

Exacq Technologies, Inc.  
Exhibit 1010

## **DECLARATION OF JAMES MARCELLA**

I, James Marcella, declare as follows:

1. I am over the age of 18 and am legally competent to make this declaration. I have personal knowledge of the matters stated herein.
2. I am Director, Technical Services at Axis Communications, Inc. ("Axis").
3. I have been employed by Axis for 18.5 years.
4. Between June 6, 1997 and present. I was directly involved with the sale of the AXIS 2400/2401 Video Server and the AXIS 2100 Network Camera Products.

### **AXIS 200**

5. Attached as Exhibit A is a true and correct copy of the "AXIS 200 User's Manual" ("200 User's Manual").
6. The 200 User's Manual indicates on page 2 that it is Revision 1.6 and dated October, 1998.
7. Axis began selling the AXIS 200 Network Camera Server in 1996.
8. At least as early as October, 1998, a hard copy of the 200 User's Manual was provided with the purchase of an AXIS 200 Network Camera Server.

9. At least as early as October, 1998, Axis made the 200 User's Manual available for download from Axis's website, axis.com.
10. Visitors to axis.com were freely able to download the 200 User's Manual without registering or supplying a password.

#### **AXIS 2100**

11. Attached as Exhibit B is a true and correct copy of the "AXIS 2100 Network Camera User's Guide" ("2100 User's Guide").
12. The 2100 User's Guide indicates on page 2 that it is Revision 1.0 and dated November, 1999.
13. To the best of my knowledge, Axis began selling the AXIS 2100 Network Camera in 1999.
14. At least as early as November, 1999, a hard copy of the 2100 User's Guide was provided with the purchase of an AXIS 2100 Network Camera Server.
15. At least as early as November, 1999, Axis made the 2100 User's Guide available for download from Axis's website, axis.com.
16. Visitors to axis.com were freely able to download the 2100 User's Guide without registering or supplying a password.

#### **AXIS 2400/2401**

17. Attached as Exhibit C is a true and correct copy of the "AXIS 2400 and AXIS 2401 Video Servers Administration Manual" ("2400 Manual").

18. The 2400 Manual indicates on page 2 that it is Revision 1.1 and dated July, 1999.
19. To the best of my knowledge, Axis began selling the AXIS 2400 Video Server in 1999.
20. At least as early as July, 1999, a hard copy of the 2400 Manual was provided with the purchase of an AXIS 2400 Video Server.
21. At least as early as July, 1999, Axis made the 2400 Manual available for download from Axis's website, axis.com.
22. Visitors to axis.com were freely able to download the 2400 Manual without registering or supplying a password.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on January 29, 2016.



---

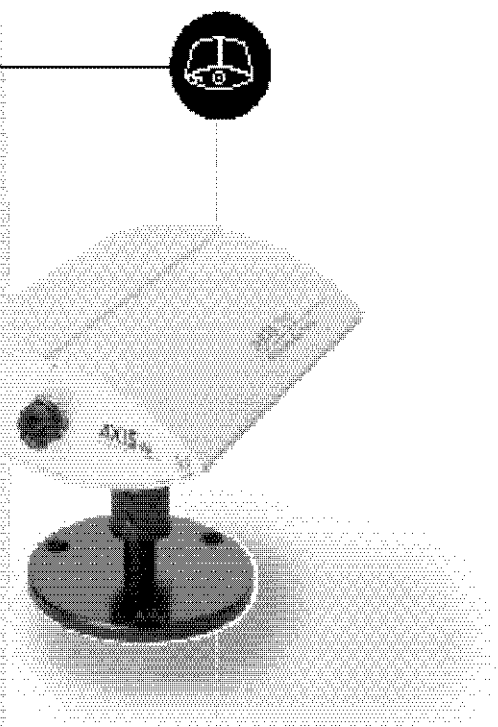
James Marcella



# Exhibit A

# 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

any kind with regard to the material contained within this document, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Axis Communications shall not be liable nor responsible for incidental or consequential damages in connection with the furnishing, performance or use of this material.

## Year 2000 Compliance

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

## Axis' Trademarks

ThinServer

## Trademark Acknowledgments

Acrobat, Adobe, Apple, Chimera, Ethernet, IBM, Internet, Internet Explorer, LAN Manager, LAN Server, Macintosh, Microsoft, NCSA Mosaic, Netscape Navigator, Novell NetWare, Oracle Power Browser, OS/2, UNIX, Windows, WWW, are registered trademarks of the respective holders.

AXIS 200 User's Manual

Revision 1.6

Part No: 14978

Dated: October 1998

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1996 - 1998

# 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

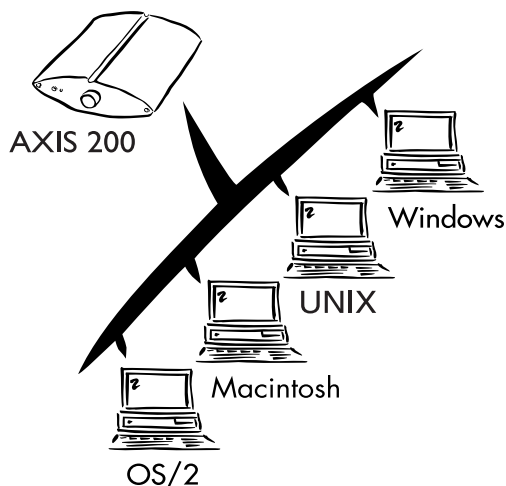
**Easy Installation** Connecting the AXIS 200 to the network is easy. It does not require the use of a PC frame grabber card or interaction with any other server. No additional software or hardware is needed. You can actually install it in a single minute - all you need to do is assign a valid Internet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

<b>Fast JPEG Compression</b>	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.
<b>External Device Connection</b>	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.
<b>Security</b>	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.
<b>Web Forum discussions</b>	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

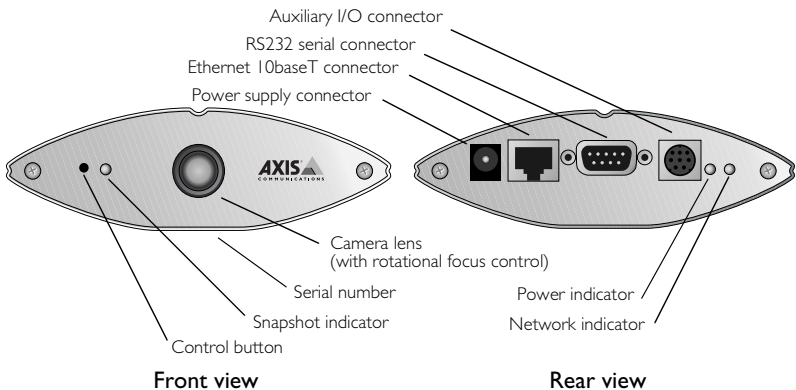
Unpack and check all the items against the check list below. Contact your dealer if anything is missing or damaged. All packing material is recyclable. The AXIS 200 hardware pack contains:

- ☐ 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:

Country	Part Number
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

Auxiliary I/O Connector	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> .
RS232 Serial Connector	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> .
Ethernet 10baseT Connector	10baseT (RJ-45) twisted pair Ethernet connector for connection to the network.
Power Supply Connector	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.

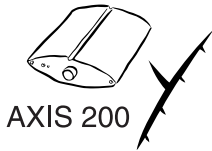
---

**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.

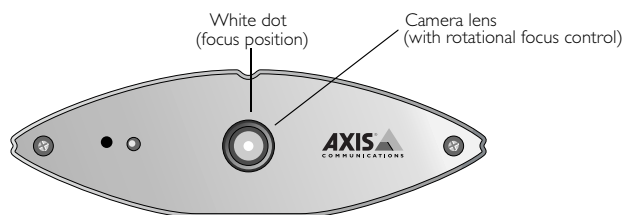
- Notes:**
- ☐ Server push and other automatic updating functions are described in *Automatic Picture Updates*, on page 37.
  - ☐ Web pages are kept locally for fast browsing and in some instances your AXIS 200 may display a cached image, as opposed to a newly taken snapshot. In these circumstances, 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
Description	Minute	Hour	Day	Month	Day of the Week	Conditional Tag
Valid values	*	*	*	*	*	boot B I1, I2
	0-59	0-23	1-31	1-12	0-6 0 = Sunday	

### 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.
* * * * * /I1 :
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
```

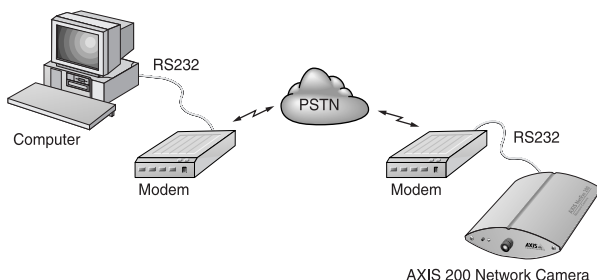
5. Type the following to terminate the connection:

```
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

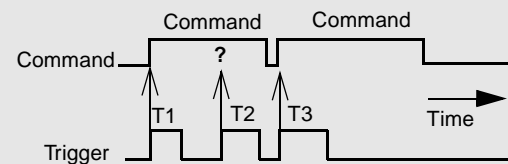
The file can be examined directly using any text editor and would typically contain information as detailed below:

```
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>bytes = 32 time = 2 ms.....</p> <p>The Internet address is already used and cannot be used again. Obtain a new Internet address.</p> <p>destination host unreachable</p> <p>The AXIS 200 is not within a reachable network node. Obtain a new Internet address.</p> <p>request timed out</p> <p>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).	<p>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> <div><p>The diagram illustrates a timing issue between a Trigger signal and a Command signal. The Trigger signal (bottom) consists of three pulses labeled T1, T2, and T3. The Command signal (top) is high during T1 and T2, but drops to low during T3. A question mark is placed above the Command signal during T2, indicating that the command was not executed because the previous command (from T1) had not yet finished. The x-axis is labeled 'Time' with an arrow pointing right.</p></div> <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. Display configured incorrectly.	Refer to page 30 for information on how to set the White balance.  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.	<p>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.</p> <p>Refer to page 30 for information on how to set the White Balance.</p>
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 “Image Page” on page 25 and try using the default value.
	White Balance parameter	Try changing the White Balance parameter. Refer to “White Balance” 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.

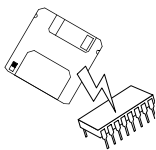
Typically, the software update file is called `200_x_xx.exe`, where `x_xx` indicates the software version. This self extracting archive file unpacks the associated data and text files upon execution. It is recommended that you save this file in your root directory.

---

*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.



<b>Performance</b>	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.
<b>Network Attachment</b>	10baseT (RJ-45) twisted pair Ethernet.
<b>Hardware</b>	CPU: 32-bit RISC processor (ETRAX). Flash PROM: 1 Mbyte RAM: 1792 kbytes.
<b>Optical Unit</b>	<ul style="list-style-type: none"><li>• Manual focus: digital, 16 million colors, 24 bits, 0.2 in (0.5 cm) to infinity</li><li>• Picture angle: 51 deg horizontal, 39 deg vertical</li><li>• Illumination range: 10 - 5 000 lux</li><li>• CCD: 1/4 in, 768 * 582 pixels</li><li>• Shutter speed: 1/50 - 1/10000 seconds</li><li>• Optical Focus: 4 mm focal length (comparable to 35 mm on a regular camera)</li></ul>
<b>Auxiliary Input/Output</b>	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 - <i>The Auxiliary IO Port</i> ".
<b>Serial Connector</b>	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 - <i>The RS232 Serial Port</i> ".
<b>Accessories</b>	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.

**Operating Temperature** 40-105°F (5-40°C).

**Humidity** 20-80% RHG, non-condensing.

**Approvals** EMC: FCC Class A, CE:EN 55022/1987,EN50082- 1/1992  
Safety: EN 60950, UL, CSA.



**Size** Height 1.9 in (4.8 cm). Width 4.9 in (12.5 cm).  
Length 6.1 in (15.5 cm).

**Weight** 1.0 lb. (0.5 kg), excluding power supply.

**Power Supply** 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

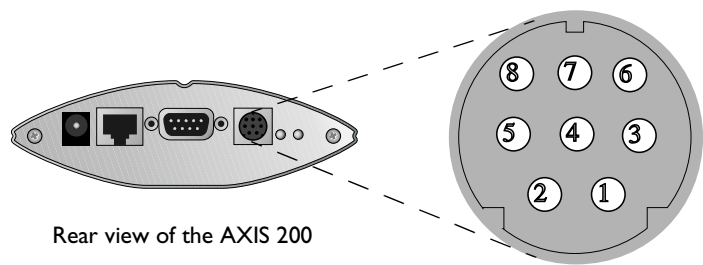
A Mini-DIN 8-pole external connector is provided for auxiliary IO connections to the AXIS 200. This appendix discusses the additional functionality that this connector provides.

## 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:



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:

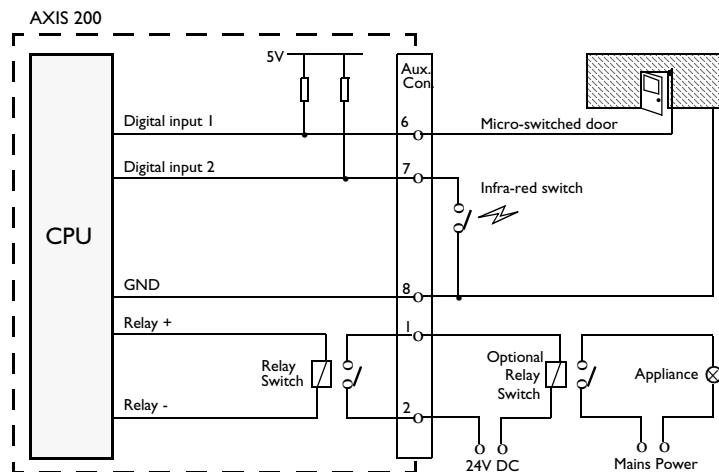
```
Relay is Off  
Relay is On
```

**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:

String	Description
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

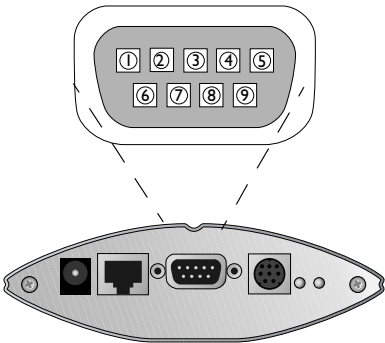
A 9 pin D-sub connector provides the physical connection for the RS232 serial interface of the AXIS 200. This connector is provided for connecting accessory equipment to the camera.

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!

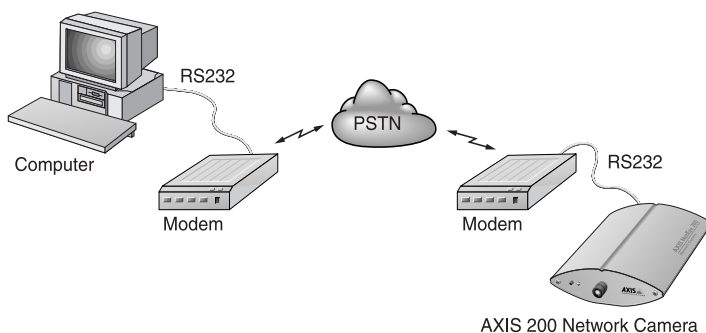
☐

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.
- \$Y 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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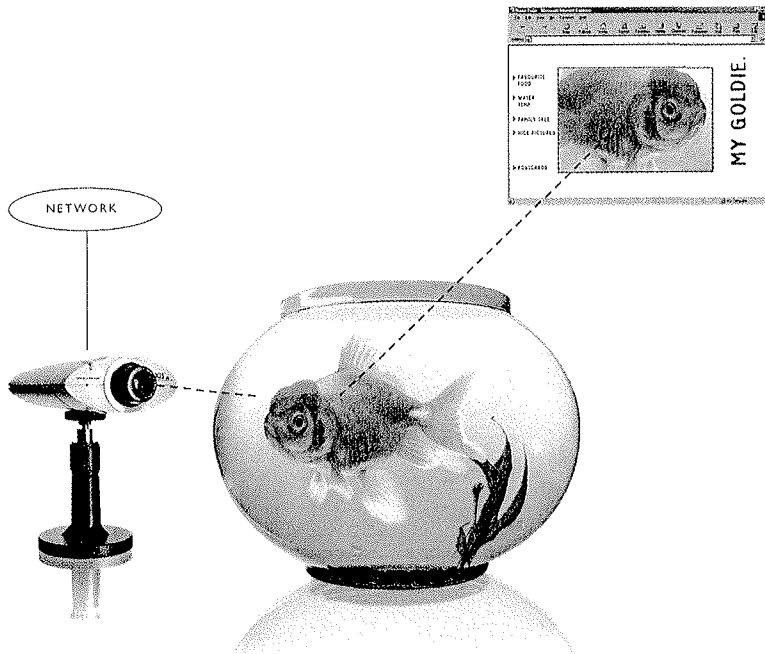
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Live web  
images unleashed.



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# Quick Network Installation Procedure

Follow the instructions below to quickly install the AXIS 2100 on an Ethernet network.

If you do not have a network and intend to use a modem with your AXIS 2100, please refer to the *Installing Your Camera to a Modem* section of this User's Guide.

1. Note the serial number found on the underside label of the AXIS 2100. The Ethernet address is the same as the serial number of the unit.
2. Acquire a valid and unused IP address for the AXIS 2100 from your Network Administrator.
3. Connect your AXIS 2100 to the network. and external power supply.

Assign the IP address using the **ARP** command, as described below:

*Windows 95/98 & NT only* - Start a DOS window and type these commands:

Syntax: `arp -s <Server IP address> <Ethernet address> <my PC IP address>`  
`ping <Server IP address>`

Example: `arp -s 172.21.1.200 00-40-8c-10-00-86 172.21.1.193`  
`ping 172.21.1.200`

*UNIX only* - Type these commands:

Syntax: `arp -s <IP address> <Ethernet address>`  
`temp ping <IP address>`

Example: `arp -s 172.21.1.200 00:40:8c:10:00:86`  
`temp ping 172.21.1.200`

00-40-8c-10-00-86

The AXIS 2100 is now automatically rebooted; whereupon, the host then returns 'Request timed out' before returning the DOS user prompt >.

To verify that the address has been set and the communication is established, ping the unit once again with the new IP address; the host then returns: 'Reply from 172.21.1.200...' or similar.

4. To access the AXIS 2100 **Home Page**, start the Web browser and enter the IP address in the location/address field:

Syntax: `http://<IP address>/`

Example: `http://172.21.1.200/`

5. With reference to the on-line help, start the **Installation Wizard** and configure your application.

**Notes:**

- When using ARP in Windows 95/98/NT environments, you should enter the `winipcfg` command to discover your IP number if you are using DHCP and are unsure of your current designation.
- If you are installing many units on to your network, please refer to the AXIS IP Installer information under the section *Installing Your Camera on a Network* in this User's Guide.

# **AXIS 2100 Network Camera User's Guide**



## About This Document

This document is intended for administrators and users of the AXIS 2100 Network Camera, and is applicable for software release 2.0. Although many of the operational aspects of the product are described within the on-line help, this guide does contain information for configuring, managing and using the unit within your networking environment, as well as a general overview of the product functionality. It is not necessary for the reader to have any previous networking experience to successfully install or use this product.

Readers are recommended to use this document as a supplement to the Wizards and other on-line information available via the Web-based interface. Superseding versions for this document will be posted to the Axis Website, as required.

## Safety Notices

Please observe all safety markings when using this product.

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

**Important!** - Potential hazard that can seriously impair operation.


Do not proceed beyond 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 local region before using the AXIS 2100 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 fulfills the requirements for radiated emission according to limit B of EN55022/1994, and the requirements for immunity according to EN50024/1998 residential, commercial, and light industry.

## Liability

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

## Year 2000 Compliance

Axis Communications AB warrants that this product is Year 2000 compliant.

## Trademark Acknowledgments

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## Support Services

Should you require any technical assistance, please contact your local dealer. If your questions cannot be answered immediately, your dealer will forward your queries through the appropriate channels to ensure you a rapid response. If you are connected to Internet, you can obtain on-line manuals, technical support, software updates, application software and general corporate information from any of the locations listed below.

WWW:	<a href="http://www.axis.com/">http://www.axis.com/</a>
Axis' CCTV Website	<a href="http://cctv.axis.com/">http://cctv.axis.com/</a>
FTP:	<a href="ftp://ftp.axis.com/pub/axis/">ftp://ftp.axis.com/pub/axis/</a>

### AXIS 2100 User's Guide

Revision 1.0

Part No: 17091

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## Product Overview

The AXIS 2100 is a digital network camera running TCP/IP that includes all of the required networking connectivity for distributing monitored images over a secure intranet network, or the Internet. With its own built-in Web server, the AXIS 2100 not only allows high-quality remote surveillance images to be viewed directly from any browser application on your network, but full Web-based control all of the unit management and configuration functions as well.



Connecting directly to Ethernet or Fast Ethernet networks, the AXIS 2100 is a standalone digital camera that can also connect via an external modem to your local Internet Service Provider.

The Web-based interface features several user-sensitive Wizards that not only simplify the installation process, but also allow for a seamless and automated integration into your networking and application environments. Furthermore, its open-network structure minimizes the need for costly coax cabling to provide a cost effective intranet and Internet imaging solution for a minimal connection overhead.

## Features and Benefits

**Ease of Use** - The AXIS 2100 does not require the use of a PC frame grabber card or interaction with any other server; the only software required is Netscape Navigator 4.x or above; alternatively, you can use Axis' ActiveX component for use with Microsoft Internet Explorer 4.x or above. It has complete plug-and-picture functionality - all you need to do is assign a valid IP address.

**Cost-effective** - Provides a reliable and low-cost resource for network imaging without the hidden accessories normally associated with digital cameras; such as, expensive software, management workstations, dedicated applications, video cabling or PC frame-grabber cards.

**Open Standards Environment** - Supporting TCP/IP networking, SMTP e-mail, HTTP and other Internet-related protocols; the AXIS 2100 can be used in mixed operating system environments, such as, Windows, UNIX, Macintosh and OS/2. It integrates easily into other WWW/Intranet applications and CGI scripts.

**Simple Administration** - Using a standard Web browser, you configure and manage the AXIS 2100 directly from its own Web pages. And, when a new firmware release becomes available, you can simply batch upgrade all of your Axis camera products remotely over the network using the AXIS ThinWizard.

**Standard Image Format** - As opposed to many inferior solutions that need to fracture image files prior to broadcast, the AXIS 2100 delivers complete high-quality pictures in a standard JPEG format; this means that the integrity of your pictures is always assured and can be viewed using any standard Web browser.

**Image Updating** - The on-board AXIS ETRAX 100 processor and revolutionary AXIS ARTPEC-1 Real Time Picture Encoder provides an amazing power-synergy to deliver up to 10 frames/second over 10Mbps or 100Mbps networks.

**High Compression and Sensitivity** - The fully programmable compression features afforded by the AXIS ARTPEC chip allows a normal quality image to be compressed down to around 8 kbytes. Actual file sizes vary according to quiescent lighting conditions; although the product works well even in dark environments - right down to 3 lux.

**Standard Lens** - the AXIS 2100 uses a standard CS type lens, which means that it can be replaced by any other preferred lens conforming to the same standard.

**External Device Connection** - Supporting an auxiliary Input/Output Connector, you can connect your AXIS 2100 to a variety of external devices; such as, IR-sensors, switches and alarm relays. In combination with the programmable alarming facilities, you can quickly develop a variety of security applications that are triggered on time or alarm-based events.

**Wide Range of Applications** - The AXIS 2100 offers live video over the internet networks and the Intranet, and is ideal for use with many of today's high-speed internet services. Allowing remote access directly from your Web browser, you can view live images, manage and control the AXIS 2100 at any time and anywhere. Use it for intruder detection, traffic surveillance, bank security, child protection, process control, industrial and public surveillance, visual security, image archiving, or any other application - to give you the peace of mind that only networked camera technology can provide.

**ISP and Modem** - The Point to Point Protocol (PPP) support allows you to use your AXIS 2100 remotely over a serial link, just as if it were located on your local network. Initially setting up the unit using a computer connected by the supplied Null Modem cable, you can quickly configure the unit for remote use using an external modem; where your video images can even be uploaded to your preferred Internet Service Provider (ISP) to allow global access to your live images from any desktop browser within the Internet community. Select any of the supported ISPs within the embedded Web-based Wizards, or choose any other preferred ISP as an imaging repository for your live images.

**Security** - The AXIS 2100 includes a self-contained Web server, which means that digital images can be secured like any other Internet host. Data protection is normally implemented by your Network Administrator using the unit security settings in combination with an organization's Internet firewall; the Administrator can decide whether individuals, groups, the whole company or the whole world may access your camera.

**Network Camera Servers Developer's Pages** - The Camera Division at Axis maintain a specialist site for network camera developers. New exciting application ideas, tools, and preprogramming scripts are constantly being added - this is an invaluable reference site for Axis' development partners and OEMs. Follow the camera links and check it out at:  
<http://www.axis.com/> and <http://cctv.axis.com/>

**Linux Operating System** - Including a Boa Web server, the Linux operating system provides a stable platform for open-source development in future releases of the product. In accordance with the *GNU General Public License*, Axis have published the kernel for this product at <http://developer.axis.com/>. Axis would like to thank Paul Phillips, who wrote Boa; and Larry Doolittle, who is now enhancing and maintaining this free program software - published at <http://www.boa.org/>.

# Physical Description

Read the following information to familiarize yourself with the AXIS 2100, making particular note of where the connectors and indicators are located. This information provides a useful reference during the installation of the product.

## Front Panel

### Status Indicator

Used in conjunction with the Focus Assistant, this multi-colored indicator can be configured for use as a local focusing aid (for further details please refer to *Adjusting the Camera Focus*, on page 32). Under normal conditions however, this indicator defines the operational status of the camera, as described below:

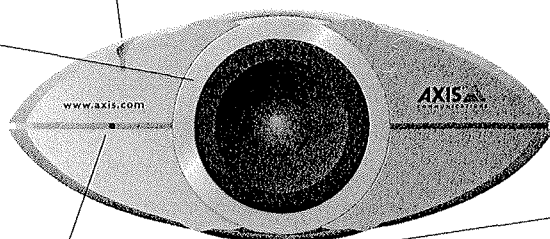
- green - the indicator flashes briefly and momentarily displays orange during the start-up and self-test routines; the indicator then displays green to indicate a healthy unit status.
- red - the indicator will display red only if a problem with the AXIS 2100 has occurred. Refer to *Appendix A - Troubleshooting*.

Note: The Status indicator also displays orange when setting the factory default settings, as described in *Reinstating the Factory Default Settings*, on page 39.

### Lens Assembly

Includes a wide angle lens with rotational focus control.

The supplied lens is removable and can be replaced with any standard C/CS lens.



### Serial Number

Located on the underside label of the AXIS 2100, the serial number is identical to the Ethernet address of the unit.

### Control Button

Located to the left of the lens assembly; this button is recessed within the product casing. Using a suitably pointed object, you press this button to restore the factory default settings as described in *Reinstating the Factory Default Settings*, on page 39; and enabling the Focus Assistant, as described in *Adjusting the Camera Focus*, on page 32.

## Caution!

The AXIS 2100 Network Camera is intended for indoor use only; prolonged exposure to direct sunlight or halogen light may damage the CCD. The Axis warranty does not cover CCD damage caused by prolonged strong light exposure.

## Rear Panel

### Network Connector

The AXIS 2100 is designed for 10 Mbps Ethernet and 100 Mbps Fast Ethernet networks and connects to the network via a twisted pair category 5 cable (10baseT and 100baseTX) terminated using a standard RJ-45 connector. Supporting NWay, the AXIS 2100 detects the speed of the local network segment and varies the speed of data communication accordingly, between 10 Mbps and 100 Mbps.

### Network Indicator

After completion of the startup and self test routines, this multi-colored indicator flashes independently, as follows:

- yellow - activity on a 10Mbps network
- green - activity on a 100Mbps network
- red - no physical connection to the network

### Power Indicator

Normally lit when power is applied. If it is not lit, or it flashes, there is problem with the AXIS 2100 external power source.

### Power Supply Connector

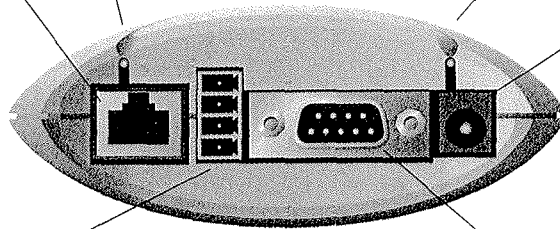
A single Jack socket (PS-D) for connection of AXIS 2100 power supply. The terminal block connector provides an auxiliary connection point for AC or DC power to the unit.

### I/O Connector

Provides the physical interface to a digital output, and a single digital photo-coupled input that is used for connecting a variety of external alarm devices to the AXIS 2100; including, IR-sensors, switches and alarm relays. In combination with the configurable alarm facilities, you can quickly develop a variety of security applications that are triggered on time - or alarm based - events. The connector can also be utilized as an alternative connection point for DC supply to the unit.

### RS-232 Serial Connector

Single 9-pin D-sub connector providing the RS-232 serial interface dedicated for modem connection.



**Note:** The power supply supplied with your AXIS 2100 is country specific. Please check that the type of power supply you are using is correct. See page 9.

# Assembling Your Camera

The information provided in this section will help you unpack and assemble your product; you are then ready to proceed with the installation and configuration of the product into your application environment, as described in the following sections of this document.

## Checking the Hardware Inventory

Unpack and check all the items against the itemized list below. You should contact your dealer immediately if you find anything is missing or damaged.

Hardware	Model Variants	Part Numbers
Digital Camera	AXIS 2100	0106-001-01
Null Modem Cable	-	I6954
Mounting Assembly	-	I5104
Power Supply (PS-D)	Europe	I4233
	UK	I4234
	Australia	I4255
	USA	I4253
	Japan	I4254
PS-D Extension Cable	3.3 meter	I5187
Printed Materials	AXIS 2100 User's Guide	I7091

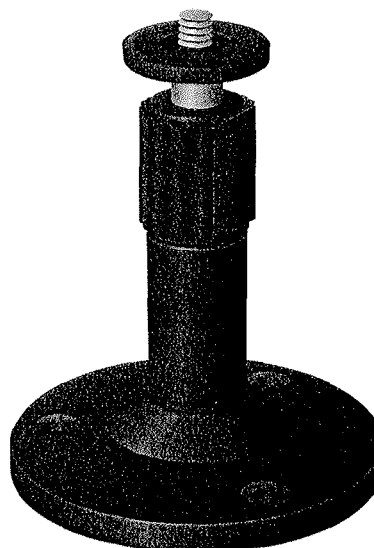
## Connecting the AXIS 2100 to a Mounting Assembly

### Caution!

When assembling your product, please note that the AXIS 2100 is specifically intended for indoor use only, and that the charged coupled device (CCD) within the product will become permanently damaged if the lens is exposed to too much direct sunlight, or halogen light! The Axis warranty does not cover CCD damage caused by prolonged exposure to strong light.

The mounting assembly supplied with your AXIS 2100 features a screw head that attaches to the underside of the product. Fasten the AXIS 2100 to the mounting assembly and position it appropriately for your application; three holes in the base unit allow the product to be securely fastened to any wall or ceiling.

**Note:** If you need to mount your camera upside-down, the AXIS 2100 can be easily configured to flip images through 180°.





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## Choosing Your Application

The AXIS 2100 can be used in a wide variety of applications: installing directly onto an Ethernet network or via any V.90-compatible modem, the product is completely independent and requires no additional software on your viewing desktop. Crisp live images are available directly within your preferred browser as soon as the product is installed, and your application can be further developed using the easy-to-use *Wizards*, or the Web-based *Administration Tools* resident within the product.

Not to be regarded as a comprehensive catalog of possible applications, this section describes several typical applications and includes reference information that will help prepare you for the installation and configuration of the unit.

**Note:** For the latest tips and tricks, check out the Axis camera pages at <http://www.axis.com/>

## Networking Applications

If you have access to a local Ethernet connection at your chosen point of installation, you only need to plug the AXIS 2100 onto your LAN/WAN and set the IP Address to instantly view the images from any desktop on your network.

However, the AXIS 2100 offers more than just access to live video images; and by using the available *Wizards* to guide you through the process, you can configure your product for any number of exciting applications, including:

- Viewing images in a custom-designed Web page.
- Uploading images to a remote FTP server on a LAN/WAN network to accommodate a large viewing audience where a high volume of Web page hits is anticipated.
- Connecting an external alarm device to the AXIS 2100 and uploading pre and/or post alarm images to a target FTP server when an alarm or time-based event occurs; and optionally, sending e-mail alerts containing a single image, or a Web link to a pre/post alarm image sequence stream saved to the target FTP server.

**Note:** Once the AXIS 2100 is physically connected and installed onto your network, you are then able to access live video from any desktop browser on your network - without any further configuration whatsoever. Whether you are an advanced or novice user, you should use the *Wizards* - available from the product *Home Page* - to configure your preferred application. Advanced user's can optionally use the Web-based *Administration Tools* to refine their application once the basic configuration has been established using the *Wizards*.

## Picture frequency for Networking Applications

When used in a TCP/IP networking environment, the AXIS 2100 delivers up to 10 images/second; where, the actual image frequency is typically limited by:

- the available network bandwidth
- your Web browser/computer
- the chosen picture size
- the quiescent lighting conditions at the point of installation.
- complexity of detail and color variation within the image

## Image Compression Ratios

The file size of a JPEG-compressed image depends upon the actual content of the image. Images containing much detail will generate larger files. Image quality is controlled through the level of compression; where, high compression yields small files, while low compression maintains higher image quality at the expense of larger files. The table below contains average file sizes in kilobytes, derived from real-life tests:

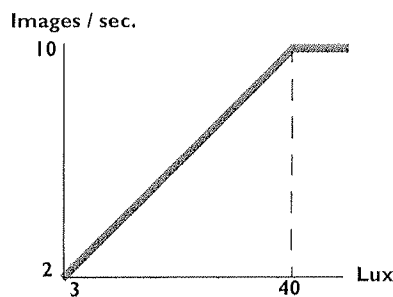
Resolution	Typical File Sizes (kbytes)			
	Lowest	Low	Medium	High
640 x 480	250	20	13	8
320 x 240	70	8	5	3

**Notes:** • Using any modern computer of 300 MHz or above, will avoid introducing any unnecessary imaging bottleneck when viewing the images.

## Lighting Conditions

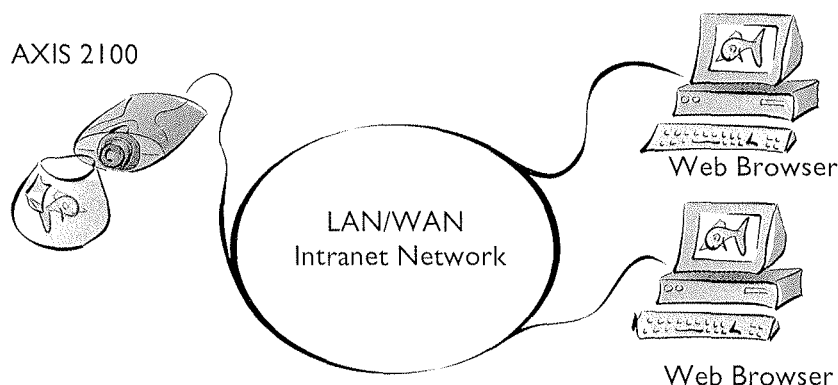
Just like an ordinary camera, the shutter time of the AXIS 2100 increases in low light conditions to guarantee optimal image quality.

The actual frame rate for your images is effected by the prevailing light conditions within your application environment; and although the AXIS 2100 will produce good quality images right down to 3 Lux, the local lighting should ideally be stable at above 40 Lux to achieve optimal image frequency. Consequently, you can expect a reduced frame rate under low light conditions in your application environment, as shown in the diagram (right).



## Viewing Images in a Custom-designed Web Page

Simply install the AXIS 2100 directly your local Ethernet network and complete the *Installation Wizard* to immediately view live video images within your own custom-designed Web page. The Wizard not only helps you to define the image format and personalized characteristics of your Web page *Layout*, but even allows you to decide how accessible your product is over the intranet or Internet network - you decide in just a few simple steps:



Often used as a Web attraction for enhancing a Web site with live images, this typical application represents the most basic form of network camera configuration; it is ideally suited for *occasionally-visited* sites on both large corporate networks, and SOHO (Small-Office Home-Office) applications where a small network is installed and maintained. If you anticipate a significantly large viewing audience for your images, you should consider configuring your product to upload images to an FTP server on your network, as described in *Sequentially Uploading Images to a Remote FTP Server*, on page 13.

## Installation and Configuration Overview

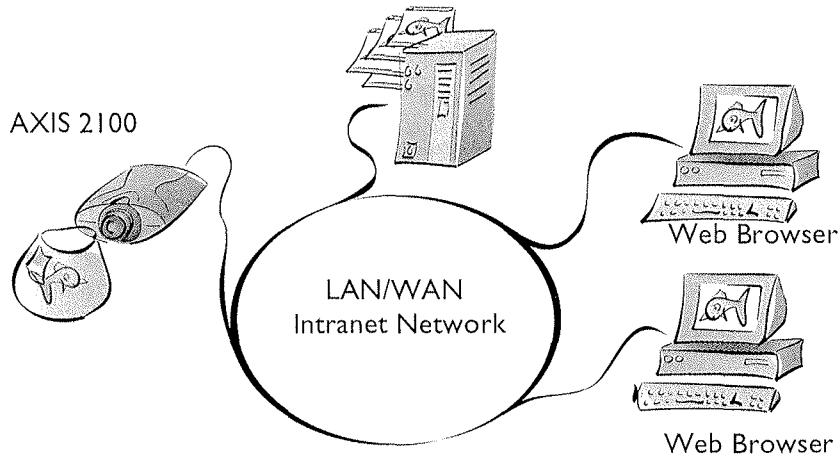
You configure your AXIS 2100 for viewing images over a network as follows:

1. Connect the AXIS 2100 to your local network. Refer to *Installing Your Camera on a Network*, on page 19.
2. Open the **Home Page** in your browser and start the **Installation Wizard**; complete the Wizard to establish the standard *Security, Date and Time, Image General Layout* and *TCP/IP Network* settings - selecting **network** as your chosen method of connection in the **Modem or Network** dialog. Refer to *Configuring Your Camera*, on page 35.
3. Your application is now complete. Having completed the Wizard, you should now verify the installation by checking that you have full access to both the images and the product Web pages in your browser.

**Note:** You can refine your application using the Web-based Administration Tools.

## Sequentially Uploading Images to a Remote FTP Server

Ideal for *busy* Web sites on both large corporate networks, and SOHO (Small-Office Home-Office) applications where a small network is installed and maintained; this application uploads images to a designated FTP server on your network, and is perfect for applications where a significantly large viewing audience is expected.



Simply install the AXIS 2100 directly on your local Ethernet network and complete the **Installation** and **Application Wizards** to develop an *active* application that will upload images to a designated FTP server - as a *sequential* stream that is unlimited or restricted between specified time periods; you organize the times and the frequency at which images are taken and uploaded to the target FTP server.

### Installation and Configuration Overview

You configure the AXIS 2100 to actively upload images to an FTP server, as follows:

1. Connect the AXIS 2100 to your local network. Refer to *Installing Your Camera on a Network*, on page 19.
2. Open the **Home Page** in your browser and start the **Installation Wizard**. Complete the Wizard to establish the standard *Security, Date and Time, Image General Layout* and *TCP/IP Network* settings - selecting **network** as your chosen method of connection in the **Modem or Network** dialog. Refer to *Configuring Your Camera*, on page 35.
3. Continue the configuration of your product using the **Application Wizard** to define the target FTP server and your preferred mode of operation - choosing **Sequential** mode to create your active application.
4. Having completed the Wizard, you should now verify the configuration by accessing the images stored on the FTP sever from your browser.

**Note:** You can refine your application using the Web-based Administration Tools.

### Uploading Pre and/or Post Alarm Images to a Remote FTP server

The AXIS 2100 is an ideal solution for light indoor surveillance applications: by connecting your chosen external alarm devices to the I/O connector, you can quickly configure the product to upload single images or pre/post alarm image sequences to an FTP server when a time or event-based event occurs.

Using the available *Wizards*, you organize the times and frequency at which images are taken and uploaded to the target FTP server; you optionally arrange for e-mail alerts that contain single images, or Web references to your recorded image sequences stored on the target FTP server.

### Installation and Configuration Overview

You configure the AXIS 2100 to upload Pre and/or Post Alarm images, as follows:

1. Connect the AXIS 2100 to your local network. Refer to *Installing Your Camera on a Network*, on page 19.
2. Open the **Home Page** in your browser and start the **Installation Wizard**. Complete the Wizard to establish the standard *Security, Date and Time, Image General Layout* and *TCP/IP Network* settings - selecting **network** as your chosen method of connection in the **Modem or Network** dialog. Refer to *Configuring Your Camera*, on page 35.
3. Continue the configuration of your product using the **Application Wizard** to define the target FTP server and define your preferred mode of operation - choosing **Alarm Mode** to upload single images, or pre/post alarm image sequences, when a defined alarm or time-based event occurs.
4. Having completed the Wizard, you should now verify the configuration by triggering the defined alarm event and then viewing the uploaded images in your browser.

**Note:** You can refine your application using the Web-based Administration Tools.

## Modem Applications

If a local network connection is not available at the point of installation for your AXIS 2100, you can alternatively connect your AXIS 2100 to any V.90-compatible modem and quickly configure any number of exciting applications using the Wizards; including:

- Viewing images in a fully custom-designed Web page over a Dial-up modem connection.
- Sequentially uploading images to an ISP (Internet Service Provider) over a Dial-up modem connection and publishing images to the whole Internet community.
- Uploading single or pre/post alarm image sequences to your ISP over a Dial-up modem connection, when an alarm or time-based event occurs; and optionally, sending e-mail alerts containing single images or Web references to pre/post alarm images stored by your ISP.

All modem applications are primarily configured using a local computer connected to the AXIS 2100 using the supplied *Null Modem Cable*.

- Notes:**
- Once the Dial-up modem connection has been created and the AXIS 2100 is physically connected to the modem, you are able to Dial-up your AXIS 2100 in exactly the same fashion as you would do your ISP - without any further configuration whatsoever! You use the *Installation* and *Application Wizards* - recommended for advanced and novice users alike - to establish the basic parameters for your application; advanced user's can optionally use the *Administration Tools* to refine their application, after the basic configuration has been established using the available Wizards.
  - Your telephone connection charges should be a prime consideration when developing any modem configuration - especially, if you do not have free calls to your ISP.

### Picture Frequency for Modem Applications

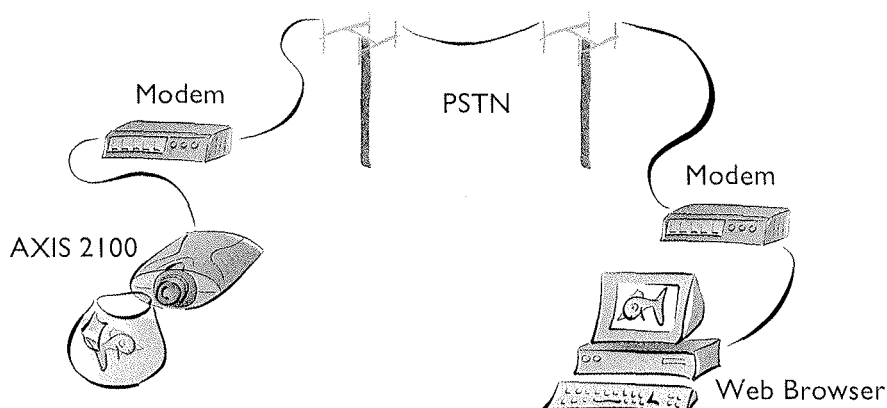
When used with a modem, the speed of your communications link will normally determine the image frequency in your browser; a standard image is normally transmitted in around 4 seconds, although an optimal imaging frequencies are achieved by buffering the video stream into internal memory before uploading the recorded images to your ISP or designated Web server. This is the ideal solution for remote applications connected to external security devices requiring an optimal image frequency during pre and post alarm events.

### Proprietary ISP Dial-up Protocols

If your ISP requires you to install any special software before initiating a Dial-up connection, it is likely that your ISP is using proprietary protocols, incompatible with the standard-based AXIS 2100. In these circumstances we recommend that you ask your ISP to provide you with an alternative dial-up facility that allows for standard dial-up networking. Axis do not guarantee the compatibility of this product with any ISPs that require the use of proprietary or non-standard software as a pre-requisite for a Dial-up connection.

## Remote Imaging in a Custom-designed Web Page

Using the supplied *Null Modem Cable*, you can conveniently configure the AXIS 2100 as a standalone application that is completely remote from any network. Ideal for remote surveillance, industrial control, and process monitoring applications; you can quickly configure the AXIS 2100 for a direct installation to your serial modem, suitable for a multitude of remote applications that can be viewed from anywhere - from the comfort of the computer at home, or the office.



Having established a Dial-up connection for your AXIS 2100, the product plugs directly into a serial modem to provide immediate access to live video images within your own custom-designed Web page. You access the images and the product Web pages in exactly the same fashion as you would Dial-up to your ISP.

### Installation and Configuration Overview

You configure the AXIS 2100 for viewing images over a remote Dial-up modem connection as follows:

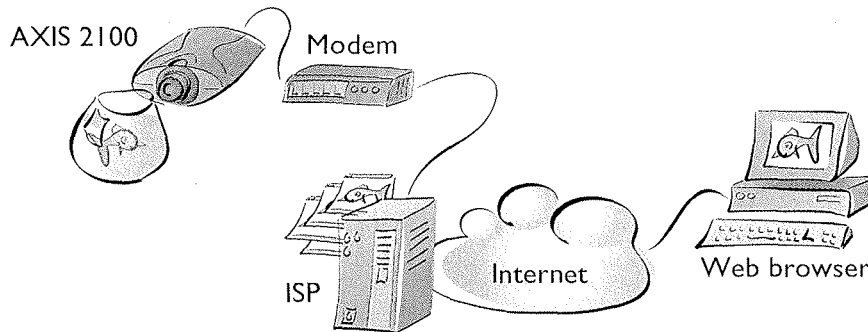
1. Connect a computer to the camera using the supplied *Null Modem Cable* and initiate a Dial-up connection to the AXIS 2100. For this and general information on the Dial-up connection, refer to *Installing Your Camera to a Modem*, on page 25.
2. Create a dedicated Dial-up Connection.
3. Refine the Dial-up parameters.
4. Initiate the Dial-up connection.
5. Referring to *Configuring Your Camera*, on page 35, open the **Home Page** in your browser and start the **Installation Wizard**. Complete the Wizard to establish the standard *Security*, *Date and Time*, *Image General Layout* and *Modem* settings - selecting **modem** as your chosen method of connection.
6. Disconnect the computer and connect your AXIS 2100 directly to your modem.
7. Your application is now complete. You should now verify the installation by remotely accessing the AXIS 2100 Web pages from your browser via the connected modem.

**Notes:** •By configuring the AXIS 2100 to accept incoming calls, you can at any time refine or amend the product configuration via a remote Dial-up connection - or local computer connected via the supplied Null Modem Cable.

•You can refine your application using the Web-based Administration Tools.

## Uploading Images to Your Internet Service Provider

Perfect for Web attraction, remote light surveillance and process control applications; the AXIS 2100 can be quickly configured to dial-out from any remote location and transmit live images to several users, or the whole Internet community - via your preferred Internet Service Provider. You select any of the *Public ISPs* supported within the **Application Wizard**, or alternatively specify another *Public* or *Private ISP* of your choosing.



Having established the Dial-up connection for your AXIS 2100; you then continue with your configuration using the **Installation Wizard** to develop an *active* application that uploads live images to a designated ISP over normal phone lines. Your image files are transmitted as a *sequential* stream, or restricted between specified time periods; and you set the times and the frequency at which images are taken and uploaded to the ISP.

## Installation and Configuration Overview

You configure the AXIS 2100 to upload images to an Internet Service Provider, as follows:

1. Connect a computer to the camera using the supplied *Null Modem Cable* and initiate a Dial-up connection to the AXIS 2100. For this and general information on the Dial-up connection, refer to *Installing Your Camera to a Modem*, on page 25.
2. Create a dedicated Dial-up connection.
3. Refine the Dial-up parameters.
4. Initiate the Dial-up connection.
5. Referring to *Configuring Your Camera*, on page 35, open the **Home Page** in your browser and start the **Installation Wizard**. Complete the Wizard to establish the standard *Security*, *Date and Time*, *Image General Layout* and *Modem* settings - selecting **modem** as your chosen method of connection.
6. Continue the configuration using the **Application Wizard** to define your preferred ISP and mode of operation - choosing **Sequential** mode to upload an image sequence that is unlimited or restricted between specified time periods, but independent of any alarm event.
7. Disconnect the computer and connect your AXIS 2100 directly to your modem.
8. Your application is now complete. You should now verify the installation by remotely accessing the images now stored with your ISP.

**Notes:** •By configuring the AXIS 2100 to accept incoming calls, you can at any time refine or amend the product configuration via a remote Dial-up connection - or local computer connected via the supplied Null Modem Cable.

- You can refine your application using the Web-based Administration Tools.



## Uploading Pre/Post Alarm Images to Your Internet Service Provider

Perfect as a remote imaging and light surveillance tool; the AXIS 2100 can not only transmit live video streams over a standard Dial-up connection, but can also be connected with a wide variety of standard external alarm devices; it can be quickly configured for uploading single images, or pre/post alarm image sequences, to a *Public* or *Private* ISP when a time or alarm-based event occurs.

Using the available Wizards, you set the times and the frequency at which images are taken and uploaded to your ISP; you optionally arrange for e-mail alerts that contain single images, or Web references to recorded image sequences stored with your ISP.

### Installation and Configuration Overview

You configure the AXIS 2100 to upload images to an Internet Service Provider in Alarm Mode, as follows:

1. Connect a computer to the camera using the supplied *Null Modem Cable* and initiate a Dial-up connection to the AXIS 2100. For this and general information on the Dial-up connection, refer to *Installing Your Camera to a Modem*, on page 25.
2. Create a dedicated Dial-up connection.
3. Refine the Dial-up parameters.
4. Initiate the Dial-up connection.
5. Referring to *Configuring Your Camera*, on page 35, open the **Home Page** in your browser and start the **Installation Wizard**. Complete the Wizard to establish the standard *Security, Date and Time, Image General Layout* and *Modem* settings - selecting **modem** as your chosen method of connection.
6. Continue the configuration using the **Application Wizard** to define your preferred ISP and mode of operation - choosing **Alarm Mode** to upload single images, or pre/post alarm image sequences, when a defined alarm or time based event occurs.
7. Disconnect the computer and connect your AXIS 2100 directly to your modem.
8. Your application is now complete. You should now verify the configuration by triggering the defined alarm event and then viewing the resultant images uploaded to your ISP.

**Notes:** •By configuring the AXIS 2100 to accept incoming calls, you can at any time refine or amend the product configuration via a remote Dial-up connection - or local computer connected via the supplied Null Modem Cable.

- You can refine your application using Web-based Administration Tools.

# Installing Your Camera on a Network

Follow the instructions below to quickly install the AXIS 2100 onto an Ethernet network.

## Important!

If you do not have access to a network connection at your point of installation, the AXIS 2100 can be installed and configured for use with a modem. For further details, please refer to *Installing Your Camera to a Modem*, on page 25.

1. Note the serial number of your AXIS 2100 for future reference during the installation procedure. This is located on the underside label of the unit.
2. Connect your AXIS 2100 to the network with twisted pair category 5 cable (10baseT or 100baseTX) terminated using a standard RJ-45 connector.
3. Connect the power supply to the AXIS 2100.
4. Check that the Power Indicator is constantly lit.

The AXIS 2100 is now successfully connected to your network.

## Assigning an IP Address

### Before you begin:

- Make sure the AXIS 2100 is powered up and attached to the network.
- IP Address: Acquire an unused IP address from your Network Administrator.
- Server Privileges: Although no special privileges on Windows 95/98, you will need *Administrator* privileges for Windows NT, and *Root* privileges on UNIX systems.
- Ethernet Address: The AXIS 2100 is pre-configured with a unique Ethernet Address that is based upon the serial number printed on the underside label of the unit; the serial number typically follows the format 00-40-8c-xx-yy-zz. You must know the Ethernet address to install the product.

## Mapping a Host Name to the IP Address

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

**Notes:** If the Host Name is not included in the system host table, you can still download the IP address by replacing the Host Name with the IP address - as defined in the following examples.

The AXIS 2100 is designed with high-speed Internet services foremost in mind. However, as most high speed Internet services only provide you one external IP address, there are some practical issues that should be considered when developing your application. For further details, refer to *Appendix D - High Speed Internet Services*.

## Choosing an Appropriate Method

### Important!

When installing your AXIS 2100, do not use the default or the IP address featured as examples within this document. Always consult your Network Administrator before assigning an IP address.

Set the IP address using an appropriate method for your operating system from the table below:

Method	Operating Systems	Refer to...
<b>AXIS IP Installer</b>	Windows 95/98 and NT	"Using the AXIS IP Installer" on page 23.
<b>ARP</b> Requires the IP address for each new device to be downloaded individually and is not appropriate for use over routers.	Windows 95/98 and NT	"Using ARP in Windows 95/98 and Windows NT" on page 20.
	UNIX, OS/2	"Using ARP in UNIX and OS/2" on page 21
<b>BOOTP</b> Requiring a BOOTP daemon on your system, this method operates over the entire network. A request to an active daemon initiates a search of the boot table to find an entry matching the unit's Ethernet address. The daemon downloads the IP address to the device if a match is found.	UNIX	Refer to <i>Using BOOTP in UNIX</i> , on page 22.

### Tip!

For easy editing and correction of erroneous DOS commands, try making the first entry in your DOS Command Window 'doskey'. This allows you to scroll through a buffer of old commands using the 'up' and 'down' arrow keys; you can also use the F7 key to select from a list of commands used in the current session.

## Using ARP in Windows 95/98 and Windows NT

### Important!

When using the Windows 95/98 implementation of ARP, change the first line in the following examples to:

```
arp -s <server IP address> <Ethernet address> <w95/98 host IP address>
```

where: <w95/98 host IP address> is the IP address of your Windows 95/98 host.

Example:

```
arp -s 172.21.1.200 00-40-8c-10-00-86 172.21.1.193
```

```
ping 172.21.1.200
```

Tip! Use the *winipcfg* command to discover your IP number if you are using DHCP and are unsure of your current designation.

To download the IP address and verify the communication, start a DOS Command window and type the following commands:

```
arp -s <server IP address> <Ethernet address>
ping <server IP address>
```

**Example:**

```
arp -s 172.21.1.200 00-40-8c-10-00-86
ping 172.21.1.200
```

- Notes:**
- When you execute the PING command for the first time, you may experience a significantly longer response time than usual.
  - Should you encounter any difficulty in setting an IP address for your AXIS 2100, please refer to *Appendix A - Troubleshooting*.

The AXIS 2100 is now automatically rebooted; whereupon, the host then returns 'Request timed out' before returning the DOS user prompt >.

To verify that the address has been set and the communication is established, ping the unit once again with the new IP address; the host then returns: 'Reply from 172.21.1.200...' or similar.

## Using ARP in UNIX and OS/2

To download the IP address and verify the communication, type the following commands:

```
arp -s <server IP address> <Ethernet address> temp
ping <server IP address>
```

**Example:**

```
arp -s 172.21.1.200 00:40:8c:10:00:86 temp
ping 172.21.1.200
```

The AXIS 2100 is now automatically rebooted; whereupon, the host then returns 'Request timed out' before returning the DOS user prompt >.

To verify that the address has been set and the communication is established, ping the unit once again with the new IP address; the host then returns: '172.21.1.200 is alive...' or similar.

- Notes:**
- When you execute the PING command for the first time, you may experience a significantly longer response time than usual.
  - Should you encounter any difficulty in setting an IP address for your AXIS 2100, please refer to *Appendix A - Troubleshooting*.

## Using BOOTP in UNIX

Follow these steps to use the BOOTP method:

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

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

where:

ht    = ether  
vm    = rfc1048  
ha    = The Ethernet address of the AXIS 2100  
ip    = The IP address of the AXIS 2100  
sm    = The subnet mask  
gw    = The default router address

### Example:

```
mycam:ht=ether:vm=rfc1048:\  
:ha=00408c100086:ip=172.21.1.200:\  
:sm=255.255.255.0:gw=172.21.1.1
```

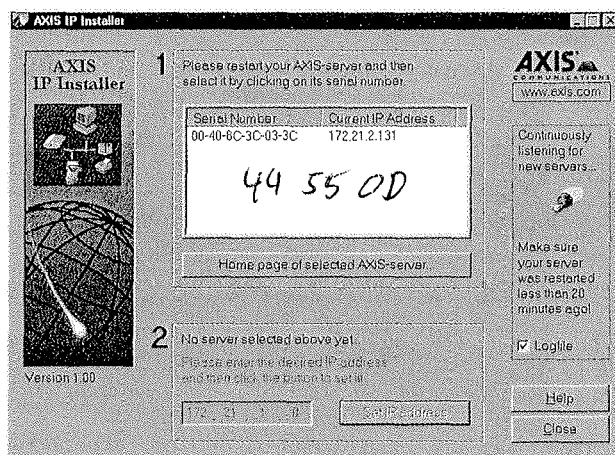
2. If necessary, update your host table and alias name databases as described required by your system.
3. If it is not already running, start the BOOTP daemon. This is typically done using the command `bootpd`.
4. Restart the AXIS 2100 to download the IP address, default router address, and subnet mask.

## Using the AXIS IP Installer

The AXIS IP Installer is a Windows 95/98 & NT program is ideal for setting the IP addresses for *multiple* Axis' networking products on your network. Additionally allowing you to conveniently access the home Web page of any Axis ThinServer device connected to your network, this freely distributed software is available for download from Axis' Website at <http://www.axis.com/>.

### Installing the AXIS IP Installer:

1. Download the latest AXIS IP Installer software onto your desktop and run the *Setup\_IPInstaller.exe* program to start the installation.
2. The AXIS IP Installer - Setup dialog is displayed on the screen.



3. Follow the instructions as they appear on the screen.
4. Click **Finish** to complete the installation.

### Setting the IP Address with AXIS IP Installer:

1. Run the AXIS IP Installer from the Start menu. The AXIS IP Installer dialog is displayed on the screen.
2. Restart your camera server.
3. Select the serial number of your camera server in the list. The serial number is identical to the Ethernet address of the unit.
4. Enter the desired IP address. Click **Set IP address**. The IP address will now be set.
5. To access the home page of the camera server, click **Home page of selected Axis-server...** You can now configure the AXIS 2100 according to your requirements.
6. Click **OK** to exit the program.

For more help during the installation of the IP address, click **Help** or **F1**.

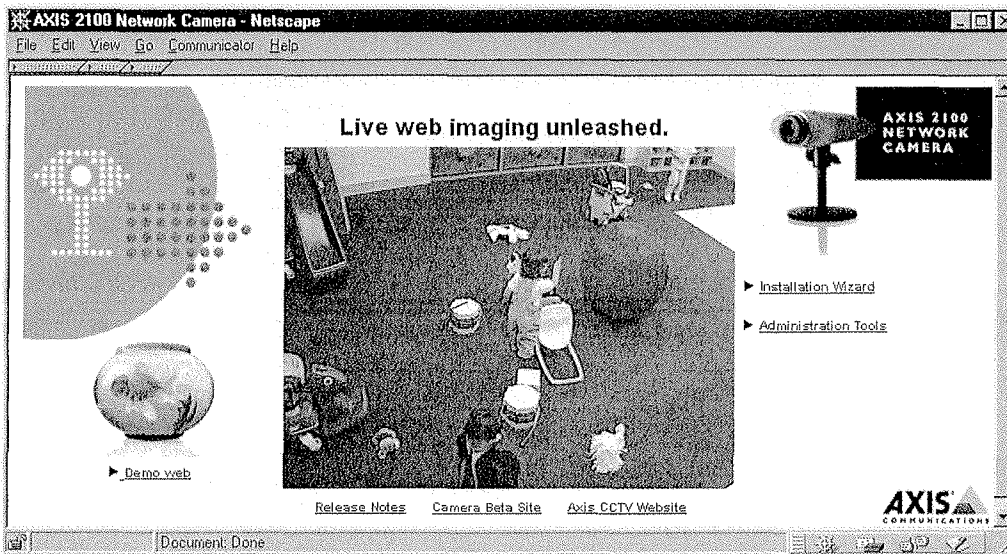
## Verifying the Installation

After assigning an IP address, verify the connection between the AXIS 2100 and the network:

1. Start your Web browser (see note below) and enter the name or IP address in the Location/Address field:

Example:

2. The Home Page for your AXIS 2100 is now displayed:



3. Continue the setup process and configure your own application using the **Installation Wizard** or **Administration Tools**, as described in *Configuring Your Camera*, on page 35.

### Important!

When accessing the Administrator Tools for the first time during a session, you are prompted for user-name and password. Log on as an Administrator using the username root and default password pass. You are recommended to change the root password, since all Axis products are shipped with the same password as default. For further information on this, refer to *System Security*, on page 38.

# Installing Your Camera to a Modem

Complete the following installation procedures if you are not installing your camera to a local area network, but instead wish to connect the AXIS 2100 to a serial modem for transmitting images to an Internet Service Provider (ISP) or remote Web server, using a normal Dial-up connection.

## Quick Start For Advanced Users:

Follow these abbreviated instructions only if you are experienced with Windows Dial-up Networking:

- Set up an existing session to 115.200 baud, using the physical COM port to which you have connected your AXIS 2100.
- Login with userid *root* and password *pass*; the *Phone Number* and *Modem Type* that you enter are irrelevant at login and can be remain undefined.
- Start your Dial-up Networking session, and enter any URL: the AXIS 2100 emulates a DNS server and will respond to this regardless.
- Start the Installation Wizard and Administration Tools to further configure the product, as described in *Configuring Your Camera*, on page 35.

**Note:** Axis regularly maintain an updated list of all supported ISPs and modems; please visit our Web-site for this, and other late information on our products at <http://www.axis.com/>

## Modem Installation Summary

Before you can access your AXIS 2100 using a Web browser, you must first install a local computer to the AXIS 2100 via the supplied *Null Modem Cable*; you then proceed to create a Dial-up connection and establish some basic settings. A full summary of the defined procedures follow:

- Connect your computer to the camera using a null modem cable
- Creating a Dial-up connection
- Refining the Dial-up connection properties
- Initiating the Dial-up connection
- Verifying the modem connection using a Web browser
- Defining your basic configuration using the available *Wizards*
- Installing the modem to your AXIS 2100

## Important!

The information and screen examples contained within this section are specific to Windows NT and 98; and although similar to the Dial-up implementation in Windows 95, small deviations in the dialog instructions can be expected. Refer to your system information for details on how create a Dial-up modem connection if you are using any other operating system.



## Connecting Your Computer Using the Null Modem Cable

### Before you begin:

Windows Dial-up Networking and TCP/IP must be correctly installed prior commencing with the modem cable connection. Carry out the following checks before proceeding with your installation:

Windows Dial-up Networking:

Double click My Computer. If the Dial-up networking icon is not visible in the Network folder, double click *My Computer* and then start the *Dial-up Networking Wizard*. More detailed information on this is provided in the Windows Help.

TCP/IP:

From the Start menu, open the Control Panel and double click the Network icon.

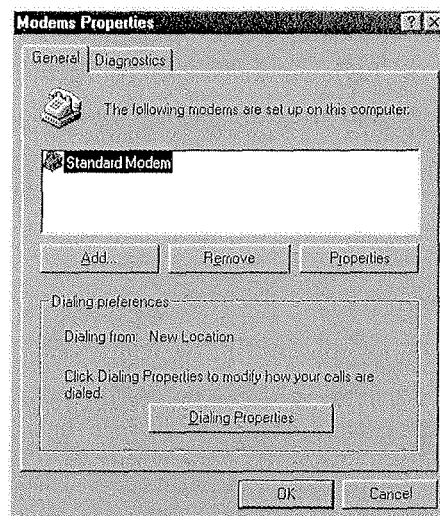
Follow the remaining instructions only if TCP/IP is not displayed as an installed network component:

- Click *Add...* and highlight *Protocol* as the *Network Component Type*. Click *Add*.
- Click *Add*, select *Microsoft TCP/IP*, and then *OK*.

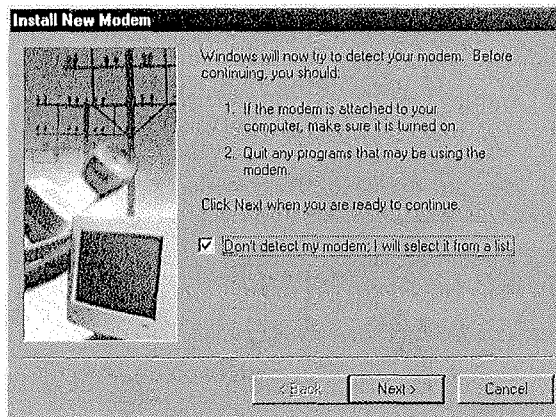
Follow the steps below and connect a computer to the AXIS 2100 for configuring an appropriate serial modem connection to your product:

**Note:** If you already have a serial modem connected to the serial port of your computer, and configured it as a Standard Modem (see below), you may now want utilize this connection by simply replacing this modem with your AXIS 2100. In this case, you can proceed directly to *Creating a Dial-up Networking Connection*, on page 28.

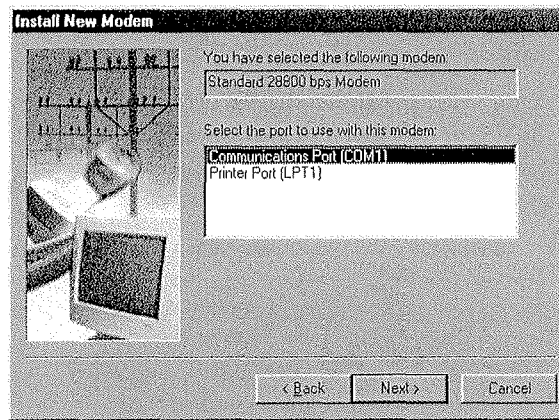
1. Connect the supplied Null modem cable between the *Modem* connector on the AXIS 2100 and the *COM* port on your computer.
2. Connect the power supply to the camera server and check that the Power indicator is constantly lit.
3. From the Start menu, open the Control Panel and double click the Network icon.
4. If a Standard Modem is already set up and displayed within the *Modem Properties* dialog (see right) you should proceed directly to the step 8. Otherwise, click *Add...* to start the *New Modem Installation* wizard.



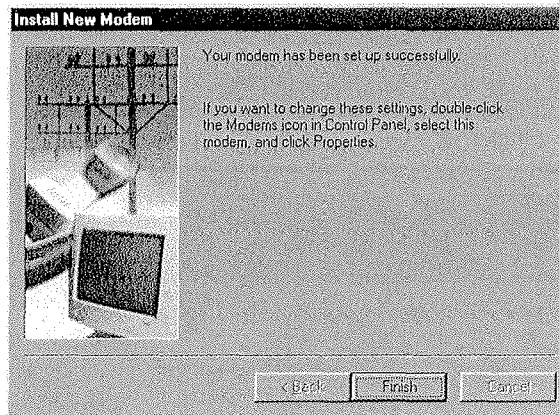
5. Check the dialog: *Don't detect my modem, I will select it from a list.* Click **Next**.
6. Select the Standard 28800 modem from the displayed list of modems. Click **Next**.



7. Select the serial port to which your AXIS 2100 is now connected via the Null Modem cable. Click **Next**.



8. A Standard 28800 modem connection is now available for the AXIS 2100. Click **Finish** to close the *Install New Modem* dialog.

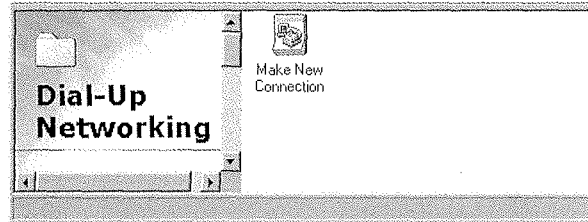


9. Click the **Properties** button to finally check that the displayed Communications Port is set correctly; that is, set to the same port as you have connected the AXIS 2100. Click **OK**.
10. Click **Close**.

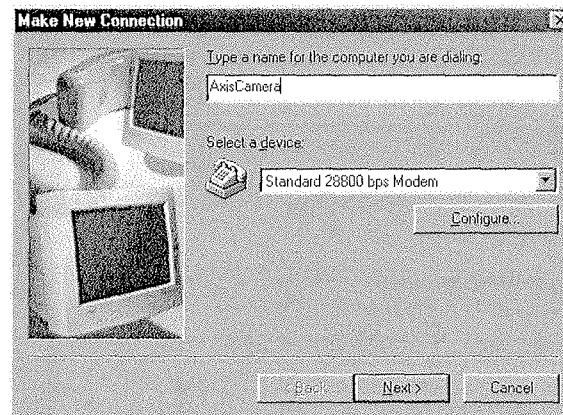
## Creating a Dial-up Networking Connection

Follow the steps below to create a dedicated Dial-up networking connection to your AXIS 2100:

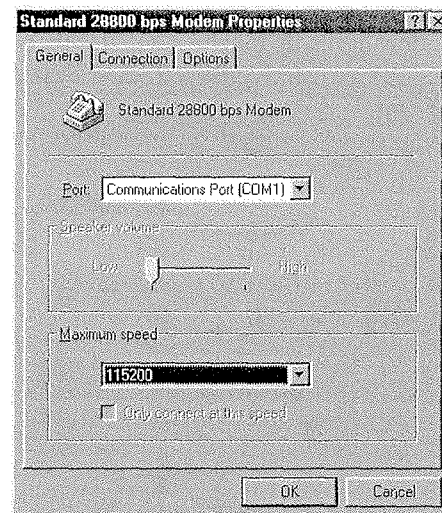
1. Double click My Computer and then double click Dial-up networking icon.
2. Double click the *Make New Connection* icon.



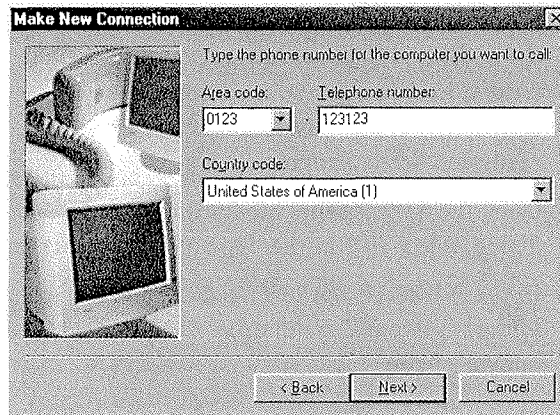
3. Provide the connection with a name (*AxisCamera* is the name used in the subsequent examples).
4. From the drop down dialog, select the Standard Modem previously created for the AXIS 2100 as the selected device. Click **Configure...**



5. Double check that the Port is set correctly and increase *Maximum Speed* to 115200: this will severely increase performance of your AXIS 2100 when accessed via Null-Modem cable.
6. Click **OK** to return to the *Make New Connection* dialog.



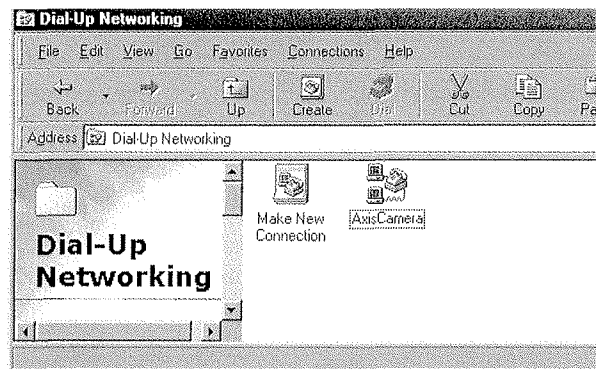
7. Click **Next**. The telephone numbers requested in the following dialog are not required for use in the logical connection to your camera. To bypass the wizard error correction, simply enter any dummy entry into the *Area code*, *Telephone number* and *Country code* fields. Click **Next**.



8. You have now successfully created your dedicated Dial Up Networking connection for your AXIS 2100. Click **Finish**.



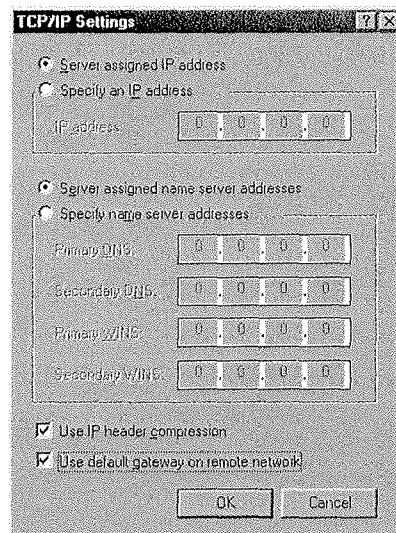
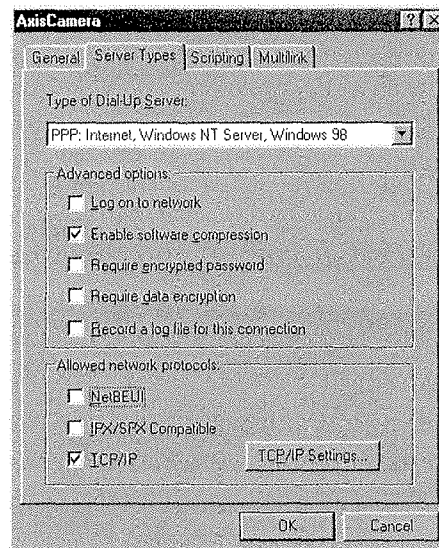
The Dial-up Network connection is now displayed and ready for use within the Dial-up Networking dialog (see right).



## Refining the Dial Up Networking Properties

Having created the Dial-up connection for your AXIS 2100, you then follow the steps below to refine several of the connection properties:

1. From the Dial-up Networking dialog, right click the dedicated Dial-up connection previously created for you camera. *AxisCamera* was the connection created used in this and previous examples. Select **Properties**.
2. Click the Server Types tag. From the drop-down dialog, select *PPP* as the Type of Dial-up Server.
3. In the Advanced options field, check *Enable software compression*. All other checkboxes should remain unchecked.
4. In the *Allowed network protocols* field, check the TCP/IP checkbox. NetBEUI and IPX/SPX checkboxes should remain unchecked.
5. Click TCP/IP settings and then check the *Server assigned IP address*, and *Server assigned name server addresses* radio buttons.
6. Check *Use IP header compression* and *Use default gateway on remote network* checkboxes. Click OK.



7. Click the Scripting tag and ensure that the *Start terminal screen minimized* checkbox is checked. Click OK to exit Dial-up Networking Properties.

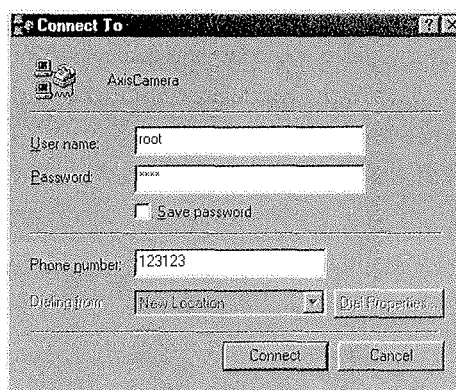
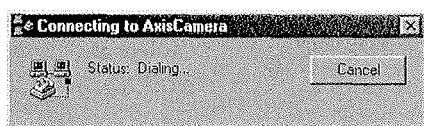
## Initiating the Dial-up Connection

### Before you begin:

Please ensure that the Null Modem Cable is correctly installed and that the relative connection properties are correctly configured prior to initiating a Dial-up connection. Step by step instructions on how to do this are provided on the following pages:

- *Connecting Your Computer Using the Null Modem Cable*, on page 26
- *Creating a Dial-up Networking Connection*, on page 28
- *Refining the Dial Up Networking Properties*, on page 30

1. Double click *My Computer* and then double click the *Dial-up Networking* dialog.
2. Double click the Dial-up connection icon that was previously created for your AXIS 2100. *AxisCamera* was used in this and previous examples.
3. Click **Connect** to initiate the Dial-up connection.



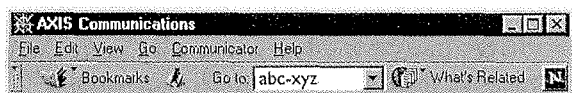
**Note:** You may enter any username or password when initiating a Dial-up connection for the first time.

You have now successfully opened the Dial-up connection to your Axis Lisa and are free to configure your camera as you wish using any standard Web browser.

### Verifying the Modem Connection Using a Web Browser

Having initiated your Dial-up connection, as described above, you can quickly verify the integrity of the connection by accessing the AXIS 2100 using a standard Web browser; such as Netscape or Internet Explorer as follows:

1. Because the AXIS 2100 emulates a DNS server, type in any URL in the **Location/Site** field of your browser to display the AXIS 2100 Home Page, as defined below:



2. Now, configure the unit using the **Installation Wizard** or the **Administration Tools**.

## Adjusting the Camera Focus

### Important!

As an alternative to the focusing method described in this section, you can also adjust the focus of the product using the Administration Tools - for more information on this, please refer to your on-line help.

The AXIS 2100 features a replaceable CS-type lens that can be targeted for different applications. Supporting rotational focus control, the lens must first be focused under normal quiescent conditions to optimize the image quality for your product.

- Notes:**
- The lens rotates on a screw fitting and can be completely removed. If you do need to remove the lens, take care not to let any dust enter the lens or the camera window - as this can adversely effect the quality of your live images.
  - The unit is delivered with the lens set in approximate focus position, with focus set to infinity.

### The Focus Assistant

The **Status Indicator** used in conjunction with the **Focus Assistant**, provides an immediate visual display that will help you achieve a good basic level of focus at the point of camera installation; this is particularly useful for remotely installed cameras, where the distance between the AXIS 2100 and your viewing workstation is often considerable.

#### Focus Quality

Once set to *Focus Mode*, the **Status Indicator** displays the following colors that represent a predefined level of focus:

Color	Level of Focus (%)	Focus Quality
Red	0 - 60	Poor
Yellow	60 - 80	Reasonable
Green	80 - 100	Good

#### Rotational Focus Control

The lens provided with the AXIS 2100 has rotational focus control that allows the focal length of the lens to be adjusted manually; the lens is used to establish the basic level of focus under quiescent conditions: rotated clockwise, for close focus; or anticlockwise, for distant focus.

Dependent upon the cameras location, it is likely that several planes of focus exist within the camera's normal field of view; consequently, the **Status Indicator** is likely to display green, indicating a *good* level of focus, several times throughout the full travel of the lens assembly.



## Focusing the Camera Under Quiescent Conditions

### Before you begin:

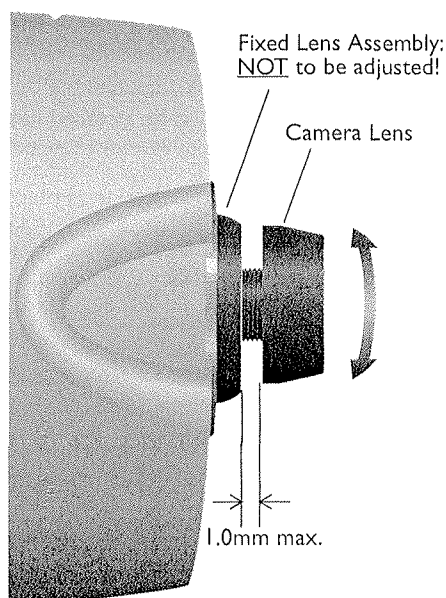
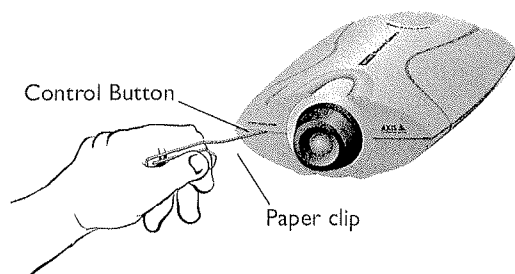
For the focusing algorithm to work effectively, always ensure that minimal movement occurs within the camera's field of view when focusing your camera, as described below.

With reference to the accompanying illustrations, follow the instructions below to achieve a good basic level of focus under normal quiescent conditions:

### Important!

Do not press the Control Button within 10 seconds of powering on the unit - as this will cause the product to return to the factory default settings.

1. Power-on the AXIS 2100 and then wait at least 10 seconds.
2. Set the AXIS 2100 to its extreme close-focus position by turning the **Camera Lens** fully clockwise (see illustration, right).
3. Press and hold the **Control Button** using a thin paper clip, or any other suitably pointed object (see illustration, below) - until the **Status Indicator** flashes *Yellow*.



The **Focus Assistant** is now enabled with the **Status Indicator** set to **Focus Mode**; the AXIS 2100 simultaneously initiates a focusing algorithm that regularly calculates the quality of focus within the camera's field of view.

4. In order for the **Focus Assistant** to access the full focusing range for your application environment, you now turn the lens six full-turns in the anticlockwise direction; unless you want to replace the lens, it should not be unscrewed more than 1.0mm apart from the **Fixed Lens Assembly** (see illustration, above-right).
5. Finally, turn the lens slowly clockwise until the **Status Indicator** displays *Green*; that is, until a *Good* level of focus is achieved.



- Notes:**
- A *Good* level of focus is normally achievable throughout several planes within the camera's focusing spectrum.
  - The Status Indicator displays *Green* to indicate a *Good* level of focus at 80% of optimum focus.
  - Since optimum focusing is dependent upon the camera's field of view, it is important to scan the focusing plane from the closest to furthest perspectives before attempting any fine-tuning.
6. Return to your browser application and review the picture quality. Repeat step 5 only if you consider the focal distance as too distant - until you are satisfied with both the focal-distance and focus-quality.
  7. To exit the **Focus Assistant**: press and hold the **Control button** until the **Status Indicator** flashes *Yellow*. The **Status Indicator** displays *Green* when the **Focus Assistant** is closed.

## Replacing the Lens

Because the AXIS 2100 is designed with a CS-mount, the lens supplied with your product can be replaced with any standard C or CS lens, typically used within the surveillance industry.

**Note:** Although the lens supplied with your product can be directly replaced with any CS-type lens, a C-type lens must be installed with an adaptor for it to work with your AXIS 2100; this adaptor effectively moves the lens 5mm farther from the camera.

Follow the instructions below to replace the supplied lens with any C or CS type lens:

1. Unscrew the AXIS 2100 lens.
2. *C-lens only:* Attach the *new lens* to a *C-CS Adaptor*.
3. Screw the *new lens* onto the AXIS 2100. If applicable, adjust the iris according to the prevailing light conditions.
4. Referring to *Focusing the Camera Under Quiescent Conditions*, on page 33, adjust the camera focus.
5. Reload your Web browser and monitor the results from the product **Home Page**.



# Configuring Your Camera


## Before you begin:

Successful installation of the product is pre-requisite to configuring the unit: it is assumed that you have decided what application you wish to develop and subsequently installed your product, prior to commencing with this section. If not, please refer to *Choosing Your Application*, on page 10 and the respective sections for your installation: *Installing Your Camera on a Network*, on page 19; or *Installing Your Camera to a Modem*, on page 25.

The AXIS 2100 is configured and integrated into your application environment using the available *Wizards*, or the Web-based *Administration Tools*.

This section provides detailed information on how to use the *Installation and Application Wizards* for creating your preferred application, and a general overview of the supported *Administration Tools* used for refining the product configuration for use in your preferred application environment.

## Important!

On-line help  is available from most pages within the AXIS 2100 Web interface. Containing comprehensive details on all product parameters; this information is your first point of reference when configuring and managing the unit, and is a particularly useful reference when resolving any administration queries. The help system is stored internally in the AXIS 2100.

When accessing the Administrator Tools for the first time during a session, you are prompted for username and password. Log on as an Administrator using the username `root` and default password `pass`. You are recommended to change the root password, since all Axis products are shipped with the same password as default. For further information on this, refer to *System Security*, on page 38.

## Configuring Using the Wizards

Having decided the application you wish to develop and installing your AXIS 2100 accordingly, the unit is now connected directly to a local area network, or to a local PC using the supplied *Null Modem Cable*.

## Before you begin:


Prior to accessing the *Installation Wizard* or *Administration Tools over a network*, you must first set the Internet address, as described in *Assigning an IP Address*, on page 19.

For speedy development of your application, the AXIS 2100 supports two easy-to-use Wizards that are recommended for both novice and advanced users alike: the *Installation Wizard* and the *Application Wizard*. Dependent upon your choice of application, you can run each of these Wizards either consecutively or independently of one another.

## Installation Wizard Overview

The Installation Wizard provides a quick and easy method with which to define the *System*, *Security*, *Image* and *Layout* settings for your application - as defined in the *Administration Tools Overview*, on page 38.

### Starting the Installation Wizard

1. With reference to the operational information provided in the On-line Help , double click the **Installation Wizard** from the **Home Page** and follow the Wizard to complete your configuration.
2. Click the **Finish** button to save the defined application settings to the camera.


### Tip!

Having used the Installation Wizard to initially configure your application, you refer to the on-line Help and use the Administration Tools to refine the application to meet your specific needs.

## Application Wizard Overview

The Application Wizard can be started within the final page of the **Installation Wizard**, or started independently from the **Administration Tools - Wizards** page; it provides a quick and easy method to define the *Operation* and *Layout* settings for your application - as defined in the *Administration Tools Overview*, on page 38.

### Starting the Application Wizard

1. With reference to the operation information provided in the On-line Help , click **Continue...** within the **Application Wizard** or click the link from within the **Administration Tools - Wizards Page** to start the Wizard.
2. Click the **Finish** button to save the defined application settings to the camera.

## The Administration Tools

Whether you are viewing images directly over the network, or transmitting images over a modem, you can use the Web-based **Administration Tools** for configuring and managing your AXIS 2100 at any time. Used for reviewing and refining your configuration after initially setting up the AXIS 2100 with the **Installation Wizard**, these tools are ideal for more advanced users.

## Accessing the Tools

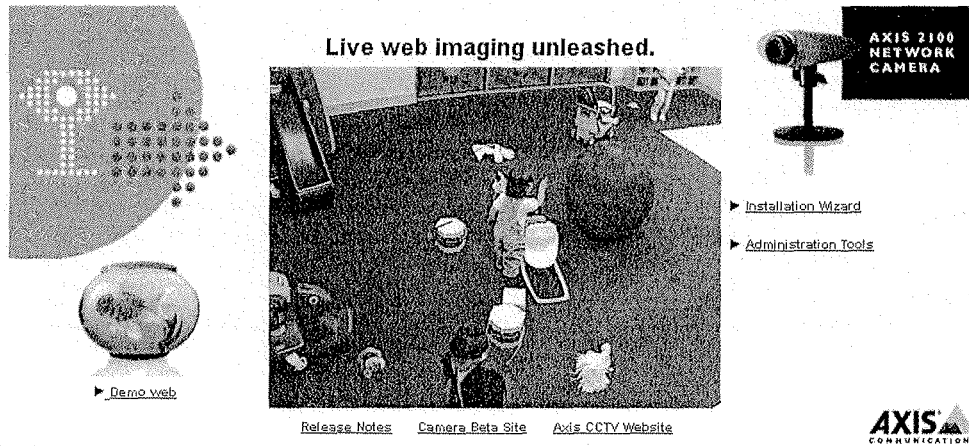
Follow the instructions below to access the **Administration Tools** using a standard Web browser:

1. Start the Web browser and enter the name or Internet address of the AXIS 2100 (or any DNS name if you are accessing the unit via the Null Modem Cable) in the location/address field.

### Example

http://172.21.1.200/

2. The AXIS 2100 Home page is now displayed. Click **Administration Tools**.



**Note:** A prompt for a *username* and *password* is displayed when entering these pages for the first time in a Web browser session. At the prompt, log on as *root* and use the default password *pass*. It is recommended that you change the password of your AXIS 2100 as soon as possible.

3. The **Administration Tools** are now presented as links within the margin of the Administration Page. Simply click the relevant link for the parameters you want to configure.

As an *Administrator*, you configure and modify the system directly from this page.



**Settings**  
 ▶ [Image](#)  
 ▶ [Network](#)  
 ▶ [Modem](#)  
 ▶ [System](#)  
 ▶ [Security](#)

**Applications**  
 ▶ [Operation](#)  
 ▶ [Layout](#)

**Wizards**  
 ▶ [First Time](#)  
 ▶ [Application](#)

## Administration Tools



Using the links displayed in the left hand margin, navigate your way around the Administration Tools to conveniently configure and manage the AXIS 2100 directly from your Web browser; on-line Help is available for each of the supported tools.

## Tools Overview

The table below provides a one-stop overview of the **Administration Tools**:

Settings	Tool Description
Image	Focus the camera using the Focus Assistant and define image attributes for your AXIS 2100.
Network	Configure the TCP/IP, SMTP E-mail and FTP network settings.
Modem	Configure the communication settings for the <i>Dial-up Modem Connection</i> to your ISP or remote Web server.
System	Set the product Date and Time
Security	Choose the Administrator's username and password (default to root and pass respectively), and create or delete authorized users.
Applications	Tool Description
Application	Choose to run your AXIS 2100 in Sequential or Alarm Mode; determine when and how often images are taken using the <i>Scheduler</i> ; and define when the images are uploaded to an ISP, or target FTP/Web server.
Layout	Determine the Layout for the Web page in which your images will appear; customize the page after your own design and include your own logos, links and title texts, enable or disable specific function buttons ...and much more.
Misc	Tool Description
Wizard	A one-stop reference point for the Installation Wizard and Application Wizard.
Support	Display the product <i>Release Notes</i> , view the <i>Parameter List</i> , and/or initiate a <i>Restart</i> of the unit.
Home	Links directly to the Home Page of your application.

## System Security

To prevent any unauthorized use of the AXIS 2100, the AXIS 2100 supports multi-level password protection and access is strictly restricted to defined **users only**. The system *Administrator(s)* has exclusive access to the product *Administration Tools* and can determine the registration, and access rights for all **users**.

**Note:** Although, the Administrator's default username and password (set to *root* and *pass* respectively) can be used for logging in to the unit for the first time, it is strongly recommended that you change the this password for your AXIS 2100 as soon as possible - since all Axis products are shipped with the same password as default.

## User Access Rights

As an *Administrator*, you click the **Security** to perform any of the following tasks:

- defining or editing the **administrator (root)** password
- defining, adding and deleting **user names** and **passwords**
- assigning individual access rights to a selected user, where each user is awarded with one or all of the following levels of access:
  - **Admin:** a user granted with *Admin rights* has exclusive access to the product *Administration Tools* and can consequently determine the registration of all *users*.
  - **Dial-in:** provides the user with dial-in modem access to the AXIS 2100 only.
  - **View:** provides the lowest level of access that allows the user to view the images only.

## Important!

By default, the AXIS 2100 supports anonymous user access, which means that anybody on the Internet/intranet has access to the video images from a Web browser.

To restrict open access, simply register a single authorized user: this effectively revokes the anonymous user service and inhibits camera access strictly to specified users. If the anonymous user service is satisfactory for your application, simply do not add any users.

## Reinstating the Factory Default Settings

In certain circumstances it may become necessary to restart or reinstate the **Factory Default** settings for your AXIS 2100: this can be initiated by clicking the appropriate button within the **Administration Tools**, *or* by pressing the **Control Button** as described below:

1. Power cycle the AXIS 2100 by removing and then reconnecting the power cord.
2. Within five seconds of power cycling the unit, press and continue to hold the **Control button** depressed until the **Status Indicator** displays permanently *Yellow*.

The AXIS 2100 is now reset to factory default settings. Restart the AXIS 2100 by disconnecting and then reconnecting the power cable.

**Note:** The Ethernet address remains unchanged, but all other parameters including the IP address are reset. Refer to *Assigning an IP Address*, on page 19 for details on how to set the IP number.

## Appendix A - Troubleshooting

This appendix provides useful information to help you to resolve any difficulty you might have with your AXIS 2100. Fault symptoms, possible causes and remedial actions are provided within a quick reference table.

### PINGing Your IP Address

By sending a packet to the specified address and waiting for a reply, the *PING* (Packet Internet Groper) can determine whether a specific IP address is accessible; it also provides a particularly useful method for confirming addressing conflicts with your AXIS 2100 on the network.

Having disconnected your AXIS 2100, follow the instructions below in association with *Symptoms, Possible Causes and Remedial Actions*, on page 41, and run the PING utility to troubleshoot TCP/IP problems on your network:

1. Start a DOS window.
2. Type `ping x.x.x.x`, where `x.x.x.x` is the IP address of the AXIS 2100.
3. The subsequent replies will provide an explanation as to the cause of the problem. Replies can be interpreted as defined in the table below:

PING Reply	Interpretation and recommendation
bytes = 32 time = 2 ms.....	The IP address is already used and cannot be used again. You must obtain a new IP address.
destination host unreachable	The AXIS 2100 is not accessible within your subnet. You must obtain a new IP address.
request timed out	This IP address is not used by anyone and is available for use with your AXIS 2100.



## Symptoms, Possible Causes and Remedial Actions

Symptoms	Possible causes	Remedial actions
The AXIS 2100 cannot be accessed from a Web browser.	The IP address is already used by another device.	<ol style="list-style-type: none"> <li>1. Disconnect your AXIS 2100 from the network.</li> <li>2. Run the PING utility (as described in <i>PINGing Your IP Address</i>, on page 40) and follow the appropriate recommendations.</li> </ol> <p><b>Note:</b> The assigned IP number can be assumed valid if the PING utility returns "request timed out" - in which case you should set the IP address again, power on the AXIS 2100 and then try accessing the unit again.</p>
	The IP address is located within a different subnet.	<p>Run the PING utility (as described in <i>PINGing Your IP Address</i>, on page 40). If the utility returns "no response" or similar, the diagnosis is probably correct - you should then proceed as follows:</p> <p>In Windows 95/98 or Windows NT, check that the IP address for your AXIS 2100 is within the same subnet as your workstation:</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> <li>3. Check that the first 3 numbers within the IP address of your AXIS 2100 matches the first 3 of your workstation. If not, your AXIS 2100 may be on a different subnet and the IP address cannot be set from this workstation. You must set the IP address for the AXIS 2100 from a workstation on the same subnet.</li> </ol>
	In Windows 95, the ARP table was empty when you tried to set the IP 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 IP address to the AXIS 2100, using ARP.</p> <p>See also the Important Note on page 20. The AXIS IP Installer provides a valuable alternative to ARP.</p>
	Possible problem with your proxy server.	Try disabling the proxy default in your browser.
	Other networking problems.	<p>Try replacing your network cable.</p> <p>Test the network interface of the product by connecting a local computer to the unit, using a standard <i>Crossover (hub-to-hub) Cable</i>.</p> <p>If the above actions do not resolve the problem, the AXIS 2100 maybe faulty. In this case, try to localize the problem by connecting the AXIS 2100 to the serial port of a local computer, using the supplied <i>Null Modem Cable</i>; and report your findings to your local distributor.</p>



Symptoms	Possible causes	Remedial actions
The Power indicator is not constantly lit	Faulty power supply.	Verify that you are using an AXIS PS-D power supply.
The Network indicator displays red.	Faulty cabling.	<ol style="list-style-type: none"> <li>To verify that the cables are functional, PING the address of a known existing unit on your network.</li> <li>If the cabling is OK and your network is reachable, you should receive the reply similar to this: ...bytes = 32 time = 2 ms,</li> </ol>
The Active and Network indicators are flashing every 0.5 seconds	Hardware failure.	Contact your Axis dealer.
Your AXIS 2100 works locally, but not externally.	Firewall protection	Check the Internet firewall with your system manager.
	Default routers required	Check if you need to configure the default router settings.
	The Internet site is too heavily loaded.	Configure the AXIS 2100 to upload your video images to an FTP server or an ISP.
No image using Refresh and/or Slow updating of images.	Complex images, i.e. those containing great picture contrasts, have greater file size and thus place greater demand on the available file space within the AXIS 2100.	The memory constraints become significantly more acute when multiple clients try to access the same images; Try limiting the number of clients, or configure the AXIS 2100 to upload your video images to an FTP server or an ISP.
Cannot access the connected modem	Modem not set for RTS/CTS.	Ensure that the modem is set for RTS/CTS serial communication. Disable Local echo mode using the command <code>ATE0</code> . Save the changes in the NVRAM of the modem using the command <code>AT&amp;W</code> .
	Local echo not disabled	
A series broad vertical white lines appear across the image.	The CCD sensor becomes overloaded when the light is too bright. This can happen e.g. with sun light reflexes.	Direct exposure to extreme sunlight or halogen light may cause serious damage to the CCD sensor. Reposition your AXIS 2100 into a more shaded location immediately. <b>Note:</b> damage caused to the AXIS 2100 through over exposure to direct sunlight or halogen light is not covered under the product warranty.
Bad focus	Focus has not been correctly adjusted.	Referring to the on-line help, adjust the White Balance setting and then try resetting the camera focus again using the <i>Focus Assistant</i> , as described in <i>Adjusting the Camera Focus</i> , on page 32.
	No adaptor fitted with your C-type lens.	If you have previously replaced the supplied CS-type lens, you may inadvertently have installed a C-type lens - without the required adaptor. See also page 34.

Symptoms	Possible causes	Remedial actions
Noisy images.	Video images may be noisy if you are using the AXIS 2100 in a very low light environment.	To solve this problem, you need more light. The performance of the camera is best in 100 - 3,000 lux. You may wish to consider replacing the basic lens with a more sensitive lens (Lower F-number), if the lighting conditions within the installation area can not be improved.
Bad quality images.	The Display Properties are incorrectly configured for your desktop.	Open the Display Properties in your desktop and configure your display to show at least 65'000 colors, i.e. at least 16-bit.  <b>Note:</b> Using only 16 or 256 colors on your computer will produce dithering artifacts in the image.
	The camera is not focused correctly.	Referring to the on-line help, adjust the White Balance setting and then try resetting the camera focus again using the <i>Focus Assistant</i> , as described in <i>Adjusting the Camera Focus</i> , on page 32.
No images available in your browser application.	ActiveX disabled.	If you are using Microsoft Internet Explorer, ensure that ActiveX has not been disabled in the Internet Options menu.

**Note:** If you still have a problem after reading this information, please contact your reseller or check the FAQ on the Axis Website at <http://www.axis.com>.

## Appendix B - Updating the Software

The AXIS 2100 camera 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. 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 2100 as soon as they become available - without having to replace any parts. New software can be simply loaded into the AXIS 2100 over the network.

### Obtaining Updated Software

The latest version of the AXIS 2100 camera software is available free of charge from Axis or your local distributor. You can obtain this software over the Internet or via anonymous FTP.

#### Over the Internet

From the <http://www.axis.com/> link on the AXIS 2100 Home Page and follow the "Support and Services" and then firmware links.

Click the Flash firmware and Release Note link to download the file `axis2100.exe`. 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.

#### Anonymous FTP

Log in to `ftp.axis.com` and go to the `/pub/axis/software/cam_srv/cam_2100/latest/` directory. Download the software download the file `axis2100.exe`. This self extracting archive file unpacks the associated data and text files upon execution.

### Upgrading the Software



There are two methods for updating to the AXIS 2100 Flash memory:

- over the network using the AXIS ThinWizard
- over the network using FTP

#### Upgrading Using the AXIS ThinWizard

##### Before you begin:

The AXIS 2100 must be assigned an IP address before being upgraded using the AXIS ThinWizard.

AXIS ThinWizard is a tool for locating, managing and upgrading AXIS ThinServer devices, including AXIS 2100 products on your TCP/IP network. Available from Axis' Website, it enables batch upgrading of several ThinServer devices simultaneously, and is the recommended method if you need to upgrade multiple Axis camera products.

Follow the instructions below to upgrade your Axis camera products using AXIS ThinWizard:

1. Click the **Manage Network** button in the AXIS ThinWizard main menu.
2. Select a network group from the drop-down list. You can only update the servers that are included in the selected network group.
3. All AXIS servers included in the network group appear. Click the **Firmware** button to start the Upgrade Wizard.
4. Follow the instructions that are presented to you to complete the installation.

For more information about AXIS ThinWizard, refer to the Axis Website at <http://www.axis.com/>

## Upgrading using FTP

### Before you begin:

Always read the upgrade instructions available with each new release, prior to upgrading your software.

Having obtained the upgrade software, install it into the AXIS 2100 by following the instructions below:

1. Reset the AXIS 2100 by powering it off and then on again.
2. Start an FTP session and log in to the AXIS 2100 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 2100 by using the command `put 2100_xxx.bin flash`, where `xxx` is the version number for the firmware.  
The product indicators flash slowly during programming

### Important!

Downloading normally takes between 30 seconds and 10 minutes, although it can take longer: After commencing with the download, you should always wait at least 20 minutes before power cycling the AXIS 2400 - even if you suspect the download procedure has failed.

5. The FTP prompt is returned once the programming is complete.

### Caution!

In controlled environments, flash memory upgrades provide a very safe method for updating software. However, flash products can become damaged if the updating operation is not performed correctly. Your dealer reserves the right to charge for any repair attributable to faulty upgrading by the user.

# Appendix C - The Unit Connectors

This section provides a detailed overview of the two supported product connectors; namely the **Serial Connector** and **IO Connector**; it also includes a schematic diagram describing how the AXIS 2100 is connected for a typical application:

## The Serial Connector

In absence of a local network connection, the RS232 serial connector provides a physical interface for connecting a modem or computer to the AXIS 2100. This means that the AXIS 2100 can operate as a standalone unit - independent of any computer network. When a local network connection is unavailable at the point of installation, you connect your PC to this connector using the supplied *Null Modem Cable* to initially configure your product.

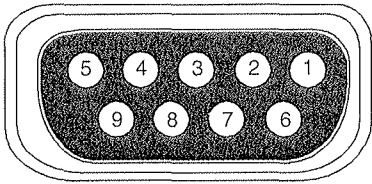
**Note:** Axis' Camera Division regularly maintains an updated list of all supported modems; please visit our Website for this, and other late information on our products, at <http://www.axis.com/>

## The Physical Connector

A single 9 pin D-sub connector provides the physical connection for the RS232 serial interface of the AXIS 2100. This connector is dedicated for use with an external modem and is suitable for speeds up to 115kbps.

A diagram of the RS232 connector complete with pinout information is shown below.

Pin	Function
1	CD (Carrier Detect)
2	RXD (Receive Data)
3	TXD (Transmit Data)
4	DTR (Data Terminal Ready)
5	GND (Ground)
6	DSR (Data Signal Ready)
7	RTS (Return To Send)
8	CTS (Clear To Send)
9	RI (Ring Indicator)



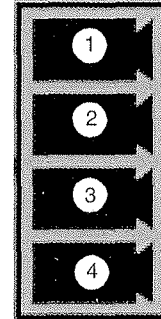
## The IO Connector

A 4-pole connector is provided for auxiliary IO connections to the AXIS 2100.

### Physical Connector

The IO connector provides the interface to a single digital output and a single digital input; a diagram for the connector complete with a pinout table is provided below:

Pin	Function
1	Common Ground
2	Positive Connection for DC Power Input or Output: Electrically in parallel with the derived DC power for the unit, this pin may be used as an input or output. As an input it can be used for remote applications to supply the AXIS 2100 via an external direct current source; for example, a 9-15V DC battery supply. Used as an output, it can drive the photo coupled input or other equipment; such as, an infrared sensor. The output voltage level is dependent upon the input voltage to the unit. A maximum current of 50mA can be sourced from the DC output.
3	Digital Input (photo-coupled anode): Voltages 5-24V DC will activate the input. It is possible to use pin 2 to source the input.
4	Digital Output: With a maximum load of 100mA and maximum voltage of 24VDC voltage, this output has an open-collector NPN transistor with the emitter connected to pin 1. If it is to be used with an external relay, a diode must be connected in parallel with the load for protection against any voltage transients - as detailed in the <i>Schematic Diagram</i> , on page 48. <b>Note:</b> Connecting AC to the transistor output will damage the unit.



### Digital Input

Used for connecting external alarm devices and triggering images for specific alarm-based events, the digital input is typically connected to a motion detector - or any other external security device - for taking images on each occasion that the detector is activated.

### Digital Output

The supported transistor output can drive a maximum load of 24V DC at 100mA directly; and by connecting additional relay circuitry, can drive even heavier loads.

### Controlling and Monitoring

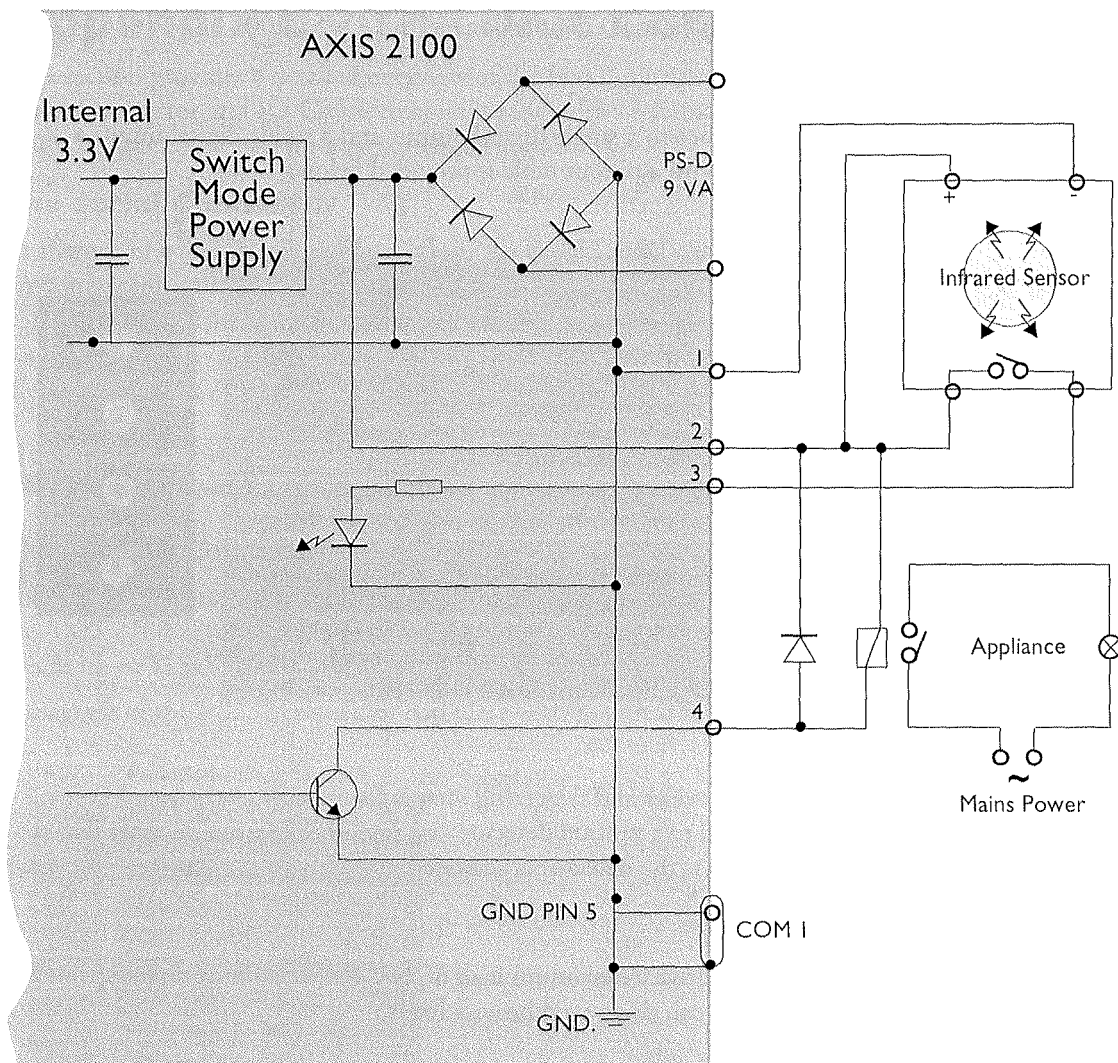
You use the **Administration Tools** for controlling and monitoring the **IO Status** of both the **Digital Input** and **Digital Output**; specifically for:

- querying the status the **Digital Output** and/or driving the output high or low
- monitoring the status of the **Digital Input**

**Note:** IO Status must be enabled within the Layout settings for IO status to feature in the Home Page.



## Schematic Diagram



Schematic diagram of the I/O and RS232 connector - displaying a possible application

### Caution!

Pins 1 and 2 are connected to the derived DC power for the unit, and can be used as an external power feed for external equipment; such as an Infrared sensor. When connecting other equipment using this connector, the maximum current of 50mA must be strictly observed. Failure to do this may cause a loss of power to the unit and even damage your camera.

## Appendix D - High Speed Internet Services

The AXIS 2100 is designed with high-speed Internet services foremost in mind, and you will experience the full performance of your AXIS 2100 if you are fortunate enough to have xDSL or a cable modem connection. However, as most high speed Internet services only provide you one external IP address, there are some practical issues that should be considered when developing your application:

### Available IP Addresses

Ideally your ISP (Internet Service Provider) will supply you with several external static IP addresses - in which case you can assign any one of these to your AXIS 2100 to make it fully accessible over the internet. If your service provider supplies you with only one IP number - which is normally the case - this IP number is normally assigned to your PC. If your ISP is unable to provide you with an additional IP number, you still have a number of other options that you may like to consider; including:

#### Windows 2000 NAT-feature (Network Address Translation):

Utilize the NAT feature in Windows 2000 to allow multiple Ethernet cards in your PC; you then use one port for the internet and the other for your internal network. Using this solution, you can let your AXIS 2100 upload image streams to an external Web server, maintained and located with your preferred ISP.

#### Routers and Firewalls

Another ideal solution is to use one of several small routers/firewalls that are currently available on the market: this provides the necessary NAT functionality and allows complete independence for your PC, which can be switched off or rebooted without effecting the image transmission from your AXIS 2100.

#### WinGate Server Software:

Running on a single Windows 95/98 or NT computer, this software allows multiple users simultaneous access to the Internet through a single modem; ISDN; or high speed line, such as xDSL or cable modem connection; and effectively shares a single Internet connection with almost any type of client computer running TCP/IP.

For more advanced users, the WinGate 3.0 Standard and Pro versions allow the administrator to change the IP bindings so that external requests may be routed specifically to your AXIS 2100 - running behind the WinGate software.



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## Appendix E - Technical Specifications

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**System Requirements** - The AXIS 2100 uses the standard Internet TCP/IP suite of protocols and can be used with most operating systems: Windows 95, 98, NT and 2000 as well as Linux, UNIX, Mac and several others. The only software required is Microsoft Internet Explorer 4.x, or higher (used with Axis' ActiveX component AXIS Camera Control), or Netscape 4.x or above.

**Installation** - Physical network connection using RJ45 twisted pair cable, or remote connection using any standard serial modem.

**Management** - Remote configuration and status using Web-based Administration Tools.

**Features** - Time stamp, text overlay and image control.

**Networking** - 10baseT Ethernet or 100baseTX Fast Ethernet, TCP/IP, HTTP, FTP, SMTP, NTP, ARP and BOOTP.

**I/O Connector** - Providing a single optical-isolated alarm input, and a single digital output (max 24V, 0.1 A) that features a programmable digital input/output for remote image storage via File Transfer Protocol (FTP) or E-mail (SMTP), pre/post alarm image storage.

**Pre/Post Alarm Buffer** - Up to 1.5 MByte memory available for pre/post alarm image storage.

**Modem Connector** - Single 9-pin D-SUB RS-232 connector, max 115 kbps, half duplex

**Security** - Multi-level user password protection.

**Operating Conditions:** - Temp: 40-105° F (5-40° C), Humidity: 20-80% RHG.

**Approvals** - EMC: FCC Class A, **CE** :EN 55022/1987, EN50024/1998  
Safety: EN 60950, UL, CSA.

**Metrics:** - Height: 1.6" (4.1 cm), Width: 4.0" (10.2 cm), Length: 5.8" (14.7 cm), Weight: 0.55 lb. (0.25 kg) excluding psu.

**Hardware** - ARTPEC-1 compression chip; ETRAX-100, including, 32 bit RISC, 100 MIPS CPU, 8 Mbyte RAM, 2 Mbytes FLASH PROM.

**Power** - External power supply 12V AC, 9.6 VA (PS-D, included), 9-15V AC, min 10VA, or 9-15V DC, min 7W.

**Complimentary Software** - AXIS IP Installer - for quick installation of multiple units, AXIS Thin Wizard - remote upgrade of multiple Axis units. AXIS Camera Control (Axis' ActiveX component software required for Microsoft Internet Explorer)

**ThinServer Technology** - Incorporating Axis ThinServer Technology, the AXIS 2100 comprises: "thin" versions of the most popular network operating systems, Web management tools, Axis' own ETRAX 32-bit RISC processor - based on open architecture, streamlined and optimized for device connectivity independent of any file server; and the industry's first dedicated network digital video surveillance compression chip - the AXIS ARTPEC-I.

**Compression and Performance** - With an adaptive frame rate dependent upon the prevailing lighting conditions, the AXIS 2100 delivers Motion-JPEG images at up to 10 images per second, as well as single JPEG images that feature user controlled compression level. See also *Picture frequency for Networking Applications*, on page 11.

All specifications are subject to change without prior notice.

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1601

# Exhibit C

# **AXIS Video Servers**

**The Plug-and-Watch Remote Monitoring and  
Surveillance Solution for TCP/IP Networks**



**AXIS 2400/2401 Administration Manual Version 1.1**



# Quick Installation Procedure

To get your AXIS 2400/2401 up and running on an Ethernet network, follow these instructions:

1. Note the serial number found on the underside label of the AXIS 2400/2401. The Ethernet address is the same as the serial number of the unit.
2. Connect the video camera(s) to the AXIS 2400/2401.
3. Connect your AXIS 2400/2401 to the network.
4. Connect the external power supply.  
**Note:** The power supply supplied with your product is country specific. Refer to *Checking the Hardware Inventory*, on page 11 and check that the type of power supply is correct.
5. Acquire a valid and unused IP address for the Video Server from your Network Administrator.
6. Assign the IP address using either the **AXIS IP Installer** program or **ARP** command, as described below:

## Easy - AXIS IP Installer

- 7a. *Windows 95/98 & NT* - Install the **AXIS IP Installer**. You will find the installation program on the AXIS Online CD and on the Axis Web Site at <http://www.axis.com>
- 7b. Run the AXIS IP Installer from the **Start** menu.
- 7c. Restart your AXIS 2400/2401.



- 7d. Locate and select the serial number of your AXIS 2400/2401 in the list.
- 7e. Enter the desired IP address, and click **Set IP address**.
8. To access the Video Server Home Page, click **Home page of selected Axis-server...**

## Quick - ARP/PING

7. *Windows 95/98 & NT* - Start a DOS window and type these commands:

```
arp -s <Server IP address> <Ethernet address>
      <my PC IP address>
ping <Server IP address>
```

### Example

```
arp -s 172.21.1.200 00-40-8c-10-00-86
      172.21.1.193
ping 172.21.1.200
```

*UNIX & OS/2* - Type these commands:

```
arp -s <IP address> <Ethernet address> temp
ping <IP address>
```

### Example

```
arp -s 172.21.1.200 00:40:8c:10:00:86 temp
ping 172.21.1.200
```

8. To access the camera server Home Page, start your Web browser and enter the IP address in the location/address field:

```
http://<IP address>/
```

### Example

```
http://172.21.1.200/
```

The installation is complete. Access the Web-based Administration Tools and configure the AXIS 2400/2401 to suit your user requirements.

# **AXIS 2400 and AXIS 240 I Video Servers**

## **Administration Manual**



## About This Document

This manual is intended for both administrators and users of the AXIS 2400/2401 Video Server, and is applicable for software release 1.0. It includes simple step-by-step instructions for configuring, managing and using the AXIS 2400/2401 Video Server within your networking environment.

It is not necessary for the reader to have any previous networking experience to install or use this product, although some knowledge of UNIX systems would be beneficial for developing custom programming scripts.

Readers are recommended to use this document as a supplement to the Wizards and other on-line information available via the Web-based interface. Superseding versions for this document will be posted to the Axis Website, as required.

## Safety Notices

Please observe all safety markings when using this product.

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

**Important!** - Potential hazard that can seriously impair operation.


Do not proceed beyond 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 local region before using the AXIS 2400/2401 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 fulfills 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.

## Liability

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

## Year 2000 Compliance

Axis Communications AB warrants that this product is Year 2000 compliant.

## Trademark Acknowledgments

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## Support Services

Should you require any technical assistance, please contact your local dealer. If your questions cannot be answered immediately, your dealer will forward your queries through the appropriate channels to ensure you a rapid response. If you are connected to Internet, you can obtain on-line manuals, technical support, software updates, application software and general corporate information from any of the locations listed below.

Axis' CCTV Website	<a href="http://cctv.axis.com/">http://cctv.axis.com/</a>
WWW:	<a href="http://www.axis.com">http://www.axis.com</a>
FTP:	<a href="ftp://ftp.axis.com/pub/axis">ftp://ftp.axis.com/pub/axis</a>

AXIS 2400/2401 Administration Manual

Revision 1.1

Part No: 16741

Dated: July 1999

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# Product Overview

Axis' Video Servers include a built-in Web server that enhances traditional surveillance systems and provides added networking connectivity for distributing monitored images over a secure intranet network, or even the Internet. Video camera management, configuration, and monitoring - all at your fingertips through a standard Web browser; such as, Netscape Navigator or Microsoft Internet Explorer.

The following models are currently available:

## The AXIS 2400 Video Server -

Connecting directly to Ethernet or Fast Ethernet networks, the AXIS 2400 Video Server supports up to four PAL/NTSC video cameras and is programmable for both NTSC and PAL video systems.



## The AXIS 2401 Video Server -

Connecting directly to Ethernet or Fast Ethernet networks, the AXIS 2401 Video Server provides a single video input that accommodates any standard composite video source and a loop-through video output connector. The AXIS 2401 is available for NTSC or PAL video systems.



Both product variants include a Web-based interface featuring several user-friendly Wizards that not only simplify the installation process, but also allow for a seamless and automated integration into your networking environment and custom applications. Furthermore, its open-network structure minimizes the need for costly coax cabling and optimizes imaging broadcasting for a minimal connection overhead.

The AXIS 2400/2401 is the smart and cost-effective solution for the sophisticated demands of a modern interactive surveillance and remote monitoring system. Simple to install - and easy to use!

## Features and Benefits

**Ease of Use** - The AXIS 2400/2401 has plug-and-picture functionality - all you need to do is assign a valid IP address. The only software required is Microsoft Internet Explorer 4.x (used with Axis' ActiveX component), or Netscape 4.x or above.

**Cost-effective** - Increases image distribution with minimal connection overhead to provide a reliable and low-cost resource for network imaging. Absolutely no hidden accessories; such as, expensive software, management workstations or dedicated video cabling, is required.

**Open Standards Environment** - Supporting TCP/IP networking, SMTP e-mail, HTTP and other Internet-related protocols; the AXIS 2400/2401 can be used in mixed operating system environments; such as, Windows, UNIX, Macintosh and OS/2.

**Simple Administration** - Using a standard Web browser, you configure and manage the AXIS 2400/2401 directly from its own Web pages. When a new firmware release becomes available, you can batch upgrade all of your Axis Video Servers remotely over the network using the AXIS ThinWizard.

**Standard Image Format** - The AXIS 2400/2401 generates high-quality pictures in standard JPEG format, which can be viewed using any standard Web browser.

**Picture Updating** - The on-board ETRAX 100 processor and revolutionary AXIS ARTPEC-1 Real Time Picture Encoder provides an amazing power-synergy to deliver up to 30 frames over 10Mbps or 100Mbps networks.

**Wide Range of Applications** - The AXIS 2400/2401 offers live video over the network for enhancing and modernizing traditional CCTV systems - and much more.

The AXIS 2400/2401 allows remote CCTV and video access directly from a standard Web browser. Users can access live images or remotely control CCTV at any time anywhere. Accordingly, the AXIS 2400/2401 can be used for: verifying intruder alarms, traffic surveillance, banking applications, parking lots, factory monitoring, industrial surveillance, visual security systems, image archiving, etc. SMTP e-mail is supported which allows images to be sent as e-mail attachments at predetermined times or events.

**External Device Connection** - The auxiliary inputs make it possible to trigger the AXIS 2400/2401 from external devices, e.g. IR-sensors, switches, alarm relays etc.

**Pan/Tilt Device Connection** - Via an RS232 or RS485 serial interface, you can combine the AXIS 2400/2401 with a Pan/Tilt device for automatically adjusting camera orientation.

**Security** - The AXIS 2400/2401 includes a self-contained Web server. This means that the camera server is secured like any other Internet host. The Network Administrator can decide whether individuals, groups, the whole company or the whole world may access your video server. This protection is normally implemented using the user security settings within the AXIS 2400/2401 or in combination with an organization's Internet firewall.

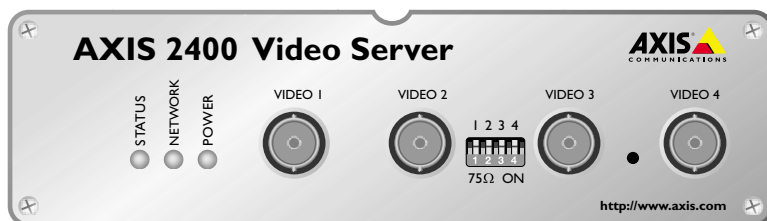
**Web Forum Discussions** - Axis Communications have a Web forum for ideas and suggestions for possible camera applications. Axis also maintain a collection of interesting links where you can insert your own link to your application and keep lists of application notes, FAQs and other related information.

**Network Camera Servers Developer's Pages** - The Camera Division at Axis maintain a specialist site for network camera developers. New exciting application ideas, tools, and preprogramming scripts are constantly being added - this is an invaluable reference site for Axis' development partners and OEMs. Follow the camera links and check it out at:  
<http://cctv.axis.com/> and <http://www.axis.com/>

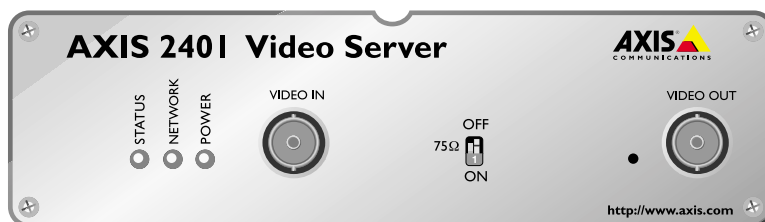
## Physical Description

Read the following information to familiarize yourself with the AXIS 2400/2401, making particular note of where the connectors and indicators are located. This information provides a useful reference during the installation of the product into your networking environment.

### The Front Panel



AXIS 2400 Front Panel



AXIS 2401 Front Panel

**Video Inputs** - The AXIS 2401 allows a single video source to be connected via the VIDEO IN connector; the AXIS 2400 accommodates up to 4 separate video sources (VIDEO 1- VIDEO 4) simultaneously.

Each supported video input is terminated using a coax/BNC connector. Physical connections made using RG59, 75 ohm coax video cable; have a recommended maximum length of 800 feet (250 meters).

**Video Output (AXIS 2401 only)** - A single video output (VIDEO OUT) terminated with a coax/BNC connector allows direct connection of an external monitor.

**DIP Switches** - DIP switches provide the line termination for each supported video input. All units are shipped with the line termination *enabled* for each supported video input; that is, with the DIP switches set in the down-position.

If the AXIS 2400/2401 is to be connected in parallel with other equipment, disable the input termination by turning the corresponding DIP switch to the **up-position** (OFF). Failure to do this can cause the picture quality to be impaired.

**Status Indicator** - The multi-colored status indicator defines the operational status of the server, as described below:

- green - the indicator flashes briefly and momentarily displays orange during the start-up and self-test routines; the indicator then displays green to indicate a healthy unit status.
- red - the indicator will display red only if a problem with the AXIS 2400/2401 has occurred. Refer to *Appendix A - Troubleshooting*.

**Note:** The Status indicator also displays orange when setting the factory default settings, as described in *Reinstating the Factory Default Settings*, on page 25.

**Network Indicator** - After completion of the startup and self test routines, the multi-colored Network Indicator flashes independently, as follows:

- yellow - indicating network activity on a 10Mbps Ethernet network
- green - indicating network activity on a 100Mbps Fast Ethernet network
- red - indicating no physical connection to the network.

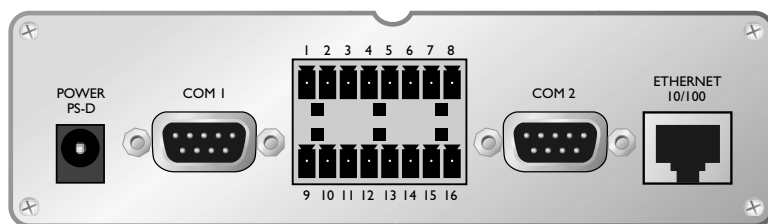
**Power Indicator** - The Power indicator is normally lit while power is applied. If it is not lit, or it flashes, there is problem with the AXIS 2400/2401 external power source.

**Control Button** - Located centrally between the supported video input connectors on the AXIS 2400, and to the left of the loop-through video output on the AXIS 2401; this button is recessed within the product casing. Using a suitably pointed object, you press this button to restore the factory default settings, as described in *Reinstating the Factory Default Settings*, on page 25.

**Serial Number** - Located on the underside label of the AXIS 2400/2401, the serial number is identical to the Ethernet address of the unit.



## The Rear Panel



AXIS 2400/2401 Rear Panel

**I/O Terminal Block** - The I/O Terminal Block connector is located between the two serial ports on the rear panel and provides the physical interface to one relay switch output, four digital photo-coupled inputs, and an RS-485 interface. For details, refer to *Appendix F - The IO Terminal Block*.

Use this connector for transmitting data over a multi-drop communication lines, RS485 Pan Tilt devices, and external triggering - typically associated with CCTV equipment. The connector can be utilized as an alternative connection point for DC supply to the unit.

**RS-232 Serial Connectors** - Two 9-pin D-sub connectors providing RS-232 serial connection, one of which is multiplexed with the RS-485 port via the Terminal Block Connector. Typically used for Pan/Tilt device interface.

**Network Connector** - The AXIS 2400/2401 is designed for 10 Mbps Ethernet and 100 Mbps Fast Ethernet networks and connects to the network via a twisted pair category 5 cable (10baseT and 100baseTX) terminated using a standard RG-45 connector. Supporting NWay, the AXIS 2400/2401 detects the speed of the local network segment and varies the speed of data communication accordingly, between 10 Mbps and 100 Mbps.

**Power Supply Connector** - A single Jack socket (PS-D) for connection of AXIS 2400/2401 power supply. The terminal block connector provides an auxiliary connection point for AC or DC power to the unit.

**Note:** The power supply supplied with your AXIS 2400/2401 is country specific. Please check that the type of power supply you are using is correct. See page 11.

# Installation

Follow the instructions included in this section to install the AXIS 2400/240I into your networking environment. Each phase of the documented installation procedure is summarized below:

- Checking the Hardware Inventory
- Connecting the AXIS 2400/240I
- Assigning an IP Address
- Verifying the Installation

## Checking the Hardware Inventory

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.

Hardware	Model Variants	Part Numbers
<b>Video Server</b>	AXIS 2400	0092- 001- 01
	AXIS 240I (NTSC)	0092- 007- 01
	AXIS 240I (PAL)	0092- 008- 01
<b>Power Supply (PS-D)</b>	Europe	I4233
	UK	I4234
	Australia	I4255
	USA	I4253
	Japan	I4254
Media	Title	Part Numbers
<b>CD-ROM</b>	AXIS Online CD	-
<b>Printed Materials</b>	AXIS 2400/240I Administration Manual	I674I

## AXIS Online CD

The AXIS Online CD supplied with this product provides an easy-to-use electronic catalog that includes all of the latest AXIS Utilities Software, Product Software, White Papers, User Documents, Technical References, Technical Notes, etc. It is compatible for use within all of the supported Axis computing environments.

You can view the contents of the AXIS Online CD via the Adobe Reader interface or HTML interface. All documents presented on the CD are in PDF format.

**Notes:** If Adobe Acrobat Reader 3.0 is not installed on your system:

- Windows users can click the Get Adobe Reader button from the main user interface.
- Non-Windows users can locate and run the appropriate installer from the tools/Acrobat/ folder. Refer to the readme.txt file for full path name details.

## Connecting the AXIS 2400/2401

The AXIS 2400 accommodates up to four coax/BNC connected video sources; whereas, the AXIS 2401 allows single video connection with a loop-through video output for connection to an external monitor. The AXIS 2401 Web applications also support integrated image feed from other Axis camera and video servers on the network within a single-presentation interface.

Both models display video images in single, or traditional quad picture format, delivering up to 25 PAL and 30 NTSC frames/second over 10/100Mbps networks.

- Notes:**
- NTSC delivering 525 lines of resolution at 60 half-frames per second is the common standard in the United States; whereas, PAL delivers 625 lines at 50 half-frames per second and is the dominant television standard in Europe.
  - The AXIS 2401 is supplied as either an *NTSC or PAL-specific unit*. The AXIS 2400 is programmable for both PAL and NTSC operation.

### Connecting your Camera(s)

Connect the video output of your camera(s) to the AXIS 2400/2401 video port(s) using standard 75 ohm coaxial video cable, terminated with a BNC-connector.

- Notes:**
- The AXIS 2400/2401 will experience lower image framerate when simultaneously accessed by multiple clients. In particular, you will notice this on the AXIS 2400 when two or more different video sources are accessed simultaneously.
  - Use a BNC-to-RCA converter if your camera is supplied with a standard phono-type (RCA) connector.

### Connecting your Server to the Network

Follow the instructions below to connect the AXIS 2400/2401 to your network:

1. Note the serial number of your AXIS 2400/2401 for future reference during the installation procedure. This is located on the underside label of the unit.
2. Connect your video server to the network with twisted pair category 5 cable (10baseT or 100baseTX) terminated using a standard RG-45 connector.
3. Connect the power supply to the video server.
4. Check that the Power Indicator is constantly lit.

## Assigning an IP Address

To enable access to your video server you must first assign it an appropriate IP Address.

### Before you begin:

- Make sure the AXIS 2400/240I is powered up and attached to the network.
- IP Address: Acquire an unused IP address from your Network Administrator.
- Server Privileges: You need root privileges for UNIX; administrator privileges for Windows NT.
- Ethernet Address: Each AXIS 2400/240I is pre-configured with a unique Ethernet Address that is based upon the unit serial number; which you can find printed on the underside label of the unit. You will need to know the Ethernet address of your AXIS 2400/240I to install the unit.

## Mapping a Host Name to the IP Address

If you are using host names, you can map a unique host name to the acquired IP address. Refer to your system manuals or 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 IP address. In this case, simply replace the host name entry with the IP address wherever required.

## Choosing an Appropriate Method

Set the IP address using an appropriate method for your operating system from the table below:

Method	Operating Systems	Refer to...
<b>AXIS IP Installer</b>	Windows 95/98 and NT	"Using the AXIS IP Installer" on page 14
<b>ARP</b> Requires the IP address for each new device to be downloaded individually and is not appropriate for use over routers.	Windows 95/98 and NT	"Using ARP in Windows 95/98 and Windows NT" on page 15
	UNIX, OS/2	"Using ARP in UNIX and OS/2" on page 15
<b>RARP</b> Requiring a RARP daemon on your system, this method downloads the IP address to each device automatically and operates within a single network segment only.	UNIX	Refer to <i>Using RARP in UNIX</i> , on page 16.
<b>BOOTP</b> Requiring a BOOTP daemon on your system, this method operates over the entire network. A request to an active daemon initiates a search of the boot table to find an entry matching the unit's Ethernet address. The daemon downloads the IP address to the device if a match is found.	UNIX	Refer to <i>Using BOOTP in UNIX</i> , on page 16

**Important!**

When installing your AXIS 2400/240I, do not use the default or the IP address featured as examples within this document. Always consult your Network Administrator before assigning an IP address.

**Using the AXIS IP Installer**

The AXIS IP Installer is a Windows 95/98 & NT program that simplifies the procedure for setting IP addresses within Axis' networking products; it also allows you to conveniently access the home Web page of any Axis ThinServer connected to your network. The program is available on the AXIS Online CD and from Axis' Websites at <http://cctv.axis.com/> and <http://www.axis.com/>

**Installing the AXIS IP Installer:**

1. On the AXIS Online CD, click on the **Software** button.
2. Select the **AXIS IP Installer** and click **Install**. The **AXIS IP Installer - Setup** dialog is displayed on the screen.
3. Follow the instructions as they appear on the screen.
4. Click **Finish** to complete the setup.

**Setting the IP Address with AXIS IP Installer:**

1. Run the **AXIS IP Installer** from the **Start** menu. The **AXIS IP Installer** dialog is displayed on the screen.
2. Restart your camera server.
3. Select the serial number of your camera server in the list. The serial number is identical to the Ethernet address of the unit.
4. Enter the desired IP address. Click **Set IP address**. The IP address will now be set.
5. To access the home page of the camera server, click **Home page of selected Axis-server...** You can now configure the video server according to your requirements.
6. Click **OK** to exit the program.

For more help during the installation of the IP address, click **Help** or **F1**.

## Using ARP in Windows 95/98 and Windows NT

To download the IP address and verify the communication, start a DOS window and type the following commands:

```
arp -s <server IP address> <Ethernet address>
ping <server IP address>
```

### Example:

```
arp -s 172.21.1.200 00-40-8c-10-00-86
ping 172.21.1.200
```

The host will return 'Reply from 172.21.1.200 ...' or some similar message. This means that the address has been set and the communication is established.

## Important!

Windows 95 only: When using the Windows 95 implementation of ARP, change the first line to:

arp -s <server IP address> <Ethernet address> <w95host IP address>, where <w95host IP address> is the IP address of your Windows 95 host.

### Example:

```
arp -s 172.21.1.200 00-40-8c-10-00-86 172.21.1.193
ping 172.21.1.200
```

**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

To download the IP address and verify the communication, type the following commands:

```
arp -s <server IP address> <Ethernet address> temp
ping <server IP address>
```

### Example:

```
arp -s 172.21.1.200 00:40:8c:10:00:86 temp
ping 172.21.1.200
```

The host will return '172.21.1.200 is alive', or some similar message to indicate that the address has been set and the communication is established.

**Note:** When you execute the PING command for the first time, you may experience a significantly longer response time than usual.

## 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 videoserv
```

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, typically done using the command `rarpd -a`.
4. Restart the AXIS 2400/2401 to download the IP 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 done using the command `/etc/bootptab`:

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

where:

```
ht    = ether
vm    = rfc1048
ha    = The Ethernet address of the AXIS 2400/2401
ip    = The IP address of the AXIS 2400/2401
sm    = The subnet mask
gw    = The default router address
```

### Example:

```
videoserv:ht=ether:vm=rfc1048:\
:ha=00408c100086:ip=172.21.1.200:\
:sm=255.255.255.0:gw=172.21.1.1
```

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 done using the command `bootpd`.
4. Restart the AXIS 2400/2401 to download the IP address, default router address, and subnet mask.

## Verifying the Installation

After assigning an IP address, verify the connection between the AXIS 2400/2401 and the network:

1. Start your Web browser (see note below) and enter the name or IP address in the **Location/Address** field:

### Example

`http://172.21.1.200/`

### Important!

When using Microsoft Internet Explorer for the first time, you must then temporarily lower your security settings to perform a one-time-only installation of Axis' ActiveX component onto your workstation, as described below:

- From the View menu, select **Internet Options**
- Click the **Security** tab and make note of your current security settings
- Set the security level to **Low** and click **OK**
- Type the Internet Address or Host Name of your AXIS 2400/2401 into the Location field
- A dialog asking if you want to install *ATLCamImage.ocx* will appear. Click yes to start the installation
- Once the ActiveX installation is complete, return the security settings to their original value, as noted above

**Note:** This functionality is currently under review in order to increase ease-of-use; new instructions relating to this will shortly will be available from our Website <http://cctv.axis.com/>

2. The **Welcome Page** of your AXIS 2400/2401 is now displayed:



3. To continue the setup process and configure your own application, click the **Admin** button in the top left corner of this window and proceed to *Configuring the Video Server*, on page 18. Log on as user **root** with the default password **pass**.

**Note:** Web pages are kept locally for fast browsing, and your browser may occasionally display a cached image as opposed to a newly taken snapshot. When this happens, simply click Reload/Refresh in your Web browser. Some browsers may even force you to clear the cache, or use forced reload, e.g. Shift+Reload in Netscape.



---

## Configuring the Video Server

This section is targeted specifically to personnel responsible for the administration of the AXIS 2400/2401. The *Administrator(s)* is granted with high-level privileges denied to the ordinary *user(s)*.

### Before you begin:

To access the AXIS 2400/2401 configuration pages, you must first set the Internet address as described in *Assigning an IP Address*, on page 13.


You configure the AXIS 2400/2401 from a standard Web browser such as Netscape Navigator or Microsoft Internet Explorer.

As a viable alternative to managing and configuring the AXIS 2400/2401 using a Web browser, you can alternatively edit the system configuration file using a text editor and upload the file to the AXIS 2400/2401 using FTP. For further information please refer to *Configuring using FTP*, on page 33.

## Overview of the Administration Tools

The Web-based Administration tools are displayed in a graphical user interface that allows simple point-and-click display of the system tools. Several user-friendly Wizards are provided to guide you through every aspect of the installation; from designing the user interface and configuring the supported networking protocols, right down to integrating the unit into your specific application environment - it is incredibly easy!

### Important!

On-line help  is available on every page within the AXIS 2400/2401 Web interface. This information is of particular relevance when configuring the unit and should be used as a first point of reference for resolving any administration queries. The help system is stored internally in the AXIS 2400/2401.

Following the instructions provided within this section, use the Web-based Administration tools for configuring and managing your AXIS 2400/2401.

## Accessing the Tools

Follow the instructions below to access the Administration tools using a standard Web browser:

1. Start the Web browser and enter the name or Internet address of the AXIS 2400/240I on the location/address field.

### Example

http://172.21.1.200/

### Important!

If this is the first time you have accessed the AXIS 2400/240I, the Welcome page will be now be displayed. In this case, click the Administration button and proceed to configure your application using the Installation Wizard prior to proceeding with the next step.

**Note:** When accessing the AXIS 2400/240I for the first time using Microsoft Internet Explorer, you must temporarily lower your security settings to perform a one-time-only installation of Axis' ActiveX component onto your workstation, as described on page 17.

The *Administrator(s)* can choose not to display the Administration and other navigational buttons from the user interface. Selecting this feature within in a Wizard ultimately means that the Administration tools can then only be accessed by entering the full *Admin* address into the URL of the Web browser; for example: http://172.21.1.200/admin.html

2. Your defined **Application** page is now displayed. Click the **Admin** button to display the **Administration Overview** page and access the system *Administration tools*.




**Note:** A prompt for a *username* and *password* is displayed when entering these pages for the first time in a Web browser session. At the prompt, log on as *root* and use the default password *pass*. It is recommended that you change the password of your AXIS 2400/240I as soon as possible.





3. The various components of your video system are represented as icons within the displayed graphic. Simply click the component part you want to configure. As an *Administrator*, you configure and modify the system directly from this page.



## Tools Overview

The following table provides a one-stop overview of the information and services available from the **Administration** pages:

Service	Description
Administration Overview	<ul style="list-style-type: none"> <li>The First-time Installation Wizard allows novice administrators to automatically set the most important system parameters and quickly establish an appropriate application for the system users.</li> </ul>
View Application	<ul style="list-style-type: none"> <li>Displays the page and picture format that is presented to your users. Use this page as a reference after making any changes to your application design.</li> </ul>
Help Contents	<ul style="list-style-type: none"> <li>Displays the table of contents for the On-line Help</li> </ul>
Support	<ul style="list-style-type: none"> <li>Displays support and trouble-shooting information.</li> </ul>
Design Application Settings 	<ul style="list-style-type: none"> <li>Layout and Programming Wizard: design the look-and-feel of the user interface with an easy-to-use Wizard. Choose Surveillance System or Web Attraction preconfigurations and refine the application specifically for your user needs.</li> <li>Programming Script Editor: create programming scripts yourself using the embedded text editor - recommended for advanced users only.</li> </ul>
Network Settings 	<ul style="list-style-type: none"> <li>Specify the system settings for each of the supported networking protocols, using a Wizard or manually via the Detailed View; including:               <ul style="list-style-type: none"> <li>- TCP/IP (Network settings)</li> <li>- DNS (Domain Name System)</li> <li>- SMTP (E-Mail)</li> </ul> </li> </ul>
Video Server Settings 	<ul style="list-style-type: none"> <li>Set the system date &amp; time, manually or automatically</li> <li>Define the username and password for administrator(s) and user(s)</li> <li>View parameter list and log file</li> <li>Emergency Settings: Restart the unit or set server parameters to factory default.</li> </ul>

Specific Settings	Description
<p>Video Settings</p> 	<p>Enable/Disable video sources and specify which Pan Tilt driver (serial port) the attached video camera is connected to - if any. <b>Note:</b> Two different icons are displayed to differentiate video sources not connected to Pan Tilt devices (icon-left) from those that are (icon-right). For each source specify:</p> <ul style="list-style-type: none"> <li>Image settings: set the image features; such as: displaying text, clock, color or Black &amp; White etc</li> <li>Video Input/Modulation: to define the video transmission standard automatically or manually.</li> <li>Preset Positions: used for creating Pan Tilt and Zoom preset conditions and only visible if the selected video source is connected to a pan tilt device.</li> </ul>
<p>Configure Serial Port</p> 	<p>For each of the two supported serial ports specify:</p> <ul style="list-style-type: none"> <li>Purpose: Pan Tilt, Generic or None</li> <li>Interface Mode/Serial mode: RS485 or RS232 (Port 1 only)</li> <li>Communication settings: Baud Rate (bps), Data Bits (length), Stop and Parity Bits</li> </ul>
<p>Pan Tilt Settings</p> 	<p>A Pan Tilt icon is displayed underneath a Serial Port icon only if the <i>purpose</i> of the respective serial port is defined as Pan Tilt.</p> <p>Select the Pan Tilt driver and define the driver specific settings: Canon VC-C3, Sony EVI-D30, Sony EVI-D31, Sony EVI-G20, Sony EVI-G21, VideMech, Ernitec, ICU and Diamond Smartscan are all supported.</p>
<p>Generic Settings</p> 	<p>A Generic icon is displayed underneath a Serial Port icon only if the <i>purpose</i> of the respective serial port is defined as Generic. The Generic driver is often referred to as terminal server or serial server and enables complete control of the Axis server serial ports from third-party client applications.</p> <p>Configure the port as an HTTP input/output or TCP input/output and save the changes.</p>

## Designing your Application

As an *Administrator*, you decide the general look and feel of the user interface and determine:

- the appearance of the *user* interface
- how video images are to be displayed to *user*
- the services and functions available to *user*

Click the **Application Design** icon within the graphic user interface to display the settings for your application.

### Application - Layout


Design the layout of the application specifically to your users needs, using either the **Wizard** or **Programming Text Editor**.

### Important!

The *Administrator* can choose not to display the Administration and other navigational buttons from the user interface. Selecting this feature within in the Wizard ultimately means that the Administration tools can then only be accessed by entering the full *Admin* address into the URL of the Web browser, as defined below:

<http://172.21.1.200/html/admin.html>

### Using the Layout and Programming Wizard

From the **Application Design** page, click the **Layout and Programming Wizard** button  and follow the on-line instructions to automatically configure the look-and-feel of the user interface.

You can choose **Surveillance System** or **Web Attraction** preconfigurations and refine the application specifically to your needs by selecting from several of the available features, including: alarm triggering, picture storage using FTP, image distribution via e-mail, etc.

You will find that the Wizard helps you not only to define the functionality of your system; such as: Quad system with or without pre/post alarm storage, picture size and magnification parameters, but also allows you to decide some of the more cosmetic aspects of system presentation; including: background, logo, user button and product title presentation.

Click the **Finish** button to save the defined configuration to the Video Server.

### Tip!

Spend some time to go through the different Application Wizards and try various settings. Click the View Application button to view the results.

## Wizard Overview

As a supplement to the information provided by the available Help, the table below provides a one-stop-reference for the parameters established by the Application Wizard:

Parameter	Options	Description
Image size	<ul style="list-style-type: none"> <li>Huge size (interlaced image, NTSC=704 x 480, PAL=704 x 576)</li> <li>Full size (NTSC=352 x 240, PAL=352 x 288)</li> <li>Half size (NTSC=176 x 112, PAL=176 x 144)</li> </ul>	<p>You can adjust the size and appearance of the displayed images: ranging from small, highly compressed pictures; to large, high-quality JPEG images.</p> <p>Typical file sizes for each of the available image sizes are dependent upon a number of different factors. Generally, low compression and large images sizes produce large filesizes; although higher quality images that include a lot of detail, will also increase resultant file size.</p> <p><b>Note:</b> NTSC (60Hz) is the common standard in the USA, whereas PAL (50Hz) dominates in Europe.</p>
Image Scale	x2 or x4	<p>To allow an increase in the image display size without impacting network bandwidth, you can choose to scale your images by a multiple factors of two (x2) or four (x4).</p> <p>Increasing a <i>halfsize</i> image by x2 enlarges the picture area to that of a <i>fullsize</i> image - delivering a lower picture resolution, but using approximately one quarter of the network bandwidth demanded to display a fullsize image.</p>
Page style	<ul style="list-style-type: none"> <li>Show gray background picture</li> <li>Show title, line and Axis logo</li> <li>Show buttons (e.g. Help, Admin)</li> </ul>	<p>The <i>Administrator</i> can choose <u>not</u> to display the Administration and other navigational buttons from the user interface. Selecting this feature within in the Wizard ultimately means that the Administration tools can then only be accessed by entering the full <i>Admin</i> address into the URL of the Web browser, as defined below:</p> <p><a href="http://172.21.1.200/admin.html">http://172.21.1.200/admin.html</a></p>

## Programming Script Editor

The Programming Script Editor editor offers advanced administrators and developers with an even greater level of flexibility for customizing the application specifically to meet their user needs. Using the on-line help as a reference, advanced users follow the instructions below to quickly develop programming scripts for time and/or alarm-triggered events:

### Tip!

As a supplement to the information provided in the on-line help, the scripting language and syntax is also fully explained in *Appendix H- The Programming Script*. Several tips and examples are also provided.

1. Click the **Programming Script Editor** button to start the editor.
2. Enter a valid script in the main window and then click the **Save** button to deposit the script in product memory.
3. Check the **Enable** box to activate the programming scripts in your system.

- Notes:**
- Scripts are not activated until the Enabled button is checked and the script is re-saved.
  - Saving new scripts automatically removes any existing script(s) previously saved with the Editor.
  - Previously saved scripts are automatically displayed when the Programming Script Editor is opened.

## Server Settings

Click the **Video Server** icon within the graphic user interface to display and/or edit the following settings:

### Date and Time

You click the **Date and Time** icon and set the current date and time either *Automatically*, or *Manually*. Setting the date and time *Automatically* requires you to provide the Internet Address of a local NTP server and select your local time zone from the available drop-down dialog.

Click Save to register the settings with the Video Server.

### Security

To prevent any unauthorized use of the Video Server, access is strictly password protected and restricted to defined *Users* and the *Administrator(s)* only. *Administrator(s)* have exclusive access to the product Administration Tools and determine the registration of all ordinary *users*.

- Notes:** Although, the Administrator's default username and password (set to *root* and *pass* respectively) can be used for logging in to the unit for the first time, it is strongly recommended that you change the Administrator (root) password of your AXIS 2400/240I as soon as possible - since all Axis products are shipped with the same password as default.

As an *Administrator*, you click the **Security** button to either:

- define or edit the *Administrator* password (the Administrator username is permanently set to root, with password default to **pass**), **or**
- define, add and delete *user* names and passwords

### Important!

By default, the AXIS 2400/240I supports anonymous user access, which means that anybody on the Internet/intranet has access to the video images from a Web browser:

Should you wish to restrict access, simply enter the usernames and passwords of authorized users in the General Settings - Security page. If the anonymous user service is satisfactory for your application, simply do not add any users.

Note: Only characters a - z, A - Z and 0 - 9 are valid when entering usernames and passwords.

## The Log File

All system messages are recorded in a single log file and stored in product memory. Consequently, the file can be used as reference for examining system events. It can also serve as a useful diagnostic tool when attempting to resolve any problem that might occur. See also *Appendix A - Troubleshooting*.

Follow the instructions below to display all Video Server messages since the last *Restart* of the system:

1. Click the **Video Server** icon in the graphic interface.
2. Click the **View Log File** button. All recent commands are displayed in a separate window.

## Viewing the Parameter List

The Parameter List provides a comprehensive list of all of the system parameters and their current settings. Follow the instructions below to display the list:

1. Click the Video Sever icon in the graphic interface.
2. Click **View Parameter List** to display the list.
3. Click **Print** to print a hard copy of the displayed list to your default printer.

## Emergency Actions

In certain circumstances it may become necessary to restart or return the Video Server to its **Factory Default** settings, or initiate a hardware **Restart** of the unit. Both emergency actions can be initiated by clicking the appropriate button on this page.

**Note:** Clicking Factory Default deletes any previously defined layout and preprogramming configurations.

## Reinstating the Factory Default Settings

Follow the instructions below to reinstate the factory default settings in AXIS 2400/240I:

1. Switch off the AXIS 2400/240I by disconnecting the power cord.
2. Using a suitably pointed object, press and continue to hold the Control button depressed.

**Note:** The Control Button is recessed within the product casing and located between the VIDEO 3 and VIDEO 4 input connectors on the AXIS 2400, and to the left of the VIDEO OUT connector on the AXIS 240I.

3. While continuing to hold the Control Button depressed, reconnect the power supply cable to the video server.
4. When the Status LED starts flashing yellow, release the Control Button for at least 2 seconds.
5. Press and continue to hold the Control Button until the Status indicator permanently displays yellow.



The AXIS 2400/2401 is now reset to factory default settings. Restart the AXIS 2400/2401 by disconnecting and then reconnecting the power cable.

**Note:** The Ethernet address remains unchanged, but all other parameters including the IP address are reset. Refer to *Assigning an IP Address*, on page 13 for details on how to set the IP number.

## Network Settings

The AXIS 2400/2401 supports the following networking protocols that are configured directly via **Network Settings**:

- **Transmission Control Protocol/Internet Protocol (TCP/IP)** - used by the Video Server for transmitting data over the network.
- **Domain Name System (DNS)** - the Internet service used by the product for translating domain names into Internet Addresses.
- **Simple Mail Transfer Protocol (SMTP)** - this is the protocol for sending e-mail messages between e-mail servers on the network. The AXIS 2400/2401 can be pre-programmed to send images as e-mail attachments to pre-defined addresses.

**Note:** • DNS servers are only necessary if scripts with DNS names are used. If you do not use scripts or only use IP addresses in scripts, you need not enter a DNS server reference.

Click the Network icon within the graphic user interface, or click the **Network Settings** button to configure the above protocols, using the **Wizard**, or by clicking **Detailed View**.

### Using the Wizard


The Wizard guides you through the setup procedures for each of the above protocols - one at a time. After completing one protocol, you optionally proceed to configure another protocol.

Clicking the **Finish** button on the last page of the Wizard saves the new settings to the Video Server.

## Using the Detailed View

Clicking the **Detailed View** displays the **Network Settings** dialog which is navigated by clicking any visible tag. From this dialog you can display, edit and refine the settings for any supported network protocol.

**Note:** Any changes that you make are only implemented when you click the OK button; consequently, all of the protocols can be safely browsed and edited before deciding to save the settings.

With reference to the on-line help information and the table below, use the **Detailed View**  to manually configure the Network Settings:

TCP/IP Parameters	Description
BOOTP	Enable the BOOTP protocol for downloading the Internet address automatically. For further information on using BOOTP see also <i>Using BOOTP in UNIX</i> , on page 16. If you intend to use the AXIS IP Installer BOOTP <u>must</u> be enabled.
RARP	Enable the RARP protocol for downloading the Internet address automatically to the unit. For further information on using RARP, see also <i>Using BOOTP in UNIX</i> , on page 16.
IP Address	Specifies the unique 32-bit IP address of your unit.
Default Router	Defines the default router for the AXIS 2400/2401 which by default, is set to automatic router search. If script applications the default router must be defined.
Subnet Mask	Defines the subnet mask for the AXIS 2400/2401. Used for determining when the traffic should be sent via a router. The default 0.0.0.0 indicates automatic router sensing. If script applications the subnet mask must be defined.
Bandwidth	Default to unlimited, this parameter defines the network bandwidth restriction for the video server; particularly useful for connection to busy and/or heavily loaded networks.
DNS Parameters	Description
Primary DNS	Defines the IP address of the primary DNS server. Used for identifying computers with names instead of IP addresses.
Secondary DNS	The IP address of the secondary DNS server. The secondary DNS server will be used in case the primary DNS server is unavailable or disconnected.
SMTP Parameters	Description
SMTP Mail Server	Defines the server that is to provide your e-mail facilities.
SMTP Return Address	The reply address for e-mails sent by the AXIS 2400/2401; that is, the name address that is to appear in the 'sent by' field of the dispatched e-mail.

## Video Settings

Each **Video** icon within the graphic display represents a supported video input to the AXIS 2400/2401. An icon that is dull or opaque in color indicates the relative video source is not enabled; whereas, a cross **x** visible to the left of the icon suggests that the associated video signal is not present at the input.

Click the appropriate button to configure your video source, including:

- Video enabling and disabling
- Specifying the Pan Tilt Serial Port for the connected video camera
- Setting the image features as displaying text, clock, color or B&W etc
- Detecting the video modulation standard
- Editing PTZ (pan, tilt, zoom) preset positions

## Image Settings

You click the Image Settings button to set the image features for the supported video source(s).

As the AXIS 2400 supports up to four video inputs, you can optionally choose to implement your preferred settings *generically* - that is, valid for all connected video sources, or *specifically* - limiting your settings to the video source previously selected in the graphic only.

From the **Apply settings to** drop-down dialog, you select whether your settings are to be applied *generically* or *specifically*; that is, **Video 1's** or **All Videos**.

With reference to the table below, configure the image settings to match your application demands:

General Parameter	Description
Display date & time on Image	Check to enable time display within the selected video source(s).
Display text on image	Enable or disable the display of a defined text string within the selected video image. Type the text string that you want to display within the Text field.
<b>Miscellaneous Settings</b>	
Color	Choose to display <i>Color</i> or <i>Black and White</i> video images.
Compression	Determines the compression factor for the selected video source: min, <i>low</i> , <i>medium</i> , <i>high</i> or <i>very high</i> . Minimum ( <i>min</i> ) compression optimizes picture quality, but generates larger image file sizes that demand greater network bandwidth.

**Notes:** • Image control can also be achieved directly using CGI parameters in the image URL.

- Using CGI parameters embedded in a URL request temporarily overrides any parameters defined within the Image Settings dialog.
- For further information on using CGI Parameters, see also *Appendix E - CGI Parameters*.

## Input Modulation

### Important!

The AXIS 2400/240I supports today's two most popular video standards - NTSC and PAL: NTSC delivers 525 lines of resolution at 60 half-frames per second is the common standard in the United States; whereas, PAL delivers 625 lines at 50 half-frames per second and is the dominant video standard in Europe.

The AXIS 2400 supports NTSC, PAL and their derived standards; whereas the AXIS 240I is supplied as either an *NTSC or PAL-specific unit*.

### Automatic Detect-and-Store for the AXIS 240I

The AXIS 240I is supplied as either a NTSC or PAL-specific unit; simply click the **Video Input Modulation** button from the **Video Settings** page to automatically detect and store an appropriate derivative-standard for your video input.

### Automatic or Manual Selection for the AXIS 2400

The AXIS 2400 is fully compatible between both NTSC or PAL transmission protocols and supports several derivative modulation standards that are chosen either *Manually* or *Automatically*.

From the **Video Settings** page, you click the **Video Input/Modulation** button and select whether the settings are to be applied generically or specifically; that is, **Video 1's** or **All Videos**. Using either method described below, you then define the transmission standard for the unit:

**Automatically** - Simply click the **Start** button to initiate a search of the selected video source(s). An appropriate modulation type is then automatically assigned to the selected source(s).

**Manually** - Select a specific modulation type from the drop-down dialog box, as detailed below:

- PAL BGH/NTSC M:
- NTC 4.43, 50Hz / PAL 4.43, 60Hz
- PAL N/NTSC 4.43, 60Hz
- NTSC N/PAL M
- SECAM / PAL 4.43, 60Hz

Clicking **Save** registers your the settings with the Video Server.

## Preset Positions

To enable quick and accurate camera PTZ positioning to known camera *hotspots*, the Administrator can control and record any camera *orientation* as a named entity - creating up to twenty **Preset Positions** that can be used at any time by the *Administrator(s)*, or *Users*.

### Defining Preset Positions

The camera *orientation* for the selected video source is controlled by Pan Tilt and Zoom control bars. Follow the instructions below to define a preset position:

1. Click the **Preset Position** button. An image taken from the selected source - at its current position - is displayed in a new window.
2. Using the **Pan Tilt** and **Zoom** control bars, move the camera to the desired position.
3. Enter a descriptive name in the **Current Position** field.
4. Click **Save** to register the new preset position with the AXIS 2400/2401 and then check that the entered name is included in the **Preset Positions** drop-down list.
5. Click **Remove** only if you want to remove this or any other preset position in the list.

Established preset positions are reinstated from the **Preset Positions** drop-down dialog in the application viewing environment, or by the *user(s)* when viewing a specific video source.

## Serial Port Settings

The AXIS 2400/2401 is supplied with two internal serial ports managed directly from the user interface:

- **Serial Port 1** - typically used for controlling CCTV devices; such as, PTZ devices. This port can be logically connected to the **RS232 COM 1** port or the **RS485/422** port on the **Terminal Block Connector**; consequently, it is configurable as either an RS232 or RS485/422 port. Click the **Port1** within the graphic interface to determine the **Purpose**, **Interface Mode** and **Communication Settings** for port.
- **Serial Port 2** - logically connected to the COM2; this port is also used for connecting Pan/tilt devices, but additionally provides a high-speed RS232 interface for connecting accessory equipment; such as, VCRs and badge readers to the AXIS 2400/2401. Click the **Port 2** icon within the graphic interface to determine the **Purpose** and **Communication Settings** for the port.

### Important!

Some pan tilt units are external devices; that are, standalone devices that connect to a fixed video camera without inherent pan-tilt-zoom support. Unless stated to the contrary, Pan Tilt devices are assumed to be in-built mechanisms within the video camera throughout this document.

## Purpose

Both serial ports - **Port 1** and **Port 2** - can be designated as either of the following:

- **Generic** - the AXIS 2400/2401, through the Generic driver, has terminal server capabilities; consequently, third party applications can have complete control of the serial ports using TCP or HTTP. For more information see *Appendix D - The RS232 Interface* and *Appendix E - CGI Parameters*.
- **Pan Tilt** - from the drop down dialog choose from several Pan Tilt drivers supported as standard by the AXIS 2400/2401. A list of currently supported drivers is provided in *Supported Pan Tilt Drivers*, on page 48.
- **None** - if you are not connecting a Pan Tilt or Generic driver to the port.

## Interface Mode

From the drop-down dialog you can configure **COM1** as either an **RS232** or **RS485** port. Selecting the former logically connects **Serial Port 1** to the **COM 1** connector; whereas the latter connects the port to the **Terminal Block Connector**.

- Notes:**
- Most CCTV equipment supports the RS485 standard - that is a bi-directional, half duplex standard for transmitting data over multi-drop communications line. Supporting up to 32 drivers and 32 receivers over a single twisted pair cable, the maximum cable length should not exceed 4000 feet. Typically used for connecting a single PC to several addressable devices over the same cable.
  - Many Video cameras support RS232 as it provides for a reliable point-to-point communications at low data transmission rates. Your wiring distances should be limited to one or two hundred feet for asynchronous data lines, and about 50 feet on synchronous lines.

## Communications Settings

Using the drop-down dialogs for Baud Rate, Data Bits, Stop Bits and Parity; match the AXIS 2400/2401 data transmission formats with the devices connected to the COM1 and COM2 ports.

- Note:** The appropriate communications settings for each supported Pan/Tilt driver are defined in *Supported Pan Tilt Drivers*, on page 48. Check the user documentation supplied with your Pan Tilt device for detailed information.

## Pan Tilt Settings

### Before you begin:

- Ensure that your pan tilt devices are properly connected prior to proceeding with this section. Instructions for the physical connection of pan tilt devices are provided in *Appendix D - The RS232 Interface*.
- The Pan Tilt icon is displayed within the graphic interface only after the Purpose of the relative Serial Port has been set to Pan Tilt. If the Pan Tilt icon is not visible, or a Generic icon is displayed next to the relative serial port icon, refer to *Purpose*, on page 31 and redefine the purpose of the port.

Having defined the *purpose* as **Pan Tilt**, specified the related *Interface Mode* (COM1 only) and defined the *Communications Settings* for a serial port, you can then proceed to select an appropriate driver for connecting Pan Tilt devices.

Click the Pan Tilt icon within the graphic user interface to view and configure the General **Pan Tilt** settings, including:

- Defining the driver for your Pan Tilt device
- Viewing and editing the driver-specific settings
- Creating, editing and deleting preset camera positions

### Choosing the Pan Tilt Driver

The AXIS 2400/2401 supports a variety of standalone Pan Tilt devices as standard.

You select an appropriate driver from the drop-down dialog, and click **Save** to register your choice with the AXIS 2400/2401. The driver configuration is then refined by clicking **Driver Specific Settings**.


### Refining Driver Specific Settings

The comprehensive selection of embedded Pan Tilt drivers is listed in *Appendix D - The RS232 Interface*. For specific instructions on how to refine your installation by setting the respective **Driver Specific Settings**, see *Supported Pan Tilt Drivers*, on page 48.

## Generic Driver Settings

Defining the *purpose* of the related serial port (COM1 or COM2) to **Generic** provides you with the option to position the video source directly using: **HTTP** (CGI parameters) in a Web browser, or a TCP client; such as, a Visual Basic application. Refer to *Appendix D - The RS232 Interface* for details.

### Important!

The Generic icon  is displayed within the graphic interface only after the Purpose of the relative Serial Port has been set to Generic. Refer to *Purpose*, on page 31 and redefine the purpose if the Pan Tilt icon not visible, or a Pan Tilt icon is displayed next to the relative serial port icon.

## Configuring using FTP

As an alternative to configuring the AXIS 2400/2401 using a Web browser, the configuration parameters of your unit can also be modified using the File Transfer Protocol (FTP).

FTP is supported by most operating environments and is useful method for quickly downloading standard preconfigurations to one or several remote video servers.

### Modifying the Configuration File

Follow these instructions to modify the configuration file using FTP:

1. In a DOS or UNIX window, type **ftp videoserv**, where **videoserv** is the name or Host Name of your AXIS 2400/2401.
2. Login using the user **root** and the root password. Default password is **pass**. It is highly recommended that you change the root password, since all Axis products are shipped with this password as default.
3. Type **get config.ini** to access the configuration file.
4. Edit the config file using any text editor. In Windows 95/98 and Windows NT environments, you can for example use Notepad.
5. Once the editing is complete, save the file as **config.ini**. Type **put config.ini** to save the configuration file permanently.
6. To exit FTP, type the command **quit**, **bye**, or **exit**.

### Tip!


To install similar settings on several units: simply make the correct settings for one unit, fetch via FTP the *config.ini* file, and then use a text editor to remove the IP address and any other unique settings. You can then download this file to all your units via FTP.



## Using the Video Server

This section is specifically targeted at system *Users*; that is, personnel responsible for using the AXIS 2400/2401 as part of an integrated surveillance system.

### Important!

- Your system *Administrator(s)* has installed the AXIS 2400/2401 to your computer network, connected several surveillance video cameras to the unit, and tailored the user functions and general look and feel of the system to specifically meet your surveillance needs; consequently, many of the functions and examples provided within the section can vary from those displayed in your system.
- Any deficiencies or shortcomings within your application should be escalated to the system *Administrator(s)* who has with high-level privileges normally denied to ordinary users.
- On-line help  may not be available from the user interface, as your access to this information may be denied by your system Administrator.

## Accessing your Surveillance Images

The AXIS 2400/2401 can be used with most operating systems; including: Windows 95/98 and NT; as well as Linux, UNIX, Mac, and several others. You access the AXIS 2400/2401 from any standard Web browser; such as, Netscape Navigator 4.x or Internet Explorer 4.x (see the Important notice, below).

Follow the instructions below to access your surveillance images:

1. Start your Web browser application
2. Enter the name or IP address of the AXIS 2400/2401 into the **Location/Address** field (URL) of your Web browser:

### Example

`http://172.21.1.200/`

A video image, similar to one of the examples featured on page 35, is now displayed within your Web browser.

**Note:** When accessing the AXIS 2400/2401 for the first time using Microsoft Internet Explorer, you must then temporarily lower your security settings to perform a one-time-only installation of Axis' ActiveX component onto your workstation, as described on page 17.

## Typical Image Styles

Because the look and feel of the AXIS 2400/2401 user interface is set up by your *Administrator(s)*, the images format and page styles can vary considerably. Typical layout styles are featured below - but these examples should **not** be interpreted as an exhaustive library of available style formats.



Typical Quad Image Style



Typical Single Image Style

## Disconnected Video Sources

All **Disabled** or **Disconnected** video cameras are displayed with an appropriate text message in single-display viewing areas; that is, when a source other than **VIDEO ALL** is specifically selected.

A blank display - without text, may indicate a break in the signal transmission; such incidents should be escalated to your system administrator immediately.

## Positional Control of the Video Sources

Video cameras supporting Pan Tilt and Zoom (PTZ) control can be attached and positioned directly from the supported serial ports (COM 1 and COM 2).

Furthermore, the AXIS 2400/2401 can control up to two external (standalone) PTZ devices for positioning fixed cameras on your system.

All PTZ devices can be steered via the AXIS 2400/2401 Web interface, or TCP application if your Administrator chooses.

## Using the Pan Tilt and Zoom Toolbars

Clicking a specific **Video** button, other than **Video All**, automatically displays *pan-tilt-configured* video sources in a *single-image* format that features **Pan**, **Tilt** and **Zoom** bars, as shown below:

### Select Preset Position

To enable quick and accurate camera positioning, the Administrator can define within server memory, up to 20 preset camera positions. Presets positions are established and saved as named entities by your Administrator and can be re-established at any time from the drop-down dialog.

### Pan

Allows smooth or stepped horizontal panning of the camera. For details, refer to Camera Positioning (below).



### Zoom

Allows smooth or stepped camera zoom between telescopic and wide viewing.

### Click-in-image

For navigational control of pan tilt devices

### Tilt

Allows smooth or stepped vertical panning of the camera. For details, refer to Camera Positioning (below).


### Home

Returns the camera to the default 'home' position. For details, refer to Camera Positioning (below).

**Note:** Pan Tilt control can be disabled by your Administrator and unavailable from the user interface.

## Camera Positioning

Although very similar, the navigational functionality is slightly different for each of the available pan tilt drivers. The table below describes the basic positioning methods, and the level to which these are supported by the drivers available from the Administration pages:

Positioning method	Diamond Smartscan	Sony	Canon	Videmech	Ernitec	Pelco
 <b>Step:</b> Click the left, right, up or down arrows within the positional toolbar to move the selected camera in 5° steps (approx) in the chosen direction.	Yes	Yes	Yes	Yes	Yes	Yes
<b>Smooth:</b> Each positional toolbar represents the full viewing angle for the selected camera. Click anywhere along the toolbar to gently travel the camera to its equidistant position.	Yes	Yes	Yes	Yes	No	No
<b>Click in picture:</b> Click directly in the picture to define the central position of the selected camera.	Yes	Yes	Yes	Yes	No	No
 <b>Home:</b> Click to move the camera to its home position, as defined by the pan tilt device.	Yes	Yes	Yes	Yes	No	No

## Camera Zoom

In a fashion similar to that provided for positional control, the degree of camera zoom is controlled by clicking a scaled toolbar that represents the full tele-zoom potential for the selected device.

Click the left or right arrows within the toolbar for *stepped* increases for *Wide* and *Tele* zoom respectively. Clicking anywhere along the toolbar gently adjusts the level of camera zoom by a *variable* value predetermined by the device.

**Note:** Variable zoom control is not supported by the Pelco and Ernitec drivers.

## Assuming Preset Positions

To enable quick and accurate camera positioning to known camera *hotspots*, the *Administrator(s)* can create up to twenty **Preset Positions** that can be reinstated at any time by the *users*.

Choosing a preset position from the drop-down dialog immediately causes the selected camera to assume the predefined orientation.

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## Appendix A - Troubleshooting

This appendix provides useful information to help you to resolve any difficulty you might have with your AXIS 2400/2401. Fault symptoms, possible causes and remedial actions are provided within a quick reference table.

### The Log File

The AXIS 2400/2401 log file records events 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 reading the information in this appendix or by referring to the AXIS 2400/2401 FAQ, you can escalate the problem to the AXIS support desk. To help us resolve your problems expediently, please ensure to provide the following information:

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

See “Support Services” on page 2 for information on how to contact your local support center.

### Obtaining the File

Follow the instructions below to display all Video Server commands executed since the last *Restart* of the system:

1. Click the **Video Server** icon in the graphic interface.
2. Click the **View Log File** button. All Video Server commands executed since the last *Restart* of the system are displayed in a separate window.

Alternatively, obtain a copy of the log file, by typing the following command directly into the location/Address field (URL) of your Web browser:

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

## Examining the File

The Log file can be examined directly using any text editor and typically contains the following information:

```
Wed Jun 30 19:13:10 Info: Initialize video decoders
Wed Jun 30 19:13:15 Info: Initialize serial ports and device Drivers
Wed Jun 30 19:13:15 Info: Create Canon VC-C3, COM1
Wed Jun 30 19:13:15 Info: Create HTTP Generic, COM2
Wed Jun 30 19:13:15 Info: Prepare for FTP/CRON image access
Wed Jun 30 19:13:15 Info: Initialize Juliette chip
Wed Jun 30 19:13:15 Info: Start script
Wed Jun 30 19:13:15 Info: Start SoftWatchdog
Wed Jun 30 19:13:15 Info: Create camera device port connection
```

Typical AXIS 2400/2401 Log File

## PINGing Your IP Address

By sending a packet to the specified address and waiting for a reply, the *PING* (Packet Internet Groper) can determine whether a specific IP address is accessible; it also provides a particularly useful method for confirming addressing conflicts with your AXIS 2400/2401 on the network.

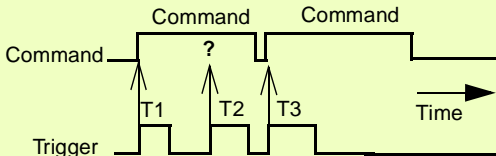
Having disconnected your AXIS 2400/2401, follow the instructions below in association with *Symptoms, Possible Causes and Remedial Actions*, on page 40, and run the PING utility to troubleshoot TCP/IP problems on your network:

1. Start a DOS window.
2. Type **ping x.x.x.x**, where *x.x.x.x* is the IP address of the AXIS 2400/2401.
3. The subsequent replies will provide an explanation as to the cause of the problem. Replies can be interpreted as defined in the table below:

PING Reply	Interpretation and recommendation
bytes = 32 time = 2 ms.....	The IP address is already used and cannot be used again. You must obtain a new IP address.
destination host unreachable	The AXIS 2400/2401 is not accessible within your subnet. You must obtain a new IP address.
request timed out	This IP address is not used by anyone and is available for use with your AXIS 2400/2401.

## Symptoms, Possible Causes and Remedial Actions

Symptoms	Possible causes	Remedial actions
The AXIS 2400/2401 cannot be accessed from a Web browser.	The IP address is already used by another device.	<ol style="list-style-type: none"> <li>1. Disconnect your AXIS 2400/2401 from the network.</li> <li>2. Run the PING utility (as described in <i>PINGing Your IP Address</i>, on page 39) and follow the appropriate recommendations.</li> </ol> <p><b>Note:</b> The assigned IP number can be assumed valid if the PING utility returns "request timed out" - in which case you should set the IP address again, power on the AXIS 2400/2401 and then try accessing the unit again.</p>
	The IP address is located within a different subnet.	<p>Run the PING utility (as described in <i>PINGing Your IP Address</i>, on page 39). If the utility returns "no response" or similar, the diagnosis is probably correct - you should then proceed as follows:</p> <p>In Windows 95/98 or Windows NT, check that the IP address for your AXIS 2400/2401 is within the same subnet as your workstation:</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> <li>3. Check that the first 3 numbers within the IP address of your AXIS 2400/2401 matches the first 3 of your workstation. If not, your AXIS 2400/2401 may be on a different subnet and the IP address cannot be set from this workstation. You must set the IP address for the AXIS 2400/2401 from a workstation on the same subnet.</li> </ol>
	In Windows 95, the ARP table was empty when you tried to set the IP 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 IP address to the AXIS 2400/2401, using ARP. See also the Important Note, on page 15. An alternative is to use the AXIS IP Installer.</p>
The programming script is not working.	A programming script locking the unit.	Restore the unit to the factory default default settings. For details, refer to <i>Reinstating the Factory Default Settings</i> , on page 25.
	The programming script is disabled.	Check that the programming script has been enabled.
The Power indicator is not constantly lit	Faulty power supply.	Verify that you are using an Axis PS-D power supply.

Symptoms	Possible causes	Remedial actions
The Network indicator displays red.	Faulty cabling.	<ol style="list-style-type: none"> <li>1. To verify that the cables are functional, PING the address of a known existing unit on your network.</li> <li>2. If the cabling is OK and your network is reachable, you should receive the reply similar to this: ...bytes = 32 time = 2 ms,</li> </ol>
The Active and Network indicators are flashing every 0.5 seconds	Hardware failure.	Contact your Axis dealer.
Your AXIS 2400 works locally, but not externally.	Firewall protection	Check the Internet firewall with your system manager.
	Default routers required	Check if you need to configure the default router settings.
	The Internet site is too heavily loaded.	Use a script running on your web server to relay images from the AXIS 2400/2401 to the Internet.
No image using Refresh and/or Slow updating of snapshots using the Server push function.	Complex images, i.e. those containing great picture contrasts, have greater file size and thus place greater demand on the available file space within the AXIS 2400/2401.	<p>The memory constraints become significantly more acute if multiple clients try to access the same snapshot.</p> <p>Try limiting the number of clients.</p>
Triggering difficulties with programming scripts	Unable to triggering on both positive and negative transitions of the Control Button and/or IO ports (double-edged triggering).	<p>Repetitive trigger conditions that occur in quick succession of one another can be missed. This is because the command initiated by the first trigger event may not have been fully executed prior to the second event. This scenario is demonstrated in the illustration below:</p>  <p>This feature has particular significance when using commands that take a relatively long time to process, e.g. mail or ftp, especially if they are conjugated with a loop statement. See also <i>Appendix H- The Programming Script</i>.</p>
Bad snapshot images.	Display configured incorrectly on your workstation.	<p>Within Display Properties, configure your display to show at least 65'000 colors, i.e. at least 16-bit.</p> <p>Using only 16 or 256 colors on your computer will produce dithering artifacts in the image.</p>

**Note:** If you still have a problem after reading this information, please contact your reseller or check the FAQ on the Axis Website at <http://cctv.axis.com>.



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## Appendix B - Updating the Software

The AXIS 2400/2401 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. 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 2400/2401 as soon as they become available - without having to replace any parts. New software can be simply loaded into the AXIS 2400/2401 over the network.

### Obtaining Updated Software

The latest version of the AXIS 2400/2401 server software is available free of charge from Axis or your local distributor. You can obtain this software over the Internet or via anonymous FTP.

#### Over the Internet

From the <http://cctv.axis.com/> link on the AXIS 2400/2401 Welcome Page, follow the “Support and Services” and then **firmware** links, or enter <http://cctv.axis.com/service/fware.htm> directly within the URL of your Web browser.

Click the **Flash firmware and Release Note** link to download the file `axis2400.exe`. 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.

#### Anonymous FTP

Log in to <ftp.axis.com> and go to the `/pub/axis/software/cam_srv/cam_2400/latest/` directory. Download the software download the file `axis2400.exe`. 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.

### Upgrading the Software



There are two methods for updating to the AXIS 2400/2401 Flash memory:

- over the network using the AXIS ThinWizard
- over the network using FTP

#### Upgrading Using the AXIS ThinWizard

AXIS ThinWizard is a tool for locating, managing and upgrading AXIS ThinServer devices, including AXIS 2400/2401 products. Supplied on the AXIS Online CD and Axis Website, it enables batch upgrading of several video servers simultaneously and is the recommended method for upgrading Axis products in TCP/IP networks.

## Before you begin:

You must assign the AXIS 2400/2401 with an IP address, as described in *Assigning an IP Address*, on page 13, before you can use this upgrading method.

Follow the instructions below to upgrade your video servers using AXIS ThinWizard:

1. Click the **Manage Network** button in the AXIS ThinWizard main menu.
2. Select a network group from the drop-down list. You can only update the servers that are included in the selected network group.
3. All AXIS servers included in the network group appear. Click the **Firmware** button to start the Upgrade Wizard.
4. Follow the instructions that are presented to you to complete the installation.

For more information about AXIS ThinWizard, refer to the Axis Website at <http://www.axis.com/>

## Upgrading using FTP

Having obtained the upgrade software, install it into the AXIS 2400/2401 by following the instructions below:

1. Reset the AXIS 2400/2401 by powering it off and then on again.
2. Start an FTP session and log in to the AXIS 2400/2401 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 2400/2401 by using the command `put 2400_xxx.bin flash`, where `xxx` is the version number for the firmware.  
This process takes 30 - 60 seconds. The LEDs will flash slowly during programming.

**Note:** If you need to force a download, e.g. when reverting to an older version of software, use the syntax `put 2400_xxx.bin FLASH`, where `xxx` is the version number for the firmware.

5. The AXIS 2400/2401 will report "Transfer complete, flash programming finished OK", once the programming is complete.

## Caution!

In controlled environments, flash memory upgrades provide a very safe method for updating software. However, flash products can become damaged if the updating operation is not performed correctly. Your dealer reserves the right to charge for repairs made necessary due to incorrect upgrading by the user.

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## Appendix C - Technical Specifications

**System Requirements** - The AXIS 2400/240I uses the standard Internet TCP/IP suite of protocols and can be used with most operating systems: Windows 95, 98 and NT as well as Linux, UNIX, Mac and several others. The only software required is Microsoft Internet Explorer 4.x, or higher (used with Axis' ActiveX component AXIS Camera Control), or Netscape 4.x or above.

**Installation** - Physical network connection using RJ45 twisted pair cable. Installs directly to NTSC or PAL video cameras using BNC connectors. Use as a standalone system or as an add-on to existing CCTV systems.

**Management** - Remote configuration and status using Web-based tools.

**Compression** - Motion-JPEG, as well as single snapshot JPEG images. User controlled compression level.

**Video Features** - Time stamp and text overlay. Color control (B/W or color).

**Video Inputs (AXIS 2400)** - supports up to four BNC composite video inputs with 75ohm/Hi Z termination and includes autosensing for NTSC and PAL.

**Video Inputs (AXIS 240I)** - Supplied as an NTSC or PAL-specific unit allowing single BNC composite video connection with 75ohm/Hi Z termination.

**Video Output (AXIS 240I)** - A single video output (VIDEO OUT) terminated with a coax/BNC connector that allows direct connection of an external monitor.

**Networking** - 10baseT Ethernet or 100baseTX Fast Ethernet, TCP/IP, HTTP, FTP, SMTP, NTP, ARP, BOOTP.

**General I/O** - 4 optical-isolated alarm inputs and 1 output relay (max 24V, 0.1 A) supplied on a single terminal block connector. Programmable inputs for remote image storage via File Transfer Protocol (FTP) or E-mail (SMTP), pre/post alarm image storage.

**Pre/Post Alarm Buffer** - Up to 8 MByte memory available for pre/post alarm image storage.

**Serial Connectors** - 9 pin D-SUB RS-232 max 230 Kbps, 9 pin D-SUB RS-232 or RS-485/422 max 38.4 Kbps, half duplex

**Pan/Tilt/Zoom** - PTZ support for remote camera control. Currently supported units and protocols include: Ernitech ICU 51PA, Sony EVI-G20/21, EVI-D30/31, Canon VC-C3 and Diamond Smartscan. Future support for other PTZ units.

**Security** - User level password protection.

**Operating Conditions:** - Temp: 40-125°F (5-50°C), Humidity: 20-80% RHG.

**Approvals** - EMC: FCC Class A, **CE** :EN 55022/1987,EN50082- 1/1992  
Safety: EN 60950, UL, CSA.

**Metrics:** - Height: 1.7" (4.2 cm), Width: 5.7" (14.5 cm), Length: 8.7" (22.0 cm), Weight: 1.7 lb. (0.8 kg), excl. psu.

**Hardware** - ARTPEC-I compression chip, ETRAX-I00, 32 bit RISC, 100 MIPS CPU, 16 Mbyte RAM, 2 Mbytes FLASH PROM.

**Power** - 3 alternative power sources: External power supply 12V AC, 9.6 VA (PS-D, included), 9-20V AC, min 10VA, 6-30V DC, min 7W

**Complimentary Software** - AXIS IP Installer - for quick installation of multiple units, AXIS Thin Wizard - remote upgrade of multiple Axis units. AXIS Camera Control (Axis' ActiveX component software required for Microsoft Internet Explorer)

**ThinServer Technology** - Incorporating Axis ThinServer Technology, the AXIS 2400/240I comprises: "thin" versions of the most popular network operating systems, Web management tools, Axis' own ETRAX 32-bit RISC processor - based on open architecture, streamlined and optimized for device connectivity independent of any file server; and the industry's first dedicated digital video surveillance compression chip - the AXIS ARTPEC-I.

**Performance** - The AXIS 2400/240I delivers the following filesizes:

NTSC			PAL		
Resolution	Filesize (kb)	Max fps*	Resolution	Filesize (kb)	Max fps*
704 x 480**	7 - 150	10	704 x 576**	8.5 - 180	8
352 x 240	1.4 - 40	30	352 x 288	1.7 - 50	25
176 x 112	0.3 - 10	30	176 x 144	0.4 - 12	25
Quad (4 x 352 x 240)	7 - 150	5***	Quad (4 x 352 x 288)	8.5 - 180	5***

\* Maximum performance given single user and only one video source in use.

\*\* Interlaced image

\*\*\* Quad image, images from all four video sources integrated into one single image (AXIS 2400 only).

All specifications are subject to change without prior notice.

## Appendix D - The RS232 Interface

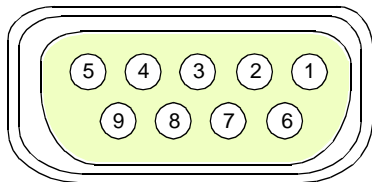
As a complement to the information provided in *Pan Tilt Settings*, on page 32, this appendix discusses the functionality of the RS232 serial interface and provides detailed instructions on how to install a standalone Pan/Tilt device to the AXIS 2400/2401 Video Server.

Two 9 pin D-sub connectors provide the physical connection for the RS232 serial interface of the AXIS 2400/2401. These connectors are provided for connecting accessory equipment; typically standalone Pan/Tilt devices for remote positioning of connected video cameras.

### The Physical Connector

A diagram of an RS232 connector and the AXIS 2400/2401 pin assignment table are detailed below.

Pin	COM1 Function	COM2 Function
1	NC	CD
2	- RXD	- RXD
3	- TXD	- TXD
4	RTS	DTR
5	GND	GND
6	DSR	DSR
7	RTS	RTS
8	NC	CTS
9	NC	RI



**Notes:** The pinout is different for each supported serial port

NC = Not connected

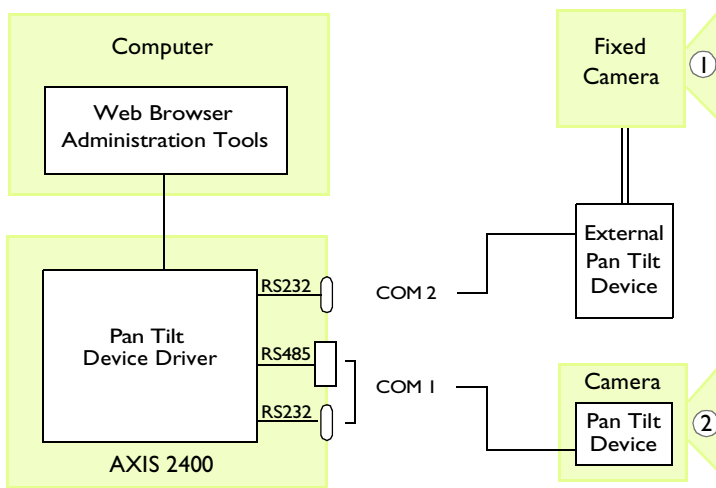
### Camera Positioning

The AXIS 2400/2401 can control the position of connected cameras in three different ways:

- *Pan Tilt Control using the Web Administration Tools:* where, the position of the selected video camera is controlled using a standard Web browser.
- *Generic Control using CGI parameters:* enter the positioning data as a CGI command directly into your Web browser Location/Address (URL).
- *Generic control using a TCP client:* using a TCP client-application to control the position of the chosen camera.

## Installing Pan/Tilt Devices

The diagram below illustrates how the AXIS 2400/2401 connects to your workstation, video cameras and relative Pan Tilt Device. ① A fixed camera can be positioned remotely by using an External Pan Tilt device. ② A PTZ-supported camera is connected directly to the COM 1 or COM 2 ports directly.



Follow the instructions below to install a Pan/Tilt device:

1. Attach the Pan/Tilt device to the Pan/Tilt port of the AXIS 2400/2401 using an RS232 cable.

**Note:** It is also possible to connect a Pan Tilt device via the RS485 port. See *Appendix F - The IO Terminal Block* for details.

2. On the AXIS 2400/2401 Home Page, click **Settings**. You will be prompted to supply a username and password. By default, these are set to `root` and `pass`.
3. Click **Pan/Tilt**.
4. Click **Driver**. Select the driver that corresponds to your Pan/Tilt device from the drop-down menu. Click **Store driver**.

## Supported Pan Tilt Drivers

A comprehensive list of currently supported drivers with their associated settings is provided below:

Driver	Serial Settings	Driver Specific Settings
<b>Diamond Smartscan (SCAN III Family)</b>	Baud = 9600 Parity = Even Databits =8 Stopbits=1	Define the unit identity, corresponding to the DIP switch settings for the connected device(1-255).
<b>Canon VC C3</b> Accommodates single device connection only - per RS232 port.	Baud = 9600 Parity = None Databits =8 Stopbits=2	None.
<b>Sony G20/G21/D30/D31 (VISCA)</b> Accommodates up to three devices connected in daisy-chain.	Baud = 9600 Parity = None Databits =8 Stopbits=1	<b>AXIS 2400 only:</b> Define the unit identity, corresponding the order in which the device is connected in the daisy chain. <b>Note:</b> Sony devices normally support automatic sensing and chronological assignment of device identities for daisy-chain configurations.
<b>Videmech (Universal Outstation Communication Protocol)</b> Up to four devices connect to the RS485 connector in the terminal block.	Baud = 9600 Parity = Odd Databits =8 Stopbits=1	Define the following: <ul style="list-style-type: none"> <li>Serial Address: the address of the head connected to the camera corresponding to the DIP switch settings for the connected device(1-255). <b>Note:</b> the address 255 is reserved for broadcast, i.e all connected heads will receive commands sent to this address.</li> <li>Movement limits: the limits representing the end positions in all directions; i.e left, right, up and down. These limits ensure that head travel is kept within certain bounds and must be used if there is any risk of obstruction in the device head movement.</li> <li>Zoom and focus limits: indicating the end position for focus and zoom. In order not to stall the motors when approaching the mechanical end positions of your lens, it is very important that you limit the wide/tele intervals in accordance with the physical travel restrictions for the lens mechanism.</li> <li>Zoom and focus enabled: uncheck these boxes if you not using a zoom and/or focus lens.</li> <li>Optical Data: the MaxDeg setting should correspond to the optimal width of the viewing angle at max wide; the MinDeg setting should correspond to the minimal viewing angle at max tele.</li> </ul>
<b>Ernitec ERNA</b> Up to four devices connect to the RS485 connector in the terminal block.	Baud = 2400 Parity = None Databits =8 Stopbits=1	Define the unit identity, corresponding to the DIP switch settings for the connected device(1-255).
<b>Pelco Digital Coaxitron</b> Up to four devices connect to the RS485 connector in the terminal block.	Baud = 2400 Parity = None Databits =8 Stopbits=1	Define the unit identity, corresponding to the DIP switch settings for the connected device(1-255).

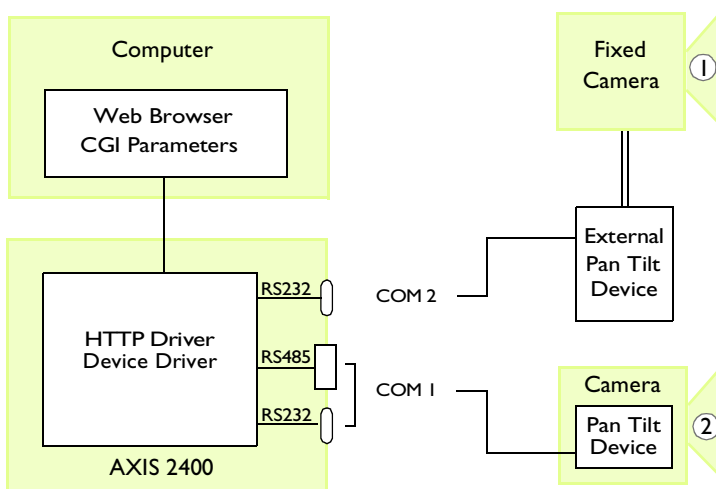
## Important!

Although many of the supported drivers have been tested and found to work satisfactorily with the AXIS 2400/2401, Axis cannot guarantee the compatibility of all drivers, conforming or otherwise, to a specific manufacturer's protocol.

- Notes:**
- Setting the Pan Tilt Address to 255 causes the control signals to be broadcast to all connected devices.
  - Check the user documentation supplied with your Pan Tilt device for detailed information.

## Generic Serial Port Control using HTTP

The AXIS 2400/2401 supports input/output operations on the serial ports via the HTTP protocol. The functionality can be used for adjusting the video camera position **or** for controlling a simple device, such as a relay switch. The schematic diagram below illustrates the logical elements for such a configuration:



Follow the instructions below to configure serial port control for use with the HTTP protocol:

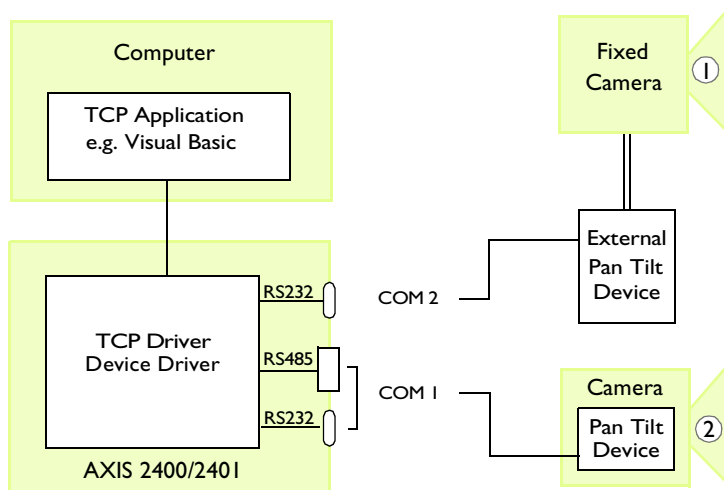
1. Click the **Generic** icon within the graphic user interface.
2. Set the HTTP radio button.
3. Click **Save**.

The Pan/Tilt port is now enabled for input/output operations via HTTP.



## Serial Port Control using the TCP Protocol

The AXIS 2400/240I supports input/output operations on the serial ports directly via the TCP protocol. The functionality can be used for adjusting the video camera position **or** for controlling a simple device, such as a relay switch. This functionality is normally used from a client application, developed for instance in Visual Basic. The schematic diagram below illustrates the logical elements for such a configuration:



To enable TCP input/output operations on the Pan/Tilt port, follow these steps:

1. Click the **Generic** icon within the graphic user interface.
2. Set the TCP radio button.
3. Define the appropriate TCP Port number.
4. Click **Save**.

**Note:** Your TCP client application must also use this TCP port when communicating with the AXIS 2400/240I.

5. The Pan/Tilt port is now enabled for input/output operations via TCP.

### Tip!

In step 3 (above), use a Telnet session to access the TCP port, and set a null modem connection to a terminal program; such as, Hyper Terminal to verify the setup of the generic TCP driver.

# Appendix E - CGI Parameters

The Common Gateway Interface (CGI) is a standard for interfacing external applications with information servers, such as a Web server. A CGI program within the AXIS 2400/240I allows you to define special video image features within an embedded URL request and generate simple HTTP input/output operations for controlling the Pan/Tilt port.

CGI parameter requests are generated in the form of query strings appended to the URL of the AXIS 2400/240I.

## CGI Parameters for Image Requests

For snapshot requests, use this syntax:

```
http://<servername>/cgi-bin/<imagefile>?<parameter>=<value>[&<parameter>=<value>...]
```

This table lists the CGI parameters for snapshot requests:

Parameter/Syntax	Description	Values
camera=<n> (applicable for AXIS 2400 only)	Selects the source for generating snapshots. If omitted, the default camera is used.	1,2,3 or 4
compression=<value>	Adjusts the image quality and file size.	1-5, where: 1= minimum, 2=low, 3=medium, 4=high, 5=very high
color=<value>	Selects color or grayscale.	1 or 2; where: 1=grayscale, 2=color
clock=<value>	Shows/hides the time stamp.	on, off
motion=<n>	Shows motion JPEG image stream	0

### Example 1

Request a fullsize JPEG snapshot from the default camera connected to the AXIS 2400/240I `videoserv` that contains a clock reference:

```
http://videoserv/cgi-bin/fullsize.jpg?clock=on
```

### Example 2

Request a highly compressed hugesize JPEG snapshot from the camera connected to VIDEO 2 on an AXIS 2400 with the DNS name `videoserv`:

```
http://videoserv/cgi-bin/hugesize.jpg?camera=1&compression=5
```

**Example 3**

The following example features a simple JavaScript that transmits live video images from a AXIS 2400/2401 into a Web page, using Netscape:

```
<html>
<head>
<title>Live Video Demo for Netscape</title>
</head>
<body>
<H2>Live Video Demo for Netscape</H2>
  <IMG SRC="http://172.21.1.200/cgi-bin/fullsize.jpg?camera=1&motion=0">
</body>
</html>
```

**Example 4**

The following example features a JavaScript that transmits live video images from a AXIS 2400/2401 into a Web page, using either Netscape or Microsoft Internet Explorer:

```
<html>
<head>
<title>Live Video Demo, Netscape and Microsoft Internet Explorer</title>
</head>
<body>
<H2>Live Video Demo, Netscape and Microsoft Internet Explorer</H2>
<SCRIPT LANGUAGE="JavaScript">
<!--//hide script
if ((navigator.appName ==
    "Microsoft Internet Explorer") &&
    (navigator.platform != "MacPPC") &&
    (navigator.platform != "Mac68k"))
{
    document.write("<OBJECT ID=\"CamImage\" WIDTH=352 ";
    document.write("HEIGHT=288 CLASSID=CLSID:917623D1-")
    document.write("D8E5-11D2-BE8B-00104B06BDE3 CODEBASE=");
    document.write("\"http://172.21.1.200/activex/ATLCamImage.ocx");
    document.write("#Version=1,0,1,18\"> <PARAM NAME=\"URL\" ");
    document.write("VALUE=\"http://172.21.1.200/cgi-bin/fullsize.jpg");
    document.write("?motion=10&camera=1\">");
    document.write("</OBJECT>");
}
else
{
    document.write("<IMG SRC=\"http://172.21.1.200");
    document.write("/cgi-bin/fullsize.jpg?camera=1&motion=0\"");
}
//end hide -->
</SCRIPT>
</body>
</html>
```

## CGI Parameters for Pan Tilt and Zoom Control

Use the following syntax for creating CGI parameters to control Pan Tilt devices:

```
http://<servername>/cgi-bin/control?camera=<n>&<parameter>=<value>[&<parameter>=<value>...]
```

### Example

Move the camera connected to VIDEO 1 on videoserv 45 degrees to the right:

```
http://videoserv/cgi-bin/control?camera=1&pan=45
```

This table lists the CGI parameters for Pan Tilt requests:

Parameter/Syntax	Description	Values
camera=<n>	Selects the source for pan tilt requests. This is mandatory and must be submitted (for the AXIS 240I this is always set to 1).	1,2,3 or 4
move=<x>	Moves the Pan/Tilt device 5 degrees in the specified direction.	up/down/left/right/upleft/upright/downleft/downright/*home/
*pan=<n>	Pans the Pan/Tilt device <n> degrees relative to the home position.	-180 ... 180
*tilt=<n>	Tilts the Pan/Tilt device <n> degrees relative to the home position.	-180 ... 180
*rpan=<n>	Pans the Pan/Tilt device <n> degrees relative to the current position.	-180 ... 180
*rtilt=<n>	Tilts the Pan/Tilt device <n> degrees relative to the current position.	-180 ... 180
*zoom=<n>	Adjusts the camera zoom to the specified angle.	1 ... 999 where 1 is full zoom out
zoomrel=<x>	Adjusts zoom to specified values.	wide/tel/*widemax/*telemax/
*focus=<x>	Adjusts zoom within the specified scale.	1 ... 999
*focusrel	Adjusts zoom to upper and lower extremes.	far or near
presetposno	Assumes the camera position defined by the preset position number.	1 ... 20
presetposname=<name>	Assumes the camera position defined by the preset position name.	<name>
*speed=<n>	Sets the head speed of the pan tilt device connected to the selected camera/port.	1 ... 999
whoami	Identifies the type of pan tilt driver connected to the selected camera/port.	check

**Notes:** • Parameters and values identified with an asterisk "\*" are not available to all supported pan tilt devices. For the latest driver-specific information, check out the Axis Camera Developer's Web at <http://cctv.axis.com/>

- The CGI parameters that adjust the camera position are only applicable when using one of the supported Pan/Tilt devices.

## CGI Parameters for Preset Positions

For preset position requests, use this syntax:

```
http://<servername>/cgi-bin/control?presetposname=<position name>&camera=<n>
```

It is also possible to use an index number instead of the preset position name:

```
http://<servername>/cgi-bin/control?presetposno=<1-20>&camera=<n>
```

## CGI Parameters for Serial Port Control

For HTTP input/output operations on the Pan/Tilt port requires the **Generic** driver to be selected. Use the following syntax:

```
http://<servername>/cgi-bin/control?<parameter>=<value>[&<parameter>=<value>...]
```

This table lists the CGI parameters for input/output operations

Parameter/Syntax	Description	Values
dataout=<string>	Writes a specified data string to the defined serial port (see port parameter, below). Maximum string length = 128 bytes.	Hexadecimal coded bytes {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, a, b, c, d, e, f}
port = <n>	Selects the serial port as either COM1 or COM2. This is mandatory and must be submitted.	1 or 2
read=<n>	Reads the specified number of bytes from the Pan/Tilt port. The returned value will be hexadecimal coded and placed between #'s, e.g. #3A#.	1 ... 128
wait=<n>	Waits the specified number of seconds before reading from the Pan/Tilt port. Used together with the "read" parameter.	1 ... 9
flush=<value>	Empties the input buffer for the Pan/Tilt port. Always performed first when combined with other parameters.	yes/no

### Example 1

Writes the data stream 430001FF to COM1:

```
http://videoserv/cgi-bin/control?port=1&dataout=430001FF
```

### Example 2

Clears the input buffer, writes the data string 2B004C4C4F to COM1 and waits 5 seconds for a reply. The AXIS 2400/240I will return a value to the Web browser:

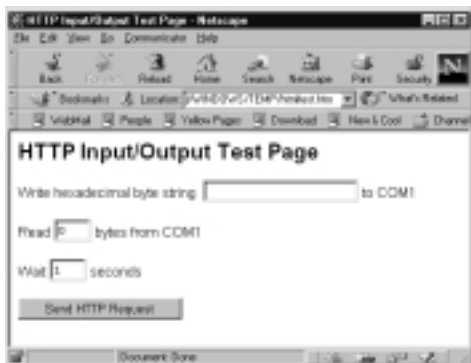
```
http://videoserv/cgi-bin/control?port=1&flush=yes&dataout=2B004C4C4F&wait=5&read=20
```

### Example 3

An HTML page for reading and writing to the COM1 serial port:

```
<html>
<head>
<title>HTTP Input/Output Test Page</title>
</head>
<body>
<h2>HTTP Input/Output Test Page</h2>
<form action="http://videoserv/cgi-bin/control" method=post>
Write hexadecimal byte string&nbsp;
<input type=hidden name="port" value="1">
<input type=text size=20 maxsize=19 name="dataout"> to COM1
<p>Read&nbsp;<input type=text size=4 name="read" value="0"> bytes from COM1 </p>
<p>Wait&nbsp;<input type=text size=4 name="wait" value="1"> seconds</p>
<input type=submit name="send" value="Send HTTP Request">
</form>
</body>
</html>
```

In a Web browser, the page will look like this:

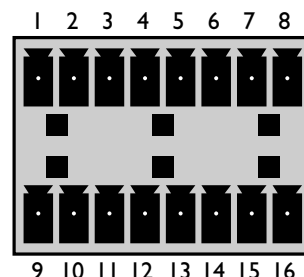


## Appendix F - The IO Terminal Block

Typically used in association with programming scripts for developing applications for motion detection, event triggering, time lapse recording, alarm notification via e-mail, picture storage to FTP locations and a variety of other functions; the 16-pin IO Terminal Block is located on the rear panel and provides the interface to: a single relay switch output, four digital photo-coupled inputs, an RS 485 interface, and auxiliary power.

This appendix describes the pinout, interface support and the control and monitoring functions provided by this connector.

**Note:** *Appendix H- The Programming Script* supplements the information provided within this section and is recommended reading for developers wanting to fully utilize the control and monitoring functions supported by this connector.



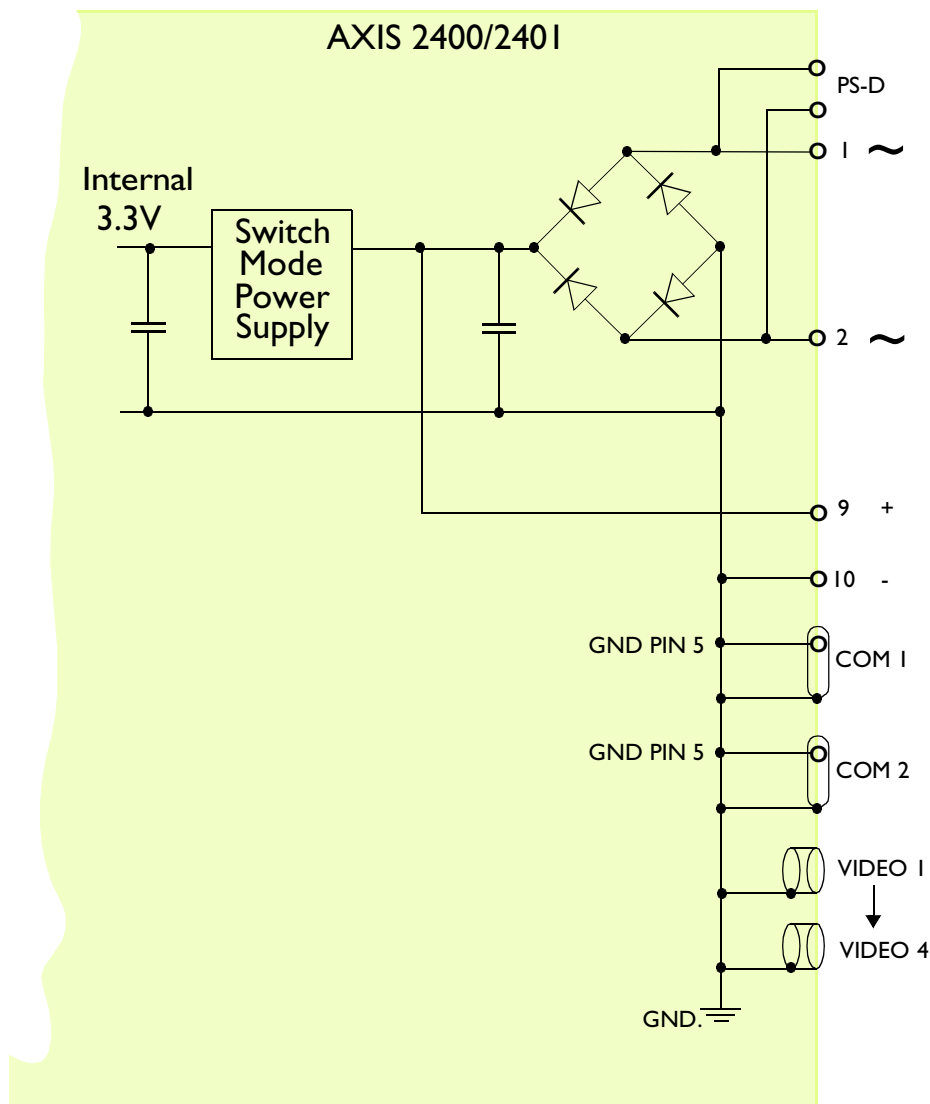
### Connector Pinout

The pinout for the Terminal Block (*illustrated left*) and signaling details for each pin is fully described in the table below:

Pin	Function	Description
1	Auxiliary AC Power Input	Electrically connected in parallel with PS-D power connector; pins 1 & 2 provide an auxiliary connector for mains power to the unit.
2	Auxiliary AC Power Input	
3	Digital Input 3 - Photocoupler Anode (+)	Photocoupled Input 3: Electrically isolated from the chassis and connectors, this input can be supplied from an external DC voltage or the DC Power Input/Output on pins 9 and 10.
4	Digital Input 3 - Photocoupler Cathode (-)	
5	Digital Input 4- Photocoupler Anode (+)	Photocoupled Input 4. As above.
6	Digital Input 4 - Photocoupler Cathode (-)	
7	RS 485 - B (inverting)	Serial Port I - RS485. A half duplex RS485 interface for controlling auxiliary equipment. <b>Note:</b> Serial Port I is programmed as either RS232 (COM1 Connector) or RS485 (Terminal Block Connector), via the Web browser interface.
8	RS 485 - A (non-inverting)	
9	DC + Power (Input or Output)	DC Power Input or Output: Used as an input, it supplies the Axis 2400 via a DC source; for example. a solar panel or a battery. As an output, it can drive the photo coupler inputs or other equipment; such as an IR-sensor. The output voltage level is dependent upon the input voltage to the unit. A maximum current of 50mA can be sourced from the DC output. Pin 10 is connected to unit chassis, and Ground on each serial port and video input. See circuit diagram (below).
10	DC - Power (Input or Output)	
11	Digital Input 1 - Photocoupler Anode (+)	Input 1 Photo coupler input. As Input 3.
12	Digital Input 1 - Photocoupler Cathode (-)	
13	Digital Input 2 - Photocoupler Anode (+)	Input 2 Photo coupler input. As Input 3.
14	Digital Input 2 - Photocoupler Cathode (-)	
15	Relay Switch	Relay switch - electrically isolated from chassis and connectors.
16	Relay Switch	

**Note:** For compatible replacement connectors, contact <http://www.phoenixcontact.com>, quoting: MC1.5/8-ST-3.8I (art no 1803633)

## Power and Ground





## Controlling and Monitoring

The status of the input/output interface can be controlled and monitored by the IO software file resident within your AXIS 2400/2401.

From your Web browser, you can access the IO control file to:

- query the relay status, or drive the relay output high or low
- monitor the status of the 4 digital inputs

**Note:** To access the control file requires `root` access, you will therefore need to supply a username and password. Login as `root` and supply the root password (default = `pass`).

### Relay Output

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

### Querying the Status of the Relay

Enter the following URL to query the status of the relay output:

```
http://<servername>/io?relay=check
```

The AXIS 2400/2401 displays the relay status as either:

```
relay=on or  
relay=off
```

### Setting the Relay

The relay can be controlled from the scripting language using the relay command, as described in *relay*, on page 75, or by entering the following URL:

```
http://<servername>/io?relay=on or  
http://<servername>/io?relay=off
```

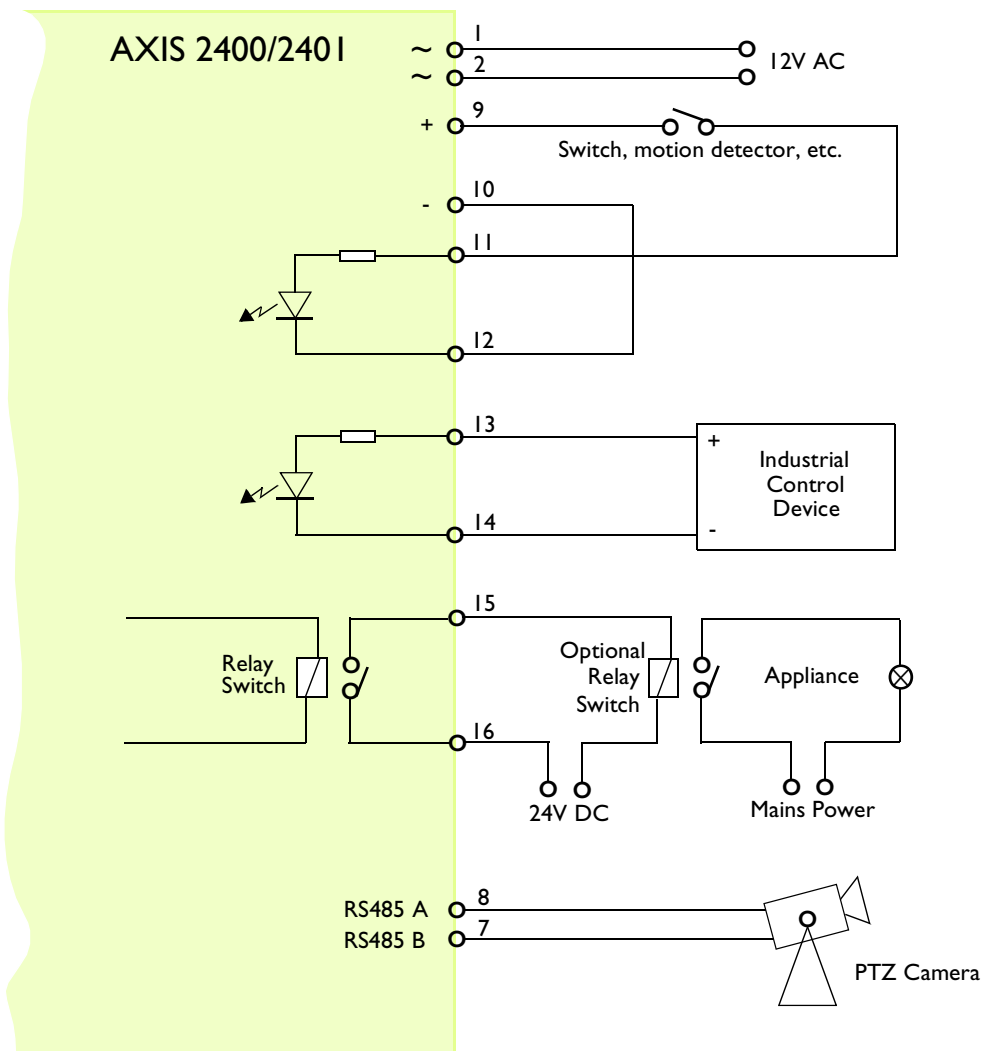
The AXIS 2400/2401 returns a respective messages, to confirm the relay status:

```
Relay is off  
Relay is on
```

## Digital Inputs

The four digital inputs make it possible to trigger your snapshots on chosen events using a programming script. By connecting a motion detector to a digital input for example, it is possible to trigger picture storage for each occasion that the detector is activated.

For full programming information, please refer to *Appendix H- The Programming Script*.



Schematic diagram of the AXIS 2400/240I Auxiliary Connector  
- displaying a possible application

### Querying the Status of Digital Inputs

The status of the four supported digital inputs can be queried in exactly the same fashion as the relay output. Simply enter the following URL to query the status of the digital inputs:

```
http://<servername>/io?relay=check
```

The AXIS 2400/2401 displays the relay status as either:

```
Input1 is on / off  
Input2 is on / off  
Input3 is on / off  
Input4 is on / off
```

# Appendix G - Camera Applications

The AXIS 2400/2401 offers live video over the network for enhancing and modernizing traditional CCTV and video surveillance systems... and much more.

Whereas traditional security systems often limit camera access to a specific monitor; the AXIS 2400/2401 allows industrial and security surveillance over a secure intranet network and even allows you to broadcast live images over the Internet. You can now monitor operations remotely from within the comfort of your own home, corporate headquarters; or indeed, from any workstation of your choosing that supports a Web browser. Just think... no more late trips to the factory to investigate problems!

This section provides a detailed description of each preconfigured application available within the Layout and Configuration Wizard and several client application ideas that will be of interest to Administrators developing their own applications.

## Wizard Preconfigurations

There are currently two Layout and Preprogramming applications available. The Application Wizard guides you through the configuration procedure and helps you to define the functionality of your application and general look-and-feel of the user interface. You initially choose from Surveillance System or Web Attraction preconfigurations and then refine the application specifically to your needs by selecting from several of the available features in the Wizard.

**Surveillance System** - Provides a typical surveillance design; including: Quad system with or without pre/post alarm storage, Pan Tilt Zoom control and preset, variable picture size and magnification parameters. Aesthetic aspects of system presentation; such as, background, logo, user button and product title presentation, are also configurable.

**Web Attraction** - A basic system design that delivers a standard picture system - without the alarm and control features provided by of the former. Aesthetic aspects of system presentation; such as, background, logo, user button and product title presentation, are configurable.

## Client Applications

Aside from the preconfigured applications included as standard in the AXIS 2400/2401; there are a whole host of other exciting applications that have already been developed, tested and implemented by other developers using Axis' camera products.

Typical applications include: security surveillance in banks, parking lots and conference rooms, industrial surveillance, visual security systems, medical applications, intruder alarm verification, traffic surveillance, image archiving, integrating video images into personal Web application using CGI scripts, fun applications etc. SMTP e-mail support means that you can even send images as e-mail attachments at predetermined times or events.

- Notes:**
- Take the time to look at what other organizations in the industry are doing with Axis' network cameras. Visit Axis' dedicated CCTV Website at: <http://cctv.axis.com>
  - Network Camera Servers Developer's Pages: The Camera Division at Axis maintain a specialist site for network camera developers. New exciting application ideas, tools, and pre-programming scripts are constantly being added - this is an invaluable reference site for Axis' development partners and OEMs. Follow the camera links and check it out at: <http://cctv.axis.com/>

# Appendix H- The Programming Script

Administrators and developers wishing to create a special level of customization within their applications can create their own programming scripts using the **Programming Script Editor**.

Using the programming scripts demonstrated in this appendix, you can quickly develop applications for: motion detection, event triggering, alarm notification via e-mail, picture storage to FTP locations and a whole host of other functions limited only by your imagination.

The programming syntax and option information is supported by practical examples presented within the context of genuine scripts that have been developed, tested and implemented into proper user applications.

**Note:** Network Camera Servers Developer's Pages: The Camera Division at Axis maintain a specialist site for network camera developers. New exciting application ideas, tools, and programming scripts are constantly being added to provide an invaluable reference site for Axis' development partners and OEMs. Follow the camera links and check it out at: <http://cctv.axis.com/>

## Starting and Enabling the Editor

1. Click the **Programming Script Editor** button to start the editor.
2. Enter a your script in the main window and then click the **Save** button to deposit the script in product memory.
3. Check the **Enable** box to activate the programming scripts in your system.

**Notes:**

- Scripts can be saved but are not activated until the Enabled button is checked.
- Saving new scripts automatically removes any existing script previously saved with the Editor.
- A previously saved script is automatically displayed when the Programming Script Editor is opened.

## Programming Script Format

A programming script for the AXIS 2400/2401includes one or several entries and is entered into the editor in the following format:

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

where:

- The <comments> are optional.
- The <trigger condition> includes the following fields: <minute> <hour> <day> <month> <weekday> <optional input/boot event>
- The <commands> include one or several programming script commands.

## 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 programming 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 Field (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 indicate an inclusive range; for example, 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-hour 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.

Using the trigger variables **boot**, **B**, **I1** and **I2** respectively, you can program the AXIS 2400/240I to trigger at startup or on the logical states present on the Control button and digital input ports. The **B**, **I1** and **I2** trigger variables must be proceeded by an activate condition, **/**, **\**, **0** or **1**, to indicate when the trigger variable is activated.

**Note:** The AXIS 2400/240I has four digital input ports 1 - 4 interfaced via the Terminal Block Connector. For connection details please refer to *Appendix F - The IO Terminal Block*.

The table below outlines the available trigger variables and their possible combinations:

Trigger Variable	Description
BOOT	Activate at startup.
START	Activate at startup and when a new script is compiled
\V	Activate when one enabled video signal is lost
/V	Activate when all enabled video signals are back
\B	Activate after high-low logical transition of Control button.
/B	Activate after low-high logical transition of Control button.
IB	Activate when Control button is logically high (pressed).
0B	Activate when Control button is logically low (released).
\I1	Activate after high-low logical transition on Input Port 1.
/I2	Activate after low-high logical transition on Input Port 2.
I1I1	Activate when Input Port 1 is logically high.
0I2	Activate when Input Port 2 is logically low.
... etc.	

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

Complex triggering mechanisms can be developed by simply conjugating the trigger variables using a logical AND function (&), as shown below.

### Example 1

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

```
\B&I1I1
```

### Example 2

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

```
0I1&/I2
```



## Commands

A comprehensive catalog of available programming commands, complete with their syntax and valid options are described below:

### alert

The alert command sends a message to a remote host.

### Syntax

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

### Options

**-host** Specifies the host name or IP 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 2400" to the remote host when
# input port 1 goes high.
* * * * */I:
alert -host 172.21.1.202 -port 2703 -message "Alarm \"0013\" from AXIS 2400";
%
```

### buffer\_init

The buffer\_init command initiates or clears the image buffers. This is needed in order to store images using the buffer\_start and buffer\_stop commands.

### Syntax

```
buffer_init [[CAMERANUMBER],[IMAGE],[SIZE]][:[CAMERANUMBER],[IMAGE],[SIZE]]];
```

### Options

**CAMERANUMBER**

Specifies the camera source, i.e. 1- 4 (AXIS 2401 must be set to 1)

**IMAGE**

Specifies the image type 1- 3, where: 1=halfsize.jpg, 2=fullsize.jpg and 3=hugesize.jpg

#### SIZE

Specifies the maximum number of images that can be stored in the buffer. The valid range is 0-65535, although in practice is limited by the amount of available memory within the AXIS 2400/2401.

To initiate several buffers, you can stack multiple statements separated by colon.

- Notes:**
- To clear the image buffer, you simply do not specify any arguments.
  - To initiate several buffers, you can stack multiple statements. Each statement must be separated by a colon ":".

#### Example 1

```
# At startup, this command will initiate one
# buffer for camera 1 with 25 fullsize.jpg images
# and one buffer for camera 2 with 5 hugesize.jpg
# images.
* * * * * BOOT:
buffer_init 1,2,25:2,3,5;
%
```

#### Example 2

```
# This command will clear the buffer every Sunday.
0 0 * * 0 * :
buffer_init;
%
```

### buffer\_start

The **buffer\_start** command stores snapshots in a specific image buffer. Before the command can be used, the buffer facility must be initiated using the **buffer\_init** command.

When invoked, the **buffer\_start** command is executed in the background and any subsequent command in the event entry is executed immediately.

Images are retrieved using the **ftp** or **mail** command (refer to page 70 and page 73 respectively).

### Syntax

```
buffer_start [-src SOURCEFILE] [-cam CAMERANUMBER]
[-interval TIME] [-duration TIME] [-store SIZE];
```

### Options

- src Specifies the source file name, i.e. halfsize.jpg, fullsize.jpg or hugesize.jpg.
- cam Specifies the camera source, i.e. 1-4. If omitted, the default camera will be used (AXIS 2401 must be set to 1)

**-interval**

Specifies the time interval between consecutive snapshots. If omitted, new snapshots are generated without any delay.

**Format:** h<hours>m<minutes>s<seconds>, or fps <approximate frames per second>.

**-duration**

Specifies the total time for the command to run. If omitted, the `buffer_start` command will be issued only once.

**Format:** h<hours>m<minutes>s<seconds>.

If you specify `-duration inf`, the command will continue to be executed until it is interrupted by any of the commands: `buffer_init`, `buffer_start` or `buffer_stop`.

**-store**

Specifies the number of images to be stored in the buffer. This setting will override the duration. The maximum number of images is specified by the `buffer_init` command.

**Example**

```
# This command will keep loading fullsize.jpg images.
*****;
buffer_start -src fullsize.jpg -cam 3 -interval s30
-duration inf;
%
```

**buffer\_stop**

The `buffer_stop` command terminates the storage of snapshots to an image buffer. Until completed, the `buffer_stop` command will block the execution of any subsequent commands in the event entry. Note that the `buffer_start` command behaves differently.

The command is typically used together with the `buffer_start` command.

**Syntax**

```
buffer_stop [-src SOURCEFILE] [-cam CAMERANUMBER]
[-interval TIME] [-duration TIME] [-store SIZE];
```

**Options**

**-src** Specifies the source file name, i.e. `halfsize.jpg`, `fullsize.jpg` or `hugesize.jpg`.

**-cam** Specifies the camera source, i.e. 1- 4. If omitted, the default camera will be used.

**-interval**

Specifies the time interval between consecutive snapshots. If omitted, new snapshots will be generated without any delay.

**Format:** h<hours>m<minutes>s<seconds>, or fps <approximate frames per second>.

**-duration**

Specifies the total time for the command to run. If omitted, the `buffer_start` command will be issued only once.

**Format:** `h<hours>m<minutes>s<seconds>`.

Note that if you specify `-duration inf`, the command will continue to be executed until it is interrupted by a `buffer_init` command.

**-store**

Specifies the number of images to be stored in the buffer. This setting will override the duration. The maximum number of images is specified by the `buffer_init` command.

**Example**

```
# This command initiates the buffer to hold 60
# halfsize.jpg and 5 hugesize.jpg images. New images
# are captured until the buffer_start command is
# interrupted.
***** BOOT :
buffer_init 1,1,60:1,3,5;
buffer_start -src halfsize.jpg -interval s1 -duration inf;
buffer_start -src hugesize.jpg -interval m1 -duration inf;
%
# When port 1 is triggered, an alert message is sent
# to host 1.2.3.4. Another 10 halfsize.jpg images are
# captured and all the images are sent to an ftp
# server with the names "Halfsize_1" to
# "Halfsize_60". Then the buffer is restarted.
***** /11:
alert -host 1.2.3.4 -port 4000 -message "Alert! Input on port 1.";
buffer_stop -src halfsize.jpg -store 10;
ftp -host somehost -user USER -pass PASS -src images/buffer.jpg -dest
Halfsize_$(1-60) -time
h1 -buffer halfsize.jpg;
alert -host 1.2.3.4 -port 4000 -message "Alert! Images sent to ftp server";
%
# When port 2 is triggered, the 5 most recent
# hugesize.jpg images are sent to an ftp server
# with the names "Picture_1" to "Picture5". Note that
# the buffer is not stopped.
***** /12:
ftp -host somehost -user USER -pass PASS -src images/buffer.jpg -dest
Picture_$(1-5) -time h1
-buffer hugesize.jpg;
%
```

## ftp

The ftp command uses the standard File Transfer Protocol (FTP) for transferring an image from your AXIS 2400/2401 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_DESTINATION_NAME] [-loop LOOPTIME]
[-time TOTALTIME] [-cam CAMERANUMBER]
[-buffer BUFFERTYPE];
```

## Options

- host Specifies the name or IP address of the remote host. If specifying the DNS name, performance will be slightly decreased due to the DNS lookup. If no host is specified, the compiler will complain.
- user Specifies the user name for logging on to the remote host. If no user name is specified, the compiler will complain.
- pass Specifies the password for logging on to the remote host.
- src Specifies the source file name. If omitted, the `fullsize.jpg` file will be sent. To include the image buffer, specify `images/buffer.jpg`.
- dest Specifies the name and whole path of the destination file. If omitted, the destination file name will be the same as the source file name. The maximum length of a destination file name 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 file name. This is useful for example when you are transferring a series of files.

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.

\$Y

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.

**Note:** The rS-E substitution can be used with the first destination file only.

- temp Specifies a temporary name for the 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 and used together with the time attribute. If omitted, there will be no delay between repeated transfers.  
**Format:** h<hours>m<minutes>s<seconds>, or fps <approximate frames per second>. Optional.
- time Specifies the total time the command should loop. Used together with the loop attribute. If omitted, the ftp command will be issued only once.  
**Format:** h<hours>m<minutes>s<seconds>. Optional.
- cam Specifies the camera source, i.e. 1 - 4. If this is omitted, video camera source 1 is used as default.
- buffer  
Specifies the buffer type, e.g. fullsize.jpg, halfsize.jpg or hugesize.jpg. Only valid if -src is set to images/buffer.jpg.

## 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>.

**Example 1**

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

**Example 2**

```
# This command will every hour, every five seconds
# for twenty minutes, download a fullsize image
# from camera 3 and save the images with a time
# stamp in the filename.
0*****:
ftp -host an.interesting.site -user user -pass pass -src fullsize.jpg
-dest tmp/full$h$m$.jpg -loop s5 -time m20 -cam 3;
%
```

**Example 3**

```
# This command will send 1001 consecutive fullsize
# images to "your.host.name". The first and last
# images will be named "fullsize1000.jpg" and
# "fullsize2000.jpg", respectively.
*****:
ftp -host your.host.name -user user -pass pass
-src fullsize.jpg -dest
/home/camera1/tmp/fullsize$r1000-2000.jpg;
%
```

## log

This command writes a message to the AXIS 2400/2401 log file.

**Note:** To display the log file, you type the following in the address/location field of your Web browser:  
http://<video server>/log/messages

## Syntax

```
log [MESSAGE];
```

## Options

[MESSAGE]

The message string must be surrounded by quotation marks.

## Example:

```
# This command writes a message to the log file when the AXIS 2400/2401 Control Button is pressed.
***** /B :
log "The Control button was pressed." ;
%
```

## mail

This command uses the Simple Mail Transfer Protocol (SMTP) for sending images and files from your AXIS 2400/2401 to e-mail addresses.

**Note:** The IP address of the mail server and a valid return address on the TCP/IP page must be specified when using the mail command.

## Syntax

```
mail [-s SUBJECT] [-a ATTACHMENTS] [-t RECIPIENTS]
[-cam CAMERANUMBER] [-b BUFFERTYPE] [-n NUMBER];
```

## Options

- s Specifies the subject text for the e-mail. A simple one-word subject does not require quotation marks. A subject with multiple words must be surrounded by quotation marks.
- a Specifies attachments such as images or files. To include the image buffer, specify: `images/buffer.jpg`.
- t Specifies the e-mail address of the recipient(s).
- cam Specifies the camera source, i.e. 1-4. If omitted, the default camera will be used (AXIS 2401 must be set to 1).
- b Specifies the buffer type, i.e. `fullsize.jpg`, `halfsize.jpg` or `hugesize.jpg`. Only valid if -a is set to: `images/buffer.jpg`.



**-n** Specifies the number of buffered images to be included in the e-mail. Only valid if **-src** is set to `images/buffer.jpg`.

### Example 1

```
# This command will send an e-mail with the
# subject "Hello" and the attached file
# fullsize.jpg 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 2400" to two recipients.
*****;
mail -s "This \"fullsize.jpg\" was sent from my AXIS 2400" -a fullsize.jpg -t
someone@axis.com anotherone@axis.com;
%
```

### Example 3

```
# This command will send an e-mail with two attachments.
*****;
mail -a fullsize.jpg halfsize.jpg -t me@home;
%
```

## ptz

This command pans, tilts and zooms connected video cameras.

### Syntax

```
ptz [-speed VALUE[DEVICE]][-preset POSITION]
[-cam CAMERANUMBER][-zoom VALUE][-move DIRECTION]
[-pan ANGLE][-tilt ANGLE];
```

### Options

**-speed**

Supported by Canon and Sony drivers only, this parameter defines within the range 1 - 999, the speed with which the camera source moves between the defined positions; where: 1 is slow and 999 is fast.

**-preset**

Specifies the preset position, i.e. 1 - 20. Note that camera source must be defined within the command.

**-cam** Specifies the camera source, i.e. 1 - 4. If this is omitted, video camera source 1 is used as default (AXIS 2401 must be set to 1).

**-zoom** Specifies the zoom value of the selected camera source, i.e. 1 - 999.  
Note that this option is device dependent and is supported by Sony, Canon and Videmech drivers only.

**-move** Specifies in which direction the selected camera source shall be moved, i.e. home, up, upleft, left, downleft, down, downright, right, upright. Note that the move home option is only supported by the drivers Sony, Canon and Videmech.

**-pan** Specifies the pan angle of the selected camera source, i.e. -180 - 180. Note that this option is device dependent and is supported by the drivers Sony, Canon and Videmech.

**-tilt** Specifies the tilt angle of the selected camera source, i.e. -180 - 180. Note that this option is device dependent and is supported by the drivers Sony, Canon and Videmech.

**Example 1**

```
# This command moves camera 1 up five degrees and zooms wide.
*****;
ptz -cam 1 -zoom 1 -move up;
%
```

**Example 2**

```
# This command moves camera 1 to preset position 1.
*****;
ptz -preset 1 -cam 1;
%
```

**Note:** The options must be entered in the following order:

-speed, -preset, -cam, -zoom, -move, -pan, -tilt

For example; ptz -tilt 10 -cam 4, will not work. You must enter; ptz -cam 4 -tilt 10.

**relay**

This command sets the relay on or off within the AXIS 2400/2401.

**Syntax**

```
relay [-on | -off];
```

## Options

-on sets the relay on.  
-off sets the relay off.

## Example

```
# This command sets the relay ON when digital input 1 goes high:
***** / I1 :
reset -on;
%
```

## reset

This command resets the software or hardware of the AXIS 2400/2401.

## Syntax

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

## Options

-soft Reinitiates the AXIS 2400/2401 protocols.  
-hard Performs a complete reboot of the AXIS 2400/2401.

## Example

```
# This command will reset the hardware once a day.
00 ***** :
reset -hard;
%
```

## sleep

This command adds a pause to the programming script execution. The command is typically used if you want to assure that the previous command is finished before continuing the script.

## Syntax

```
sleep <seconds>;
```

## Options

<seconds>

Specifies the seconds to wait before proceeding with the next command in the event entry.

## Example

```
# This command will result in a 30 seconds pause in the programming script execution.
***** :
sleep 30;
%
```

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