

## Axis Camera Servers

The First Plug-and-Picture  
Web Camera



U s e r ' s   M a n u a l

## Safety Notices

Please observe all safety markings and instructions when using this product.

**Caution!** - potential hazard that can damage the product.

**Important** - potential hazard that can seriously impair operation.

Do not proceed any of the above notices until you have fully understood the implications.

## Legal Considerations

Camera surveillance can be prohibited by laws that vary from country to country. Check out the laws in your country before using the AXIS 200 for surveillance.

## Electromagnetic Compatibility (EMC)

**USA** - This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It 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. Shielded cables should be used with this unit to ensure compliance with the Class A limits.



**Europe** - This digital equipment fulfils the requirements for radiated emission according to limit B of EN55022/1994, and the requirements for immunity according to EN50082-1/1992 residential, commercial, and light industry (Compliance is not valid for unshielded network and printer cables).

## Liability

Every care has been taken in the preparation of this manual; if you detect any inaccuracies or omissions, please inform us at an address which can be found in the last appendix of the manual. Axis Communications 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 makes no warranty of

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## Year 2000 Compliance

Axis Communications warrants that the AXIS 200 is year 2000 compliant.

## Axis' Trademarks

ThinServer

## Trademark Acknowledgments

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AXIS 200 User's Manual

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## Preface

Thank you for purchasing the AXIS 200 Network Camera Server. This product has been developed to connect your cameras anywhere in your network, allowing all users to take high quality snapshot pictures around the globe over Internet and intranet networks.

### About This Manual

The manual provides introductory information as well as detailed instructions on how to set up and manage the AXIS 200 in various network environments. It is intended for everyone involved in installing and managing the AXIS 200. To fully benefit from the manual, you should be familiar with basic networking principles.

This manual applies to the AXIS 200, with software release 1.31.

### About Axis

Axis Communications is dedicated to providing innovative solutions for network-connected computer peripherals. Since the start in 1984, Axis has been one of the fastest growing companies in the market and is now a leader in its field.

**ThinServer™ Technology** Being the core of all Axis' products, the ThinServer™ technology enables them to act as intelligent file server independent ThinServer™ devices. A ThinServer™ device is a network server which includes "thin" embedded server software capable of simultaneous multiprotocol communication, scalable RISC hardware and a built-in Web server which allows easy access and management via any standard Web browser. The ThinServer™ technology makes it possible to connect any electronic device to the network, thus providing "Access to everything".

Today, Axis Communications is offering the ThinServer™ technology as well as six major ThinServer™ product lines consisting of:

**Network Print Servers** offer you a powerful and cost-efficient method for sharing printer resources in your network. They connect to any standard printer, featuring high performance, simple management and easy upgrading across the network. The print servers are available in Ethernet, Fast Ethernet and Token Ring versions.

**IBM Mainframe and S/3x - AS/400 Print Servers and Protocol Converters** includes a wide range of LAN, coax and twinax attached print servers for the IBM host environment. By emulating IBM devices, these servers provide conversion of the IPDS, SCS and 3270DS data streams to the major ASCII printer languages.

**Network Attached Optical Media Servers** provide you with a flexible and cost-efficient solution for sharing CD-ROMs, DVD-ROMs and other optical media across the network. They are available in Ethernet, Fast Ethernet and Token Ring versions.

**Network Attached Storage Servers** offer network connectivity for re-writable media such as hard disks and Iomega Jaz cartridges, which, via the storage server, can be backed up on DAT tapes. They are only available in Ethernet versions.

**Network Camera Servers** provide live images using standard Internet technology, thus enabling access to live cameras via any standard Web browser. They offer a perfect solution for remote surveillance over the Internet and their sharp images can bring life into any web site. These servers support Ethernet as well as PSTN and GSM phone lines.

**Network Scan Servers** enable easy distribution of paper-based information across workgroups and the enterprise. By sending the scanned documents to your destination via the Internet/intranet, you will reduce your faxing/mailing costs, as well as save time, thus improving your organization efficiency.

## Support Services

Should you require any technical assistance, please contact your local dealer. If your questions cannot be answered immediately, your local dealer will forward your queries through the appropriate channels to ensure you a rapid response.

WWW:	<a href="http://www.axis.com">http://www.axis.com</a>
FTP server:	<a href="ftp://ftp.axis.com/pub/axis">ftp://ftp.axis.com/pub/axis</a>
Support e-mail address:	<a href="mailto:tech-sup@axis.com">tech-sup@axis.com</a>

If you are connected to Internet, you can find online manuals, technical support, firmware updates, application software, company information, on any of the addresses listed to the left.

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## Section I Introduction

### The AXIS 200 Network Camera

The AXIS 200 Network Camera is a digital snapshot camera with a built-in Web server. Connecting directly to Ethernet networks, it provides a source for live color pictures over the Internet.



The AXIS 200 Network Camera

In the past, network imaging solutions have required cumbersome, complicated systems involving PCs or workstations with specific video cabling. The AXIS 200 eliminates the cost, management and maintenance issues commonly associated with those types of solutions.

Technically, the AXIS 200 is a microprocessor-based device that includes:

- A digital color camera
- RISC-based hardware for image compression
- Standalone Web server functionality
- Physical Ethernet connection

## Features and Benefits

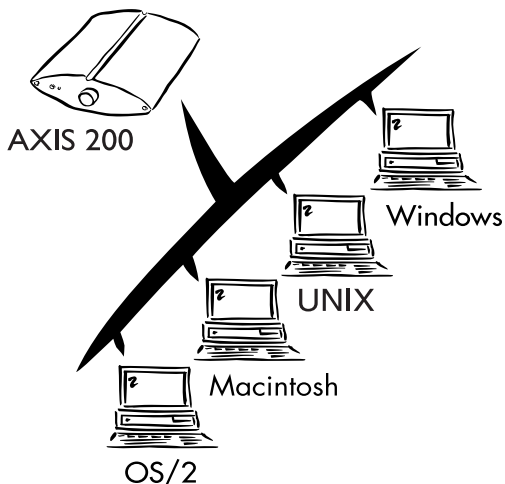
**Easy Installation** Connecting the AXIS 200 to the network is easy. It does not require the use of a PC frame grabber card or interaction with any other server. No additional software or hardware is needed. You can actually install it in a single minute - all you need to do is assign a valid Internet address.

**Cost-effective** With all necessary features included, the AXIS 200 provides a reliable and low cost alternative for publication of pictures on the network.

**Operating Environments** The AXIS 200 supports TCP/IP and Internet-related protocols. It can therefore be used in mixed operating system environments such as Windows, Macintosh, UNIX and OS/2.

Using a standard Web browser, the AXIS 200 can be configured and managed directly from its own Web pages.

The AXIS 200 also supports FTP so that snapshots can be taken and saved locally.



**Standard Image Format** The AXIS 200 generates pictures in standard JPEG format which means that users can take and view pictures over the network using any standard Web browser. Pictures taken by the AXIS 200 can be displayed in your Web pages by creating HTML links.

The AXIS 200 provides high-quality snapshot pictures for any Internet/intranet client that cares to visit it. Primarily designed to produce a 'live' snapshot for each occasion it is accessed, it can also broadcast recently generated pictures upon request.



**Fast JPEG Compression** The AXIS 200 has hardware support for the JPEG compression as well as a 32-bit high speed RISC CPU. This results in fast JPEG compression. The AXIS 200 provides JPEG images directly, without the need for manual conversion between image formats. A full size JPEG image is compressed in less than one second.

**External Device Connection** The auxiliary input makes it possible to control the AXIS 200 from external relays. This means that external devices like door-openers, external switches, etc. can trigger the camera.

**Security** The AXIS 200 is a self-contained web server. This means that the server is secured like any other Internet host. It is up to the Network Administrator to decide whether individuals, groups, the whole company or the whole world may access your camera server. Normally this is done in your company's Internet firewall.

**Web Forum discussions** Axis Communications will be running a web forum for ideas and suggestion notes for possible camera applications. Axis will also maintain a link collection where you can insert your own link to your application and keep lists of application notes, FAQ:s and other related information.



## Section 2 Installing the AXIS 200

This section provides a brief description of the unit connectors and indicators, and describes the AXIS 200 installation procedures.



### Installation Summary

The AXIS 200 is installed in these stages:

- Stage 1. Unpacking and Checking the Hardware.
- Stage 2. Identifying the Connectors and Indicators
- Stage 3. Connecting the AXIS 200 to your Network
- Stage 4. Assigning an Internet Address and Host Name
- Stage 5. Testing the AXIS 200
- Stage 6. Adjusting the Focus

## Stage 1. Unpacking and Checking the Hardware

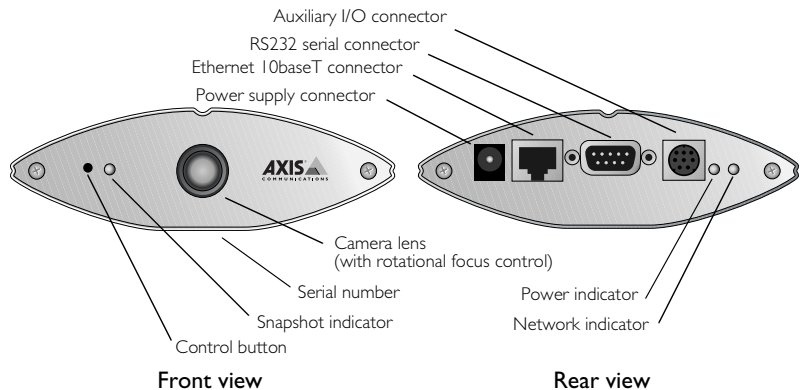
Unpack and check all the items against the check list below. Contact your dealer if anything is missing or damaged. All packing material is recyclable. The AXIS 200 hardware pack contains:

- AXIS 200 Network Camera, part no: 0064-1
- AXIS 200 Quick Installation Guide, part no: 15107
- AXIS 200 Tripod
- Product Brochure, part no: 14412
- Power supply. Part numbers vary according to country, as described in this table:

<b>Country</b>	<b>Part Number</b>
Europe	14233
UK	14234
Australia	14255
USA	14253
Japan	14254

## Stage 2. Identifying the Connectors and Indicators

Please read the following information to familiarize yourself with the AXIS 200, making particular note of where the connectors and indicators are located. This information provide a useful reference when performing the remaining stages of the installation.



### Connectors

<b>Auxiliary I/O Connector</b>	A Mini-DIN 8-pole external connector for auxiliary connection to the AXIS 200. The functionality of this connector is fully discussed in <i>Appendix E - The Auxiliary IO Port.</i>
<b>RS232 Serial Connector</b>	A 9 pin D-sub connector provides the physical RS232 serial interface to a modem server within the AXIS 200. This connector is discussed in detail in <i>Appendix F - The RS232 Serial Port.</i>
<b>Ethernet 10baseT Connector</b>	10baseT (RJ-45) twisted pair Ethernet connector for connection to the network.
<b>Power Supply Connector</b>	Jack socket for connection of AXIS 200 power supply.

**Caution!** The power supply delivered with your AXIS 200 is country specific. Please check that the type of power supply you are using is correct against the checklist on page 10.

### Indicators

- Snapshot Indicator** This indicator will flash on every occasion the AXIS 200 takes a snapshot.
- Power Indicator** This is normally lit while power is applied. If it is not lit, or it flashes, there is problem with the AXIS 200 power supply.
- Network Indicator** This flashes to indicate network activity.

### Camera Lens

Wide angle lens with rotational-focus control. Refer to *Appendix D - Technical Specifications* for complete specification.

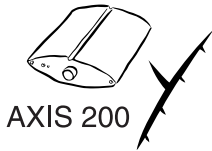
### Serial Number

This is located on the underside label of the AXIS 200. Please note that the serial number of your AXIS 200 is identical to the Ethernet address of the unit.

### Control Button

This is used for multiple purposes, e.g. restoring the factory default settings, adjusting the White balance, triggering CRON scripts. Refer to the appropriate sections of the manuals.

### Stage 3. Connecting the AXIS 200 to your Network



To connect your AXIS 200 to the network, follow the step-by-step instructions below:

1. Note the serial number of your AXIS 200 for future reference during the installation procedure. This is located on the underside label of the AXIS 200. Please note that the serial number of your AXIS 200 is identical to the Ethernet address of the unit.
2. Fasten the AXIS 200 to its tripod and position it appropriately for your application.

- Caution!**  Please note that the CCD (charged coupled device) within the AXIS 200 can become permanently damaged if the camera lens is exposed to too much direct sunlight! If your application demands prolonged exposure to sunlight, you should consider the purchase of a visor. Refer to the following link for further information:  
[http://www.axis.com/products/camera\\_servers/applic/housing.htm](http://www.axis.com/products/camera_servers/applic/housing.htm)
3. Connect your AXIS 200 to the network using an Ethernet 10baseT connector.
  4. Connect the power supply to the AXIS 200.
  5. Check that the Power indicator is constantly lit.

### Stage 4. Assigning an Internet Address and Host Name

Assign and download an Internet address and Host name for your AXIS 200. Refer to *Section 3 - Assigning an Internet Address*.

## Stage 5. Testing the AXIS 200

You are now ready to test the connection between your AXIS 200 and the network.

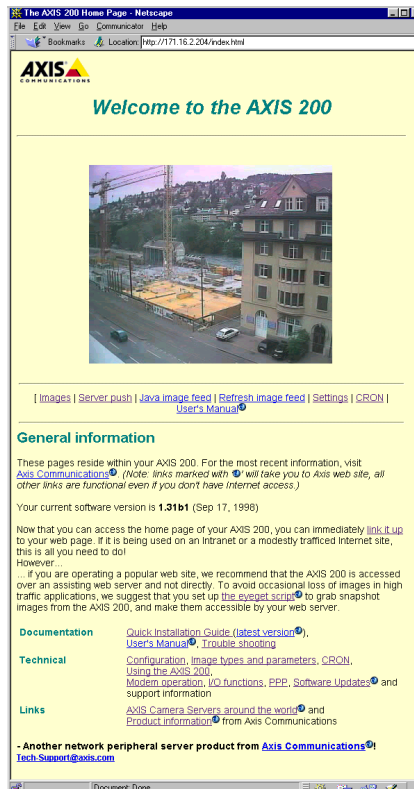
1. Start your Web browser.
2. Enter the name or Internet address of the AXIS 200 in the location/address field:

`http://cameraname/`

or:

`http://192.168.3.191/`

The Home Page of your AXIS 200 appears.





3. To further test your AXIS 200, take some more pictures. You can do this by simply reloading your Web browser.

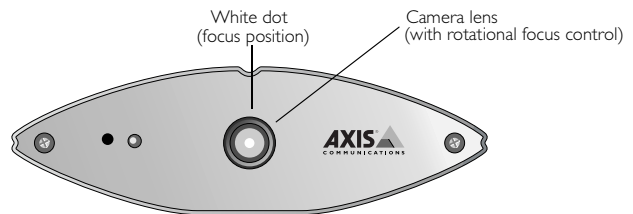
- Notes:**
- Server push and other automatic updating functions are described in *Automatic Picture Updates*, on page 37.
  - Web pages are kept locally for fast browsing and in some instances your AXIS 200 may display a cached image, as opposed to a newly taken snapshot. In these circumstances, we recommend that you reload your Web browser.

## Stage 6. Adjusting the Focus

The AXIS 200 has a lens with rotational focus control. To obtain a sharp picture, adjust the focus of your AXIS 200 by carefully turning the lens. A white spot on the lens assembly indicates the approximate focus position for the unit, when adjusted to a 12 o'clock position.

You can test the results of the adjustments you have made by taking some new pictures. To do this, simply reload your Web browser. If you are using Netscape Navigator, you can simultaneously monitor the changes to focus by clicking on the `Server push` link within the Home Page.

- Notes:**
- To correctly set the focus, you might need to turn the lens one or two full turns either clockwise or anticlockwise from the 12 o'clock position.
  - The lens assembly rotates on a conventional screw fitting and may be completely removed if taken to the end of its thread. You should not normally require to remove the lens, but should you have cause to do so, take care not to let any debris enter the lens as this will adversely effect the quality of your picture snapshots.



Front view

The installation is now complete and pictures may now be included into your own applications.

- Note:**
- To avoid the occasional loss of snapshot images, we suggest that you use the CRON script facility described in “*CRON Script*” on page 39.

## Section 3 Assigning an Internet Address

To enable access to your AXIS 200, you must first assign it an appropriate Internet address.

This section describes how to assign and download an Internet address for your AXIS 200.

### Downloading the Internet Address

You can set the Internet address of the AXIS 200 in three different ways, using either ARP, RARP or BOOTP. All methods are enabled by default. The main characteristics of each of these methods are described below:

- ARP** ARP is available in Windows 95, Windows NT, UNIX and OS/2. It requires the Internet address for each new device to be downloaded individually. It is not appropriate to use this method over routers.
- RARP** RARP is available in UNIX. It downloads the Internet address to each device automatically. It requires a RARP daemon on your system, and operates within a single network segment only.
- BOOTP** BOOTP is available in UNIX and is similar to RARP, although it can operate on the entire network. It requires a BOOTP daemon on your system. A request made to an active BOOTP or RARP daemon initiates a search of the Ethernet address table (RARP daemon), or boot table (BOOTP daemon) for an entry matching the unit's Ethernet address. If a matching entry is found, the daemon then downloads the Internet address to the device.

---

**Before you begin** Make sure the AXIS 200 is powered up and attached to the network.

**Internet Address** Acquire an unused Internet address from your Network Administrator.

**System Privileges** You will require *root* privileges on your UNIX system and *administrator* privileges on the Windows NT servers.

**Ethernet Address** Depending on the method you are using, you will need to know the Ethernet address of your AXIS 200. The Ethernet address is based upon the serial number found on the underside label of the unit.

**Important!**  Do **not** use the default or example Internet address when installing your AXIS 200. Always consult your Network Administrator before assigning an Internet address.

**Mapping a Host Name to the Internet Address** If you are using host names, you can map a unique host name to the acquired Internet address. Refer to your system manuals or to your Network Administrator for instructions on how to perform the name mapping on your particular system.

---

**Note:**  If the host name has not been included in the system host table, you can still perform the following instructions on how to download the Internet address. In this case, simply replace the host name entry with the Internet address wherever required.

Procedures

Choose one of the following methods to download the Internet address to your AXIS 200.

Using ARP in  
Windows 95 and  
Windows NT

Follow these instructions to download the Internet address and verify the communication.

Start a DOS window and type the following commands:

```
arp -s <Internet address> <Ethernet address>
ping <Internet address>
```

**Example:**

```
arp -s 192.168.3.191 00-40-8c-10-00-86
ping 192.168.3.191
```

The host will return 'Reply from 192.168.3.191 ...' or some similar message. This indicates that the address has been set and the communication is established.

**Important!**

*Windows 95 only:* if the ARP table is empty, you must first ping an existing unit on your network before setting the Internet address of your AXIS 200. Type `arp -a` to display the ARP table.

Note that if your AXIS 200 unit is connected to the Windows 95 client via a hub, without network connection to other devices, you must use the command `arp -s <Internet address> <Ethernet address> <client address>` where `<client address>` is the Internet address of your Windows 95 client.

- Note:**  When you execute the `ping` command for the first time, you will experience a significantly longer response time than usual.

Using ARP in UNIX and OS/2 Follow these instructions to download the Internet address and verify the communication.

Type the following commands:

```
arp -s <host name> <Ethernet address> temp  
ping <host name>
```

**Example:**

```
arp -s cameraname 00:40:8c:10:00:86 temp  
ping cameraname
```

The host will return 'cameraname is alive', or some similar message to indicate that the address has been set and the communication is established.

- Notes:**
- ❑ Please note that when you execute the ping command for the first time, you may experience a significantly longer response time than is usual.
  - ❑ The arp -s command may vary from system to system. Some BSD-type systems expect the host name and Ethernet address in reverse order, whereas IBM AIX systems require the additional argument ether. For example:

```
arp -s ether <host name> 00:40:8c:10:00:86 temp
```

Using RARP in UNIX Follow these steps to use the RARP method in UNIX:

1. Append the following line to your Ethernet address table. This is typically performed using the command `/etc/ethers:`

```
<Ethernet address> <host name>
```

**Example:**

```
00:40:8c:10:00:86 cameraname
```

2. If necessary, update your host table and alias name databases as described required by your system.
3. If it is not already running, start the rarp daemon. This is typically performed using the command `rarpd -a`
4. Restart the AXIS 200 to download the Internet address.

### Using BOOTP in UNIX

Follow these steps to use the BOOTP method:

1. Append the following entry to your boot table. This is typically performed using the command `/etc/bootptab`:

```
<host name>:ht=<hardware type>:vm=<vendor  
magic>:\  
:ha=<hardware address>:ip=<Internet address>:\  
:sm=<subnet mask>:gw=<gateway field>
```

where:

ht = ether  
vm = rfc1048  
ha = The Ethernet address of the AXIS 200  
ip = The Internet address of the AXIS 200  
sm = The subnet mask  
gw = The default router address

Example:

```
cameraname:ht=ether:vm=rfc1048:\  
:ha=00408c100086:ip=192.168.3.191:\  
:sm=255.255.255.0:gw=192.168.1.1
```

2. If necessary, update your host table and alias name databases as described required by your system.
3. If it is not already running, start the bootp daemon. This is typically performed using the command `bootpd`
4. Restart the AXIS 200 to download the Internet address, default router address, and subnet mask.



## Section 4 Configuring the AXIS 200

This section includes an overview of the AXIS 200 configuration parameters.

You can configure the AXIS 200 via hyperlinks from within its own web pages from any standard Web browser. Alternatively, you can configure the AXIS 200 using FTP.

Refer to *Appendix B - The Parameter List* for a full listing of the configuration parameters.

- Note:**  For the latest technical information, refer to the AXIS 200 web site at [http://www.axis.com/products/cam\\_200/](http://www.axis.com/products/cam_200/) .

## Configuring using a Web browser

To configure the AXIS 200, enter the name or Internet address into the location/address field of your Web browser:

`http://cameraname/`

or

`http://172.16.253.80/`

The Home Page for your AXIS 200 will be displayed:



On the AXIS 200 Home Page, click on the **Settings** link to reach the Configuration pages.

The configuration parameters are grouped into these pages:

- Image
- Date & Time
- Security
- TCP/IP
- Modem

**Note:**  When entering the configuration pages for the first time during a session, you will be prompted for username and password. Log on as user `root` and use the default password `pass`. You are recommended to change the root password, since all Axis products are shipped with the same password as default.

Image Page

To specify the default image settings, click **Image** at the top of the Configuration page.

The following is a description of the Image parameters:

Parameter name	Description
Rotation	Snapshots may be presented with a varied degree of rotation. The following settings are available: normal, upsidedown, 90 deg or 270 deg.
Mirror	Enables horizontal mirror images for your snapshots.
Color	The AXIS 200 currently provides three different color settings: none, less, or normal. When set to none, a black and white snapshot file is produced. The two other settings produce progressively colorful snapshots results.
Compression	Three different compression settings for your snapshots: high, medium or low. These settings determine the compression factor for the resulting JPEG image. Low compression produces an optimum picture quality, but creates larger snapshot file sizes.
White balance	The white balance is the reference color to which all other colors in an image are compared. These modes are available: Automatic, Fixoutdoor, Fixindoor and Freeze. See further description on page 30.
Brightness	Standard brightness parameter with a range setting of 0-9 and default value 5.

Contrast	Standard contrast setting that defines the color contrast for AXIS 200 snapshots. This parameter has a range setting of 0-9 and a default value 5.
Dark Detect	Generally, black and white image production provides better clarity during low light conditions. With the Dark Detect parameter set to on, the AXIS 200 will only generate black and white images once the level of light has reached a predetermined minimum threshold.
Image Cache time	A single snapshot image will be transmitted for multiple accesses of the AXIS 200 within the defined Image Cache time. This parameter may be varied between 0 - 999 seconds. The default value of zero causes the AXIS 200 to generate a new snapshot for each access.
Front panel LED	Enables the Snapshot indicator on the front panel of the AXIS 200.
Image Text Position x position y	Text to be displayed on the image at the position specified by the x and y coordinates.

- Note:**  If you use CGI parameters within a URL request, these parameters will override any settings defined within the Configuration - Image page. You will find further information on the CGI parameters on page 47.

Date & Time Page

You can set the current date and time via the Configuration - Date & Time Page. You reach the page by clicking **Date & Time** on the Configuration pages.

The following is a description of the Date and Time parameters:

Parameter name	Description
Date	The date is displayed in this format: day-month-year .
Time	The time is displayed in this format: hour:minute:second. The time must be set in 24 hour format, e.g. 5pm should be entered in the hour field as 17.
Datesync Server	To activate the integrated date and time synchronization mechanism, you must provide the Internet address of a date server, a synchronization period (in minutes) greater than zero, the synchronization protocol and time zone adjustment. The date server provides the actual time and date when connected to TCP port 13 (Daytime protocol), TCP port 37 (Time protocol) or UDP port 123 (NTP protocol). The date and time will be automatically updated in intervals as specified in the synchronization period field. Default values are 0.0.0.0, 0, Time and 0, respectively.
Datesync Period	
Datesync Protocol	
Datesync Time Zone	
Display Date/Time	An internal clock enables a time stamp to be superimposed upon the picture image. You may choose whether or not to display the date and time in your snapshots simply by selecting Yes or No from the Display Date/Time field.
Time format	The clock may be presented in either of the following formats: 24 hours or AM/PM.
Clock Position x	These settings determine where the date and time stamp will be placed within the snapshot. The date and time is always shown within the snapshot area, regardless of whether one or more of the clock co-ordinates are out of limit. Under such circumstances, the clock is displayed as close as possible to the furthest co-ordinate within the snapshot boundary.
Clock Position y	

Security Page

You may change the configuration password for your AXIS 200 via the Configuration - Security page. Click **Security** at the top of the Configuration pages.

The following is a description of the Security parameters:

Parameter name	Description
Root password	The password of the Administrator. When configuring the unit for the first time, log on as user <code>root</code> and use the default password <code>pass</code> . It is recommended that you change the root password later, since all Axis products are shipped with this password as default.
Username and passwords	The AXIS 200 is default to anonymous user access, which means that anybody on the Internet/intranet may access the pictures taken by the camera from a Web browser. Should you wish to restrict access to specific users, enter the user names and passwords of only those authorized users. If you are happy to provide an anonymous user service, simply do not add any users. Only characters a-z, A-Z or 0-9 are valid.

TCP/IP Page

You can set the IP parameters via the Configuration - TCP/IP page. Click **TCP/IP** at the top of the Configuration pages.

Parameter name	Description
IP Address	Defines the Internet address of the AXIS 200.
Node address	Defines the Ethernet address of the AXIS 200.
Default Router	Defines the default router for the AXIS 200. By default the parameter is set to automatic router search.
Net Mask	Defines the net mask for the AXIS 200. Used to determine when the traffic should be sent via a router. The default 0.0.0.0 indicates that automatic router sensing is used.
Primary DNS	The Internet address of the primary DNS server. Used for identifying computers with names instead of IP addresses.
Secondary DNS	The Internet address of the secondary DNS server, should the primary DNS server be unavailable or disconnected.
SMTP Mail Server	Name of the server that provides your e-mail facilities.
SMTP Return Address	The reply address for e-mails sent by the AXIS 200.
Enable BOOTP	Enables the BOOTP protocol for downloading the Internet address.
Enable RARP	Enables the RARP protocol for downloading the Internet address.

Modem Page

To enable a serial link to the AXIS 200, click **Modem** at the top of the Configuration page. This is needed if you want to transfer snapshots and configuration data via a connecting modem.

The following is a description of the Modem parameters:

Parameter name	Description
[Mode]	
Serial Mode	When set to Disabled, PPP or zmodem access is not available. When set to Full Support, serial mode is enabled for both incoming and outgoing modem connection. When set to Inbound only, the AXIS 200 answers incoming calls, but does not dial up. When set to Outbound only, the AXIS 200 dials up according to the behavior programmed in the cronscript, but does not answer incoming calls.
[Settings]	
Modem Type	Autodetected Modem or Null Modem.
Detected Modem	Set internally by the AXIS 200.
Modem Init String	String of setup commands to be sent to the modem. Used for non-US Robotics modems.
Busy Redial Attempts	Specifies how many additional attempts the AXIS 200 will make in order to establish a connection in case the line is busy.
Baud Rate	19200 or 38400 is recommended. When used with GSM/cellular phones, always set the Baud rate to 9600.
Dial Prefix	Specifies whether your modem is using tone dialing or pulse dialing. The default is Tone Dialing which is the most commonly used method.
Flow Control	Modem server operation mode. Always set to XON/XOFF.

To ensure that the new configuration is activated within the AXIS 200, you must reset the unit after the serial mode has been enabled.

To do this, remove and then re-insert the power connector.

Alternatively, type this command in the location/address field:

```
http://<cameraname>/hardreset/
```

- Note:**  Do not enable serial mode unless you intend to connect your AXIS 200 to a modem.

Refer to “*Setting Up the AXIS 200 Modem Server*” on page 78 for more information on how to connect the AXIS 200 to a modem.

## White Balance

White balance can be described as the reference color against which all other colors in an image are compared. In considering the operational aspects of the AXIS 200, the white balance is of particular importance. You set the white balance parameter on the Configuration - Image page.

The resident white balancing system within the AXIS 200 can automatically detect white colors in any image, and use these intelligently as a reference for other colors it views. In certain situations, this system will not operate effectively.

Generally, problems will occur if the viewed image does not contain any white color at all, or if the dominant color is something other than white. In such circumstances, the AXIS 200 might erroneously base the white balance on some other visible color in the scanned image. Consequently, the colors may become distorted. A pale background picture with foreground objects of an acute reddish or blue hue are symptomatic of this condition. If this is the case, it is best to operate the AXIS 200 in a fixed white balance mode.

**White balance modes** You can specify one of these white balance modes:

Mode	Description
Automatic	The AXIS 200 uses the dominant color in the scanned image as the white balance reference. This is the recommended mode.
Fixed outdoor	This provides a standard white balance setting that is normally suitable for outdoor use of the AXIS 200.
Fixed indoor	This provides a standard white balance setting that is normally suitable for indoor use of the AXIS 200.
Freeze	The AXIS 200 uses a fix white balance that you establish manually. See "Setting the white balance manually" on page 31.. Note that the setting will be lost when the AXIS 200 is powered off.



**Setting the white balance manually**

Follow these steps to set the white balance of the AXIS 200 manually:

1. Hold a white paper in front of the camera lens for at least one minute.
2. Press and hold down the Control button a few seconds until the Snapshot indicator starts to flash rapidly. The Control button is situated at the front of the AXIS 200.
3. Release the button.
4. Press the Control button again while the Snapshot indicator continues to flash. The Snapshot indicator should then stop flashing. The AXIS 200 saves the white balance setting a couple of seconds after you have pressed the button.
5. Confirm that the white balance has been set by clicking the Settings link from the AXIS 200 Home Page. The white balance settings should read Freeze.

The white balance is now fixed and your AXIS 200 is no longer dependent upon the prevailing light conditions. Note that the setting will be lost when the AXIS 200 is powered off.

- Note:**  Due to the multiple functionality of the Control button, you should not run a CRON script while setting the white balance.

## Configuring using FTP

The configuration parameters of your AXIS 200 can be modified using the File Transfer Protocol (FTP). FTP is supported in UNIX, Windows 95 and Windows NT environments.

### Modifying the configuration file

The instructions below describe how to modify the configuration file using FTP:

1. In a DOS or UNIX window, type `ftp cameraname`, where `cameraname` is the Internet address or host name of your AXIS 200 specified in your Web browser.
2. Login using the user `root` and the root password. Default password is `pass`. You are highly recommended to change the root password, since all Axis products are shipped with this password as default.
3. If you are using an operating system other than Windows 95, proceed directly to the next step. In Windows 95, you must change directory not to overwrite any of your system files.
4. Use the `get config` to access the configuration file.
5. Edit the `config` file using any editor. In Windows 95 and Windows NT environments, you can use the Notepad editor to edit the parameters you wish.
6. Once the editing is complete, save the file as `config`. Type `put config CONFIG` to save the configuration file permanently. Note that if the last uppercase `CONFIG` is omitted, the file will only be stored temporarily until the next time the product is powered off.
7. To exit FTP, type the command `quit`, `bye`, or similar.

**Caution!**  Windows 95 has a library called 'config' that contains important system files. It is therefore important to change this directory using the `cd/` command before modifying your AXIS 200 configuration file from within a Windows 95 environment. Failure to do this may result in some of your system files to be overwritten.

## Section 5 Using the AXIS 200

After installing the AXIS 200 and assigning it with an appropriate Internet address, you are ready to begin using it in your own applications.

This section describes how to use the AXIS 200 effectively to realize its full potential, including:

- **Snapshots** - Taking snapshots of various formats and including them on your own web pages
- **Automatic picture updates** - Using the Server push, Java image feed and Refresh image feed functions
- **External web sites** - Using snapshot files on the Internet
- **CRON script** - Triggering the AXIS 200 by time or input events
- **CGI parameters** - Defining special snapshot features and input/output operations within embedded URL requests
- **Point to Point Protocol (PPP)** - Accessing the AXIS 200 remotely over a serial link
- **Zmodem** - Downloading snapshot images to remote computers using standard modem equipment

## Snapshots

Throughout this manual, a picture image generated by the AXIS 200 is referred to as a snapshot. The following information describes how to take a snapshot and also defines the various types of snapshots file that can be produced.

### Taking Snapshots

For each snapshot taken a JPEG file is created and stored within the internal memory of the unit.

#### Home Page Snapshots

To produce a snapshot that is presented within the AXIS 200 Home page, simply enter the chosen Internet address or Host name of your unit into the URL of your Web browser. This initiates a camera access to produce a fullsize JPEG image.

#### Example:

```
http://192.36.253.80
```

This causes the AXIS 200 to generate a fullsize JPEG image. Each time you reload the page, a new snapshot is displayed within the AXIS 200 Home Page.

#### Clean Snapshots

To generate clean snapshots that are not embedded within the AXIS 200 Home Page, you must specify the preferred snapshot type for the target JPEG file within the URL of your Web browser. Snapshots can be created in different file sizes, e.g. fullsize, halfsize etc.

#### Examples:

```
http://192.36.253.80/fullsize.jpg
```

```
http://192.36.253.80/halfsize.jpg
```

Snapshot Files Sizes

You can adjust the size and appearance of your snapshots, ranging from small, highly compressed to large, high-quality images.

The file size depends on several factors. Low compression and large images result in larger files, but higher quality. Images with a lot of detail will also generate larger files.

These snapshot types are available within your AXIS 200:

File name	Size (pixels)	Description
fullsize.jpg	352 x 288 (30 kBytes)	The standard resolution. Hardware generated in 0.5 seconds.
halfsize.jpg	176 x 144 (15 kBytes)	Excellent for thumbnails. Hardware generated in 0.3 seconds.
lastshot.jpg	352 x 288 or 176 x 144	The last snapshot taken, either a 'fullsize' or 'halfsize' snapshot. Primarily intended for software applications for archiving a buffered image.
hugesize.jpg	704 x 576	The highest resolution snapshot available. As opposed to the 'fullsize' and 'halfsize' images, the 'hugesize' image is software generated which takes about 18 seconds.
zoom.jpg	352 x 288	A cutout from the center of 'hugesize'. It takes about 8 seconds to generate.

### Using Snapshots in Web Pages

---

Follow these steps to integrate live snapshots into your own web pages:

1. Create your web page using your preferred HTML creation tool, i.e. an ordinary text editor, or a dedicated HTML design application, such as Microsoft Internet Assistant, Front Page, Adobe PageMill, etc.
2. In your Web browser, enter the name or Internet address of your AXIS 200 together with the preferred snapshot type.

#### Example

```
http://cameraname/fullsize.jpg
```

3. Add an HTML reference to the snapshot within the target web page.

#### Example

```
<HTML>
<HEAD>
<TITLE>Sample page</TITLE>
</HEAD>
<BODY>
<H1>Welcome to Axis Web camera demo</H1>
<IMG ALT="Fullsize JPEG Image"
SRC="http://cameraname/fullsize.jpg"
WIDTH=" 320" HEIGHT="240">
</BODY>
</HTML>
```

Each time anyone visits this page, a new fullsize snapshot will be generated and displayed in the Web browser.

## Automatic Picture Updates

The AXIS 200 supports three methods for automatic picture updates, namely:

- Server push
- Java image feed
- Refresh image feed

These are available from links on the AXIS 200 Home Page.

**Server Push** The Server push function pushes new snapshots into your Web browser continuously.

The frame rate depends on how fast the AXIS 200 can deliver the snapshot data over the available network bandwidth. Therefore, you cannot adjust the frequency of the Server push snapshots within your Web browser.

In order to limit the memory overhead that this facility demands, a maximum number of 5 clients can simultaneously activate a Server push link to the same camera. Once this client threshold has been exceeded, a single snapshot image is produced for all additional clients that are trying to activate the link.

**Note:**  The Server push function is currently supported by Netscape Navigator only. However, you can download an ActiveX component from the AXIS 200 web site that will provide the same function.

**Java Image Feed** This function is implemented within a Java applet that can be started from anywhere on the network. The refresh rate is programmable.

**Refresh Image Feed** This function instructs your Web browser to collect a new snapshot at a programmable rate. It is supported by most standard Web browsers.

**Note:**  To terminate the automatic picture updating, you can click Stop or enter another URL in the location/address field.

## External Web Sites

When using the AXIS 200 over the Internet, we recommend that it is accessed over an assisting web server and not directly. This is because the AXIS 200 has limited capacity for handling the extra amount of buffering that might be required.

**Note:**  You can use the CRON script facility to collect snapshots periodically. See “*CRON Script*” on page 39.

If your web site does not have heavy traffic, it is possible to use the URL directly to the AXIS 200. However, this has three main drawbacks:

- Your AXIS 200 may be located on the other side of a firewall.
- The AXIS 200 cannot handle more than 5 simultaneous requests.
- Generating large files, such as the `hugesize.jpg`, is very time consuming. If used with a CRON script, the delay will not be noticed.



## CRON Script

Axis has developed an extended CRON service to facilitate periodic command execution. In practice, the CRON service allows you to program event and/or time triggered functions within the AXIS 200.

### Script Format

From the AXIS 200 Home Page, you can access an on-line editor for generating the CRON script file. Alternatively, you can use a common text editor and download the file via FTP.

A CRON script can include one or several entries. Each entry is composed of the following elements:

- Comment(s)
- A trigger condition
- Command(s)
- An entry termination character %

**Note:**  Only one CRON script can be resident within the AXIS 200 at a time.

A typical CRON script construction is detailed below:

```
# <comment> (first entry)
  <trigger condition> :
    <command 1> ;
    <command 2> ;
    .
    .
    .

%
# <comment> (second entry)
  <trigger condition> :
    <command 1> ;
    <command 2> ;
    .
    .
    .

%
# <comment> (...nth entry)
  <trigger condition> :
    <command 1> ;
    <command 2> ;
    .
    .
    .

%
```

CRON Script Construction

---

### Comments

It is good programming practice to start each new entry with a comment to describe its function. Comments are optional but must be preceded by a # character, as detailed below:

```
# <comment>
```

**Example:**

```
# This cron entry will...
```

Trigger Condition

The commands contained within each specific entry are triggered by a defined trigger condition. The trigger condition is specified by six separate fields and must be terminated with a colon “:”.

```
<Minute> <Hour> <Day> <Month> <Day of the week>
<Input and Boot (optional)> :
```

**Time and Date  
Event Fields**

The first five fields specify the time and date events, i.e. Minute, Hour, Day, Month and Day of the week.

The syntax for each field within a trigger condition is governed by the following rules:

- Each time and date field can contain several numerical event variables that are delimited by commas and hyphens.
- Each field is delimited by an open space.
- An asterisk (\*) represents the full range of event variables within the relative time and date field, i.e. \* \* \* \* \* means every minute, every hour, every day, every month, every day of the week.
- Numerical event variables separated by a hyphen indicates an inclusive range, i.e. 2-6 means 2 to 6.

**Example:**

Trigger every month, between the fourth and eighth at 10.03, 12.03 and 14.03, using the 24 hr clock:

```
3 10,12,14 4-8 * * :
```

**Input and Boot Field** The sixth field is an optional Input and Boot field that defines the input and boot trigger functions.

You can program the AXIS 200 to trigger at startup or on the logical states present on the Control button and digital input ports, using the trigger variables `boot`, `B`, `I1` and `I2` respectively. The `B`, `I1` and `I2` trigger variables must be preceded by an activate condition, `/`, `\`, `0` or `1`, to indicate when the trigger variable is activated.

This table outlines the available trigger variables and their possible conjugation:

Trigger Variable	Description
<code>boot</code>	Activate at startup
<code>\B</code>	Activate after high-low logical transition of Control button
<code>/B</code>	Activate after low-high logical transition of Control button
<code>1B</code>	Activate when Control button is logically high (pressed)
<code>0B</code>	Activate when Control button is logically low (released)
<code>\I1</code>	Activate after high-low logical transition on Input Port 1
<code>/I2</code>	Activate after low-high logical transition on Input Port 2
<code>I11</code>	Activate when Input Port 1 is logically high
<code>OI2</code>	Activate when Input Port 2 is logically low
... etc.	

**Note:**  The AXIS 200 polls the input ports every 0.2 seconds. Thus, more rapid logical transitions will not be detected.

By conjugating the trigger variables using a logical AND function (`&`), you can develop complex triggering mechanisms.

#### Example 1

Activate on Control button transition from high to low and Input port 1 high.

```
\B&1I1
```

**Example 2**

Activate on Input port 1 low and Input port 2 transition from low to high.

```
0I1&/I2
```

**Triggering Fields Summary**

This table summarizes the valid values of the triggering event fields:

Field #	Time and Date Fields					Input and Boot Field (Optional)
	1	2	3	4	5	6
<b>Description</b>	Minute	Hour	Day	Month	Day of the Week	Conditional Tag
<b>Valid values</b>	* 0-59	* 0-23	* 1-31	* 1-12	* 0-6 0 = Sunday	boot B I1, I2

**Commands**

Several CRON script commands can be used within an entry. All commands must be terminated with a semi-colon “;”.

This table lists the available commands:

Command	Description
alert	Sends a message to a remote host.
ftp	Transfers an image to a remote host using FTP.
mail	Sends an e-mail using the Simple Mail Transfer Protocol (SMTP).
offline	Terminates the current PPP connection.
online	Dials up a modem for PPP connection.
reset	Resets the software or hardware of the unit.
sleep	Makes a pause in the CRON script execution.
snapshot	Updates the last snapshot image.

**Syntax** The syntax of the commands is defined below:

```
alert    [-host HOST] [-port PORTNUMBER]
         [-message STRING];
```

```
ftp    [-host HOST] [-user USERNAME] [-pass PASSWORD]
       [-src SOURCEFILE] [-dest DESTINATIONFILE]
       [-temp TEMPORARY_DESTINATIONFILE]
       [-loop LOOPTIME] [-time TOTALTIME];
```

```
mail   [-s SUBJECT] [-a ATTACHMENTS]
       [-t RECIPIENTS];
```

```
offline    ;
```

```
online   [-dial NUMBER] [-user USERNAME -pass
          PASSWORD] [-timeout TIME]
          [-script "word_1 word_2 ... "];
```

```
reset   [-soft | -hard];
```

```
sleep   [TIME];
```

```
snapshot [-l LOOPTIME] [-t TOTALTIME]
          [FILE];
```

- Notes:**
- ❑ For more details on the CRON script command options, refer to the *Appendix H - CRON Script Command Reference*.
  - ❑ Although the downloaded entries are effectively executed in parallel, the commands included within each entry are executed sequentially, i.e the second command is not executed until the first is finished.

Sample CRON Script

This example shows how several entries can be programmed into one CRON script:

```
# This is an example of an Axis extended CRON script:

# Once a day I want my mother to receive an e-mail
# containing the lastshot.jpg image.
0 0 * * * * :
mail -s "Hi mom! Look what my little camera has taken
for you." -a lastshot.jpg -t mother@some.site;
%

# This, the second entry will store a fullsize image
# using ftp on the ftp server an.ftp.site in
# /home/snapshots when input 1 goes high.
* * * * * /11 :
ftp -host an.ftp.site -user aUser -pass aPass -src
fullsize.jpg -dest home/snapshots;
%

# This, the third entry will dial up an ISP and store
# an image on the ftp server an.ftp.site every
# hour. It will then disconnect.
0 * * * * :
online -dial aNumber -user aUser -pass aPass;
ftp -host an.ftp.site -user aUser -pass aPass -src
fullsize.jpg -dest home/snapshots;
offline;
%
```

Downloading the CRON Script

These instructions describe how to download a CRON script, e.g. cron.txt, to the AXIS 200 using FTP:

1. Start an FTP session and log in as root, using the root password.
2. Set FTP to binary mode, using the command bin.
3. Download the script using the command  
put cron.txt cronscript

FTP will indicate "File transfer complete" or similar when the file transfer is complete. The CRON script becomes active within one minute after it has been downloaded to the AXIS 200.

**Example:**

```
C:\Temp>ftp 171.16.3.30
Connected to 171.16.3.30.
220 AXIS NetEyeV1.30a2 Nov 6 1997 ready.
User (171.16.3.30:(none)): root
331 User name ok, need password
Password:
230 Root user logged in
ftp> bin
200 TYPE set to I.
ftp> put cron.txt cronscript
200 PORT command successful.
150 Opening data connection for cronscript
(171,16,4,70,4,6), (mode binary).
226- Compilation OK
    Events initiated
226 File transfer complete
112 bytes sent in 0.00 seconds (112000.00 Kbytes/sec)
ftp> quit
221 Goodbye.
```

**FTP session downloading a CRON script**

- Notes:**
- Only one CRON script can be resident within the AXIS 200 at a time. Active entries contained in any previously downloaded CRON script are stopped and automatically erased from memory once a new script is installed.
  - An erroneous CRON file will not be accepted by the AXIS 200 and consequently will not erase a previously loaded script.



## Common Gateway Interface (CGI)

A CGI program within the AXIS 200 allows users to define special snapshot features within an embedded URL request. These requests are generated in the form of a query strings that are appended to the chosen URL of your AXIS 200.

### Example

```
http://cameraname/fullsize.jpg?clock=on&rotation=270deg
```

The URL above requests a fullsize JPEG snapshot from the AXIS 200 cameraname. The embedded CGI query string `?clock=on&rotation=270deg` denotes that the image should contain a clock reference and be rotated by 270 degrees.

### CGI Parameter Summary

This table summarizes all available CGI parameters:

Parameter/ Syntax	Description	Values
Compression/ compression=<value>	Adjusts the image quality and file size.	medium/high/low
Color/ color=<value>	Selects color or grayscale image	normal/none
AXIS Logo/ axislogo=<value>	Shows/hides the Axis logotype.	off/on
Clock/ clock=<value>	Shows/hides the timestamp	
Dark detect/ dark detect=<value>	Generates gray-scale images in low light conditions	off/on
Rotation/ rotation=<value>	Rotates the image.	normal/upsidedown/90deg/ 270deg
Mirror/ mirror=<value>	Mirrors the image horizontally	off/on
Cropping/ top=<value> &left=<value> &width=<value> &height=<value>	Crops a 'hugesize' type image	Parameter values expressed in number of pixels and truncated to multiples of 8 (45 is truncated to 40)  Top+height must not exceed 576 pixels (hugesize height).  Left+width must not exceed 704 pixels (hugesize' width).

#### Summary of CGI the available CGI parameters

Click on the Image types and parameters link within the Home Page of your AXIS 200 for further details and sample images.

- Note:**  CGI parameters embedded in URL requests override image parameters previously established within the Configuration - Image page.

## Point to Point Protocol (PPP)

The AXIS 200 supports the Point to Point Protocol (PPP) which is a mechanism for creating and running the Internet Protocol and other network protocols over a serial link. This can be either:

- a direct serial connection that uses a null-modem cable, or
- a connection established using modems and telephone lines (including digital lines such as ISDN).

PPP can transport any IP based protocol and allows the AXIS 200 to be remotely accessed almost as if it were directly connected to the network. However, the major difference between PPP and an Ethernet connection is of course speed. A standard Ethernet connection operates at 10 Mbps (maximum theoretical throughput), whereas an analog modem only operates at speeds up to 56 kbps.

### PPP Setup for Windows 95

---

Follow these instructions to configure PPP from a Windows 95 host:

1. Connect the remote modem to the serial port of the AXIS 200 (US Robotics modem recommended).
2. From the Windows desktop, double click on the **My Computer** icon and then open **Dial-Up Networking**.
3. Double click on **Make New Connection**. From within this dialog, define a name that describes the connection you are creating in the 'Type name for the computer you are dialing' field. Select a local modem from the displayed modem list.
4. Click **Configure...** to open the Modem Properties dialog box. Accept all default settings but ensure that modem speed is compatible with your modem and does not exceed 38,400 bps, which is the maximum serial port speed for the AXIS 200.
5. Click the **Connection** tab and then click **Advanced...** Check 'Use flow control' and select Software (XON/XOFF). Click **OK** to return to the 'Make New Connection' dialog.
6. Enter the relevant phone number information for the remote modem connected to your AXIS 200. Click **Next**.

7. Click **Finish**. The system then proceeds to build the Driver information database and your connection dialog will then subsequently appear in the Dial-Up Networking dialog.

### Accessing the remote AXIS 200

Follow this procedure to dial out to a remote AXIS 200.

1. Double click on the newly created icon to establish a modem connection for your remote AXIS 200.
2. Enter your username and password and then click **Connect**. The status dialogs "Dialing" and "Logging onto the network" are presented prior to the display of a Connected to <name> dialog that will confirm a successful connection.

You can now access the AXIS 200 by entering the name or Internet address (URL) into the location field of your Web browser. Please ensure that you are not using a proxy server (Netscape: Options menu>Select Network\Proxies)

### PPP Setup for Linux

Follow these instructions to connect a Linux host to the AXIS 200 to your network using PPP:

1. Create a file containing the following lines:

```
ABORT BUSY ABORT 'NO CARRIER' '' ATDT<phone  
number> CONNECT
```

2. Save the file as `.DIAL_AXIS200` within the `root` home directory. This script dials out to <phone number> and then waits for a connection before proceeding to the PPP negotiation phase.

3. To open the connection, enter:

```
pppd connect '/usr/sbin/chat -f DIAL_AXIS200'
115200 /dev/modem

or,

pppd connect '/usr/sbin/chat -f DIAL_AXIS200'
:172.16.3.219 115200 /dev/modem
```

The latter variation on this command causes the AXIS 200 to temporarily have the Internet address 172.16.3.219. If an address is not specified, as displayed in first form of this command, the unit will then use its default address that was previously assigned using the `arp` command.

**Note:**  Please note that you will probably have to be `root` user to establish the connection. The modem will try to connect and the PPP process will then fork off into the background. A shell prompt will be returned immediately. You may suppress this behavior by giving the switch `-detach`.

4. After approximately 20 seconds, the connection should be ready for service. You should then try pinging the AXIS 200, and make sure that it is online. The ping response times should be similar to those below:

```
64 bytes from 172.16.3.219: icmp_seq=0 ttl=15
time=197.0 ms

64 bytes from 172.16.3.219: icmp_seq=1 ttl=15
time=180.0 ms
```

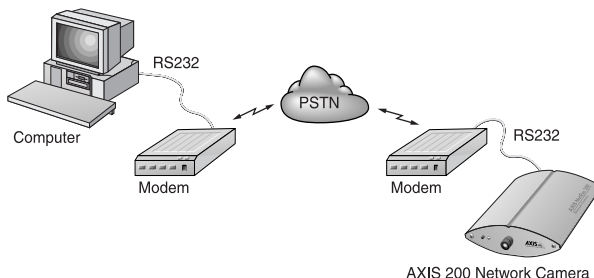
5. Type the following to terminate the connection:

```
kill -TERM `cat /var/run/ppp0.pid`
```

## Zmodem

### Modem Connection

By connecting the AXIS 200 to a modem as detailed below, it is possible to download snapshot images to remote computers using standard modem equipment.



#### Configuration of the serial port for modem connection

Snapshot data and configuration data may be transferred over the serial link using the zmodem protocol. This protocol is supported by most UNIX and PC/Mac communications packages.

### File Transfer

To initiate a file transfer, simply type the `sz` command followed by the filename of file you wish to transfer, as follows:

```
sz fullsize.jpg
```

Many communication packages allow automatic download of snapshot files, i.e. the program will detect the file transfer starting, and then proceed to take care of it. However, should your communications package not support this, you will need to manually select 'receive zmodem' (or similar) from within the program.

A successfully transferred snapshot file is in JPEG compressed image format, which is precisely the same as if the picture were saved from within a browser. Consequently, the downloaded file is an identical copy of a snapshot representation held within your AXIS 200 file system.

- Notes:**
- ❑ Before files can be transferred from your AXIS 200, the host and remote modems must be configured correctly. Refer to *Appendix E - The Auxiliary IO Port* for further details.
  - ❑ A typical zmodem session is displayed on page 85.





# Appendix A Troubleshooting

This appendix describes some of the common problems that AXIS 200 users have experienced previously and aims to provide useful information that will help you resolve any difficulty you may have, as expediently as possible.

Symptoms, possible causes and remedial actions are listed within a reference table and references to other information sources are also discussed.

## The Log File

The AXIS 200 log file records all commands executed within the unit and can prove a useful diagnostic tool when attempting to resolve any problems that might occur.

If you cannot resolve your problem after referencing the information contained in this appendix and on the AXIS 200 FAQ, we suggest that you send the following to the AXIS support desk:

- A brief description of the problem
- The log file
- The config file
- If relevant, an example of a poor image

### Obtaining the File

To obtain a copy of the log file, simply type the following command into the URL of your Web browser:

```
http://<cameraname>/log/messages
```

Examining the File

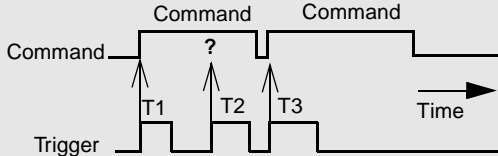
The file can be examined directly using any text editor and would typically contain information as detailed below:

```
Wed Nov 5 15:12:18 Info: BOOT
Wed Nov 5 15:12:36 Warning: Modem failed to
acknowledge hangup.
Wed Nov 5 15:12:48 Warning: Modem not responding
at 9600 BPS.
Wed Nov 5 15:12:56 Warning: Modem failed to
acknowledge hangup.
Wed Nov 5 15:13:01 Info: Modem ready for incoming
calls.
Wed Nov 5 15:13:16 Info: SMTPC.exec, trying to
connect to (193.13.178.2)
Wed Nov 5 15:13:24 Info: SMTPC.exec, mail sent
Wed Nov 5 15:13:34 Error: FTPC.exec, failed to
put
"tmp/fullsize151320.jpg", (def)
```

Typical AXIS 200 Log File

## Symptoms, Possible Causes and Remedial Actions

Symptoms	Possible causes	Remedial actions
The AXIS 200 cannot be accessed from a Web browser.	The Internet address is already used.	<p>To check that the Internet address for your AXIS 200 is unique:</p> <ol style="list-style-type: none"> <li>1. Start a DOS window.</li> <li>2. Type <code>ping x.x.x.x</code>, where x.x.x.x is the Internet address of the AXIS 200.</li> </ol> <p>The reply subsequently returned will provide some explanation as to the cause of the problem. The possible replies can be interpreted as follows:</p> <p><code>bytes = 32 time = 2 ms.....</code>                      The Internet address is already used and cannot be used again. Obtain a new Internet address.</p> <p><code>destination host unreachable</code>                      The AXIS 200 is not within a reachable network node. Obtain a new Internet address.</p> <p><code>request timed out</code>                      This Internet address is not in use by anyone and is available for use with your AXIS 200.</p>
	The Internet address is located within a different subnet.	<p>In Windows 95 or Windows NT, check that the Internet address for your AXIS 200 is within the same subnet as your workstation by following these steps:</p> <ol style="list-style-type: none"> <li>1. Click "Start", "Settings", "Control Panel" and "Network".</li> <li>2. Specify the TCP/IP adapter and click on "Properties". In Properties, click "IP Address".</li> </ol> <p>Check that the first 3 numbers within the Internet address of your AXIS 200 matches the first 3 of your workstation. If not, your AXIS 200 is in a different subnet and the Internet address cannot be set from this workstation. Obtain a new Internet address.</p>
	In Windows 95, the ARP table was empty when you tried to set the Internet address.	<p>In Windows 95, the ARP command cannot be used if you have an empty ARP table.</p> <p>Type <code>arp -a</code> to view the ARP table. If it is empty, you must ping an existing unit on your network before you can download the Internet address to the AXIS 200 using ARP.</p>

Symptoms	Possible causes	Remedial actions
The Power indicator is not constantly lit, or the Net indicator is not flashing randomly.	Faulty cabling.	To verify that the cables work, ping the address of a known existing unit on your network.  If the cabling is OK and your network is reachable, you should receive the following reply: ...bytes = 32 time = 2 ms, or something similar.
The Snapshot and Net indicators are flashing every 0.5 seconds	Hardware failure.	Contact your Axis dealer.
Your AXIS 200 works locally, but not externally.	Firewall protection	Check the Internet firewall with your system manager.
	Default routers required	Check whether you need to configure the default routers settings.
	The Internet site is too heavily loaded.	Use a script running on your web server to relay images from the AXIS 200 to the Internet. This is particularly important when generating zoom and hugesize images.
No image using Refresh and/or  Slow updating of snapshots using Server Push	Complex images, i.e. those containing great picture contrasts, have greater filesize and thus place greater demand on the available file space within the AXIS 200.	The memory constraints become significantly more acute if the same snapshot is accessed by multiple clients.  Try limiting the number of clients.
Triggering Difficulties with CRON scripts	Unable to triggering on both positive and negative transitions of the Control Button and/or IO (double-edged triggering).	Repetitive trigger conditions occurring in quick succession of one another, maybe missed. This is because the command initiated by the first trigger event may not have been fully executed prior to the second event occurring. This scenario is demonstrated in the illustration below:   <p>This feature has particular significance when using commands that take a relatively long time to process, e.g. email, ftp, especially if they are conjugated with a loop statement. See also page 92.</p>

Symptoms	Possible causes	Remedial actions
Cannot access the modem connected to the serial port of the AXIS 200.	Modem not set for XON/XOFF Local echo not disabled	Ensure that the modem is set for XON/XOFF serial communication (note that CTS/RTS handshaking is not supported) For US Robotics modems this is done using the command AT&I1.  Disable Local echo mode using the command is ATE0.  Save the changes in the NVRAM of the modem using the command AT&W.
A series broad vertical white lines appear across the image.Gray image in bright day light conditions.	The CCD sensor becomes overloaded when the light is too bright.	Turn the AXIS 200 in a direction to avoid sun light reflexes.  Try adjusting the Brightness parameter. If this does not help, you need an optical gray filter which reduces the light by e.g. 10 %.
Inferior picture definition in strong sunlight.	When focusing the camera on panoramic views, particular care should be taken with both the White Balance setting and the physical location of the camera. This is because the AXIS 200 functions much the same as an ordinary camera in these circumstances, where too much light entering the camera produces an over-exposed image.	Avoid pointing the camera directly into the sunlight. In sensitive locations it may be worthwhile installing a sun filter or shield for your camera. Attention to the White Balance setting is also highly recommended.  The AXIS 200 produces good definition of images in twilight darkness. By using the camera in automatic mode a good quality picture is achievable even in relative darkness.  <b>Caution !</b>  The CCD (charged coupled device) within the AXIS 200 may become damaged permanently if the camera lens is exposed to too much direct sunlight.
Noisy snapshots.	If you use the AXIS 200 in a low light environment the image might be noisy.	To resolve this problem, you effectively need to get some more light into the camera. The performance of the AXIS 200 is best in 100-1.000 lux.
Bad focus.	Focus is not adjusted correctly	Adjust the focus of the camera by turning the lens carefully until you get a sharp image. Normally, the white dot on the lens should be at the 12 o'clock position. If this does not help, rotate the lens a full turn, and check again.
Bad snapshot images.	White balance set incorrectly.	Refer to page 30 for information on how to set the White balance.
	Display configured incorrectly.	Within Display Properties, configure your display to show at least 65'000 colors, i.e. at least 16-bit.  Using only 16 or 256 colors on your computer will produce dithering artifacts in the image.

Symptoms	Possible causes	Remedial actions
Reduced image quality for distant objects.	Generally, objects at close-to-medium proximity of the AXIS 200 will appear with a high image quality. More far-distanced objects are however displayed with less detail when taking a panoramic view of surrounding landscapes.	This is an optical phenomenon that is common in all cameras. However, further attention to the White Balance setting may pay dividends in improving the quality of long range views generally.  Refer to page 30 for information on how to set the White Balance.
Gray image	The CCD sensor gets overloaded if the light is too bright. This can happen e.g. in bright day light conditions.	Adjust the Brightness parameter. If this does improve the image you may need use an optical gray filter which reduces the light to e.g. 10%.
Wrong colors	The camera adjusts its brightness and its colors automatically and can take up to several minutes for the camera to adjust.	Wait a couple of minutes and check the image again.
	Brightness parameter	Modify the Brightness parameter. Refer to <i>"Image Page"</i> on page 25 and try using the default value.
	White Balance parameter	Try changing the White Balance parameter. Refer to <i>"White Balance"</i> on page 30.

# Appendix B The Parameter List

This appendix contains a listing of the AXIS 200 configuration parameters and also describes how to restore the factory default settings for the unit.

## The Config File

This table shows the AXIS 200 parameter list. The left and middle columns show the parameter names and their default values as they appear in the config file. The right column contains brief descriptions of the parameters.

Parameter name	Value	Description
CONFIG MENU		
NODE_ADDR.	= 00 40 8c 18 00 86	Node address. Use when the unit is configured. Cannot be changed.
ROOT_PWD.	= PASS	Root password. Always change the default password.
USERS.	=	User names and passwords of users that are authorized to access the pictures taken by the AXIS 200. If empty, all users have full access.
TCP/IP MENU		
TCP_ENB.	= YES	Enables the TCP protocol.
INT_ADDR.	= 0.0.0.0	The AXIS 200 Internet address.
DEF_ROUT.	= 0.0.0.0	All traffic directed outside the local network (according to the NetMask) is sent to the default router. Any re-routing via other routers is done automatically. The default 0.0.0.0 indicates that no default router is set.
DNS_ADDR.	= 0.0.0.0	The Internet address of the DNS server:identifying computers with names instead of IP addresses.
MAIL_SERVER_ADDR.	= 0.0.0.0	Name of the server that provides e-mail facilities.
RETURN_PATH.	=	The reply address for e-mails sent by the AXIS 200.
NET_MASK.	= 0.0.0.0	Used to determine when the traffic should be sent via a router. For example the normal class C mask is 255.255.255.0. The default 0.0.0.0 indicates that automatic router sensing is used.
BOOTP_ENB.	= yes	Enables BOOTP Internet address setup.
RARP_ENB.	= yes	Enables RARP Internet address setup.

Parameter name	Value	Description
Camera specific parameters		
LOGO_X.	= 10	Axis logo position in pixels, the horizontal coordinate.
LOGO_Y.	= 10	Axis logo position in pixels, the vertical coordinate.
LOGO_SHOWN.	= NO	Enables Axis logo display.
CLOCK_X.	= 1	Clock position in pixels, the horizontal coordinate.
CLOCK_Y.	= 1	Clock position in pixels, the vertical coordinate.
CLOCK_SHOWN.	= NO	Enables clock display.
CLOCK_MODE.	= AM/PM	AM/PM or 24 hours time format.
Image appearance parameters		
COMPRESSION.	= MEDIUM	Determines snapshot compression and consequently file size.
BRIGHTNESS.	= 5	Brightness control.
COLOR.	= NORMAL	Color control.
WHITE_BALANCE.	= AUTOMATIC	Control the white balance settings.
CONTRAST.	= 5	Contrast control.
LIGHT_FRONT_LED.	= YES	Enables Snapshot indicator.
ROTATION.	= NORMAL	Snapshots can have varied orientation.
MIRROR.	= NO	Enables mirroring of image from right to left.
CACHE_TIME.	= 0	Determines maximum cache period for snapshots, e.g the same snapshot will displayed for all requests within a 3 seconds period.
DARKDETECT.	= NO	Enables black and white image generation for improved clarity during low light conditions.
System Parameters		
MODEM_TYPE.	=	Autodetect Modem or Null Modem.
SERIAL_MODE.	= DISABLED	Enables serial mode for ppp or zmodem access when set to Full_Support, Inbound Only or Outbound Only.
SERIAL_BAUD.	= 9600	Baud rate.
SERIAL_FLOW.	= XON/XOFF	Modem server operation mode.
MODEM_INIT.	=	String of commands to be sent to the modem for setup. Used for non-US Robotics modems.
BUSY_REDIAL.	= 0	Specifies how many additional attempts the AXIS 200 will make to establish a connection in case the line is busy.
TIME.	=	The current time.
DATE_SERVER.	= 0.0.0.0	Internet address of the server that provides the actual time and date.
DATESYNC_PERIOD.	= 0	The date and time will be automatically updated according to the specified intervals.
DATESYNC_PROTOCOL.	= TIME	The synchronization protocol used. Time (serial port 37), Day-time (serial port 13) or NTP (UDP port 123).
DATESYNC_TIME_ZONE.	= 0	The time zone adjustment as number of hours +/- UTC.



Parameter name	Value	Description
TIMEADJ_WEEK.	= 0	The time adjustment per week. Valid range is 0 to (-)32000 seconds.
WATCHDOGTIME.	= 12000	Do not change. Performs a hard reset if the server has reached a deadlock.
INDEX_FILE.	= INDEX	

## Factory Default Settings

If you should need to reset the AXIS 200 to its factory default settings, you can use the Control button. Follow these steps:

1. Switch off the AXIS 200 by unplugging the power cord.
2. Press and hold the Control button while you switch on the AXIS 200. Keep the Control button pressed until the Snapshot indicator flashes at regular two second intervals.
3. Release the Control button and wait at least two seconds (one flash of the Snapshot indicator).
4. Press and hold the Control button for at least five seconds until the Snapshot indicator remains constantly lit.
5. If you need to restore the default Internet address, press and hold the Control button once again until the Snapshot indicator starts flashing. Otherwise, the Internet address setting remains unchanged.
6. The AXIS 200 is now reset to factory default settings. Restart the AXIS 200 by switching it off and on.

**Note:**  The node address (NODE\_ADDR parameter) remains unchanged, but all other parameters are reset.

# Appendix C Updating the Software

The AXIS 200 is equipped with *Flash Memory* which means that its server software can be updated using FTP. This appendix describes how this operation can be performed.

## Obtaining Updated Software

The latest version of the AXIS 200 server software is available free of charge from Axis or your local distributor. You may obtain this software over the Internet or via anonymous FTP.

The *npsload* program used for downloading the AXIS 200 software via the parallel port, is also available free of charge at [ftp://ftp.axis.com/pub/axis/software/prt\\_srv/utility/flash/](ftp://ftp.axis.com/pub/axis/software/prt_srv/utility/flash/).

**Over the Internet** Simply follow the appropriate hyperlinks, starting with “Software Updates” from within the Home Page of the AXIS 200, or enter [http://www.axis.com/techsup/cam\\_servers/cam\\_200/](http://www.axis.com/techsup/cam_servers/cam_200/) within the URL of your Web browser.

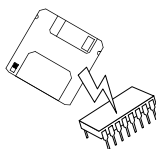
Typically, the software update file is called `200_x_xx.exe`, where `x_xx` indicates the software version. This self extracting archive file unpacks the associated data and text files upon execution. It is recommended that you save this file in your root directory.

---

*Flash Memory* The AXIS 200 server software is stored in Flash memory. This memory is provided by a silicon chip that just like any other ROM device, retains data content even after power is removed. However, Flash memory is unique because it allows its data to be erased and re-written. This means that you can install software updates for your AXIS 200 as soon as they become available, without having to replace any parts. The new software can be simply loaded into the AXIS 200 over the network.

**Anonymous FTP** Log in to `ftp.axis.com` and go to the `/pub/axis` directory. Download the software update file `200_x_xx.exe`, where `x_xx` indicates the software revision. It is recommend that you save this file in your root directory. Proceed then by unpacking the `.exe` file to create the associated binary and text files.

## Upgrading the Software



Theoretically, there are two methods with which to update to the AXIS 200 Flash memory:

- over the network using FTP or
- through the parallel port LPT1.

Normally, AXIS 200 should upgraded the over the network using FTP. However, if for some reason the AXIS 200 becomes unavailable over the network, it may be necessary to reload the software through the parallel port.

**Note:**  Updating instructions are also supplied with the software update.

**Upgrading using FTP** Having obtained the upgrade software, install it into the AXIS 200 by following the instructions below:

1. Reset the AXIS 200 by powering it off and then on again.
2. Start an FTP session and log in to the AXIS 200 as `root`, using the root password. By default this is set to `pass`.
3. Set FTP to binary mode using the command `bin`.
4. Download the new camera server software to you AXIS 200 by using the command `put c:\200_1_31.bin flash`. This process takes 30 - 60 seconds. The LEDs will flash slowly during programming.

**Note:**  If you need to force a download, e.g. when degrading to an older software, use the syntax `put c:\200_1_31.bin FLASH`

5. The AXIS 200 will report `Transfer complete, flash programming finished OK.`, once the programming is complete.

**Note:**  In controlled environments, Flash memory upgrades provide a very safe method for updating software. However, Flash products may easily become damaged if this operation is left to inexperienced persons. Units that become damaged due to misuse will need to be sent back to your dealer who in such circumstances, may charge for any necessary repairs. Therefore, it is highly recommended that Flash memory upgrades are performed by persons knowledgeable in this area.

**Upgrading via the Parallel Port**

You should only need to upgrade the AXIS 200 via the parallel port if it is impossible to download the software using FTP. Therefore, you are strongly advised to talk with your local distributor prior to commencing with the procedures defined below:

1. Disconnect the power supply and the other external connectors.
2. Remove the two screws securing the back plate of the enclosure.
3. Carefully remove the PCB assembly from the enclosure paying particular attention to how the earthing clips are secured on either side of the circuit board. It is essential that these clips are replaced properly when re-assembling the AXIS 200.
4. Connect the parallel cable between the PC LPT1 port of your workstation and the 26-pin array of the AXIS 200 circuit board. Make sure the parallel cable connector is mounted with the arrow close to pin 1, facing the ETRAX chip located in the middle of the pcb.
5. Reconnect the power lead to the AXIS 200.
6. Issue the following command from the DOS prompt to commence the loading sequence:

```
npsload -1 -n 200_1_31.bin
```

- Notes:**
- ❑ Do not forget to use the `-n` switch that indicates that the firmware file has a built-in loader.
  - ❑ The network LED will flash during the loading sequence. This normally takes between 30 secs and 4 minutes to complete.

# Appendix D Technical Specifications

**Network Systems** All systems running TCP/IP using a HTTP browser and supporting JPEG files, HTML version 0.9 or higher, e.g. Netscape Navigator 1.22 or higher, and Microsoft Internet Explorer 1.0 or higher.

**Web Browsers** Netscape Navigator  
 Microsoft Internet Explorer and Web TV  
 Oracle Power Browser  
 NCSA Mosaic  
 Chimera

**Protocols** HTTP, FTP, TCP, IP, ARP, RARP, BOOTP, SMTP, PPP and ICMP.

**Network Management** Configuration and status via standard HTTP or FTP browser.

**Software Updates** Flash memory allows central and remote software updates over the network using FTP over TCP/IP. All software upgrades are free of charge and are available from the Axis WWW server.

**Camera Resolution** The AXIS 200 supports the following resolutions:

Format	Maximum Resolution	Picture Quality High	Picture Quality Medium	Picture Quality Low
JPEG	704 * 576	approx. 90 kbytes	approx. 60 kbytes	approx. 30 kbytes
JPEG	352 * 288	approx. 60 kbytes	approx. 30 kbytes	approx. 15 kbytes
JPEG	176 * 144	approx. 30 kbytes	approx. 15 kbytes	approx. 8 kbytes

The resultant file size will is dependent upon the camera settings, lighting conditions and the snapshot object. However, image objects of a uniform shape generally require less detail and consequently generate smaller snapshot files.

**Performance** The AXIS 200 uses a RISC CPU and hardware compression chips for the JPEG transformation. A full size, full color JPEG file is created in less than a second. However, inherent delays created by your network and/or the Internet will also need to be added when considering the overall time required to generate a picture.

**Network Attachment** 10baseT (RJ-45) twisted pair Ethernet.

**Hardware** CPU: 32-bit RISC processor (ETRAX).  
Flash PROM: 1 Mbyte  
RAM: 1792 kbytes.

**Optical Unit**

- Manual focus: digital, 16 million colors, 24 bits, 0.2 in (0.5 cm) to infinity
- Picture angle: 51 deg horizontal, 39 deg vertical
- Illumination range: 10 - 5 000 lux
- CCD: 1/4 in, 768 \* 582 pixels
- Shutter speed: 1/50 - 1/10000 seconds
- Optical Focus: 4 mm focal length (comparable to 35 mm on a regular camera)

**Auxiliary Input/Output** A Mini-DIN 8-pole external connector is provided for auxiliary connections to the AXIS 200. The functionality of this connector is fully discussed in "Appendix E - *The Auxiliary IO Port*".

**Serial Connector** A 9 pin D-sub connector provides the physical RS232 serial interface to a modem server within the AXIS 200. The functionality of this connector is fully discussed in "Appendix F - *The RS232 Serial Port*".

**Accessories** A camera mini-tripod that can be used standalone or mounted on a wall. This is supplied with each unit and uses a standard camera 1/4 inch nut.



<b>Operating Temperature</b>	40-105°F (5-40°C).
<b>Humidity</b>	20-80% RHG, non-condensing.
<b>Approvals</b>	EMC: FCC Class A, CE:EN 55022/1987,EN50082- 1/1992 Safety: EN 60950, UL, CSA.
<b>Size</b>	Height 1.9 in (4.8 cm). Width 4.9 in (12.5 cm). Length 6.1 in (15.5 cm).
<b>Weight</b>	1.0 lb. (0.5 kg), excluding power supply.
<b>Power Supply</b>	12V AC, 9.6 VA, via external power supply (PS-D).



All specifications are subject to change without prior notice.



# Appendix E The Auxiliary IO Port

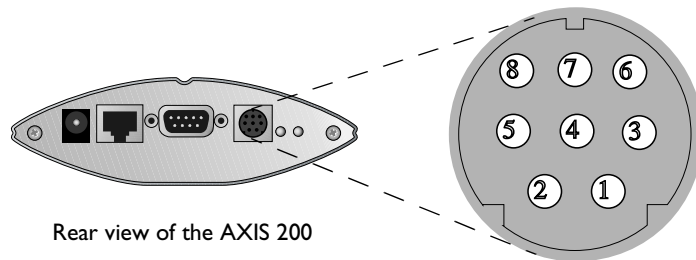
A Mini-DIN 8-pole external connector is provided for auxiliary IO connections to the AXIS 200. This appendix discusses the additional functionality that this connector provides.

## Physical connection

The auxiliary IO connector provides the interface to one relay switch output and two digital inputs.

Pinout

A diagram for the auxiliary IO connector and a pinout table are detailed below:



Rear view of the AXIS 200

Pin	Function
1	Relay switch (Max 24V AC/DC, 100mA)
2	Relay switch (Max 24V AC/DC, 100mA)
3	PAL video output upside down (1 Vpp /75 ohm)
4	NC
5	NC
6	Input 1
7	Input 2
8	GND

**Caution!** GND on the IO connector is not connected directly to the power connector. Always use two independent power sources! Connecting GND to the power connector will permanently damage your AXIS 200.

## Controlling and Monitoring

### IO Files

The status of the input/output interface can be monitored and controlled by the IO software within your AXIS 200. From your Web browser, you can access the IO control file in order to either drive the relay output or monitor the status of the digital inputs.

To access the IO file, enter the following URL:

```
http://cameraname/io/
```

You will require `root` access to reach these files and will now be asked to supply a user name and password. Login as `root` and supply the root password (default = `pass`).

Once access is granted, the following files are displayed:

```
relayon.txt  
relayoff.txt  
input.txt
```

### Relay Output

You can use the relay output to drive directly a maximum load of 24V AC/DC at 100mA. By connecting additional relay circuitry, you can also use this output to drive heavier loads.

You can drive the relay off and on simply by clicking `relayoff.txt` or `relayon.txt` in the above URL. Clicking on either of these will return either of the following messages, respectively:

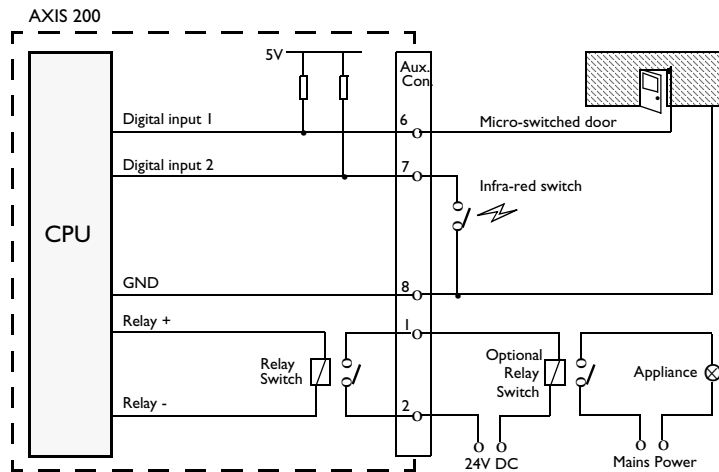
```
Relay is Off  
Relay is On
```

**Note:**  You can also control the relay switch via a CRON script using the snapshot command.

Digital Inputs

The two digital inputs on pins 6 and 7 of the connector make it possible to trigger your snapshots on chosen events. However, you must use a CRON script to implement this functionality. See “*CRON Script*” on page 39.

By connecting a digital microcircuit to a particular door for example, it is possible to take a snapshot on each occasion that it opens or closes.



Schematic diagram of the AXIS 200 Auxiliary Connector  
- displaying a possible application

Status information for each of the two digital inputs is presented within a text string. The status of the inputs can be ‘read’ by clicking on the `input.txt` parameter in the above URL. The string will amongst other things define the time and duration of the last trigger event for the each input:

```
input:1 current:0 last:1 time:12.22 pulse:2
input:2 current:1 last:0 time:14.46 pulse:6
```

This table describes each digital input text string:

<b>String</b>	<b>Description</b>
input:	Input reference (Input 1 = pin 6, Input 2 = pin 7)
current	Current port status (Logical high = 1, Logical low = 0)
last	Result of previous 'read' operation
time	The time of the last change on the input pin.
pulse	The number of logical one-to-zero transitions on the I/O pin, since the last read.

**Note:** □ The way in which you use the auxiliary connector is of course, for you to decide. Axis does not provide any application software, but instead allows you to determine how this connector is best utilized. Naturally, we would be more than pleased to learn of any interesting applications that you might develop!

# Appendix F The RS232 Serial Port

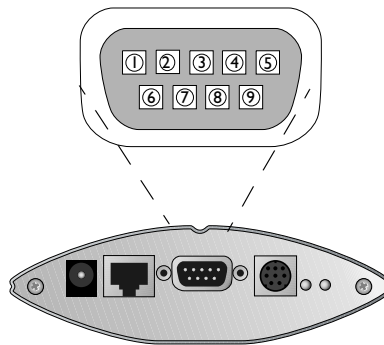
A 9 pin D-sub connector provides the physical connection for the RS232 serial interface of the AXIS 200. This connector is provided for connecting accessory equipment to the camera.

This appendix discusses the functionality of the RS232 serial interface and how to how to set up a modem connection for the AXIS 200.

## Physical connector

### Pin assignment

A diagram of the connector and a pin assignment table for the AXIS 200 are detailed below.



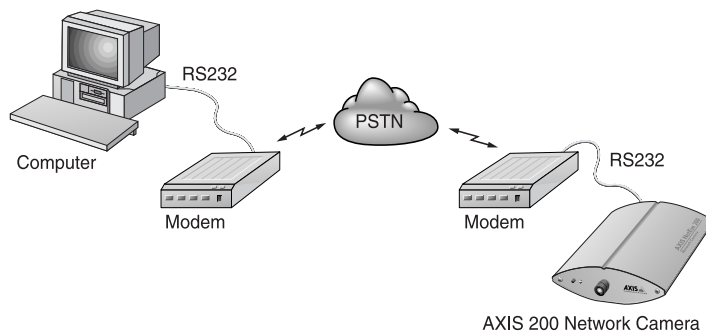
Rear view of the AXIS 200

Pin	Function
1	NC
2	- RXD
3	- TXD
4	RTS
5	GND
6	CTS
7	RTS
8	NC
9	NC

- Caution!**  GND on the serial port is not connected directly to the power connector. Always use two independent power sources! Connecting GND to the power connector will permanently damage your AXIS 200.

## Setting Up the AXIS 200 Modem Server

A modem server provided within your AXIS 200 makes it possible to transmit snapshot images over the PSTN. By connecting the AXIS 200 to a modem, it is possible to download snapshot images to remote computers using standard modem equipment.



Configuration of the serial port for modem connection

**XON/XOFF** The AXIS 200 modem server utilizes XON/XOFF handshaking. In this mode of operation, a straight-through RS232 cable is all that is required for connecting the modems to both the computer and the AXIS 200. That is, the transmit and receive signals on pins 2 and 3 of the cable do not need to be reversed.

**Note:**  This is the common wiring schedule for RS232 cables supplied with most of today's popular modems.



**CTS/RTS** In future releases of the software, the CTS/RTS handshaking will be supported. However, to enable this mode of transmission in current versions of the AXIS 200, the wiring schedule for the connecting RS232 cables must look like this:

AXIS 200 signal name	AXIS 200 (9 pin DSUB Female connector)	Modem (25 pin DSUB Male connector)
NC	1	8
-RXD	2	3
-TXD	3	2
RTS	4	20
GND	5	7
CTS	6	6
RTS	7	4
NC	8	5
NC	9	22

**Note:**  Some modems are supplied with a cables terminated by 25 pin DSUB connectors at both ends. Should you have a cable similar to this, you will need to use a 25 pin Male - 9 pin Female 'gender-bender' with the pin assignment detailed above. Null modem cables will not work!

### Configuring your modems

---

Before files can be transferred from your AXIS 200, the host and remote modems must be configured correctly.

Follow these instructions to configure a US Robotics 28k8+ modem:

1. Connect the modem to your terminal.
2. Check that the modem is responding by issuing the **at** command.
3. Continue your configuration in accordance with the session detailed below (user commands are written in **bold** text):

```

at
OK
at&f                ;load factory default settings
OK
at&b1              ;lock DTE-DCE baud rate
OK
at&h2             ;xon/xoff handshaking on
OK
atm0              ;turn speaker off
OK
ate0              ;command echo off
                        Note: this inhibits the display
                        of entered commands.
OK
at&w              ;save settings to modem
OK
-----ready -----

```

4. To make sure that your modem reloads the established settings on each occasion it powers up, issue the **ati4** command once the configuration is complete.
5. To check that the settings have been saved, turn the modem off and power it on again.
6. Type **ati4**. You should not see your own typing at this point, but if you do, check your modem DIP switches and make sure that the **ate0** command was issued successfully.

The new settings dump that is displayed should be identical to those previously saved. If it is, your modem is now ready to be connected to the AXIS 200!

- Notes:**
- ❑ The above session was performed on a US Robotics modem. Please be aware that the required settings for other types of modems may differ from those defined above. Axis are currently checking the compatibility of the AXIS 200 with other popular modem types and will release configuration details for these shortly.
  - ❑ Some modem manufacturers require you to set a DIP switch to disable command echoing. e.g. USR Sportster 28k8 modems require DIP switch 4 to be set to the DOWN position.

**Typical modem settings**

Typical US Robotics Sportster Vi 33600 Faxmodem settings are defined below:

```

B0 E0 F1 M0 Q0 V1 X1 Y0
BAUD=115200 PARITY=N WORDLEN=8
DIAL=PULSE ON HOOK
&A1 &B1 &C1 &D2 &H2 &I0 &K1 &M4 &N0 &R1
&S0 &T5 &U0 &Y1
S00=000 S01=000 S02=043 S03=013 S04=010
S05=008 S06=002 S07=059 S08=002 S09=006
S10=007 S11=070 S12=050 S13=000 S14=000
S15=000 S16=000 S17=000 S18=000 S19=000
S20=000 S21=010 S22=017 S23=019 S24=000
S25=005 S26=000 S27=001 S28=008 S29=020
S30=000 S31=000 S32=000 S33=000 S34=000
S35=000 S36=000 S37=000 S38=000 S39=000
S40=000 S41=000 S42=000 S43=200 S44=015
S45=000 S46=050 S47=000 S48=084 S49=000
S50=000 S51=000 S52=000 S53=000 S54=064
S55=000 S56=000 S57=000

LAST DIALED #:
OK
    
```

- Note:**
- ❑ The screen dump for your modem might differ from the above, as the settings can vary between modem types.

### Configuring the AXIS 200

Once you have set up your modems, you need to configure your AXIS 200 for modem control. You can use any of these methods:

- Web browser
- FTP
- The Control button

### Using the Web browser

1. On the Configuration - Modem page, enable serial mode by setting the Serial mode parameter to Full Support.
2. Connect the modem to the AXIS 200.
3. Turn the modem on.
4. Wait a few seconds and then power up the AXIS 200.

The new settings will now take effect.

### Using the Control button

For remote installations that are not directly connected to a LAN, you can alternatively configure the AXIS 200 for serial mode operation as follows:

1. Restart the AXIS 200 by removing and then re-inserting the power connector.
2. Wait 10 seconds.
3. Press the Control button and keep it pressed until the Snapshot indicator flashes.
4. Release the Control button.
5. Double click the Control button while the Snapshot indicator continues to flash.
6. Wait until the Snapshot indicator stops flashing.
7. Restart the AXIS 200 by removing and then re-inserting the power connector.

- Using FTP**
1. Log in to the AXIS 200 with the command `ftp cameraname` where `cameraname` is the AXIS 200 host name or Internet address.
  2. You will be prompted for user name and password. Use the user id `root`, which has the default password `pass`.
  3. Issue the command `get config` to copy the AXIS 200 config file to a directory on your workstation.
  4. Log out using any of the commands `quit`, `bye` or `exit` depending on your FTP version.
  5. Edit the AXIS 200 config file by setting the `SERIAL_MODE` parameter to `FULL_SUPPORT`.
  6. Start a new FTP session.
  7. When you are logged in, issue the command `put config` download the edited file to the AXIS 200.
  8. Log out again.

Dialing the server

You will reach the AXIS 200 modem server by dialing `ATDTnnnnnn`, where `nnnnnn` is the modem phone number, e.g. `ATDT555-1212`. The AXIS 200 will then answer the call, and establish the connection.

Once the connection has been established, the AXIS 200 welcome banner is displayed:

```

Welcome!
You are connected to the host shell of your AXIS
Camera Server.
Try 'help' for a list of available commands, or
just 'sz fullsize.jpg' to download an image.
```

**The Help menu**    Type the following to view the help menu:

```

$ he
```

The help menu is displayed:

Help	Display help text
Date	Get current date and time
SetDate	Set current date and time
Version	Print current software version
Su	Become super-user or another user
SoftReset	Protocol reinit of Axis 200
HardReset	Complete reboot of Axis 200
Sz	Send a file using zmodem protocol
Exit	Disconnect
Quit	Disconnect
Goodbye	Disconnect

**Note:**  All commands are case insensitive.

**Access rights** The commands available to each user from within the welcome menu will depend upon their user privileges.

**Abbreviations** All non-destructive commands can be abbreviated to shortest unambiguous form. However, because of their severity, the `HardReset` and `SoftReset` commands must be entered in their entirety.

**Super-user** The `'Su[username]'` command is used to become another user, e.g. `'Su root'` will, if you supply the correct password when prompted for it, give you root access and enable use of the `Reset` and `SetDate` commands.

**Zmodem** Once connection to the AXIS 200 has been established, you can initiate a file transfer. Simply type the `'sz'` command followed by the filename of file you wish to transfer, as follows:

```
sz fullsize.jpg
```

A typical zmodem session is detailed below:

```
at
OK
atdt555-1212
Welcome!
You are connected to the host shell of your AXIS
Camera Server.
Try 'help' for a list of available commands, or
just 'sz fullsize.jpg' to download an image.
$ sz fullsize.jpg
**B000000000000000
>> Notice: Redirecting stdin/stdout.
>> Notice: Executing the command ``cd ~/dl/modem
; rz ; xv *& ; sleep 2;
rm *''.
rz waiting to receive.
Receiving: fullsize.jpg
Bytes received: 24188/ 24188: 3020 Bytes per
sec
Transfer complete.
Transfer complete.
$
```

Typical zmodem session





## Appendix G Camera Applications



With an estimated 60 million Web sites on the Internet today, it is important that Internet advertisers create their Web pages in a way that is interesting to visitors. Web designers can benefit from adding attractive links to exciting 'live' pictures within their Web pages.

Live Internet and intranet picture publishing, visual surveillance and process monitoring represent just a few of the many applications for which you can use your AXIS 200.

### Application Ideas

The only real limitation for the number of applications to which the AXIS 200 may be suited is your fantasy. Some of the more obvious applications ideas are:

- Adding 'live' pictures to your Web pages. Snapshot pictures may be triggered and viewed from anywhere in the world.
- Monitoring and surveillance of industrial processes. Monitor the production flow in any kind of industry. Let the AXIS 200 save snapshots at specified times for quality control and generic surveillance purposes.
- Various kinds of security surveillance applications.
- Monitoring of conference rooms, e.g. how many and which people are present in a meeting.
- Creating a company photo catalog for use over the intranet.
- Integrating the AXIS 200 into your CGI scripts in order to create your own applications.
- Fun applications. Who visits the coffee machine most in your organization?

### Application Examples

The list below contains links to a number of Web sites, and illustrates the wide range of applications suitable for the AXIS 200:

- Surveillance of the company entrance door:  
[http://www.axis.com/neteye/rm\\_demo/front\\_doors.html](http://www.axis.com/neteye/rm_demo/front_doors.html)
- Child monitoring system for daycare centers and preschools:  
<http://www.kindercam.com/>
- Construction pictures from the Riverview Wastewater treatment plant project:  
<http://www.pirnie.com/pws/riverview.cfm>
- Elephant bath at the National Zoo, Washington D.C.:  
<http://www.si.edu/organiza/museums/zoo/zooview/exhibits/elehouse/elephant/bath.htm>
- Underwater pictures at Hawaii's Waikiki Aquarium:  
<http://waquarium.mic.hawaii.edu/coralcam/>
- View of the prayers, celebrations and special ceremonies at the Jewish Kotel (the Western) Wall:  
[http://www.virtual.co.il/city\\_services/kotel/kam/index.htm](http://www.virtual.co.il/city_services/kotel/kam/index.htm)
- Traffic monitoring in New York City:  
<http://www.mte.com/webcam/>

**Note:** Axis is not responsible for maintaining the web sites listed above. However, you will find links to a number of applications and demos at the AXIS 200 web site at [http://www.axis.com/products/cam\\_200/](http://www.axis.com/products/cam_200/)

# Appendix H CRON Script Command Reference

This appendix details the syntax of the CRON script commands.

For information on how to use the CRON scripts with your AXIS 200, refer to “*CRON Script*”, on page 39.

## Script Format

A CRON script for the AXIS 200 can include one or several entries. The CRON script entries use this format:

```
# <comments>
<triggering condition> :
<commands>;
%
```

where <triggering condition> includes the following fields:

<minute> <hour> <day> <month> <weekday> <input and boot event (optional)>

and <commands> includes one or several CRON script commands.

## Commands

alert The alert command sends messages to a remote host.

**Syntax** alert [-host HOST] [-port PORTNUMBER]  
[-message STRING];

**Options** -host Specifies the host name or Internet address of the remote host.  
-port Specifies the TCP port number in the range [0..65534].  
-message Specifies the message that will be sent to the remote host. The message must be surrounded by quotation marks. Hexadecimal coded messages must be preceded by \0x, e.g. "\0x04" for the non-printed character EOT. To include a quotation mark, it must be preceded by a backslash, e.g. \".

### Example

```
# This command will send the message "Alarm
# "0013" from AXIS 200" to the remote host when
# input port 1 goes high.
* * * * * /I1:
alert -host 172.16.253.80 -port 2703 -message "Alarm
\"0013\" from AXIS 200";
%
```

ftp The ftp command uses the standard File Transfer Protocol (FTP) for transferring an image from your AXIS 200 to a remote host.

**Note:**  The ftp command keeps the connection open during each file transfer.

**Syntax** `ftp [-host HOST] [-user USERNAME] [-pass PASSWORD]  
[-src SOURCEFILE] [-dest DESTINATIONFILE]  
[-temp TEMPORARY_DESTINATIONFILE] [-loop LOOPTIME]  
[-time TOTALTIME];`

- Options**
- `-host` Specifies the host name or the Internet address of the remote host. If specifying the host name, performance is slightly decreased due to the DNS lookup. If no host is specified, the compiler will complain.
  - `-user` The username used when logging on to the remote host. If no username is specified, the compiler will complain.
  - `-pass` The password used when logging on to the remote host.
  - `-src` Specifies the source filename. If this parameter is omitted, the `fullsize.jpg` file will be sent. If an erroneous file name has been specified, no action will be taken during execution.
  - `-dest` Specifies the name and whole path of the destination file. If this parameter is omitted, the destination file name will be the same as the source filename. The maximum length of a destination filename is 255 characters. You can add as many destination files as required, separated by a space.  
  
You can add time stamps, such as time, date and file indexes, to the destination filename. This is useful for example when you are transferring a series of files.

**Note:**  The `rS-E` substitution can be used with the first destination file only. To make sure all the files in a series are captured, you must specify a sufficiently long execution time in the time attribute.

The following table lists the available time stamp variables. Every substitution must be preceded by a dollar sign '\$'.

- \$s The current second in the range 00-59.
- \$m The current minute in the range 00-59.
- \$h The current hour in the range 00-23.
- \$d The current day of the month in the range 01-31.
- \$n The current month in the range 01-12.
- \$Y The current year without the century in the range 00-99.
- \$\$ The current year including the century.

\$rS-E

Inserts an index number starting from number S through all the numbers including the number E. If you leave out number E, it will be interpreted as a very large number.

- temp Specifies a temporary name for the file destination. This is to prevent someone else from accidentally reading the file during the download.
- loop Specifies the time interval within which the command should be repeated. Format:  
h<hours>m<minutes>s<seconds>.
- time Specifies the total time the command should execute. Used together with the loop attribute. Format:  
h<hours>m<minutes>s<seconds>.

**Additional Options** In addition to the options described above, the following optional settings are also available:

`-ctrlport`

Specifies the TCP port number in the range [0..65534] to be used as the control port for the FTP server.

`-dataport`

Specifies the TCP port number in the range [0..65534] to be used as data port for the FTP server.

`-to` Specifies the timeout, i.e. the FTP session will terminate when the specified time limit has expired. Format:  
h<hours>m<minutes>s<seconds>.

However, these options can only be used via a text editor.

### Example 1

```
# This command will log in as "elvis" with the
# password "presley" on the host with the Internet
# address 123.123.123.123, download a hugesize
# image with the name "king.jpg" and put
# it in the directory "/home/elvis" on the remote
# host. During the download, the file name
# "tmp.jpg" will be used.
* * * * * :
ftp -host 123.123.123.123 -user elvis -pass
presley -src hugesize.jpg -dest
/home/elvis/king.jpg -temp tmp.jpg;
%
```

### Example 2

```
# This command will every hour, every 5
# seconds for 20 minutes, download a fullsize
# image and save the images with a time stamp in
# the filename.
0 * * * * :
ftp -src fullsize.jpg -host an.interesting.site
-dest tmp/full$h$m$s.jpg -user billy -pass
startrek -loop s5 -time m20;
%
```

### Example 3

```
# This command will send 1001 consecutive fullsize
# images to "funny.host.name". The first and last
# images will be named "fullsize1000.jpg" and
# "fullsize2000.jpg", respectively. The command
# will run for 30 minutes.
* * * * * :
ftp -host funny.host.name -user cam -pass secret
-src fullsize.jpg -dest
/home/cam/tmp/fullsize$r1000-2000.jpg -time m30;
%
```



mail This command uses the Simple Mail Transfer Protocol (SMTP) for sending images and files from your AXIS 200 to e-mail addresses.

**Note:**  To use the mail command, you must specify the Internet address of the mail server and a valid return address on the TCP/IP page.

**Syntax** mail [-s SUBJECT] [-a ATTACHMENTS] [-t RECIPIENTS];

- Options**
- s A simple one-word subject does not require quotation marks. A subject with multiple words must be surrounded by quotation marks.
  - a Attachments such as images or files.
  - t The e-mail address of the recipient(s).

**Example 1**

```
# This command will send an e-mail with the
# subject "Hello" and the attached file
# fullsize image to someone@company.com
* * * * * :
mail -s Hello -a fullsize.jpg -t
someone@company.com;
%
```

**Example 2**

```
# This command will send an e-mail with the
# subject "This "fullsize.jpg" was sent from my
# AXIS 200" to two recipients.
* * * * * :
mail -s "This \"fullsize.jpg\" was sent from my
AXIS 200" -a fullsize.jpg -t someone@axis.com
anotherone@axis.com;
%
```

**Example 3**

```
# This command will send an e-mail with five
# attachments.
* * * * * :
mail -s "Some images from the summer house." -a
fullsize.jpg halfsize.jpg hugesize.ppm cronscript
config -t me@at.home;
%
```

**offline**

This command terminates the current PPP connection. Used together with the online command.

**Syntax** `offline;`

**online** This command dials up a modem and establishes a PPP connection. Used together with the offline command.

**Syntax** `online [-dial NUMBER] [-user USERNAME -pass PASSWORD] [-timeout TIME][-script "send expect send expect ..."];`

- Options**
- `-dial` The phone number that will be sent to the modem as ATDT<phone number>. The number cannot include spaces.
  - `-user` Username used for authentication. Note that spaces are not allowed in the username. Optional.
  - `-pass` Password. Required if a username is specified.
  - `-timeout` Terminates the online session after the specified time by restarting the AXIS 200. Optional. Format: `h<hours>m<minutes>s<seconds>`
  - `-script` An optional script string of expect-send pairs to be sent over the line. This must be the last option in the command.
    - If a send word is empty, i.e. if it contains single quotes ("), nothing will be sent until the expect word is received.
    - If a word includes spaces, you must put it in single quotes.
    - For a login sequence, you can use the words `$(USER)` and `$(PASS)`. They will be replaced by the arguments specified in the `-user` and `-pass` options, respectively.
    - If the string does not include an escape code, a carriage return character will be appended automatically at the end of the string. Valid escape codes are: `\r` (carriage return), `\n` (line feed) and `\t` (tab).
    - At the end of the script, the AXIS 200 will enter the negotiation phase.

**Example 1**

```
# This command will dial up a modem with number
# aNumber, and login with username aUser and
# password aPass. It will first wait for the
# string 'ogin: ' and send the username. It
# will then wait for the string 'ass: ' and send the
# password.
* * * * * /I1:
online -dial aNumber -user aUser -pass aPass
-script "" 'ogin: ' $(USER) 'ass: ' $(PASS)";
%
```

**Example 2**

```
# This command will dial up a modem and wait for
# the prompt string '>'. It will then send the
# string 'ppp defaults'. If the session has not
# terminated after 5 minutes and 30 seconds, the
# AXIS 200 will be restarted.
* * * * * /B:
online -dial 5551234 -user bob -pass dylan
-timeout m5s30 -script "" '>' 'ppp defaults'";
%
```

---

**reset** This command resets the software or hardware of the AXIS 200.

**Syntax** reset [-soft] [-hard];

**Options** -soft Reinitiates the AXIS 200 protocols.  
-hard Performs a complete reboot of the AXIS 200.

**Example**

```
# This command will reset the AXIS 200 hardware
# once a day.
0 0 * * * :
reset -hard;
%
```

**sleep** This command adds a pause to the CRON script execution.

**Syntax** `sleep <seconds>;`

**Options** `<seconds>`  
Specifies the number of seconds to wait before proceeding with the next command in the event entry.

**Example**

```
# This command will result in a 30 seconds pause.  
* * * * * ;  
sleep 30;  
%
```

snapshot This command updates the `lastshot.jpg` image. The command can also be used for controlling the relay switch.

**Syntax** `snapshot [-l LOOPTIME] [-t TOTALTIME] [FILE];`

- Options**
- l Specifies the time between two consecutive image updates.
  - t Specifies the duration of the command. Format:  
h<hours>m<minutes>s<seconds>.
- [FILE]  
Specifies the image type: `fullsize.jpg`, `halfsize.jpg`, `hugesize.jpg`, or `zoom.jpg`.  
If using the command for controlling the relay switch, you specify `io/relayon.txt` and `io/relayoff.txt`, respectively.

**Example 1**

```
# This command will update the lastshot.jpg image
# with a fullsize image.
* * * * * :
snapshot fullsize.jpg;
%
```

**Example 2**

```
# During one minute, the lastshot image will be
# updated as halfsize.jpg with two-seconds
# intervals.
* * * * * :
snapshot -l s2 -t m1 halfsize.jpg;
%
```





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