

---

## **Wireless/Ethernet Network Camera**

---



---

## **User's Guide**

---

## Regulatory Approvals

### FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

### FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

### Channel

The Wireless Channel sets the radio frequency used for communication.

- Access Points use a fixed Channel. You can select the Channel used. This allows you to choose a Channel which provides the least interference and best performance. In the USA and Canada, 11 channels are available. If using multiple Access Points, it is better if adjacent Access Points use different Channels to reduce interference.
- In "Infrastructure" mode, Wireless Stations normally scan all Channels, looking for an Access Point. If more than one Access Point can be used, the one with the strongest signal is used. (This can only happen within an ESS.)
- If using "Ad-hoc" mode (no Access Point), all Wireless stations should be set to use the same Channel. However, most Wireless stations will still scan all Channels to see if there is an existing "Ad-hoc" group they can join.

### CAUTION:

- 1) To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
- 2) This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## Table of Contents

---

CHAPTER 1 INTRODUCTION .....	1
Overview.....	1
Physical Details.....	3
Package Contents .....	5
CHAPTER 2 BASIC SETUP.....	6
System Requirements .....	6
Installation .....	6
Setup .....	8
CHAPTER 3 ADVANCED VIEWING SETUP .....	14
Introduction.....	14
Adjusting the Video Image.....	14
Controlling User Access to the Video Stream .....	17
Making Video available from the Internet.....	18
Motion Detection/E-mail Alerts .....	21
CHAPTER 4 WEB-BASED MANAGEMENT .....	23
Introduction.....	23
Connecting to Wireless/Ethernet Network Camera.....	23
Welcome Screen.....	24
View Video Screen.....	25
Administration Menu .....	26
System Screen.....	26
Network Screen .....	28
Image Screen .....	32
User Screen.....	34
E-mail Screen.....	36
Status Screen .....	38
CHAPTER 5 VIEWING & RECORDING .....	41
Overview.....	41
Installation .....	41
System Tray Icon.....	42
Main Screen.....	42
Adding Cameras to the Camera List.....	44
Viewing Live Video.....	47
Recording Video .....	48
Viewing with your Web Browser .....	53
CHAPTER 6 TROUBLESHOOTING .....	57
Overview.....	57
Problems .....	57
APPENDIX A SPECIFICATIONS.....	59
Ethernet Network Camera.....	59
Wireless Network Camera .....	59
Regulatory Approvals .....	60
Copyright Notice .....	61

P/N: 9560GV0001

Copyright © 2004. All Rights Reserved.

Document Version: 1.5

All trademarks and trade names are the properties of their respective owners.

*This Chapter provides details of the Wireless/Ethernet Network Camera's features, components and capabilities.*

Overview

The Wireless/Ethernet Network Camera has an Integrated Microcomputer and a high quality CMOS digital-Image-Sensor, enabling it to display high quality live streaming video over your wired LAN, the Internet, and for the Wireless Network Camera, an 802.11g Wireless LAN.

Using enhanced MPEG-4 technologies, the Wireless/Ethernet Network Camera is able to stream high quality video and audio directly to your PC. The high compression capabilities of MPEG-4 reduce network bandwidth requirements to amazingly low levels.

A convenient and user-friendly Windows program is provided for both viewing and recording video. If necessary, you can even view video using your Web Browser, on a variety of software platforms.

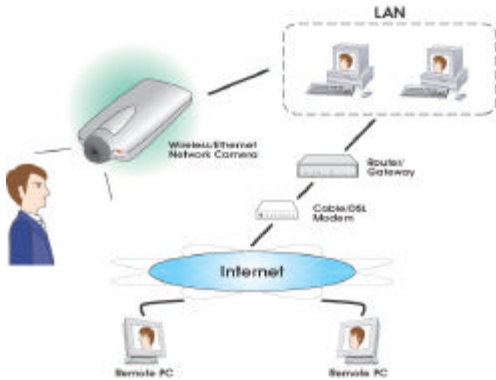


Figure 1: Wireless/Ethernet Network Camera

Features

- **Standalone Design.** The Wireless/Ethernet Network Camera is a standalone system with built-in CPU and Video encoder. It requires only a power source and a connection to your LAN or Wireless LAN.

- **Suitable for Home, Business or Public Facilities.** Whether for Home, Business or Public Facility surveillance, or just for entertainment and fun, the Wireless/Ethernet Network Camera has the features you need.
- **Multi-Protocol Support.** Supporting TCP/IP networking, SMTP (E-mail), HTTP and other Internet related protocols, the Wireless/Ethernet Network Camera can be easily integrated into your existing network.
- **Easy Configuration.** A Windows-based Wizard is provided for initial setup. Subsequent administration and management can be performed using a standard web browser. The administrator can configure and manage the Wireless/Ethernet Network Camera via the LAN or Internet.
- **Viewing/Recording Utility.** A user-friendly Windows utility is provided for viewing live video. For periods when you are absent, or for scheduled recording, this application also allows you to record video to an ASF file on your PC. The recorded files are in a standard Windows Media format, and thus usable by a wide variety of programs if required.
- **Motion Detection.** This feature will send you an E-mail when motion is detected. The Wireless/Ethernet Network Camera will compare consecutive frames to detect changes caused by the movement of large objects. This function only works indoors due to the sensitivity of the CMOS sensor. If desired, a short video can be included as an attachment to the E-mail.
- **Audio Support.** You can listen as well as look! Audio is included with the video if desired. You can use either the built-in microphone or an external microphone.

#### Internet Features

- **User-definable HTTP port number.** This allows Internet Gateways to use "port mapping" so the Wireless/Ethernet Network Camera and a Web Server can share the same Internet IP address.
- **DDNS Support.** In order to view video over the Internet, users must know the Internet IP address of the gateway used by the Wireless/Ethernet Network Camera. But if the Gateway has a dynamic IP address, DDNS (Dynamic DNS) is required. Since many existing Gateways do not support DDNS, this function is incorporated into the Wireless/Ethernet Network Camera.
- **NTP (Network-Time-Protocol) Support.** NTP allows the Wireless/Ethernet Network Camera to calibrate its internal clock from an Internet Time-Server. This ensures that the time stamp on Video from the Wireless/Ethernet Network Camera will be correct.

#### Security Features

- **User Authentication.** If desired, access to live video can be restricted to known users. Users will have to enter their username and password before being able to view the video stream. Up to 20 users can be entered.
- **Password-Protected Configuration.** Configuration data can be password protected, so that it only be changed by the Wireless/Ethernet Network Camera Administrator.

#### Wireless Features (Wireless Network Camera only)

- **Standards Compliant.** The Wireless Router complies with the IEEE802.11g (DSSS) specifications for Wireless LANs.
- **Supports both 802.11b and 802.11g Wireless Stations.** The 802.11g standard provides for backward compatibility with the 802.11b standard, so both 802.11b and 802.11g Wireless stations can be used simultaneously.
- **Speeds to 54Mbps.** All speeds up to the 802.11g maximum of 54Mbps are supported.

- **Wired and Wireless Network Support.** The Wireless Network Camera supports both wired and wireless transmission.
- **WEP Support.** Full WEP support (64/128 Bit) on the Wireless interface is provided.

Physical Details

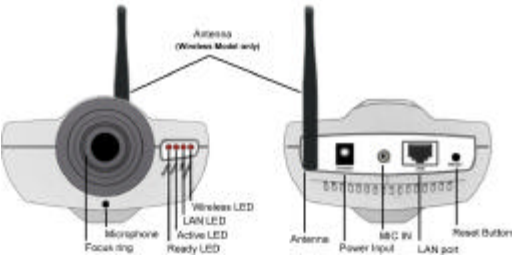


Figure 2: Wireless/Ethernet Network Camera

Front Panel	
Focus Ring	Normally, it is not necessary to adjust the focus. The default focus range is from 1 meter (3 feet) to infinity. If the image is not clear, try adjusting the focus.
Microphone	The built-in microphone is mounted on the front. There is also a connection for an external microphone on the rear. Connecting an external microphone will disable the built-in microphone.
Ready LED	<b>On</b> - Power on. <b>Off</b> - No power. <b>Blinking</b> - The <i>Ready</i> LED will blink during start up. This will take 15 to 20 seconds.
Active LED	<b>Off</b> - Idle. <b>Blinking</b> - Wireless/Ethernet Network Camera is providing a live video stream to at least one viewer.
LAN LED	<b>On</b> - LAN port is connected to a hub or switch. <b>Off</b> - LAN port is not connected. <b>Blinking</b> - Data is being transmitted or received via the LAN port.
Wireless LED	<b>(Wireless Network Camera only)</b> <b>On</b> - Wireless interface is active. <b>Off</b> - Wireless interface is not available. <b>Blinking</b> - Data is being transferred via the Wireless interface.

Rear Panel	
Antenna	Attach the supplied antenna here. The antenna is adjustable; best results are usually obtained with the antenna positioned vertically.
Power Input	Connect the supplied power adapter here.
MIC In	If required, an external microphone can be attached here. Attaching a microphone here will disable the built-in microphone on the front. Microphones designed to be used with PCs are usually compatible with this microphone input.
LAN port	<p>Use a standard LAN cable to connect your Wireless/Ethernet Network Camera to a 10/100BaseT hub or switch.</p> <p><b>Note:</b></p> <p>On the Wireless Network Camera, attaching the LAN cable will disable the Wireless interface. Only 1 interface can be active at any time.</p>
Reset Button	<p>This button has two (2) functions:</p> <ul style="list-style-type: none"><li>• <b>Restore Default IP Address.</b> When pressed and released, the Wireless/Ethernet Network Camera will reset its IP address to the default value of 192.168.0.99.</li><li>• <b>Restore Default IP Address, Administrator ID, and Administrator password.</b> When pressed and held or 3 seconds, the <i>IP address</i>, <i>Administrator ID</i>, and <i>Administrator Password</i> settings will be set to their default values.<ul style="list-style-type: none"><li>• IP address: 192.168.0.99</li><li>• Administrator ID: administrator</li><li>• Administrator Password: null (no password)</li></ul></li></ul> <p><b>Note:</b></p> <p>After this procedure is completed, the <i>Ready</i> LED will blink three times to confirm that the reset was completed successfully.</p>



**Package Contents**

The following items should be included: If any of these items are damaged or missing, please contact your dealer immediately.

- 1. The Wireless/Ethernet Network Camera
- 2. Installation CD-ROM
- 3. Quick Installation Guide
- 4. Power adapter
- 5. Base, Stand and Swivel Connector
- 6. Extender Unit
- 7. Mounting Screws
- 8. Antenna (Wireless Network Camera only)



## Basic Setup

*This Chapter provides details of installing and configuring the Wireless/Ethernet Network Camera.*

### System Requirements

- To use the LAN interface, a standard 10/100BaseT hub or switch and network cable is required.
- To use the Wireless interface on the Wireless Network Camera, other Wireless devices must be compliant with the IEEE802.11b or IEEE802.11g specifications. All Wireless stations must use compatible settings.

### Installation



Figure 3: Wireless/Ethernet Network Camera Installation

#### 1. Mount the Camera on the supplied Base and Stand.

For the Wireless network camera, screw the supplied antenna to the mounting point on the rear.

Join the Base, stand and swivel connector to the camera, as shown in the diagram above.

## 2. Connect the LAN Cable

Connect the Wireless/Ethernet Network Camera to a 10/100BaseT hub or switch.



For the Wireless Network Camera, this disables the Wireless Interface, because only one interface can be active. The LAN interface is recommended for initial configuration.

The default Wireless settings for the Wireless Network Camera are:

**Mode:** Infrastructure  
**ESSID:** ANY  
**WEP:** Disabled

## 3. Adjust the Antenna

On the Wireless Network Camera, screw the antenna to the rear mounting point, and set the antenna to the upright position to improve wireless reception.

## 4. Power Up

Connect the supplied power adapter to the Wireless/Ethernet Network Camera and power up. Use only the power adapter provided. Using a different one may cause hardware damage.

### 4. Check the LEDs

- The *Ready* LED will turn on briefly, then start blinking. It will blink during startup, which takes 15 to 20 seconds.  
After startup is completed, the *Ready* LED should remain ON.
- The *Active* LED should be OFF.  
It will flash when anyone is viewing live video.
- Either the *LAN* LED OR the *Wireless* LED should be ON.

For more information, refer to *Front Panel* in Chapter 1.

## Setup

Initial setup should be performed using the supplied Windows-based setup Wizard. This program can locate the Wireless/Ethernet Network Camera even if its IP address is invalid for your network. You can then configure the Wireless/Ethernet Network Camera with appropriate TCP/IP settings for your LAN.

Subsequent administration can be performed with your Web browser, as explained in *Chapter 3 - Web-based Administration*.

### Setup Procedure

1. Insert the supplied CD-ROM into your drive. If the setup program does not start automatically, run **Netcam\_Setup.exe** in the root folder.
  - You will see the *Welcome* screen shown below.
  - Click the *Setup* button to start the setup Wizard



Figure 4: Welcome Screen

2. The next screen, shown below, will list all the Wireless/Ethernet Network Cameras on your LAN.



Figure 5: Camera List Screen

- Select the desired Camera from the list on the left. The current settings for the selected Camera will be displayed in the table on the right.
  - Click *Next* to continue.
3. If the *Administrator ID* and *Password* have been set, you will be prompted to enter them, as shown below.
- If using the default values, enter **administrator** for the name, and leave the password blank.
  - Otherwise, enter the *Administrator ID* and *Password* set on the *User* screen.



Figure 6: Password Dialog



**Note**

The Administrator ID and password can be set on the "User" screen of the /web interface. The Web interface can be accessed via the "Web UI" button on the final screen of the Wizard.

4. On the following TCP/IP screen, shown below, choose *Fixed IP* or *Dynamic IP*.



Figure 7: Fixed or Dynamic IP Selection

- *Fixed IP* is recommended, and can always be used.
- *Dynamic IP* can only be used if your LAN has a DHCP Server.

Click *Next* to continue.

5. If you chose *Fixed IP Address*, the following **TCP/IP Settings** screen will be displayed.



Figure 8: TCP/IP Settings

- Enter an unused **IP Address** from within the address range used on your LAN.
- The **Subnet Mask** and **Default Gateway** fields must match the values used by PCs on your LAN.
- The **Primary DNS** address is required in order to use the E-mail alert or Dynamic DNS features. Enter the DNS (Domain Name Server) address recommended by your ISP.
- The **Secondary DNS** is optional. If provided, it will be used if the Primary DNS is unavailable.

Click *Next* to continue.

6. For Wireless cameras, the following **Wireless Settings** screen is displayed next.



Figure 9: Wireless Settings

- **Mode** - If you have an Access Point, select *Infrastructure*. Otherwise, select *Ad-hoc*.
  - **Authentication Type** - Select the value used on your LAN.
  - **ESSID** - Enter the value used by your other Wireless devices.
  - **Domain** - Select the domain to match your location.
  - **Channel** - For *Ad-hoc* mode, select the channel used by your other Wireless devices. (For *Infrastructure* mode, the Access Point determines the channel used.)
7. Click *Next* to continue to the **WEP Key Settings** screen, shown below.



Figure 10: WEP Key Settings

- **WEP Encryption** - Select the option used on your Wireless LAN.
- **Keys** - If using WEP, the default key must match the key used on your other Wireless stations. The other keys are optional. You can enter the key value directly, or generate a key by entering a string into the **Passphrase** field, and clicking the **Generate** button.

Click *Next* to continue to the following screen.

8. This screen allows you to enter a suitable **Description**, and set the correct **Time Zone**, **Date**, and **Time**. Make any desired changes, then click *Next* to continue.



Figure 11: Camera Settings

9. The next screen, shown below, displays all details of the Wireless/Ethernet Network Camera.
- Click *Save* if the settings are correct
  - Click *Back* to modify any incorrect values.



Figure 12: Save Settings

10. After clicking *Save*, you will see the screen below.





Figure 13: Final Screen

If desired, you can click the *Web UI* button to connect to the camera using your Web Browser.

- 11. Click *Exit* to end the Wizard.  
Setup is now complete.

## Advanced Viewing Setup

*This Chapter provides information about the optional settings and features for viewing video via the Wireless/Ethernet Network Camera. This Chapter is for Administrators only.*

### Introduction

After finishing setup via the Windows-based Wizard, the Wireless/Ethernet Network Camera can immediately be used by all users on your LAN.

Refer to **Chapter 5 - Viewing & Recording** for details on viewing and recording live video.

This chapter describes some additional settings and options for viewing live Video:

- Adjusting the video image
- Controlling user access to the live video stream
- Making video available from the Internet
- Using the *Motion Detection/E-mail* feature

### Adjusting the Video Image

If necessary, the Wireless/Ethernet Network Camera Administrator can adjust the Video image. Settings are provided for:

- **Image size** - Select the desired size. The larger sizes require greater bandwidth.
- **Image quality** - This determines the degree of compression applied to the Video stream. Higher quality requires greater bandwidth.
- **Power Line frequency** - Select 50Hz or 60Hz power line frequency, as used in your region. The correct setting will improve the picture quality under florescent lighting.
- **Exposure** - Adjust the brightness of the image, if the *Auto-Exposure* does not give satisfactory results.
- **Color Adjustment** - Red, Green, Blue intensity can be adjusted.
- **Time Stamp** - If enabled, the time will be displayed on the Video image.
- **Text Overlay** - If enabled, up to 20 characters can be superimposed on the Video image. This is useful for identifying the camera.
- **Audio** - If desired, audio can be included in the video stream.

#### To Adjust the Video Image:

1. Connect to the Web-based interface of the Wireless/Ethernet Network Camera. (See **Chapter 4 - Web-based Management** for details.)
2. On the *Administration* menu, select *Image*. You will see a screen like the example below.

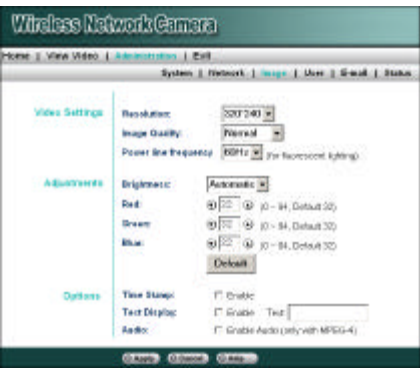


Figure 14: Image Screen

3. Make the required adjustments, as explained below, and save your changes.

Video Settings	
Resolution	Select the desired video resolution. The default resolution is set to 320*240.
Image Quality	Select the desired image quality. The default Image Quality is set to Normal. Note: Higher image quality requires more bandwidth.
Power line frequency	Select the power line frequency (50Hz or 60Hz) used in your region, to improve the picture quality under florescent lighting.
Adjustment	
Brightness	Select <i>Automatic</i> or <i>Manual</i> .  The default is set to <i>Automatic</i> in which the camera will automatically adjust the brightness based on the current environment.  Select <i>Manual</i> , if you want to adjust the brightness manually. You can then enter the desired value.
Red, Green, Blue	Adjust these color settings to the preferred values. Note: When <i>Automatic</i> is selected, this setting will not take effect.
Default Button	Clicking this will set all the <i>Adjustment</i> fields to their default values. You must click "Apply" to save these changes.

Options	
Time Stamp	Enable the check box if you want the time to be displayed on the Video image.
Text Display	If you want text to be displayed on the Video image, enable this feature by checking the checkbox. You can enter text up to 20 characters. This feature is often used to identify camera when multiple camera are installed.
Audio	If you want audio to be included with the video, enable this option. Some bandwidth will be allocated to the audio stream. In some situations, this may affect the quality of the video.

Controlling User Access to the Video Stream

By default, all users can connect to the Wireless/Ethernet Network Camera and view live Video.

If desired, you can limit access to known users, by requiring each user to login to the Wireless/Ethernet Network Camera with their individual username and password.

To Enable this feature:

- 1. Connect to the Web-based interface of the Wireless/Ethernet Network Camera. (See Chapter 4 - Web-based Management for details.)
- 2. On the Administration menu, select User.
- 3. Select the setting Allow access by Only users in database, as shown below.



Figure 15: User Screen

- 4. To add users to the database, click the Add button, and enter the name and password for each user.

Operation

- When each user connects, they will be prompted for their username and password. They must enter the name and password defined on the User screen above.
- If using the Windows Viewing/Recording utility, the username and password can be entered into the program, so that users do not need to provide the login data each time.

Making Video available from the Internet

If your LAN is connected to the Internet, typically by a Broadband Gateway/Router and Broadband modem, you can make the Wireless/Ethernet Network Camera available via the Internet.

Wireless/Ethernet Network Camera Setup

- The Wireless/Ethernet Network Camera configuration does NOT have be changed, unless:
- You wish to change the port number from the default value (1024).
  - You wish to use the DDNS (Dynamic DNS) feature of the Wireless/Ethernet Network Camera.

Second Port Configuration

Normally, HTTP (Web) connections use port 80. Since the Wireless/Ethernet Network Camera uses HTTP, but port 80 is likely to be used by a Web Server, you can use a different port for the Wireless/Ethernet Network Camera. This port is called the "Second Port". (The first port is port 80.)

The default "Second Port" number is 1024. If you prefer to use a different port number, you can specify the port number on the Wireless/Ethernet Network Camera's *Network* screen, as shown below.



Figure 16: Network Screen

The *Network* screen is part of the Web-based Administration interface. See *Chapter 4 - Web-based Management* for further details on using this interface.



Viewers need to know this port number in order to connect and view live video, so you must inform viewers of the current port number.

DDNS (Dynamic DNS)

Many internet connections use a "Dynamic IP address", where the Internet IP address is allocated whenever the Internet connection is established. This means that other Internet users don't know the IP address, so can't establish a connection. DDNS is designed to solve this problem, by allowing users to connect to your LAN using a domain name, rather than an IP address.

To use DDNS:

1. Register for the DDNS service with a supported DDNS service provider. You can then apply for, and be allocated, a Domain Name.

2. Enter and save the correct DDNS settings on the **Network** screen of the Wireless/Ethernet Network Camera.



Figure 17: DDNS Settings - Network Screen

3. Operation is then automatic:
- The Wireless/Ethernet Network Camera will then automatically contact the DDNS server whenever it detects that the Internet IP address has changed, and inform the DDNS server of the new IP address.
  - Internet users can then connect to your LAN using the Domain Name allocated by the DDNS service provider.

**Router/Gateway Setup**

Your Router or Gateway must be configured to pass incoming TCP (HTTP) connections (from Viewers) to the Wireless/Ethernet Network Camera. The Router/Gateway uses the *Port Number* to determine which incoming connections are intended for the Wireless/Ethernet Network Camera.

This feature is normally called *Port Forwarding* or *Virtual Servers*, and is illustrated below. The Port Forwarding/Virtual Server entry tells the Router/Gateway that incoming TCP connections on port 1024 should be passed to the Wireless/Ethernet Network Camera. If necessary, check the user manual for your Router/Gateway for further details.

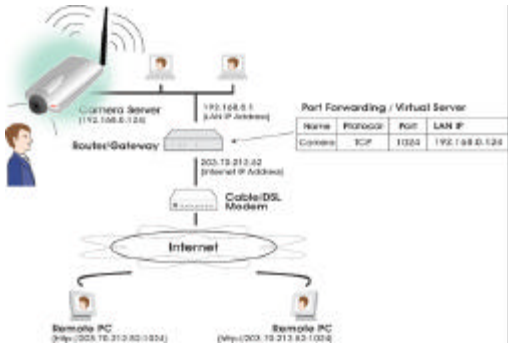


Figure 18: Connecting via the Internet



The "Port" for the *Port Forwarding / Virtual Server* entry above is the "Second Port" number specified on the *Network* screen of the Wireless/Ethernet Network Camera.

**Viewing via the Internet**

Clients (viewers) will also need a broadband connection; dial-up connections are NOT recommended.

**Using the Windows Viewing/Recording Utility**

If using the Windows Viewing/Recording Utility, the details of the Wireless/Ethernet Network Camera must be entered on the *Internet* tab of the *Add Camera* screen.

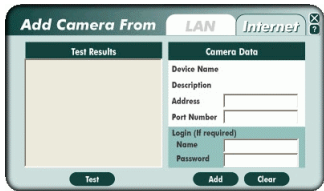


Figure 19: Add Camera from Internet

You can then select the camera in the *Cameras* list on the main screen, and click *View* to establish a connection and view live video.

See *Chapter 5 - Viewing and Recording* for full details on using the Windows Viewing/Recording utility.

**Using your Web Browser**

If using your Web browser, you need to know the address of the camera (either the Internet IP address or the Domain name) and the correct port number.

Enter the address of the Wireless/Ethernet Network Camera, and its port number, in the *Address (or Location)* field of your Browser.

**Example - IP address:**

HTTP://203.70.212.52:1024

Where the Router/Gateway's Internet IP address is 203.70.212.52 and the "Second Port" number on the Wireless/Ethernet Network Camera is 1024.

**Example - Domain Name:**

HTTP://mycamera.dyndns.tv:1024

Where the Router/Gateway's Domain name is mycamera.dyndns.tv and the "Second Port" number on the Wireless/Ethernet Network Camera is 1024.

See *Chapter 5 -Viewing and Recording* for further details of viewing Video using either the Windows Viewing/Recording utility or your Web Browser.



Motion Detection/E-mail Alerts

The *Motion Detection* feature will capture a short video and send it to your E-mail address when motion is detected.

The Wireless/Ethernet Network Camera will compare consecutive frames to detect changes caused by the movement of large objects.

But the motion detector can also be triggered by:

- Sudden changes in the level of available light
- Movement of the camera itself.

Try to avoid these situations. The motion detection feature works best in locations where there is good steady illumination, and the camera is mounted securely. It cannot be used outdoors due to the sensitivity of the CMOS sensor.

To Use Motion Detection/E-mail Alert

Using the Web-based interface on the Wireless/Ethernet Network Camera, select the *E-mail* screen, then configure this screen as described below.

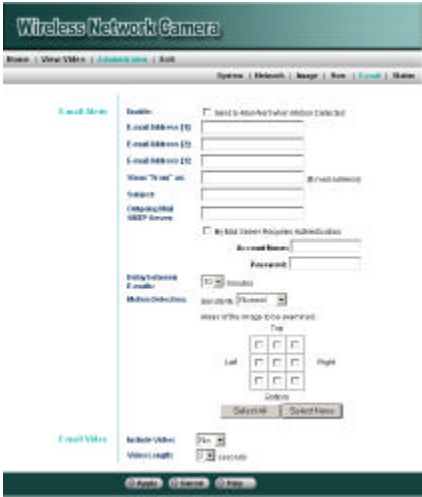


Figure 20: Motion Detection/E-mail Alert

1. Check the box *Send E-mail Alert when Motion Detected*.

2. Enter at least one (1) E-mail address
3. In the **Show “From”** as field, enter the E-mail address you wish to display as the sender, when you receive the mail. This should be a genuine E-mail address, otherwise spam filters may block your mail.
4. Enter a suitable *Subject* for the E-mail.
5. Enter the address of the SMTP Server in the *Outgoing Mail SMTP Server* field. If the SMTP Server requires a "login" in order to send mail, check the box *My Mail Server Requires Authentication* and enter your login name and password.
6. In the E-mail Video section, select the desired options
  - **Delay between E-mails** is used to prevent your E-mail inbox being flooded with E-mails. Select the desired time interval.
  - **Motion Sensitivity** determines how readily the motion detection sensor is activated. You can select the sensitivity, and also select the areas of the image to be examined.  
**Note:** You must select at least one area. If you don't, the motion detection will never be triggered, and no E-mail alerts will ever be sent.
7. In the **E-mail Video** section, select the desired options
  - Set **Include Video** to “Yes” if you want to include a video with the E-mail.
  - Set **Video Length** as desired. Note that if using higher resolution and lower compression, even a short video file could be quite large.
8. Save (Apply) your changes.

## Web-based Management

*This Chapter provides Setup details of the Wireless/Ethernet Network Camera's Web-based Interface. This Chapter is for Administrators only.*

### Introduction

The Wireless/Ethernet Network Camera can be configured using your Web Browser. The Wireless/Ethernet Network Camera must have an IP address which is compatible with your PC.

The recommended method to ensure this is to use the supplied Windows-based Wizard, as described in the previous chapter.

### Connecting to Wireless/Ethernet Network Camera

- If you have run the Windows-based setup Wizard, the final screen provided a button *Web UI*. Clicking this button will immediately connect to the Wireless/Ethernet Network Camera, using your Web Browser.
- If using only your Web Browser, use the following procedure to establish a connection from your PC to the Wireless/Ethernet Network Camera:
- Once connected, you can add the Wireless/Ethernet Network Camera to your Browser's *Favorites* or *Bookmarks*.

### Connecting using your Web Browser

1. Start your WEB browser.
2. In the *Address* box, enter "HTTP://" and the IP Address of the Wireless/Ethernet Network Camera, as in this example, which uses the Wireless/Ethernet Network Camera's default IP Address:  
  
`HTTP://192.168.0.99`
3. If the *Administrator ID* and *Password* have been assigned, you will then be prompted for a username and password. Enter the name and password you assigned.

## Welcome Screen

When you connect, the following screen will be displayed.



Figure 21: Welcome Screen

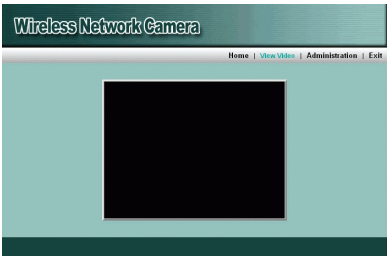
The menu options available from this screen are:

- **View Video** - View live Video using your Web Browser.
- **Administration** - Access the Administration menu.
- **Exit** - Terminate the connection to the Wireless/Ethernet Network Camera.

These options are explained in the following sections.

**View Video Screen**

This screen is displayed when you click the link *View Video in your Browser*.



**Figure 22: View Video Screen**

- If using Internet Explorer on Windows, you may see a prompt regarding an "OCX" file, like the example below.  
**You must install this OCX file in order to view the Video. Click "Yes".**



**Figure 23 ActiveX OCX Prompt**

- Video will start playing automatically. There may be a delay of a few seconds while the video stream is buffered.

Administration Menu

Clicking on *Administration* on the menu provides access to all the settings for the Wireless/Ethernet Network Camera.

The *Administration* menu contains the following options:

- **System** - Description Date / Time, and NTP
- **Network** - All network and Wireless settings
- **Image** - Adjust the Video image
- **Users** - Administrator login, User Access, and user database.
- **E-mail** - E-mail Alerts and E-mail Video
- **Status** - Current Status information.

System Screen

After clicking *Administration* on the main menu, or selecting *System* on the *Administration* menu, you will see a screen like the example below.

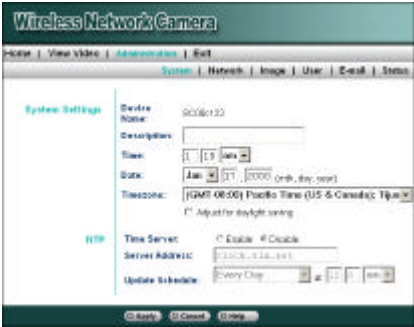


Figure 24: System Screen

Data - System Screen	
System Settings	
Device Name	This displays the name for the Wireless/Ethernet Network Camera.
Description	This field is used for entering a description, such as the location of the Wireless/Ethernet Network Camera.
Time	Enter the current time.
Date	Enter the current date.

Timezone	Choose the timezone for your location from the drop-down list.  If your location is currently using Daylight Saving, enable the Adjust for daylight saving checkbox. <b>You must UNCHECK this checkbox when Daylight Saving finishes.</b>
NTP (Network Time Protocol)	
Time Server	Enable or disable the Time Server feature as required. If Enabled, the Wireless/Ethernet Network Camera will contact a Network Time Server at regular intervals and update its internal timer.
Server Address	Enter the address for the desired NTP server.
Update Schedule	The Schedule determines how often the Wireless/Ethernet Network Camera contacts the NTP Server. Select the desired options.

Network Screen

This screen is displayed when the *Network* menu option is clicked.  
**Note:** Only the Wireless Network Camera contains the **Wireless** settings.



Figure 25: Network Screen

Data - Network Screen

IP Setting	
Obtain Address Automatically	If selected, the Wireless Network Camera will obtain its IP address and related information from a DHCP Server. Only select this option if your LAN has a DHCP Server.



<b>Fixed IP Address</b>	<p>If selected, you must assign the following data to the Wireless Network Camera.</p> <ul style="list-style-type: none"> <li>• <b>IP Address</b> - Enter an unused IP address from the address range used on your LAN.</li> <li>• <b>Subnet Mask</b> - Use the same value as PCs on your LAN.</li> <li>• <b>Gateway</b> - Use the same value as PCs on your LAN.</li> <li>• <b>Primary DNS Address</b> - Use the same value as PCs on your LAN. Normally, your ISP will provide this address.</li> <li>• <b>Secondary DNS Address</b> - This is optional. If entered, this DNS will be used if the Primary DNS does not respond.</li> </ul>
<b>Wireless Setting (Wireless Network Camera only)</b>	
<b>Mode</b>	<p>The <i>Connection Mode</i> determines the type of wireless communication used by the Wireless Network Camera.</p> <ul style="list-style-type: none"> <li>• If you have an Access Point, select <i>Infrastructure</i>.</li> <li>• Otherwise, select <i>Ad-hoc</i>.</li> </ul>
<b>Authentication Type</b>	<p>Select the appropriate value - <i>Open System</i> or <i>Shared Key</i>, as used on your LAN.</p> <p><b>Note:</b> In <i>Infrastructure</i> mode, either setting will normally work, since most Access Points can use both methods.</p>
<b>ESSID</b>	<p>This must match the value used by other devices on your wireless LAN.</p> <p><b>Note! The SSID is case sensitive.</b></p>
<b>Domain</b>	Select your region from the drop-down list.
<b>Channel No.</b>	<ul style="list-style-type: none"> <li>• In <i>Infrastructure</i> mode, this setting is ignored. The Wireless/Ethernet Network Camera will use the Channel set on the Access Point.</li> <li>• For <i>Ad-hoc</i> mode, select the Channel you wish to use on your Wireless/Ethernet Network Camera. Other Wireless stations should use the same setting.</li> <li>• If you experience interference (shown by lost connections and/or slow data transfers) you may need to experiment with different channels to see which one is the best.</li> </ul>
<b>WEP</b>	<p>This shows the current WEP setting.</p> <ul style="list-style-type: none"> <li>• This must match other Wireless stations on your LAN.</li> <li>• Click the <i>Configure WEP</i> button to change the WEP settings if required.</li> </ul>
<b>DDNS</b>	
<b>DDNS Enable/Disable</b>	<p>Enable or disable the DDNS function, as required.</p> <p>Only enable this feature if you have registered for the DDNS Service with a DDNS Server provider.</p>
<b>Service Provider</b>	Choose a service provider from the list.
<b>Host Name</b>	Enter the host name (Domain Name) allocated to you by the DDNS Server provider.
<b>Account</b>	Enter the login name for the DDNS account.
<b>Password</b>	Enter the password for the DDNS account.

<b>Check WAN IP Schedule</b>	Set the schedule for checking if the Internet IP address has changed. If the IP address has changed, the DDNS Server will be notified.
<b>Options</b>	
<b>UPnP</b>	Enable UPnP support if required. If Enabled, the Wireless/Ethernet Network Camera will broadcast its availability using UPnP. UPnP compatible systems such as Windows XP will then be able to detect the presence of the Wireless/Ethernet Network Camera.
<b>Second Port</b>	Enable this feature if required. If enabled, then HTTP connections (using your Web Browser or Media Player) can use this port number instead of the standard HTTP port 80. <ul style="list-style-type: none"><li>• If you already have a Web Server on your LAN, then you should enable the Second Port, and use this port number instead of port 80.</li><li>• If enabled, enter the desired port number to use for connections to the Wireless/Ethernet Network Camera. The default is 1024.</li></ul>

**Using DDNS (Dynamic DNS)**

Many internet connections use a "Dynamic IP address", where the Internet IP address is allocated whenever the Internet connection is established.

This means that other Internet users don't know the IP address, so can't establish a connection.

DDNS is designed to solve this problem, as follows:

- You must register for the DDNS service with a DDNS service provider. The DDNS Service provider will allocate a Domain Name to you upon request.
- The DDNS settings on the **Network** screen above must be correct.
- The Wireless/Ethernet Network Camera will then contact the DDNS server whenever it detects that the Internet IP address has changed, and inform the DDNS server of the new IP address. (The *Check WAN IP Schedule* determines how often the Wireless/Ethernet Network Camera checks if the Internet IP address has changed.)

This system allows other internet users to connect to you using the Domain Name allocated by the DDNS service provider.

WEP Screen

This screen is accessed by clicking the *Configure WEP* button on the *Network* screen. An example WEP screen is shown below.

WEP Key Setting

WEP Encryption: None

Passphrase:  Generate

Default Key

Key Value

# Key 1:

^ Key 2:

^ Key 3:

^ Key 4:

Apply Cancel Clear

Help Close

Figure 26: WEP Screen

Data - WEP Screen	
WEP Encryption	
WEP Encryption	<div>Select the option used on your Wireless LAN.</div> <ul style="list-style-type: none"><li><b>None</b> - This is the default. If selected, data is NOT encrypted before being transmitted.</li><li><b>64 Bit Encryption</b> - If selected, data is encrypted, using the default key, before being transmitted. You must enter a default key. Other Wireless stations must be set to use 64 Bit Encryption, and have the same Key value in the same position in their key table.</li><li><b>128 Bit Encryption</b> - If selected, data is encrypted, using the default key, before being transmitted. You must enter a default key. Other Wireless stations must be set to use 128 Bit Encryption, and have the same Key value in the same position in their key table.</li></ul>
Passphrase	<div>The <i>Passphrase</i> feature will generate a Key from the phrase you enter, which may be easier than entering keys in Hex (0~9 and A~F).</div> <div>To use the <i>Passphrase</i> feature, enter the desired Passphrase in the field provided, and click the <i>Generate</i> button.</div>
Default Key	<div>Select a key to be used as the default key.</div>
Key Value	<div>If WEP Encryption is used, you must enter at least one key value, for the <i>Default Key</i>. All transmissions are encrypted using the <i>Default Key</i>. Other wireless stations must use the same key value in the same position in their key table. (It does not have to be selected as the default key.)</div> <div>The other key values are optional, and are used only for decrypting data. This allows you to use different keys for transmitting and receiving, if required.</div>

	<p>When inputting a key value, follow these rules:</p> <ul style="list-style-type: none"> <li>• For 64 Bit Encryption, keys must be 10 characters.</li> <li>• For 128 Bit Encryption, keys must be 26 characters.</li> <li>• Keys must be entered in Hex. Hex characters are A ~ F, and 0 ~ 9.</li> </ul>
--	---

Image Screen

This screen is displayed when the *Image* menu option is clicked.

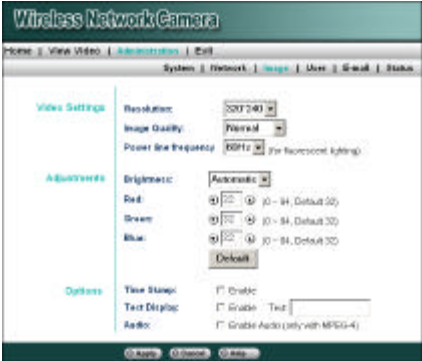


Figure 27: Image Screen

Data - Image Screen	
Video Settings	
Resolution	Select the desired video resolution format. The default resolution is set to 320*240.
Image Quality	Select the desired image quality. The default Image Quality is set to Normal. Note: Higher image quality requires more bandwidth.
Power line frequency	Select the power line frequency (50Hz or 60Hz) used in your region, to improve the picture quality under florescent lighting.

Adjustment	
Brightness	Select <i>Automatic</i> or <i>Manual</i> . The default is set to <i>Automatic</i> in which the camera will automatically adjust the brightness based on the current environment. Select <i>Manual</i> , if you want to adjust the brightness manually.
Red, Green, Blue	Adjust these color settings to the preferred values. Note: When <i>Automatic</i> is selected, this setting will not take effect..
Default Button	Clicking this will set all the <i>Adjustment</i> fields to their default values. You must click "Apply" to save these changes.
Options	
Time Stamp	Enable the check box if you want the time to be displayed on the Video image.
Text Display	If you want text to be displayed on the Video image, enable this feature by checking the checkbox. You can enter text up to 20 characters. This feature is often used to identify camera when multiple camera are installed.
Audio	If you want audio to be included with the video, enable this option. Some bandwidth will be allocated to the audio stream. In some situations, this may affect the quality of the video. Note: Audio is only available with MPEG-4 video.

User Screen

This screen is displayed when the *User* option on the *Administration* menu is clicked.

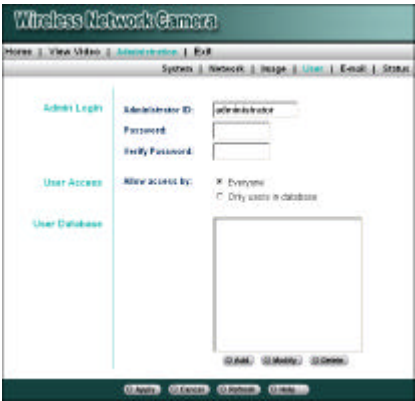


Figure 28: User Screen

Data - User Screen	
Admin Login	
Administrator ID	<ul style="list-style-type: none"><li>Enter the name for the Administrator here. Spaces, punctuation, and special characters must NOT be used in the name.</li><li>The name is case insensitive (case is ignored), so you can not have 2 names which differ only by case.</li></ul>
Password	The password for the Administrator.
Verify Password	Re-enter the password for the Administrator, to ensure it is correct.
User Access	
Allow access by	<ul style="list-style-type: none"><li>Everyone - Anyone can view the Video stream.</li><li>Only users in database - Allow viewing only by people in the user database. If selected, users will be prompted for a User Name and Password when they attempt to view the Video.</li></ul>
User Database	
User List	This displays all users you have entered into the User database. If you have not entered any users, this list will be empty.
Buttons	Use the <i>Add</i> , <i>Delete</i> , and <i>Modify</i> buttons to manage the user database.

Add/Modify User Screen

This screen is displayed when the *Add* or *Modify* button on the *User* screen is clicked. It is used to enter details of each user.



Figure 29: Add/Modify User Screen

Data - Add/Modify User	
User Name	Enter the name for the user. Spaces, punctuation, and special characters must NOT be used in the name.  Also, names are case-insensitive (case is ignored), so you can NOT use 2 names with the same spelling and different case.
User Password	The password for the user above.
Confirm Password	Re-enter the password, to ensure it is correct.

## E-mail Screen

If desired, you can use the E-mail feature to have an E-mail sent to you whenever motion is detected. Note that because of the sensitivity of the CMOS digitizer, the motion detection feature is not usable in situations where the level of illumination may change rapidly. In this situation, the change in light intensity will trigger the motion detection.

[illegible]

**Figure 30: E-mail Screen**

## Data – E-mail Screen

E-Mail Alerts	
<b>Enable</b>	<p>Check the box to enable the E-Mail Alert feature. E-mails are sent when motion is detected.</p> <p><b>Note:</b> Motion detection can be triggered by rapid changes in lighting condition, as well as by moving objects. For this reason, it should only be used indoors.</p>
<b>E-mail Address</b>	<p>Enter at least one (1) E-Mail address; the 2nd and 3rd addresses are optional. The E-mail alert will be sent to the E-mail address or addresses specified here.</p>



<b>Show "From" as</b>	Enter the E-mail address to be shown in the "From" field when the E-mail is received.
<b>Subject</b>	Enter the desired text to be shown as the "Subject" for the E-Mail when it is received. Subject can not exceed 48 alphanumeric characters.
<b>Outgoing Mail SMTP Server</b>	Enter the address of the SMTP (Simple Mail Transport Protocol) Server to be used to send E-Mail. If the SMTP Server requires a "login" in order to send mail, check the box <i>My Mail Server Requires Authentication</i> and enter your login name and password for the SMTP Server. (This is usually the same as the POP3 Server used to receive E-mail.)
<b>Delay between E-mails</b>	Use this to ensure your E-mail inbox is not flooded with E-mail alerts. Select the desired time delay between E-mail alerts.
<b>Motion Detection</b>	<ul style="list-style-type: none"><li>• Sensitivity Select the desired option to suit your environment. If covering a large area, you usually need higher sensitivity, since a moving object will take only a small portion of the image.</li><li>• Areas of the image to be examined Use the checkboxes to determine which areas of the image are examined for motion. You can also use the "Select All" and "Select None" buttons if desired.</li></ul>
<b>E-mail Video</b>	
<b>Include Video</b>	Set to "yes" to include a short video in your E-mail alert.
<b>Video Length</b>	Select the desired length. The size of the file depends on this setting, and also the Video size and degree of compression.



Figure 31: Status Screen

Data - Status Screen	
System	
Device Name	This shows the name of the Wireless Network Camera.
Description	This shows the description of the Wireless Network Camera, such as location.
F/W version	The version of the current firmware installed. You can upgrade the Firmware by clicking the <b>Upgrade Firmware</b> button. You need to obtain the firmware upgrade file first.
Network	
MAC Address	The current IP address of the Wireless/Ethernet Network Camera.
IP Address	The IP Address of the Wireless Network Camera.
Network Mask	The network mask associated with the IP address above.
Gateway	The IP Address of the remote Gateway associated with the IP Address above.

Wireless (Wireless Network Camera Only)	
Network Type	It shows the Network Type currently is use (Ad-hoc or Infrastructure).
SSID	This displays the wireless SSID.
Channel	This shows the wireless channel currently used.
Encryption	This shows if the WEP Encryption is Enabled or Disabled.
Video	
Video Type	This displays the compression type of the video stream (e.g. MPEG-4).
Resolution	The image size of the video stream.
Current Viewers	This shows how many viewers are currently viewing the Video stream.
Log	
System Log	This is a log of system activity.

## Upgrade Firmware Screen

This screen is displayed when you click the *Upgrade Firmware* button on the Status screen.



The screenshot shows a web-based interface for upgrading firmware. It has a dark green header with the text 'Upgrade Firmware'. Below the header, a message states: 'The upgrade firmware file needs to be downloaded and stored on your PC.' Underneath this message, there is a label 'Upgrade File:' followed by a text input field and a 'Browse...' button. At the bottom of the form, there are three buttons: 'Start Upgrade', 'Cancel', and 'Help'.

**Figure 32: Upgrade Firmware Screen**

This screen allows you upgrade the Firmware (software) in your Wireless/Ethernet Network Camera. Before using this screen, you must download the upgrade file to your PC.

Then follow this procedure:

1. Click the *Browse* button, and locate the upgrade file.
2. Select this file, and click OK. The filename will then appear in the *Upgrade File* field.
3. Click the *Start Upgrade* button to transfer the file to the Wireless/Ethernet Network Camera and start the upgrade procedure.

**Note:**

- The upgrade may take several minutes.
- When the upgrade is completed, the Wireless/Ethernet Network Camera will restart. This will cause any existing connections to be terminated. Any users viewing or recording the video will see this as an error.

# Viewing & Recording

*This Chapter describes how to view and record the live video stream generated by the Wireless/Ethernet Network Camera.*

## Overview

The recommended method to view video is to use the supplied Windows Viewing/Recording utility.

## Installation

1. Insert the supplied CD-ROM into your drive. If the setup program does not start automatically, run **Netcam\_Setup.exe** in the root folder. You will see the *Welcome* screen shown below.



Figure 33: Welcome Screen

2. Click the *Client Utility* button to start the installation of the Viewing/Recording Utility.
3. Follow the prompts to complete the installation.

System Tray Icon

When started, the program will create an icon in the Windows system tray on the taskbar, as shown below.



Figure 34: System Tray Icon

This Icon has the following functions:

- **Animation** - If a recording is in progress, this icon will be animated. Otherwise, it is stationary.
- **Hover** - Hovering your mouse over this icon will generate a pop-up informing you of the current status.
- **Double-click** - This will display the main screen, shown below.
- **Right Click** - This provides a menu which allows you to view program details, view the main screen, or terminate the program.

Main Screen

When started, a screen like the example below will be displayed.



Figure 35: Main Screen

### Cameras - Camera List

- The *Camera List* displays all Wireless/Ethernet Network Camera you have defined. If you have not defined any cameras, this list will be empty. For each listed camera, the following data is shown:
  - *Device Name* - The name of the camera
  - *Connection Type* - This will be either "LAN" or "Internet", indicating the type of connection used to connect to the camera.
  - *Description* - If the Camera administrator has entered a description, it will be displayed here.
  - *Status* - Normally, this will be blank. If a connection error arises, this will be indicated here.
- Click the *Add Camera* button to add a Wireless/Ethernet Network Camera. See the following section for further details.
- Once some cameras are listed, you can select one and then use the *Modify Camera*, *Delete Camera* and *View* buttons.
- To view live video, select a camera and click the *View* button.

### Recordings - Current Recordings

This panel lists all scheduled recordings currently in progress.

Any recording currently in progress can be terminated by selecting it and clicking the *Stop* button.

Adding Cameras to the Camera List

To add a camera to the *Camera List*, click the *Add Camera* button on the main screen. You will see a screen like the example below.

- The *Cameras on LAN* panel, on the left, displays all Wireless/Ethernet Network Camera found on your LAN. This list can be updated by clicking the *Refresh* button.
- The *Camera Data* panel, on the right, displays the data for the selected camera.



Figure 36: Add Camera from LAN

To add a camera to the *Camera List* on the main screen:

1. Select a camera in the list on the left.
2. Check that the *Camera Data* shown on the right is correct. See below for details.
3. Click the *Add* button. The camera will now appear in the *Camera List* on the main screen.

Camera Data - LAN

Device Name	This is the default name for the Wireless/Ethernet Network Camera, and cannot be changed.
Description	This displays the description entered by the Wireless/Ethernet Network Camera Administrator.
Address	The current IP address of the Wireless/Ethernet Network Camera.
Port Number	This will normally display "80". Only change this if requested to do so by the Wireless/Ethernet Network Camera Administrator.
Login	<div>The camera Administrator can require that users provide a username and password before being allowed to view the live video.<ul style="list-style-type: none"><li>• If the Administrator has not enabled this option, the <i>Login</i> fields can be left blank.</li><li>• Otherwise, you must enter the username and password allocated to your by Administrator.</li></ul></div>



You can add the same Camera twice, once for the LAN (using the LAN IP addresses), and again for the Internet (using the Internet IP addresses). This will allow viewing the camera whether you are on the same LAN as the camera or in a remote location.



Adding Cameras on the Internet

If the Wireless/Ethernet Network Camera you wish to add is not on your LAN, but is available via the Internet, click the *Internet* tab. You will see a screen like the example below.

The screenshot shows a software window titled "Add Camera From". It has two tabs: "LAN" and "Internet", with "Internet" being the active tab. The window is divided into two panes. The left pane, titled "Test Results", is currently empty. The right pane, titled "Camera Data", contains several input fields: "Device Name", "Description", "Address", "Port Number", and a "Login (if required)" section which includes "Name" and "Password" sub-fields. At the bottom of the window are three buttons: "Test", "Add", and "Clear".

Figure 37: Add Camera from Internet

- To add a camera to the *Camera List* on the main screen:
1. Enter the *Camera Data* on the panel on the right. See below for details.
  2. Click the *Test* button to check that a connection and login can be performed successfully.
  3. Click the *Add* button. The camera will now appear in the *Camera List* on the main screen.

Camera Data - Internet	
Device Name	<p>This is the default name for the Wireless/Ethernet Network Camera, and cannot be changed.</p> <p>This field will be displayed automatically once a connection to the Wireless/Ethernet Network Camera has been established.</p>
Description	<p>This displays the description entered by the Wireless/Ethernet Network Camera Administrator.</p> <p>This field will be displayed automatically once a connection to the Wireless/Ethernet Network Camera has been established.</p>
Address	<p>Enter the Domain Name or Internet IP address of the desired Wireless/Ethernet Network Camera.</p>
Port Number	<p>Enter the port number used by the Wireless/Ethernet Network Camera. The Wireless/Ethernet Network Camera Administrator can advise you of the port to use. The default value is 1024.</p>
Login	<p>The camera Administrator can require that users provide a username and password before being allowed to view the live video.</p> <ul style="list-style-type: none"><li>• If the Administrator has not enabled this option, the <i>Login</i> fields can be left blank.</li><li>• Otherwise, you must enter the username and password allocated to your by Administrator.</li></ul>



You can add the same Camera twice, once for the LAN, and again for the Internet. This will allow viewing the camera whether you are in the same LAN as the camera or in a remote location.

**Modifying an Existing Camera**

You can change the settings for an existing camera by selecting it in the *Camera List* on the main screen, then clicking the *Modify Camera* button. You will see a screen like the example below.

Test Results	Camera Data
	Device Name: SC112233
	Description:
	Address: 172.31.2.27
	Port Number: 80
	Login (if required) Name: <input type="text"/> Password: <input type="password"/>
<input type="button" value="Test"/>	<input type="button" value="Save"/>

Figure 38: Modify Camera

- Data on this screen is the same as for the *Add Camera* screens.
- You can use the *Test* button to button to check that a connection and login can be performed successfully.

## Viewing Live Video

To view live video, select a camera in the *Camera List* on the main screen, and click the *View* button. For each camera, a new Viewing window will open, like the example below.



Figure 39 Viewing Live Video

Controls are provided to stop and start viewing, and to start recording the video stream.



**Play** - Use this to re-start viewing, after using the *Stop* button.



**Record** - Click this to start recording the current video stream. While recording, this button will be red. To stop recording, click the button again.



**Stop** - This will terminate the connection to the camera, halting both the viewing and the recording (if in progress).



**Snapshot** Click this to take a single JPEG "snapshot" image of the current video. You can use the "Preferences" to set the folder where these images are stored.



**Audio** - This can be used to select the Audio stream which can be heard. (Only one audio stream can be selected at any time.) If the camera does not support audio, or if audio is disabled on the camera, this option is unavailable, and a red "X" will cover this icon.



**2X** - Clicking this will set the viewing image to double size. The icon will then change to the "1X" icon below.



**1X** - Clicking this will set the viewing image to standard size. The icon will then change to the "2X" icon above.

Recording Video

You can record Video while watching, or schedule recordings to occur when you are absent. Recordings are stored in a standard Microsoft ASF file format, and can be played using Microsoft Media Player.

Before doing any recording, you should review the *Recording Preferences* to ensure they are suitable for your PC.

Recording Preferences

To set the Recording Preferences, click the *Preferences* button below the *Recordings* panel on the main screen. You will see a screen like the example below.



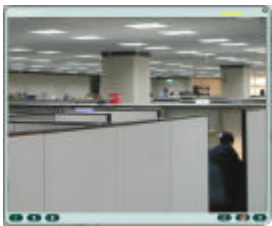
Figure 40: Recording Preferences

If necessary, change these settings to suit your environment.








Record File Location	This is the Drive and Folder on your PC where recorded files will be placed. You need a drive which has large amounts (Gigabytes) of free space. Click the <i>Browse</i> button to select the drive and folder.  Note that file names are automatically assigned, using the date and time.
Snapshot File Location	This shows the location where snapshot images (still images, in JPEG format) will be stored. You can use the <i>Browse</i> button to select the desired drive and folder
Time Limit	This sets the maximum size of a recording which is started by clicking the <i>Record</i> button on the <i>View</i> screen.  If the recording is not stopped manually, it will be terminated after the time period indicated here.

**Live Recordings**

You can start and stop recording from the *View* screen, using the controls provided.



**Figure 41 Viewing Live Video**

-  **Play** - Use this to re-start viewing, after using the *Stop* button.
-  **Record**. Click this to start recording the current video stream. While recording, this button will be red. To stop recording, click the button again.
-  **Stop**. This will terminate the connection to the camera, halting both the viewing and the recording (if in progress).
-  **Snapshot** Click this to take a single JPEG “snapshot” image of the current video. You can use the “Preferences” to set the folder where these images are stored.
-  **Audio**. This can be used to select the Audio stream which can be heard. (Only one audio stream can be selected at any time.) If the camera does not support audio, or if audio is disabled on the camera, this option is unavailable, and a red “X” will cover this icon.
-  **2X** - Clicking this will set the viewing image to double size. The icon will then change to the “1X” icon below.
-  **1X** - Clicking this will set the viewing image to standard size. The icon will then change to the “2X” icon above.

**Files**

To view recorded video or snapshot (still image) pictures, click the *Files* button under the *Files* panel on the main screen, then select the desired option.

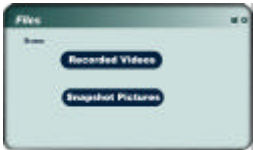


Figure 42: Files Dialog

To view a list of all recorded files, click the **Recorded Video** button, you will then see a screen like the example below.



Figure 43: Recorded Files

This list shows all of the recorded files. The following operations are supported:

- **Play** - Play the selected file using Microsoft Media Player.
- **Delete** - Delete the selected file.
- **Explore** - Open the folder containing these files, using Windows Explorer.

Scheduled Recordings

Recordings can be scheduled at any time, for any known Wireless/Ethernet Network Camera. (Of course, your PC must be ON at the scheduled time.)

To use this feature, click the *Schedule* button under the *Recordings* panel on the main screen. You will see a screen like the example below.



Figure 44: Scheduled Recording List

- This screen lists all scheduled recordings. For each recording, the following data is shown:
- **Camera** - The camera which will be recorded.
  - **Date** - The date the recording will be made. If the recording schedule is repetitive, this is the date of the next recording.
  - **Time** - The time the recording will be made.
  - **Type** - Indicates if the recording is *One Time*, *Everyday*, or on a particular day each week.
- If a scheduled recording is selected, the *Modify* and *Delete* buttons can be used to edit or delete the selected entry.

Schedule Definition Screen

If the *Add* or *Modify* button is clicked, a screen like the following is displayed. You can then enter or modify the details of this schedule.

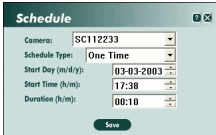


Figure 45: Schedule Definition Screen

Data - Schedule Definition	
Camera	Select the camera to be used. If the desired camera is not listed, you must define by using the <i>Add Camera</i> button on the main screen.
Schedule Type	Select the desired option: <ul style="list-style-type: none"><li>• <b>One Time</b> - Only one (1) recording is made, on the specified date, at the specified time.</li><li>• <b>Everyday</b> - The recording is made every day, at the specified time. The <i>Start Day</i> indicates when the first recording will be made.</li></ul>

	<ul style="list-style-type: none"><li>• <b>Every Sunday, Every Monday, ...</b> - The recording is made on the specified day each week. The <i>Start Day</i> indicates when the schedule becomes active.</li></ul>
<b>Start Day</b>	Select the desired date. For a single recording, this is the day the recording will be made. For daily (Everyday) recordings, this is the starting date. For weekly recordings, this determines when the schedule becomes active.
<b>Start Time</b>	Select the desired start time.
<b>Duration</b>	Enter or select the desired duration of the recording.



Viewing with your Web Browser

The recommended method to view live video from the Wireless/Ethernet Network Camera is to use the Windows utility.  
However, you can also use your Web browser if necessary.

Viewing over your LAN

- To establish a connection from your PC to the Wireless/Ethernet Network Camera:
1. Start your WEB browser.
  2. In the Address box, enter "HTTP://" and the IP Address of the Wireless/Ethernet Network Camera, as in this example, which uses the Wireless/Ethernet Network Camera's default IP Address:  
  
HTTP : // 192 . 168 . 0 . 99
  3. If the Administrator has enabled the user security feature, you will then be prompted for a username and password.  
Enter the name and password assigned to you by the Wireless/Ethernet Network Camera administrator.
  4. When you connect, the following screen will be displayed.



Figure 46: Home Screen

5. Click *View Video* to see a screen like the example below.

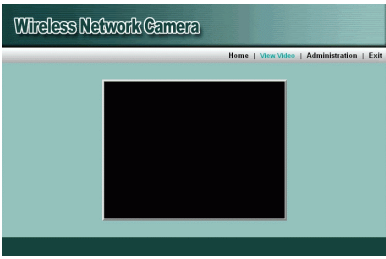


Figure 47: View Video Screen

- If using Internet Explorer on Windows, you may see a prompt regarding an "OCX" file, like the example below.  
**You must install this OCX file in order to view the Video. Click "Yes".**

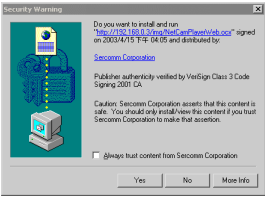


Figure 48 ActiveX OCX Prompt

- Video will start playing automatically. There may be a delay of a few seconds while the video stream is buffered.

**Viewing via the Internet**

If the LAN with the Wireless/Ethernet Network Camera is connected to the Internet, and configured correctly, you can connect to the Wireless/Ethernet Network Camera via the Internet.

See *Making Video available from the Internet* in Chapter 3 for details of the required LAN configuration.

To establish a connection from your PC to the Wireless/Ethernet Network Camera via the Internet:

- 1. Obtain the Internet address and port number of the Wireless/Ethernet Network Camera from the Administrator.
- 2. Start your WEB browser.
- 3. In the Address box, enter the following:

HTTP://Internet\_Address:port\_number

**Example using an IP address:**

HTTP://203.70.212.52:1024

Where the Router/Gateway's Internet IP address is 203.70.212.52 and the "Second Port" number on the Wireless/Ethernet Network Camera is 1024.

**Example using a Domain Name:**

HTTP://mycamera.dyndns.tv:1024

Where the Router/Gateway's Internet Domain name (using DDNS in this example) is mycamera.dyndns.tv and the "Second Port" number on the Wireless/Ethernet Network Camera is 1024.

- 4. If the Administrator has enabled the user validation feature, you will then be prompted for a username and password.  
Enter the name and password assigned to you by the Wireless/Ethernet Network Camera administrator.
- 5. When you connect, the following screen will be displayed.



Figure 49: Home Screen

6. Click *View Video* to see a screen like the example below.

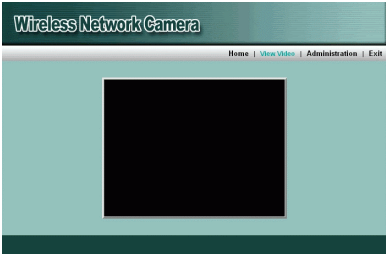


Figure 50: View Video Screen

- If using Internet Explorer on Windows, you may see a prompt regarding an "OCX" file, like the example below.  
**You must install this OCX file in order to view the Video. Click "Yes".**

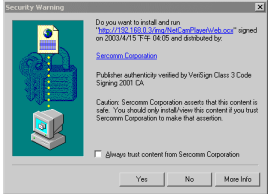


Figure 51 ActiveX OCX Prompt

- Video will start playing automatically. There may be a delay of a few seconds while the video stream is buffered.

**Note:**

Viewers need a broadband Internet connection to view video effectively. Dial-up connections are NOT recommended.

# Troubleshooting

*This chapter covers the most likely problems and their solutions.*

## Overview

This chapter covers some common problems that may be encountered while using the Wireless/Ethernet Network Camera and some possible solutions to them. If you follow the suggested steps and the Wireless/Ethernet Network Camera still does not function properly, contact your dealer for further advice.

## Problems

- Problem 1:** I can't connect to the Wireless/Ethernet Network Camera with my Web Browser to configure it.
- Solution 1:** It is possible that your PC's IP address is not compatible with the IP address of the Wireless/Ethernet Network Camera. Use the Windows utility to configure the Wireless/Ethernet Network Camera with a valid IP address.
- Problem 2:** The Windows utility doesn't list any Wireless/Ethernet Network Cameras.
- Solution 2:** Check the following:
- The Wireless/Ethernet Network Camera is installed, LAN connections are OK, it is powered ON and startup is complete.
  - Ensure that your PC and the Wireless/Ethernet Network Camera are on the same network segment. (If you don't have a router, this must be the case.)
  - Ensure that your PC has the TCP/IP network protocol loaded. In Windows, this is done by using *Control Panel-Network*. If an entry for TCP/IP -> Network card is not listed, use *Add - Protocol - Microsoft - TCP/IP* to add it. You then need to select the new entry (TCP/IP -> Network card), click *Properties*, and configure the *IP Address* tab.
    - If your LAN has a DHCP Server, you can select "Obtain an IP Address automatically".
    - Otherwise, you must select "Specify an IP Address", and enter values for *IP Address*, *Subnet Mask*, and *Gateway*. All devices on your LAN must use compatible values. Remember that each device needs a **unique** IP Address, and the **same** Subnet Mask.
- Problem 3** When I try to connect to the Wireless/Ethernet Network Camera, I get prompted for a user name and password.
- Solution 3** You SHOULD be prompted for a user name and password if trying to access the *Administration* menu.

Enter the *Administrator ID* and *Password* set on the *User* screen.

If you are just trying to view Video, the User Name/Password prompt indicates that the Administrator has restricted access to specified users. Ask the Administrator for your User Name and Password.

**Problem 4**

**I can't connect to the Wireless/Ethernet Network Camera using a Wireless connection.**

**Solution 4**

1) If a LAN cable is connected to the LAN port, the Wireless interface is disabled. Only one interface can be active.

2) Check that your PC and the Wireless/Ethernet Network Camera have compatible Wireless settings.

- Mode (Infrastructure or Ad-hoc) must be correct.
- ESSID must match.
- WEP settings must match.
- In Ad-hoc mode, the Channel should match, although this is often not required.

**Problem 5**

**Video quality may suddenly deteriorate.**

**Solution 5**

This can happen when an additional viewer connects to the Wireless/Ethernet Network Camera, overloading the camera or the available bandwidth. The image size and quality can be adjusted to cater for the required number of viewers and the available bandwidth.

**Problem 6**

**The motion detection feature doesn't send me any E-mails.**

**Solution 6**

It may be that the SMTP (Simple Mail Transport Protocol) server used by the Wireless/Ethernet Network Camera to send the E-mail will not accept mail from the Wireless/Ethernet Network Camera. Try using a different SMTP server. The Wireless/Ethernet Network Camera derives the address of the SMTP server from the E-mail address you enter in the *Show "From" as:* field.

**Problem 7**

**Using the motion detection feature, I receive E-mails which don't show any moving objects.**

**Solution 7**

The motion detection feature doesn't actually detect motion. It compares frames to see if they are different. Major differences between frames are assumed to be caused by moving objects.

But the motion detector can also be triggered by:

- Sudden changes in the level of available light
- Movement of the camera itself.

Try to avoid these situations. The motion detection feature works best in locations where there is good steady illumination, and the camera is mounted securely. This feature can NOT be used if the camera is outdoors.

**Problem 8**

The image is blurry.

**Solution 8**

Try cleaning the lens, and adjusting the focus ring.

# Appendix A

## Specifications



### Ethernet Network Camera

Model	Ethernet Network Camera
Dimensions	164 mm (L) * 88 mm (W) * 54 mm (H) 6.4 inch (L) * 3.5 inch (W) * 2.1 inch (H)
Operating Temperature	0° C to 40° C
Storage Temperature	-10° C to 70° C
Network Protocols:	TCP/IP, DHCP, SMTP, NTP, HTTP
Network Interface:	1 Ethernet 10/100BaseT (RJ45) LAN connection
LEDs	3
Power Adapter	5V DC External

### Wireless Network Camera

Model	Wireless Ethernet Network Camera
Dimensions	164 mm (L) * 88 mm (W) * 54 mm (H) 6.4 inch (L) * 3.5 inch (W) * 2.1 inch (H)
Operating Temperature	0° C to 40° C
Storage Temperature	-10° C to 70° C
Network Protocols:	TCP/IP, DHCP, SMTP, NTP, HTTP
Network Interface:	1 Ethernet 10/100BaseT (RJ45) LAN connection
Wireless interface	IEEE 802.11b/802.11g compatible, Infrastructure/Ad-hoc mode, WEP security support, roaming support
LEDs	4
Power Adapter	5V DC External

### CE Approvals

The Wireless Network Camera and the Ethernet Network Camera meet the guidelines of the European Union and comply with the 99/5/EEC and RTTE 99/5/EG directives, including the following standards:

- EN60950
- EN300 328-2
- EN301 489-1
- EN301 489-17

This is a Class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.



Copyright Notice

Many software components are covered by the GNU GPL (General Public License). Some are covered by other Licenses as listed in the table below.

Details of each applicable license are contained in the following section.

No Warranty

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Network Camera copyright information

Package source codes	License
rrload	GPL
uClinux-2.4.19.uc1	GPL
busybox-0.60.3	GPL
tinylogin-1.02	GPL
inetutils-1.3.2	GPL
thttpd-2.20b-rr	See following
uClibc-0.9.5	LGPL
Lan driver (DM9000)	GPL
cgi-lib	Copyright cgi-LIB
Cgihtml	Free SW
Ntp-4.1.0-4.src.rpm	GPL
Cron-small version	GPL
Dhcpd-1.3.22-p11	GPL
Smtclient-1.0.0	GPL
UpnpSDK-1.0.4	GPL
ez-ipupdate-3.0.11b7	GPL

## **thttpd License**

Copyright 1995,1998,1999,2000 by Jef Poskanzer <jef@acme.com>. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### **cgi-LIB Copyright Notice**

Author: Noel V Aguilar

Version: 1.4

Filename: cgi-lib.h

Program Library: CGI-LIB

Feel free to use, copy, reference, or modify this program in any way.

Support public domain freeware.

For updates or to report bugs go to my home page

<http://www.geocities.com/SiliconValley/Vista/6493/>

The web page for the library is:

<http://www.geocities.com/SiliconValley/Vista/6493/cgi-lib.html>

#### **Disclaimer**

THE INFORMATION, CODE AND EXECUTABLE PROVIDED ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL NOEL V AGUILAR BE LIABLE FOR ANY DAMAGES WHATSOEVER INCLUDING DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL, LOSS OF BUSINESS PROFITS OR SPECIAL DAMAGES. ALL THE INFORMATION, CODE AND EXECUTABLES ARE FOR EDUCATIONAL PURPOSES ONLY.

## GNU General Public License

### GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.

59 Temple Place, Suite 330, Boston, MA 02111-1307 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

#### Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software—to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all. The precise terms and conditions for copying, distribution and modification follow.

### GNU GENERAL PUBLIC LICENSE

#### Terms And Conditions For Copying, Distribution And Modification

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or

translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it. Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

- a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies

directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

## **NO WARRANTY**

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY

AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING,

**REPAIR OR CORRECTION.**

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

**END OF TERMS AND CONDITIONS**



## Lesser GNU General Public License

### GNU LESSER GENERAL PUBLIC LICENSE

Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.  
59 Temple Place, Suite 330, Boston, MA 02111-1307 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

#### Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained

for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

## **GNU LESSER GENERAL PUBLIC LICENSE**

### **TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION**

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either

verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library. You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) The modified work must itself be a software library.

b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the objectfile is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

- a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)
- b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.
- c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.
- d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.
- e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

- a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.
- b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library. If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances. It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice. This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms

and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

#### **NO WARRANTY**

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW.

EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

#### **END OF TERMS AND CONDITIONS**