
Event Servers 29
Event Types 30

F
Factory Default 41
Frame rates 17, 51

FTP Server 29

G
Guard Tour 27

H
Host name 37
HTML examples 23
HTTP API 21, 26
HTTP port number 37
HTTPS 34

I
IP Address Filtering 33
IR Cut Filter 18
IR light 9

L
Live View 15
Logs & Reports 40

M
Maximum bandwidth 38
Motion JPEG 11
MPEG-4 11
MPEG-4 clients 14
MPEG-4 licensing 49
MPEG-4 protocols 12
MPEG-4 settings 39
Multicasting 12

N
Network 36
Network Connector 7
New Server Time 34
Night Vision 18

O
Operator 33
Output Buttons 9
Output buttons 22
Overlay Image 17
Overlay Settings 17