AXIS 206 Network Camera

User's Manual

About this Document

This manual is intended for administrators and users of the AXIS 206 Network Camera, and is applicable for software release 4.40. 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.

Safety Notices Used In This Manual

Caution! - Indicates a potential hazard that can damage the product.
Important! - Indicates a hazard that can seriously impair operation.
Do not proceed beyond any of the above notices until you have fully understood the implications.

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

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.

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 B 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.

Europe – $C \epsilon$ This digital equipment fulfills the requirements for radiated emission according to limit B of EN55022/1998, and the requirements for immunity according to EN55024/1998 residential, commercial, and light industry.

Japan – This is a class B 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.

Equipment Modifications

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

Liability

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.

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Support

Should you require any technical assistance, please contact your Axis reseller. If your questions cannot be answered immediately, your reseller will forward your queries through the appropriate channels to ensure a rapid response. If you are connected to the Internet, you can:
• download user documentation and firmware updates
• find answers to resolved problems in the FAQ database. Search by product, category, or phrases
• report problems to Axis support by logging in to your private support area
• visit Axis Support at www.axis.com/techsup/

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.

Contents

Product Features

Key features

- Live high-quality video over the network, with images provided as a real-time Motion JPEG stream. Multiple resolutions are available.
- Built-in Web server, providing full access to all features and setup tools, via a standard web browser. For advanced functionality, the camera can be accessed via the AXIS VAPIX API (more info at www.axis.com/developer).
- Support for multiple viewers.
- Support for Quality of Service (QoS).
- NAT-Traversal, which allows a camera located on an intranet (LAN) to be made available from a WAN side of a NAT router.
- Support for other languages. Simply select a language from the available options. The camera's entire web interface is then displayed in the selected language.
- Upgradeable firmware.
- Support for UPnP™

Overview
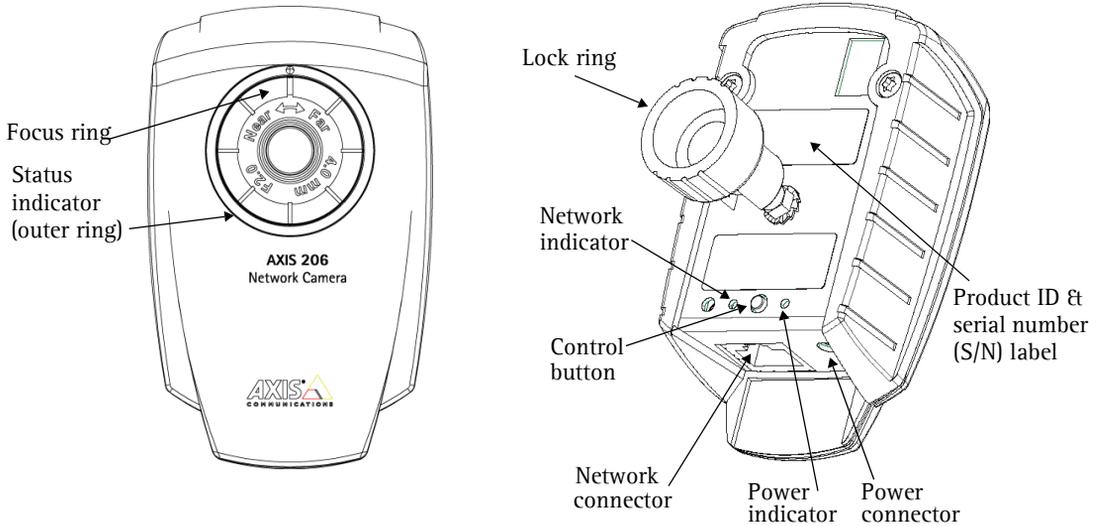
Power Connector - For connection of the PS-L power adapter (included).

Network Connector - The AXIS 206 connects to the network via a standard network cable, and automatically detects the speed of the local network segment (10BaseT/100BaseTX Ethernet).

Product ID & Serial Number Label - The serial number may be required during installation.

Control Button - Press this button to install using the AXIS Internet Dynamic DNS Service, or to restore the factory default settings, as described in *Resetting to the Factory Default Settings,* on page 25.

LED indicators

After completion of the startup and self test routines, the multi-colored Network, Status, and Power LED indicators flash as follows:

Network	Amber	Steady for connection to a 10 Mbit/s network. Flashes for network activity.
	Green	Steady for connection to a 100 Mbit/s network. Flashes for network activity.
	Unlit	No wired network connection
Status	Green	Steady for normal operation. Can be configured to flash green at intervals whenever the camera is accessed. See the online help for more information.
	Unlit	When configured for "no flash" on camera access.
	Amber	Steady during startup, reset to factory default or when restoring settings.
	Red	Slow flash for failed firmware upgrade.
Power	Green	Normal operation.
	Amber	Flashes green/amber during firmware upgrade.

Accessing the Camera

Before accessing the camera it must be installed. Please see the installation guide supplied with the product.

The camera can be used with most standard operating systems and browsers. The recommended browser is Microsoft Internet Explorer with Windows, Safari with Macintosh and Mozilla with other operating systems.

Notes: • To view streaming video in Microsoft Internet Explorer, set your browser to allow ActiveX controls and allow the AXIS Media Control (AMC) to be installed on your workstation.
• If your workstation restricts the use of additional software components, the camera can be configured to use a Java applet for viewing motion JPEG.

Access from a browser

1. Start a browser (e.g. Internet Explorer, Mozilla)

2. Enter the IP address or host name of the camera in the **Location/Address** field of your browser.
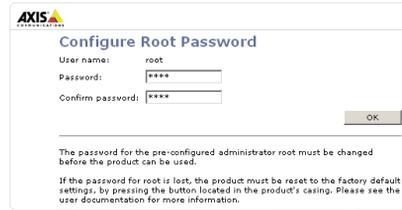
   To access the camera from a Macintosh computer (Mac OSX), simply click on the Bonjour tab and select the AXIS 206 from the drop-down list.

3. If this is the first time the camera is accessed, see *Setting the Password,* on page 9. Otherwise enter your user name and password, as set by the administrator.

4. The camera's **Live View** page is now displayed in your browser.

Note: The layout of the Live View page may have been customized to specific requirements. Consequently, some of the examples and functions featured here may differ from those displayed on your own Live View page.

Setting the Password

1. When accessing the camera for the first time, the '**Configure Root Password'** dialog will be displayed on the screen.

2. Enter a password and then re-enter it, to confirm the spelling. Click **OK**.

3. The '**Enter Network Password'** dialog will appear. Enter the User name: **root**
   Note: The default administrator user name **root** is permanent and cannot be deleted.

4. Enter the password as set in step 2 above, and click **OK**. If the password is lost, the camera must be reset to the factory default settings. See page 25.

5. If required, click **Yes** to install the AXIS Media Control (AMC). You will need administrator rights on the computer to do this.

Accessing the camera from the Internet

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

For more information, please see *NAT traversal (port mapping),* on page 21. See also the AXIS Internet Dynamic DNS Service at www.axiscam.net or, for Technical notes on this and other topics, visit the Axis Support Web at www.axis.com/techsup

Focusing

Raised line on focus ring.	**To focus:** Open a browser and examine the image. If required, adjust the focus ring until the focus is satisfactory.

Focus Ring (inner ring)

Status Indicator (outer ring)

AXIS 206 Network Camera
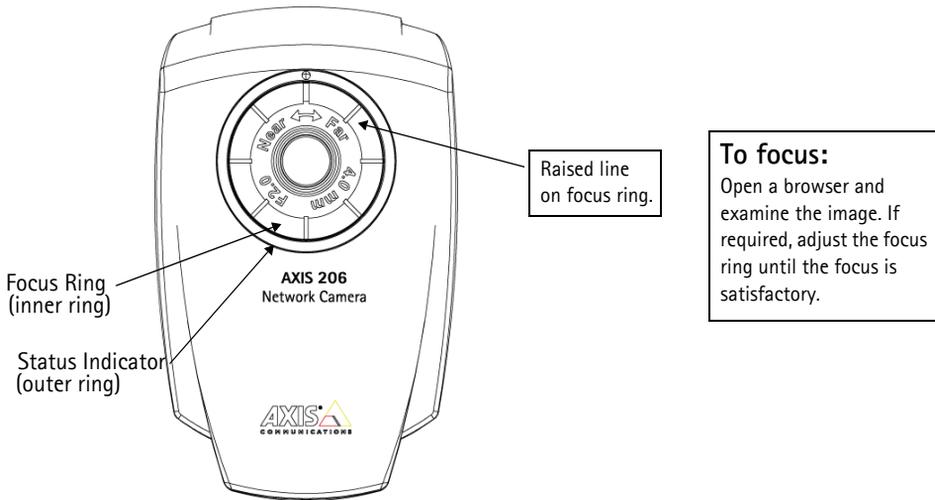
Note: Upon delivery, the raised line on the focus ring is aligned with the dot above the lens, and the focus is set to infinity.

The Live View Page

Depending on whether or not the Live View page has been customized, the buttons described below may or may not be visible.

To resize the video image, click the **View Size** buttons: half-size ($x^{1/2}$), full-size (x1), x2 or x4. Note that this does not change the video image's resolution, but simply how it is displayed.

The **Snapshot** button shows a snapshot of the video image currently being displayed. Right-click on the video image to save it in JPEG format on your computer. This button is primarily intended for use when the AMC viewer toolbar is not available.

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

The **Play/Stop** button starts and stops the live video stream.

The **Snapshot** button saves a snapshot of the video image currently being displayed. The Snapshot function and the target directory for saving snapshots can be configured from the AMC Control Applet, which is can be opened from the Windows Control Panel or by right-clicking the image in Internet Explorer.

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

Motion JPEG

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 provides excellent image quality and access to each and every individual image contained in the stream. The recommended method of accessing Motion JPEG live video from the AXIS 206 is to use the AXIS Media Control (AMC) in Microsoft Internet Explorer in Windows.

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

Alternative methods of accessing the video stream

Video/images from the AXIS 206 can also be accessed in the following ways:

- Motion JPEG server push (if supported by the client, e.g. Mozilla/Firefox). This option maintains an open HTTP connection to the browser and sends data as and when required, for as long as required. See *HTML Examples*, on page 17.
- Still JPEG images in a browser.
  Enter e.g. the path: http://<IP address>/axis-cgi/jpg/image.cgi?resolution=320x240

Configuration

This section describes how to configure the camera, and is intended for product **Administrators,** who have unrestricted access to all the Setup tools, and **Operators**, who have access to the settings for Video & Image, Audio, Live View Config and Event Configuration.

The camera is configured from **Setup, using a standard browser.**

The descriptions below show examples of the features available in the AXIS 206. For details of each setting, please refer to the online help available from the setup tools. Click 🔵 to access the online help.

Accessing the Setup tools

Follow the instructions below to access the Setup tools from a browser.

1. Start your browser and enter the IP address or host name of the camera in the location/address field.

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

AXIS Media Control

The AXIS Media Control (AMC) is installed automatically the first time the camera is accessed from Microsoft Internet Explorer. The AMC control panel can be opened by right-clicking on the video image in the Live View web page. The AMC control panel can be used to configure various video and audio settings. Please see the readme file included in the tool for more information.

Video and Image settings

Image Appearance

Use these settings to change the image as required. The video image can be rotated and fine-tuned by adjusting the color level, the brightness and the sharpness.

The configuration of the video image will affect the camera's overall performance, depending on how it is used and on the available bandwidth. Setting higher resolution and lower compression improves video image quality, but increases the amount of bandwidth used.

Please see the online help for further information on these settings.

Overlay Settings

Use these settings to include a text, date and time overlay.

The text, date and time overlay is included on one line at the top or bottom of the video image.

Text, date and time overlay

Video Stream

Define the maximum **video stream time** per session in seconds, minutes or hours, or set it as unlimited. When the set time has expired, a new stream can be started by refreshing the page in the browser.

The **frame rate** allowed to each viewer can also be limited, to avoid bandwidth problems on the network.

Test

For a preview of the image before saving, click **Test**.

Please refer to the online help for more information .

Advanced – Camera Settings

These pages include different settings for fine-tuning the video image.

To compensate for the **lighting conditions**, the **white balance** and **exposure control** can be adjusted.

Please see the online help for further instructions on these settings.

Low Light Behavior

Exposure priority defines the balance between image quality and the frame rate. Higher image quality may reduce frame rate and increase motion blur. A prioritized frame rate may instead increase the image noise. Depending on requirements, use this to give higher priority to the image quality or to the frame rate.

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 Axis look, with your own colors, images etc. Click the **Configure** button and see *Customizing the default page*, on page 16.
- Own Home Page - Upload and use your own custom page as the default web page. Click the **Configure** button and see *Customizing the default page*, on page 16.

The other settings on this page concern which features to include, e.g. action button, output button, default video stream and viewer. See page 17 for more information.

Customizing the default page

The appearance of the default 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.

Upload Own Web Files

Your own web files, background pictures, etc., must first be uploaded to the camera in
order to be available for selection in the **Custom Settings setup** dialog. Once uploaded, the
files are shown in the drop-down lists.

1. Click the **Upload/Remove** button.
2. Enter the path to the file, e.g. a file located on your workstation or click the
   Browse button.
3. 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.
4. 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.

Unchecking the box for **Show setup link** will remove the setup link from the product's
Home Page. The Setup Tools will then only be accessible by entering the full setup address
into the address/URL field of a browser.

> If the link is hidden, setup can be reached at this url: http://<ip address>/operator/basic.shtml.

Own Home Page

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

Action Buttons

Enabling the display of the **Snapshot** button allows users to save a snapshot from the video stream by clicking the button. This button is mainly intended for use with browsers other than Internet Explorer, or when otherwise not using AXIS Media Control (AMC) to view the video stream. AMC (an ActiveX control) for Internet Explorer provides its own snapshot button.

Default Viewer for Motion JPEG in Internet Explorer for Windows and Other Browsers

Select the appropriate radio button for the viewer to use in Internet Explorer for Windows and other Browsers. Please see online help ❔ for more information.

Browser	Viewer	Description
Windows Internet Explorer	AMC	Recommended viewer in Windows Internet Explorer.
	Java applet	A slower imaging alternative to AMC – no download required.
	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.
	Java applet	A slower imaging alternative to Server Push.
	Still image	Displays still images only. Hit the Refresh button in your browser to view a new image.

Viewer Settings

Check the **Show viewer toolbar** box to display e.g. the AXIS Media Control (AMC) or the QuickTime viewer toolbar under the video image in your browser.

HTML Examples

You can add live video from the AXIS 206 to your own web site. The camera can transmit a Motion JPEG stream to up to 10 simultaneous connections, although an administrator can restrict this to fewer.

Motion JPEG has additional settings for **Image Type, Image size** and other optional settings to configure the video stream to suit your Web page. Click **Update** once satisfied.

The camera generates the required source code for your configuration. Copy this code and paste it into your own Web page code.

System Options

Security

User access control is enabled by default. An administrator can set up other users, by giving these user names and passwords. It is also possible to allow anonymous viewer login, which means that anybody may access the Live View page, as described below:

Users - the **user list** displays the authorized users and user groups (levels):

Viewer	Provides the lowest level of access, which only allows access to the Live View page.
Operator	An Operator can view the Live View page, create and modify events and adjust certain other settings. Operators have no access to the System Options.
Administrator	An administrator has unrestricted access to the Setup Tools and can determine the registration of all other users.

User Settings - check the relevant checkboxes to enable:

- **Anonymous viewer login –** allows any viewer direct access to the Live View page.
- **Maximum number of simultaneous viewers –** enter a value here to restrict the number of viewers accessing the unit. This is useful if you need to save on bandwidth.

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 (see below).

New Server Time - Select your time zone from the drop-down list. If you want the server clock to automatically adjust for daylight savings time, select the **Automatically adjust for daylight saving time changes.**

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 camera will obtain the time from an NTP server every 60 minutes.
- **Set manually** - this option allows you to manually set the time and date.

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

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

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

Network – Basic TCP/IP Settings

To view the current network settings for the AXIS 206, click the **View** button. This opens a new window showing the current settings.

IP Address Configuration

The camera's IP address can be set automatically via DHCP, or a fixed IP address can be set manually. A host name can be used and there are options for setting up notification of changes in the IP address. DHCP is enabled by default. See the online help for more information.

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 camera when the IP address changes.

• Alternatively, if your DHCP server can update a DNS server, you can access the AXIS 206 by host name, which is always the same, regardless of changes in the IP address.

Services

Enable ARP/Ping setting of IP address - The IP address can be set using the ARP/Ping method, which associates the unit's MAC address with an IP address. Check this box to enable the service. Leave disabled to prevent unintentional resetting of the IP address.

Notes: • The ARP/Ping service is automatically disabled 2 minutes after the unit is started, or as soon as an IP address is set.
• Pinging the unit will still be possible when this service is disabled.

Options for notification of IP address change - if the IP address for the camera changes, 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 - use the AXIS Internet Dynamic DNS service to assign a host name for easy access to your AXIS 206 Network Camera.

Click **Settings...** to register your AXIS 206 with the Axis Internet Dynamic DNS service, or to modify the existing settings. The domain name currently registered at the Axis Internet Dynamic DNS service for your product can at any time be removed.

For more information, please refer to the online help.

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 206. 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.

NTP Configuration

Obtain NTP server address via DHCP - check this radio button to automatically look up and use the NTP server settings as provided by DHCP. Click the **View** button to see the current settings.

Use the following NTP server address – to make manual settings, check this radio button and enter the host name or IP address of the NTP server.

Host Name Configuration

The AXIS 206 can be accessed using a host name, instead of an IP address. The host name is usually the same as the assigned DNS Name.

For more information, please see the online help.

Link–Local Address

This is enabled by default and assigns the AXIS 206 an additional IP address for use with UPnP™. The AXIS 206 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 security port mapping.

NAT traversal (port mapping)

A broadband 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" i.e. the Internet. Security on the private network (LAN) is increased since most broadband routers are pre-configured to stop any attempts to access the private network (LAN) from the public network/Internet.

Use **NAT traversal** when your AXIS 206 is located on an intranet (LAN) and you wish to make it available to a WAN on the other side of a NAT router. With NAT traversal properly configured, all HTTP traffic to an external HTTP port in the NAT router will be forwarded to the camera.

LAN (Intranet)   WAN (Internet)
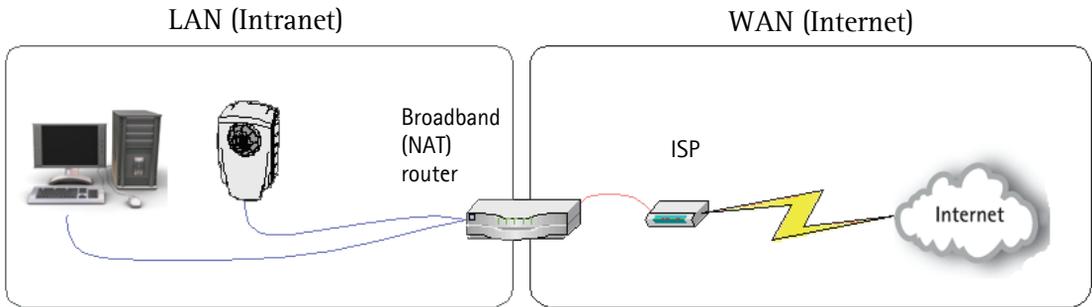
Notes: • For NAT traversal to work, it must also be supported by the broadband router.
• The broadband router has many different names: "NAT router", "Network router", Internet Gateway", "Broadband sharing device" or "Home firewall" but the essential purpose of the device is the same.

Enable/Disable - When enabled, the AXIS 206 will attempt to configure port mapping in a NAT router on your network, using UPnP™. Note that UPnP™ must be enabled in the camera (see **System Options > Network > UPnP**).

AXIS Internet Dynamic DNS Service - Use this free service to assign a host name (user-friendly name) for easy access to your camera. If the IP address of the camera or NAT router changes, the AXIS Internet Dynamic DNS Service will automatically be updated with the new IP address.

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 provided.

If a router is not manually specified, the AXIS 206 will automatically search for NAT routers on your network. If more than one router is found, the default router will be selected.

Alternative HTTP port - Select this option to manually define an external HTTP port. Enter the port number in the field provided. If no port is entered here a port number will automatically be selected when NAT traversal is enabled.

Notes: • An alternative HTTP port can be used/be active even if NAT traversal is disabled. This is useful if e.g. your NAT router does not support UPnP and you need to manually configure port forwarding in the NAT router.

• If a manually selected port is already in use, another will automatically be selected.

• When the port is selected automatically it will be displayed in this field. This can be changed by entering a new port number and clicking Save.

FTP

FTP Port - The FTP server running in the AXIS 206 enables the upload of e.g. new firmware, user applications, etc. Check this box to enable the service.

Network Traffic

Connection Type - 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.

For more information, please see the online help.

QoS (Quality of service)

Quality of Service (QoS) provides the means to guarantee a certain level of a specified resource to selected traffic on a network. Quality can be defined as e.g. a maintained level of bandwidth, low latency, no packet losses, etc. The main benefits of a QoS-aware network can be summarized as:

- The ability to prioritize traffic and thus allow critical flows to be served before flows with lesser priority.
- Greater reliability in the network, thanks to the control of the amount of bandwidth an application may use, and thus control over bandwidth races between applications.

The QoS in Axis network video products marks the data packets for various types of network traffic originating from the product. This makes it possible for network routers and switches to e.g. reserve a fixed amount of bandwidth for these types of traffic. The AXIS 206 marks the following types of traffic:

- video
- management network traffic.

QoS Settings

For each type of network traffic supported by your Axis network video product, enter a DSCP (Differentiated Services Codepoint) value. This value is used to mark the traffic's IP header. When the marked traffic reaches a network router or switch, the DSCP value in the IP header tells the router or switch which type of treatment to apply to this type of traffic, for example, how much bandwidth to reserve for it.

Note that DSCP values can be entered in decimal or hex form, but saved values are always shown in decimal.

For more infomation on Quality of Service, please see the Axis support web at www.axis.com/techsup

SMTP (email)

Enter the host names or addresses for your primary and secondary mail servers in the fields provided, to enable the sending of notifications and image/video email messages from the camera to predefined addresses via SMTP.

UPnP™

The camera includes support for UPnP™, which is enabled by default. If also enabled on your computer, the camera will automatically be detected and a new icon will be added to "My Network Places."

Note: UPnP must also be enabled on your Windows XP or ME computer. 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.

LED Settings

The Status indicator LED on the front of the camera can be set to flash at a configurable interval (or to not light up at all) whenever the unit is accessed. For a listing of all LED behavior, see page 7, or the online help.

Maintenance

- **Restart** – The camera is restarted without changing any of the settings.
- **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
- **Default** – The default button should be used with caution. Pressing this will return all of the camera's settings to the factory default values (including the IP address)

Upgrade Server - See *Upgrading the Firmware*, on page 26.

Backup - To take a backup of all of the parameters, and any user-defined scripts, click this button. If necessary, it will then be possible to return to the previous settings, 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 the configuration of multiple units 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 file,** the **Server Report** and the **Parameter List** all provide valuable information for troubleshooting and when contacting Axis support.

Configuration

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

Resetting to the Factory Default Settings

To reset the camera to the original factory default settings, go to the **System Options > Maintenance** web page (as described in *Maintenance,* on page 23) or use the **Control button** on the underside of the camera (see page 6) as described below:

Using the Control Button

To reset the camera to the factory default settings using the Control Button:

1. Disconnect the power adapter.

2. Press and hold the Control button while reconnecting the power.

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

4. Release the Control button.

5. When the Status Indicator changes to Green (which may take up to 1 minute), the process is complete and the camera has been reset. The unit will now have the default IP address 192.168.0.90

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.

Troubleshooting

Checking the Firmware

Firmware is software that determines the functionality of the AXIS 206. 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. The current firmware version in your camera can be seen on the page **Setup > Basic Configuration.**

Upgrading the Firmware

When you upgrade the firmware with a file from the Axis Web site, your camera will receive the latest available functionality. Always read the upgrade instructions and release notes available with each new release, before updating the firmware.

Note: Preconfigured and customized settings will be saved when the firmware is upgraded (providing the features are available in the new firmware) although this is not guaranteed by Axis Communications. Always read the instructions and release notes available with each new release, before upgrading the firmware.

1. Save the firmware file to your computer. The latest version of the firmware is available free of charge from the Axis Web site at **www.axis.com/techsup**

2. Go to **Setup > System Options > Maintenance** in the camera's Web pages.

3. In the **Upgrade Server** section, browse to the desired firmware file on your computer. Click **Upgrade.**
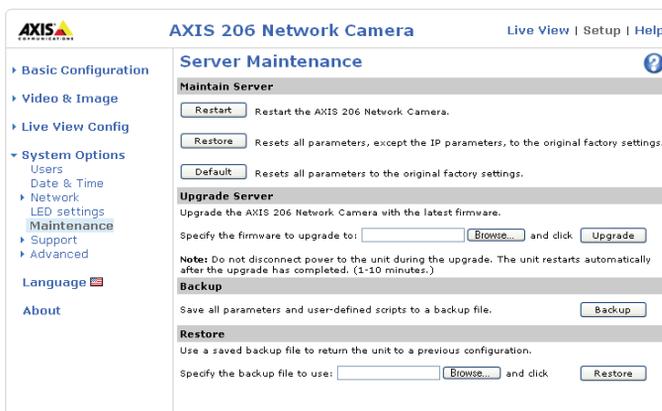
Notes: •After starting the upgrade process, always wait at least 10–15 minutes before restarting the camera, even if you suspect the upgrade has failed.

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

Emergency Recovery Procedure

If power or the network connection to the camera is lost during the upgrade, the process will fail and the unit will become unresponsive. A flashing red Status LED indicates a failed upgrade. To recover the unit, follow the steps below. The serial number is found on the label attached to the bottom of the camera.

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

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

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 camera's IP address. In the page that appears, use the **Browse** button to select the upgrade file to use, e.g. axis206.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 and Status LEDs and flashing green or amber on the Network LED.

5. Referring to the installation guide, reinstall the camera.

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

Axis Support

If you contact Axis support, please help us to help you solve your problems, by providing the server report, the 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.

The **Log file** is available from **Setup > System Options > Logs & Reports**. The Log file records events in the unit since the last system restart and can be a useful diagnostic tool when troubleshooting.

Symptoms, Possible Causes and Remedial Actions

Problems setting the IP address	
When using ARP/Ping	Try the installation again. The IP address must be set within two minutes after power has been applied to the camera. Ensure the Ping length is set to 408. See the Installation Guide.
The camera is located on a different subnet	If the IP address intended for the camera 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 to obtain an appropriate IP address.
The IP address is being used by another device	Disconnect the camera from the network. 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 see: **Request timed out** – this means that the IP address is available for use with your camera. In this case, check all cabling and reinstall the unit.
Possible IP address conflict with another device on the same subnet	The static IP address in the camera is used before the DHCP server sets a 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 camera. To avoid this, set the static IP address to 0.0.0.0.
The camera cannot be accessed from a browser	
The IP address has been changed by DHCP	1) Move the camera to an isolated network or to one with no DHCP or BOOTP server. Set the IP address again, using the AXIS IP Utility (see the Installation Guide) or the ARP/Ping commands. 2) Access the unit and disable 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 the instructions above.
Camera is accessible locally, but not externally	
Broadband router configuration	To configure your broadband router to allow incoming data traffic to the camera: Enable the NAT-traversal feature which will attempt to automatically configure the router to allow access to the camera. This is enabled from Setup > System Options > Network > TCP/IP Advanced.
Firewall protection	Check the Internet firewall with your system administrator.
Default routers required	Check if you need to configure the default router settings.
The Power indicator is not constantly lit	
Faulty power adapter	Check that you are using the correct power supply. See the technical specifications.
The Status and Network indicator LEDs are flashing red rapidly	
Firmware failure	Contact your Axis dealer.
The Status indicator LED is flashing red and the camera is inaccessible	
A firmware upgrade has been interrupted or the firmware has otherwise been damaged	See the *Emergency Recovery Procedure* above.
No image displayed on web page	
Problem with AMC. (*Internet Explorer only*)	To enable the updating of video images in Microsoft Internet Explorer, set your 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 your camera to use a Java applet for updating the video images under Live View Config > Layout > Default Viewer for Internet Explorer. See the online help for more information.
Video/Image problems, general	
Image too dark or too light	Check the video image settings. See the online help on Video and Image Settings.
Slow image update	Configuring, e.g. pre-buffers, motion detection, high-resolution images, high frame rates, etc, will reduce the performance of the camera.
Low frame rate and/or noisy images.	If there is insufficient lighting available, adjust the Low Light Behavior settings under the Advanced Image settings. See the online help for more information.
Slow performance	Slow performance may be caused by heavy network traffic, too many users accessing the unit, low performance clients, image rotation.
Image gradually gets darker or lighter	When using the AXIS 206 in locations lit by fluorescent lighting, check in the advanced image settings that the Exposer control is set to Flicker-free.
Poor quality snapshot images	
Screen incorrectly configured on your workstation	In Display Properties, configure your screen to show at least 65000 colors, i.e. at least 16-bit. Using only 16 or 256 colors will produce dithering artifacts in the image.
Browser freezes	
Netscape 7.x or Mozilla 1.4 (or later) 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. Try deleting existing files to free up space.

For additional assistance, please contact your reseller or see the support pages on the Axis Website at www.axis.com/techsup

Technical Specifications

Item	Specification
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 XP, 2000, Server 2003, • DirectX 9.0 or later • Internet Explorer 6.x or later For other operating systems and browsers, see www.axis.com/techsup
Networking	• Required protocols: Standard TCP/IP protocol suite • Supported protocols: 10baseT Ethernet, 100baseTX Fast Ethernet, TCP/IP, HTTP, FTP, DHCP, SMTP, NTP, ARP, BOOTP, DNS, UPnP. Ethernet connection via twisted pair cable (CAT-5, CAT-6).
Management	Remote configuration and status via web-based tools.
Compression	• Motion–JPEG. Snapshot JPEG images available. • Ten user-controlled compression levels.
Video Features	• Time stamp, text overlay, image rotation, color control. • Maximum frame rate: 30 fps. • Light sensitivity: 4 - 10 000 Lux. • 1/4" progressive scan CMOS image sensor.
Video Resolutions	• 640x480 • 640x360 • 320x240 • 160x120
Lens	Fixed focal length: 4 mm. Fixed iris: F2.0
Security	Multi-user password protection.
Operating Conditions	• Temperature: +5°C to +40°C (41°F to 104°F) • Humidity: 20-80% RHG. For indoor use only
Metrics	• HxWxD: 88x55x34 mm (3.46"x2.17"x1.34") • Weight: 177g (0.39 lb) including stand
Approvals	**EMC** • EN55022:1998+A1, Class B • EN61000-3-2:2000 • EN61000-3-3:1995+A1 • EN55024:1998+A1 • EN61000-3-2:2001 • CISPR24:1997+A1

Item	Specification
Compliance	**EMC** • FCC Part 15 Subpart B & Class A • FCC Part 15 Subpart B demonstrated by compliance with EN55022 • (CISPR22) • VCCI 2003 • C-tick AS/NZS 4771 **Safety** • UL CSA (power adapter only) • EN60950
Hardware & System	• Motion JPEG compression chip • 32-bit RISC CPU • 16MByte RAM • 4MByte FLASH • Linux 2.4 kernel
Power	PS-L power adapter, 5.0-5.5VDC, min 500mA, included
Complimentary software	• AXIS Media Control (AMC) – ActiveX component software required for Microsoft Internet Explorer – installed automatically on first use. • AXIS IP Utility – for small installation in Windows. • AXIS Camera Management – for larger installations.

Glossary

ActiveX - ActiveX is a standard that enables software components to interact with one another in a networked environment, regardless of the language(s) used to create them. Web browsers may come into contact with ActiveX controls, ActiveX documents, and ActiveX scripts. ActiveX controls are often downloaded and installed automatically as required.

AF (Autofocus) - A system by which the camera lens automatically focuses on a selected part of the subject.

Analog video camera – The signal from an analog video camera is viewed directly on e.g. a monitor in the analog system, which depends on traditional analog cabling. Alternatively, the signal can be digitized with the use of a video server, and can then be made available over a data (IP) network.

Angle - The field of view, relative to a standard lens in a 35mm still camera, expressed in degrees, e.g. 30°. For practical purposes, this is the area that a lens can cover, where the angle of view is determined by the focal length of the lens. A wide-angle lens has a short focal length and covers a wider angle of view than standard or telephoto lenses, which have longer focal lengths.

API (Application Programming Interface) – An API is a set of routines, protocols, and tools for building software applications. A good API makes it easier to develop a program by providing all the required building blocks. The Axis VAPIX API allows Axis products to be integrated into other applications.

ARP (Address Resolution Protocol) - This protocol is used to associate an IP address to a hardware MAC address. A request is broadcast on the local network to discover the MAC address for an IP address.

ARTPEC (Axis Real Time Picture Encoder) - A chip designed by Axis for image compression. ARTPEC supports a range of CCD and CMOS sensors, built-in functionality for sharpening, backlight compensation, noise reduction and white balance, support for multiple Motion-JPEG streams, support for MPEG-4 part 2, up to 30 frames/second from 4 simultaneous video sources and real-time compression of up to 45 Megapixels/second.

ASIC (Application Specific Integrated Circuit) - A circuit designed for a specific application, as opposed to a general purpose circuit, such as a microprocessor.

Aspect ratio - A ratio of width to height in images. A common aspect ratio used for television screens and computer monitors is 4:3. High-definition television (HDTV) uses an aspect ratio of 9:16.

Autoiris (DC-Iris) - This special type of iris is electrically controlled by the camera, to automatically regulate the amount of light allowed to enter.

AVI (Audio Video Interleave) - A video format that supports simultaneous playback of audio and video.

AXIS Camera Management - A powerful and efficient installation and management tool for Axis network video products. The tool can automatically find and set IP addresses, show connection status and manage firmware upgrades of multiple devices.

AXIS Internet Dynamic DNS Service - This free service provides an Axis network product with a unique DNS or domain name (URL address), which can then be used instead of an IP address to access the product from a web browser.

AXIS IP Utility - A tool for discovering and setting IP addresses for Axis network devices. AXIS IP Utility is supplied free of charge by Axis.

AXIS Media Control (AMC) – AMC is the ActiveX component required to view moving images from an Axis video device in Internet Explorer. The component is installed automatically on the viewing computer on first use. Once installed, AMC can be configured from Windows Control Panel.

Bitmap - A bitmap is a data file representing a rectangular grid of pixels. It defines a display space and color for each pixel (or "bit") in the display space. This type of image is known as a "raster graphic." GIF's and JPEG's are examples of image file types that contain bitmaps. Because a bitmap uses this fixed raster method, it cannot easily be rescaled without losing definition. Conversely, a vector graphic image uses geometrical shapes to represent the image, and can thus be quickly rescaled.

Bit rate - The bit rate (in kbit/s or Mbit/s) is often referred to as speed, but actually defines the number of bits/time unit and not distance/time unit.

Bluetooth - Bluetooth is an open standard for wireless transmission of voice and data between mobile devices (PCs, handheld computers, telephones and printers).

Bonjour - Also known as zero-configuration networking, Bonjour enables the automatic discovery of computers, devices, and services on IP networks. Bonjour allows devices to automatically discover each other without the need to enter IP addresses or configure DNS servers. Bonjour is developed by Apple Computer Inc.

BOOTP (Bootstrap Protocol) - A protocol that can automatically configure a network device (give it an IP address). BOOTP is the basis for a more advanced network management protocol, the Dynamic Host Configuration Protocol (DHCP).

Broadband - In network engineering terms, this describes transmission methods where two or more signals share the same carrier. In more popular terminology, broadband is taken to mean high-speed data transmission.

CCD (Charged Coupled Device) - This light-sensitive image device used in many digital cameras is a large integrated circuit that contains hundreds of thousands of photo-sites

(pixels) that convert light energy into electronic signals. Its size is measured diagonally and can be 1/4", 1/3", 1/2" or 2/3".

CCTV (Closed Circuit Television) – A CCTV system is a closed/private video system, usually constructed with coaxial cabling, and used within a single building/group of buildings. It is used to visually monitor the location for security or industrial purposes. Video from the CCTV system can be recorded and viewed on-site or remotely.

CCTV video camera – A traditional CCTV video camera is an analog camera, available in both monochrome (black and white) and color. Cameras can be set in fixed positions or placed on "Pan/Tilt/Zoom" devices, which allow the camera to be maneuvered. Using a zoom lens provides a closer view of the object being viewed. CCTV analog video cameras can be viewed over a computer network by using a video server.

CGI (Common Gateway Interface) - A specification for communication between a web server and other (CGI) programs. For example, a HTML page that contains a form might use a CGI program to process the form data once it is submitted.

CIF (Common Intermediate Format) - CIF refers to the analog video resolutions 352x288 pixels (PAL) and 352x240 pixels (NTSC). See also *Resolution*.

Client-server - Client-server describes the relationship between two computer programs in which one program, the client, makes a service request from another program, the server, which fulfils the request. Typically, multiple client programs share the services of a common server program. A web browser is a client program that requests services (the sending of web pages or files) from a web server.

CMOS (Complementary Metal Oxide Semiconductor) - A CMOS is a widely used type of semiconductor that uses both negative and positive circuits. Since only one of the circuit types is on at any given time, CMOS chips require less power than chips using just one type of transistor. CMOS image sensors also allow processing circuits to be included on the same chip, an advantage not possible with CCD sensors, which are also much more expensive to produce.

Coaxial cable - Coaxial cable is the standard means of transmitting analog video in a CCTV system. Coaxial is also used by cable companies to distribute television in residential buildings.

Codec - In communications engineering, a codec is usually a coder/decoder. Codecs are used in integrated circuits or chips that convert e.g. analog video and audio signals into a digital format for transmission. The codec also converts received digital signals back into analog format. A codec uses analog-to-digital conversion and digital-to-analog conversion in the same chip.

Codec can also mean compression/decompression, in which case it is generally taken to mean an algorithm or computer program for reducing the size of large files and programs.

Composite video - A type of video signal in which the red, blue and green signals (sometimes audio signals too) are mixed together.

Compression - See *Image Compression*.

Contrast - Defines the degree of difference between the lightest and darkest parts of an image or video stream.

Control unit - If a CCTV system has more than one camera, there must be a way to control the video signals going to recorders and monitors. There are three basic types of Video Control Unit: Multiplexer, Switch and Quad.

DC-Iris - This special type of iris is electrically controlled by the camera, to automatically regulate the amount of light allowed to enter.

Decoder - See *video decoder*.

De-interlacing - See *interlacing*.

DHCP (Dynamic Host Configuration Protocol) - DHCP is a protocol that lets network administrators automate and centrally manage the assignment of Internet Protocol (IP) addresses to network devices in a network.

DHCP uses the concept of a "lease" or amount of time that a given IP address will be valid for a computer. The lease time can vary, depending on how long a user is likely to require the network connection at a particular location.

DHCP also supports static addresses for e.g. computers running web servers, which need a permanent IP address.

DNS (Domain Name System) - DNS is used to locate and translate Internet domain names into IP (Internet Protocol) addresses. A domain name is a meaningful and easy-to-remember name for an Internet address. For example the domain name www.example.com is much easier to remember than 192.0.34.166. The translation tables for domain names are contained in Domain name servers.

Domain server - Domains can also be used by organizations that wish to centralize the management of their (Windows) computers. Each user within a domain has an account that usually allows them to log in to and use any computer in the domain, although restrictions may also apply. The domain server is the server that authenticates the users on the network.

Dome network camera – A remotely controllable camera mounted in a special housing, characterized by the dome shaped glass or plastic covering behind which the camera resides. Usually mounted on a ceiling and looking downwards, a dome camera can often rotate up to 360 degrees, thus providing excellent coverage of large areas.

Duplex - See *Full-duplex*.

DVD (Digital Versatile Disc) – An optic disc with the same physical size as a CD, but with significantly greater storage capacity.

DVR (Digital Video Recorder) – A DVR records analog video to a hard disk in digital format. Most DVR's use the

MPEG-2 format for encoding analog video signals.

Encoder - See *Video encoder.*

Ethernet - Ethernet is the most widely installed local area network technology. An Ethernet LAN typically uses special grades of twisted pair wires. The most commonly installed Ethernet systems are 10BASE-T and 100BASE-T10, which provide transmission speeds up to 10 Mbps and 100 Mbps respectively.

ETRAX (Ethernet Token Ring AXIS) - The ETRAX chip is the cornerstone of Axis technology and the 'brain' in nearly all Axis products. A multipurpose Linux chip with integrated Ethernet networking and extremely flexible I/O options.

Factory default settings - These are the settings that originally applied for a device when it was first delivered from the factory. If it should become necessary to reset a device to its factory default settings, this will, for many devices, completely reset any settings that were changed by the user.

Firewall - A firewall works as a barrier between networks, e.g. between a Local Area Network and the Internet. The firewall ensures that only authorized users are allowed to access the one network from the other. A firewall can be software running on a computer, or it can be a standalone hardware device.

Fixed dome network camera – This type of camera cannot be remotely controlled as regards movement, but is mounted in the same type of dome as a controllable network dome camera. This camera must be positioned manually to provide the required coverage.

Fixed network camera – This type of camera cannot be remotely controlled as regards movement. It must be positioned manually to provide the required coverage.

Fixed iris - See *Autoiris.*

Focal length - Measured in millimeters, the focal length of a camera lens determines the width of the horizontal field of view, which in turn is measured in degrees.

FTP (File Transfer Protocol) - FTP is an application protocol that uses the TCP/IP protocols, used to exchange files between computers/devices on networks.

Frame - A frame is a complete video image. In the 2:1 interlaced scanning format of the RS-170 and CCIR formats, a frame is made up of two separate fields of 262.5 or 312.5 lines interlaced at 60 or 50 Hz to form a complete frame, which appears at 30 or 25 Hz. In video cameras with a progressive scan, each frame is scanned line-by-line and not interlaced; most are also displayed at 30 and 25 Hz.

Frame rate - The frame rate used to describe the frequency at which a video stream is updated is measured in frames per second (fps). A higher frame rate is advantageous when there is movement in the video stream, as it maintains image quality throughout.

Full-duplex - Transmission of data in two directions simultaneously. In an audio system this would describe e.g. a telephone systems. Half-duplex also provides bi-directional communication, but only in one direction at a time, as in a walkie-talkie system. See also *Simplex.*

Gain - Gain is the amplification factor and the extent to which an analog amplifier boosts the strength of a signal. Amplification factors are usually expressed in terms of power. The decibel (dB) is the most common way of quantifying the gain of an amplifier.

Gateway - A gateway is a point in a network that acts as an entry point to another network. In a corporate network for example, a computer server acting as a gateway often also acts as a proxy server and a firewall server. A gateway is often associated with both a router, which knows where to direct a given packet of data that arrives at the gateway, and a switch, which furnishes the actual path in and out of the gateway for a given packet.

GIF (Graphics Interchange Format) - GIF is one of the most common file formats used for images in web pages. There are two versions of the format, 87a and 89a. Version 89a supports animations, i.e. a short sequence of images within a single GIF file. A GIF89a can also be specified for interlaced presentation.

Half-duplex - See *Full-duplex.*

HTML (Hypertext Markup Language) - HTML is the set of "markup" symbols or codes inserted in a file intended for display in web browser. The markup tells the browser how to display the page's words and images for the user.

HTTP (Hypertext Transfer Protocol) - HTTP is the set of rules for exchanging files (text, graphic images, sound, video, and other multimedia files) on the web. The HTTP protocol runs on top of the TCP/IP suite of protocols.

HTTPS (Hypertext Transfer Protocol over SSL) - HTTPS is a protocol used by web browsers and servers to encrypt and decrypt user page requests and the pages returned by the server. The encrypted exchange of information is governed by the use of an HTTPS certificate (issued by a Certificate Authority), which guarantees the authenticity of the server.

Hub - A (network) hub is used to connect multiple devices to the network. The hub transmits all data to all devices connected to it, whereas a switch will only transmit the data to the device it is specifically intended for.

IEEE 802.11 - A family of standards for wireless LANs. The 802.11a standard supports 1 or 2 Mbit/s transmission on the 5 GHz band. IEEE 802.11b supports data rates up to11 Mbit/s on the 2.4 GHz band, while 802.11g allows up to 54 Mbit/s on the 2.4 GHz band.

Image compression - Image compression minimizes the file size (in bytes) of an image. Two of the most common compressed image formats are JPEG and GIF. See also *MPEG* and *Motion JPEG.*

Interlacing - Interlaced video is video captured at 50

pictures (known as fields) per second, of which every 2 consecutive fields (at half height) are then combined into 1 frame. Interlacing was developed many years ago for the analog TV world and is still used widely today. It provides good results when viewing motion in standard TV pictures, although there is always some degree of distortion in the image.

To view interlaced video on e.g. a computer monitor, the video must first be de-interlaced, to produce progressive video, which consists of complete images, one after the other, at 25 frames per second. See also *Progressive scan*.

IP (Internet Protocol) - The Internet Protocol is a method transmitting data over a network. Data to be sent is divided into individual and completely independent "packets." Each computer (or host) on the Internet has at least one address that uniquely identifies it from all others, and each data packet contains both the sender's address and the receiver's address.

The Internet Protocol ensures that the data packets all arrive at the intended address. As IP is a connectionless protocol, which means that there is no established connection between the communication end-points, packets can be sent via different routes and do not need to arrive at the destination in the correct order.

Once the data packets have arrived at the correct destination, another protocol - Transmission Control Protocol (TCP) - puts them in the right order.
See also *TCP*.

IP address - An IP address is simply an address on an IP network used by a computer/device connected to that network. IP addresses allow all the connected computers/devices to find each other and to pass data back and forth.

To avoid conflicts, each IP address on any given network must be unique. An IP address can be assigned as fixed, so that it does not change, or it can be assigned dynamically (and automatically) by DHCP.

An IP address consists of four groups (or quads) of decimal digits separated by periods, e.g. 130.5.5.25. Different parts of the address represent different things. Some part will represent the network number or address, and some other part will represent the local machine address. See also *IP (Internet Protocol)*.

Infrared (IR) - Infrared radiation is radiation at a longer wavelength than visible light, which means it cannot be seen by the naked human eye. As infrared radiation can be detected as heat, this can be shown on a screen or captured by a digital camera, with hotter objects showing up brighter against colder surroundings (e.g. a human body against a colder background).

As color cameras can "see" infrared radiation as well as visible light, these cameras are equipped with an IR-cut filter, to prevent distortion of the colors the human eye can see. To use the camera in very dark locations or at night, this filter can be removed, to allow infrared radiation to hit the image sensor and thus produce images. An infrared lamp can be used for improved illumination for night surveillance, whilst not producing any extra visible light.

Inputs/Outputs (I/O's) - The digital I/Os on, for example, a network camera can be used to connect any device that can toggle between an open and a closed circuit.

For example, if a door switch is used as an input device, opening the door could trigger the upload of video images and the sending of notification messages.

An output might, for example, be used to automatically start a siren when there is a motion detection trigger.

ISMA (Internet Streaming Media Alliance) - ISMA's goal is: "To accelerate the adoption and deployment of open standards for streaming rich media content such as video, audio, and associated data, over Internet protocols."

JPEG (Joint Photographic Experts Group) - Together with the GIF file format, JPEG is an image file type commonly used on the web. A JPEG image is a bitmap, and usually has the file suffix '.jpg' or ".jpeg." When creating a JPEG image, it is possible to configure the level of compression to use. As the lowest compression (i.e. the highest quality) results in the largest file, there is a trade-off between image quality and file size.

kbit/s (kilobits per second) - A measure of the bit rate, i.e. the rate at which bits are passing a given point. See also *Bit rate.*

LAN (Local Area Network) - A LAN is a group of computers and associated devices that typically share common resources within a limited geographical area.

Linux - Linux is an open source operating system within the Unix family. Because of its robustness and availability, Linux has won popularity in the open source community and among commercial application developers.

Lux - A standard unit of illumination measurement.

MAC (Media Access Control) address - A MAC address is a unique identifier associated with a piece of networking equipment, or more specifically, its interface with the network. For example, the network card in a computer has its own MAC address.

Manual iris - This is the opposite of an autoiris, i.e. the camera iris must be adjusted manually to regulate the amount of light allowed to reach the image sensor.

Mbit/s (Megabits per second) - A measure of the bit rate, i.e. the rate at which bits are passing a given point. Commonly used to give the "speed" of a network. A LAN might run at 10 or 100 Mbit/s. See also *Bit rate.*

Monitor - A monitor is very similar to a television set, but lacks the electronics to pick up regular television signals.

Motion JPEG - Motion JPEG is a simple compression/decompression technique for network video. Latency is low and image quality is guaranteed, regardless of movement or complexity of the image. Image quality is controlled by adjusting the compression level, which in turn provides control over the file size, and thereby the bit rate.

High-quality individual images from the Motion JPEG stream are easily extracted. See also *JPEG* and *GIF.*

Megapixel - See *Pixel.*

MPEG (Moving Picture Experts Group) - The Moving Picture Experts Group develops standards for digital video and audio compression. It operates under the auspices of the International Organization for Standardization (ISO). The MPEG standards are an evolving series, each designed for a different purpose.

MPEG-2 - The designation for a group of audio and video coding standards, and is typically used to encode audio and video for broadcast signals, including digital satellite and Cable TV. MPEG-2, with some modifications, is also the coding format used by standard commercial DVD movies.

MPEG-4 - MPEG-4 is a group of audio and video coding standards and related technology. The primary uses for the MPEG-4 standard are web (streaming media) and CD distribution, conversational (videophone), and broadcast television.

Multicast - Bandwidth-conserving technology that reduces bandwidth usage by simultaneously delivering a single stream of information to multiple network recipients. See also *Unicast.*

Multiplexer - A multiplexer is a high-speed switch that provides full-screen images from up to 16 analog cameras. Multiplexers can playback everything that happened on any one camera with no interference from the other cameras on the system.

Network camera (Network video camera) - A network camera is a camera and computer combined in one intelligent unit. It captures and sends live video directly over an IP network such as a LAN, intranet or the Internet. Users can view and/or manage the camera using a standard web browser or application software from any local or remote computer on a network. The camera allows multiple authorized viewers from different locations to simultaneously access images. A network camera is sometimes known as an IP camera.

Network connectivity - The physical (wired or wireless) and logical (protocol) connection of a computer network or an individual device to a network, such as the Internet or a LAN.

Network video - Network video (often referred to as IP-Surveillance for specific applications within security surveillance and remote monitoring) is a system that gives users the ability to monitor and record video over an IP network (LAN/WAN/Internet).

NTSC (National Television System Committee) - NTSC is an analog color encoding system used in television systems in Japan, the United States and other parts of the Americas. NTSC defines the video signal using 525 TV lines per frame, at a refresh rate equal to 30 frames per second. See also *PAL.*

NVR (Network Video Recorder) - A dedicated Network Video Recorder (NVR) can be used to gather data streams from remote network cameras and video servers and store them on a hard disk. An NVR can be a standard networked PC, or a dedicated video recording hard disk server with its own software application.

OEM (Original Equipment Manufacturer) - This is a designation for companies that manufacture equipment that is then marketed and sold to other companies under their

own names.

PAL (Phase Alternating Line) - PAL is an analog color encoding system used in television systems in Europe and in many other parts of the world. PAL defines the video signal using 625 TV lines per frame, at a refresh rate equal to 25 frames per second. See also *NTSC.*

PDA (Personal Digital Assistant) - A small handheld computer, which usually provides at least a calendar, an organizer and a notepad.

PEM (Privacy Enhanced Mail) - An early standard for securing electronic mail. The PEM-format is often used for representing an HTTPS certificate or certificate request.

Ping - Ping is a basic network program used diagnostically to check the status of a network host or device. Ping can be used to see if a particular network address (IP address or host name) is occupied or not, or if the host at that address is responding normally. Ping can be run from e.g. the Windows Command prompt or the command line in Unix.

Pixel (Picture Element) - A pixel is one of the many tiny dots that make up a digital image. The color and intensity of each pixel represents a tiny area of the complete image.

PoE (Power over Ethernet) - Power over Ethernet provides power to a network device via the same cable as used for the network connection. This is very useful for IP-Surveillance and remote monitoring applications in places where it may be too impractical or expensive to power the device from a power outlet.

PPP (Point-to-Point Protocol) - A protocol that uses a serial interface for communication between two network devices. For example, a PC connected by a phone line to a server.

PPTP (Point-to-Point Tunneling Protocol) - A protocol (set of communication rules) that allows corporations to extend their own corporate network through private "tunnels" over the public Internet. In this way a corporation can effectively use a WAN (Wide Area Network) as a large single LAN (Local Area Network). This kind of interconnection is known as a virtual private network (VPN).

Pre/post alarm images - The images from immediately before and after an alarm. These images are stored in a buffer for later retrieval.

Progressive scan - Progressive scan, as opposed to interlaced video, scans the entire picture, line by line every sixteenth of a second. In other words, captured images are not split into separate fields as in interlaced scanning.

Computer monitors do not need interlace to show the picture on the screen, but instead show them progressively, on one line at a time in perfect order i.e. 1, 2, 3, 4, 5, 6, 7 etc., so there is virtually no "flickering" effect. In a surveillance application, this can be critical when viewing detail within a moving image, such as a person running. A high-quality monitor is required to get the best from progressive scan. See also *Interlacing.*

Protocol - A special set of rules governing how two entities will communicate. Protocols are found at many levels of communication, and there are hardware protocols and software protocols.

Proxy server - In an enterprise that uses the Internet, a proxy server acts as an intermediary between a workstation user and the Internet. This provides security, administrative control, and a caching service. Any proxy server associated with a gateway server, or part of a gateway server, effectively separates the enterprise network from the outside network and the local firewall. It is the firewall server that protects the enterprise network from outside intrusion.

PTZ (Pan Tilt Zoom) - A PTZ-enabled camera can be remotely controlled so as to change the view from the camera. Panning is the movement of the camera along its horizontal axis, tilting is the movement of the camera along its vertical axis, and zooming is the adjustment of the zoom lens to magnify the view.

Quad view - A Quad view displays images from up to four cameras on a single screen; where the images from each camera take up approximately a quarter of the display area.

Remote monitoring - Network video gives users the ability to gather information at all key points of an operation and view it in realtime. This makes the technology ideal for monitoring equipment, people and places, both locally and remotely. Application examples include traffic and production line monitoring, and the monitoring of multiple store locations.

Resolution - Image resolution is a measure of how much detail a digital image can hold: the greater the resolution, the greater the level of detail. Resolution can be specified as the number of pixel-columns (width) by the number of pixel-rows (height), e.g. 320x240.

Alternatively, the total number of pixels (usually in megapixels) in the image can be used. In analog systems it is also common to use other format designations, such as CIF, QCIF, 4CIF, etc.

RS-232 - A long-established standard that describes the physical interface and protocol for low-speed serial data communication between devices. This is the interface that e.g. a computer uses to talk to and exchange data with a modem and other serial devices.

RS-422 - A serial data communication protocol that specifies 4-wire, full-duplex, differential line, multi-drop communications. It provides balanced data transmission with unidirectional/non-reversible, terminated or non-terminated transmission lines. RS-422 does not allow multiple drivers, only multiple receivers. Maximum recommended range is 4,000 feet (1200 meters). Maximum recommended baud rate is 10Mbit/s.

RS-485 - An upgraded version of RS-422 that supports up to 32 devices on the same connection. RS-485 is an electrical specification of a two-wire, half-duplex,

multipoint serial connection. It enables the configuration of inexpensive local networks and multidrop communications links. It offers high data transmission speeds (up to 10Mbit/s), and as it uses a differential balanced line over twisted pair (like RS-422), it can span relatively large distances (4000 feet or 1200 meters). RS-485 only specifies the electrical characteristics of the driver and the receiver. It does not specify or recommend any data protocol.

Router - A device that determines the next network point to which a packet should be forwarded on its way to its final destination. A router creates and/or maintains a special routing table that stores information on how best to reach certain destinations. A router is sometimes included as part of a network switch. See also *Switch*.

Security surveillance – Network video's advanced functionality makes it highly suited to the applications involved in security surveillance. The flexibility of digital technology enhances security personnel's ability to protect people, property and assets. Such systems are therefore an especially attractive option for companies currently using CCTV.

Server - In general, a server is a computer program tha provides services to other computer programs in the same or other computers. A computer running a server program is also frequently referred to as a server. In practice, the server may contain any number of server and client programs. A web server is the computer program that supplies the requested HTML pages or files to the client (web browser).

Sharpness - This is the control of fine detail within a picture. This feature was originally introduced into color TV sets that used notch filter decoders. This filter took away all high frequency detail in the black and white region of the picture. The sharpness control attempted to put some of that detail back in the picture. Sharpness controls are mostly superfluous in today's high-end TVs. The only logical requirement for it nowadays is on a VHS machine.

Simplex - In simplex operation, a network cable or communications channel can only send information in one direction. See also *Full-duplex*.

SMTP (Simple Mail Transfer Protocol) - Used for sending and receiving e-mail. However, as it is "simple," it is limited in its ability to queue messages at the receiving end, and is usually used with one of two other protocols, POP3 or IMAP. These other protocols allow the user to save messages in a server mailbox and download them periodically from the server.

SMTP authentication - An extension of SMTP, where the client is required to log into the mail server before or during the sending of email. It can be used to allow legitimate users to send email while denying the service to unauthorized users, such as spammers.

SNMP (Simple Network Management Protocol) - SNMP forms part of the Internet Protocol suite, as defined by the Internet Engineering Task Force. The protocol can support

monitoring of network-attached devices for any conditions that warrant administrative attention.

Sockets - Sockets are a method for communication between a client program and a server program over a network. A socket is defined as "the endpoint in a connection." Sockets are created and used with a set of programming requests or "function calls" sometimes called the sockets application programming interface (API).

SSL/TSL
(Secure Socket Layer/Transport Layer Security) - These two protocols (SSL is succeeded by TSL) are cryptographic protocols that provide secure communication on a network. SSL is commonly used over HTTP to form HTTPS, as used e.g. on the Internet for electronic financial transactions. SSL uses public key certificates to verify the identity of the server.

Subnet & subnet mask - A subnet is an identifiably separate part of an organization's network. Typically, a subnet may represent all the machines at one geographic location, in one building, or on the same local area network (LAN). Having an organization's network divided into subnets allows it to be connected to the Internet with a single shared network address.

The subnet mask is the part of the IP address that tells a network router how to find the subnet that the data packet should be delivered to. Using a subnet mask saves the router having to handle the entire 32-bit IP address; it simply looks at the bits selected by the mask.

Switch - A network device that connects network segments together, and which selects a path for sending a unit of data to its next destination. In general, a switch is a simpler and faster mechanism than a router, which requires knowledge about the network and how to determine the route. Some switches include the router function. See also *Router*.

TCP (Transmission Control Protocol) - TCP is used along with the Internet Protocol (IP) to transmit data as packets between computers over the network. While IP takes care of the actual packet delivery, TCP keeps track of the individual packets that the communication (e.g. requested a web page file) is divided into, and, when all packets have arrived at their destination, it reassembles them to re-form the complete file.

TCP is a connection-oriented protocol, which means that a connection is established between the two end-points and is maintained until the data has been successfully exchanged between the communicating applications.

Telnet - Telnet is a simple method with which to access another network device, e.g. a computer. The HTTP protocol and the FTP protocols allow you to request specific files from remote computers, but do not allow you logon as a user of that computer. With Telnet, you log on as a regular user with whatever privileges you may have been granted for specific applications and data residing on that computer.

Time-lapse recorder – This type of video recorder is commonly used in the security industry and has the ability to record up to one week of video on a single tape. The most commonly used timing is the 24-hour mode. Having to change tapes only once a day and retaining large amounts of information are perceived as key advantages in using this particular mode of recording.

TVL (TV Lines) - A method of defining resolutions in analog video.

UDP (User Datagram Protocol) - UDP 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.

Unicast - Communication between a single sender and a single receiver over a network. A new connection is established for each new user. See also *Multicast*.

UPnP^{TM} - A set of computer network protocols that allows the automatic peer-to-peer detection of devices on the network. UPnP is promoted by the UPnP Forum.

URL (Uniform Resource Locator) - An "address" on the network.

USB (Universal Serial Bus) - A plug-and-play interface between a computer and peripheral devices (scanners, printers etc)

Varifocal lens - A lens that provides a wide range of focal lengths, as opposed to a lens with a fixed focal length, which only provides one.

Video camera – See *Network camera* and *CCTV video camera.*

Video decoder – A network video decoder converts digital video and audio streams back into analog signals, which can then be displayed on standard TV sets, analog monitors and video switches.

Video encoder (video server) – A video encoder/server digitizes analog video signals and sends digital images directly over an IP network, such as a LAN, intranet or the Internet. In effect, it turns an analog video system into a network video system and enables users to view live images using a web browser or application software on any local or remote computer on a network.

Video management software - Video management software supplies the means for monitoring, analyzing and recording network video. In its simplest form, it offers live viewing, storage and retrieval of video sequences. Advanced applications may also provide support for recording of live video from multiple devices, different recording modes, search functions, remote access via a web browser, control of PTZ devices, etc.

VMD (Video Motion Detection) - Video Motion detection defines activity (motion) in a monitored scene by analyzing image data and differences in series of images. This detection can, for example, be used to trigger an alarm event in a network camera and start the upload of images from the camera.

Video switcher – An analog video switcher sequentially displays full screen images, from one camera after another, typically at 3-5 seconds intervals. Other camera sources are not recorded while the image source from one camera is displayed on screen.

VPN (Virtual Private Network) - This creates a secure "tunnel" between the points within the VPN. Only devices with the correct "key" will be able to work within the VPN. The VPN network can be within a company LAN (Local Area Network), but different sites can also be connected over the Internet in a secure way. One common use for VPN is for connecting a remote computer to the corporate network, via e.g. a direct phone line or via the Internet.

WAN (Wide-Area-Network) - Similar to a LAN, but on a larger geographical scale.

W-LAN (Wireless LAN) - A wireless LAN is a wireless local area network that uses radio waves as its carrier: where the network connections for end-users are wireless. The main network structure usually uses cables.

Web camera (Webcam) – A camera that requires a constant connection (via e.g. USB) to a PC for its operation. See also *Network camera.*

Web server - A program that allows web browsers to retrieve files from computers connected to the Internet. The Web server listens for requests from browsers and upon receiving a request for a file sends it back to the browser. The primary function of a Web server is to serve pages to other remote computers.

WEP (Wireless Equivalent Privacy) - A wireless security protocol, specified in the IEEE 802.11 standard, which is designed to provide a wireless local area network (WLAN) with a level of security and privacy comparable to that usually expected of a wired LAN. Security is at two different levels; 40-bit and 128-bit encryption. The higher the bit number, the more secure the encryption.

WINS (Windows Internet Naming Service) - Part of the Microsoft Windows NT Server, WINS manages the association of workstation names and locations with IP addresses, without the user or administrator having to be involved in each configuration change.

WPA-PSK (Wi-Fi Protected Access - Pre-Shared Key) - This wireless encryption method uses a pre-shared key (PSK) for key management. Keys can usually be entered as manual hex values, as hexadecimal characters, or as a Passphrase. WPA-PSK provides a greater degree of security than WEP.

Zoom lens - A zoom lens can be moved (zoomed) to enlarge the view of an object to show more detail.

Index