

# DUAL CODEC CMOS Infra-Red Network Camera



## User's Guide

Software Version 1.2.X

# DUAL CODEC CMOS IR IP Cam / Video Server Series

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## Owner's Record

The model and serial numbers are located at the bottom. Record these numbers in the spaces provided below. Refer to these numbers whenever you call upon your dealer regarding this product.

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

## **WARNING**

**To prevent fire or shock hazard, do not expose the unit to rain or moisture.**

**For AC Adaptor to avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.**

## **For customers in the U.S.A.**

This equipment has been tested and found to comply with the limits for a 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 or more 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.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Part 15 of FCC Rules.

## **Declaration of Conformity**

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.

## **NOTICE TO USERS**

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We reserve the right to make any modification to this manual or the information contained herein at any time without notice. The software described herein may also be governed by the terms of a separate user license agreement.

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# Overview

This user's guide explains how to operate the Network Camera from a computer. This user's guide is written to be read on the computer display. However, users might consider printing it out to access easily and read it before you operate the Network Camera.

## Introduction

This Network Camera is an inexpensive and fully scalable surveillance technology. Because the Network Cameras can be plugged in to your existing computer network infrastructure, you will potentially save thousands of dollars on unnecessary cabling.

The Network Camera is accessible via the LAN / WLAN or Internet connection. Connect your Network Camera directly to a computer network or DSL modem, and with a standard Web browser you get instant, on demand video streams. Within minutes you can set up the Network Camera to capture a video sequence to a PC. Live video image can be uploaded to a website for the world to see or made available only to select users on the network.

## Features:

- **MPEG4 / JPEG dual video compression**
- **6 high-light IR LEDs for 0 Lux operation**
- **High quality 1/4" CMOS image sensor**
- **Pre recording for motion triggered up to 15 seconds**
- **Wired and Wireless LAN (option) interface**
- **Up to 400% digital zoom**
- **Built-in internal microphone**
- **Remote-Control via Internet Explorer**
- **Support statistic and dynamic IP address**
- **DDNS and UPnP**
- **Multi-channel control software for surveillance application**
- **On-line firmware upgrade**

**Application:**

- Remote monitoring
- Surveillance

**Minimum System Requirement**

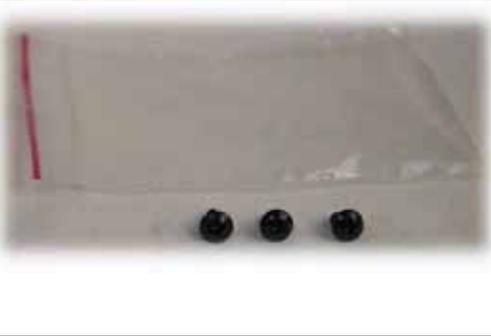
| <b>DUAL CODEC CMOS IR Network Camera</b>                        |   |
|---|---|
| <b>Network Environment</b>                                      |   |
| LAN   | 10/100M Ethernet<br>WLAN (Option)   |
| <b>Monitoring System Recommended for Internet Explorer</b>      |   |
| System Hardware   | · CPU: Pentium 4, 2GHz or above<br>· Memory Size : 128 MB (256 MB or above Recommended )<br>· VGA card resolution : 1024 x 768 or above                   |
| <b>System Requirement for Viewer &amp; Recorder Application</b> |   |
| Support OS  | Win 2000 , Win XP   |
| System Hardware   | 1-4 cameras surveillance application<br>· CPU: Pentium 4, 2GHz or above<br>· Memory Size : 256 MB or above<br>· VGA card resolution : 1024 x 768 or above |

# Package Contents

User can find the following items in the package:

1. Network Camera x 1
2. Stand x 1
3. 5V DC Power adapter x 1
4. Cross-over Ethernet Cable (red) x 1
5. Screw x 3
6. Installation software and manual CD x 1
7. Quick Start Guide x 1

| Item  | Descriptions  |
|---|---|
|   | <p><b>1. This unit</b> is the main element of the system.</p>                                     |
|  | <p><b>2. Camera Stand.</b></p>  |
|  | <p><b>3. Switching Power Adapter</b> dedicates 5V DC electric power output to Network Camera.</p> |

|   |  |
|---|--|
|    | <p><b>4. Cross-over Ethernet Cable</b> is used to connect the Network Camera with PC directly for initial setting.</p> |
|    | <p><b>5. Screws</b> are used to fix Network Camera.</p>  |
|   | <p><b>6. User's Manual</b> provides important information and instructions for operating the Network Camera.</p>       |
|  | <p><b>7. Quick Start Guide</b> provides important information and instructions for installing this device.</p>         |

If any of the above items are missing, please contact your dealer immediately.

**Note:** Using a power supply with a different voltage than the one included with the Network Camera will cause damage and void the warranty for this product.

# Connections



## DC Power Jack

The DC power input jack is located on the Network Camera's bottom. The input power is 5VDC. Note that supply the power to the Network Camera with standard power adapter included in package. Otherwise, the improper power adapter may damage the unit and result in danger.

## LAN Socket

Beside the DC power Jack, the LAN socket is an RJ-45 connector for connections to 10Base-T or 100Base-TX Fast Ethernet cabling. Please use Category 5 "straight through" cable to connect the Network Camera to an Ethernet network switch or hub.

## 10/100M Ethernet LEDs

LED stands for Light-Emitting Diode. The Ethernet LEDs are located on the RJ-45 connector. These LEDs are used to indicate the status of Network connection.

|         | LANJACK STATUS   | GREEN LED (Link / Active) | ORANGE LED (10M/100M) |
|---------|------------------|---------------------------|-----------------------|
| 10Mbps  | Remove cable     | Dark                      | Dark                  |
| 10Mbps  | Plug in cable    | Bright                    | Dark                  |
| 10Mbps  | Plug in & Access | Blinking                  | Dark                  |
| 100Mbps | Remove cable     | Dark                      | Dark                  |
| 100Mbps | Plug in cable    | Bright                    | Bright                |
| 100Mbps | Plug in & Access | Blinking                  | Bright                |

### **Factory Default Reset**

This button is hidden in the pinhole under the Network Camera's bottom. Please refer to the Appendix A in this manual for more information.



### **Microphone**

The Network Camera's has built-in an internal microphone. This microphone is also hidden in the pinhole located on the front panel.

### **Network Accessing Type LED**

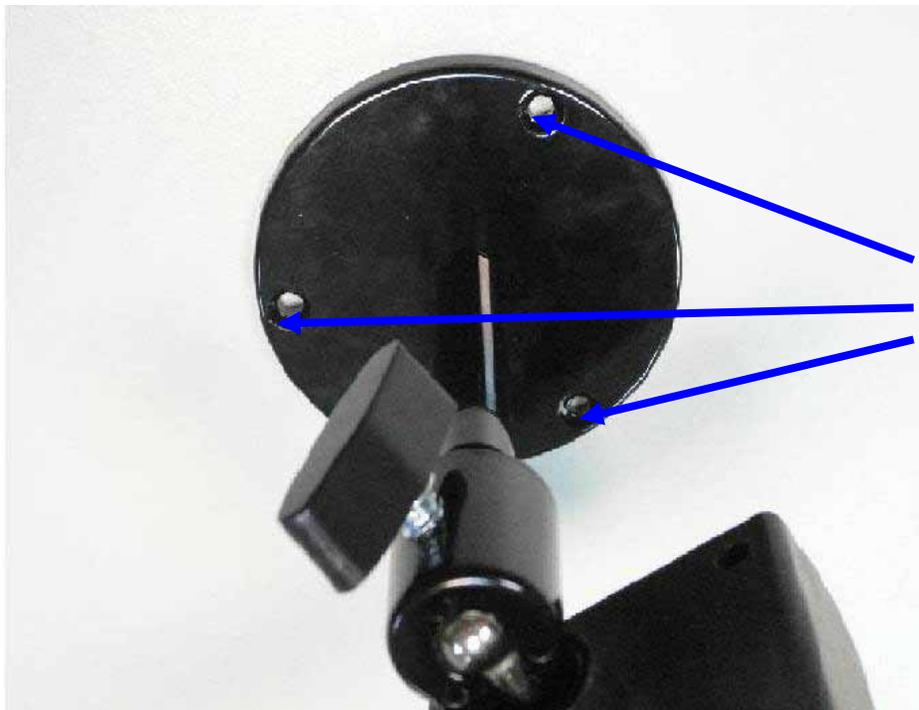
This LED is used to indicate the network type of Network Camera. The orange LED means the Network Camera under wired Ethernet mode (LAN) and green LED means Camera under wireless mode (WLAN).

# Hardware Installation

## 1. Attach the Network Camera with the included stand

### 2. Place the Camera on the table or fix it onto ceiling or wall

Use screws to fix the Network Camera onto the ceiling or wall. You could also put the Network Camera on the table directly.



Fixed it by  
Screws

### 3. Plug a cross over cable into the Network Camera

Connect an Ethernet cable to the LAN socket located on the Network Camera's bottom and attach it to the network.

**Ethernet  
Cable**



#### 4. Connect the external power supply to Network Camera

Connect the attached power adapter to the DC power jack of the Network Camera. **Note:** Use the power adapter, 5VDC, included in the package and connect it to wall outlet for AC power.

**Power  
Cable**



Once you have installed the Network Camera well and powered on, the network accessing type LED will turn green first and then orange. It means the system is booting up successfully. Furthermore, if you have a proper network connection, and access to the Network Camera, the 10/100M LAN LED will flash green

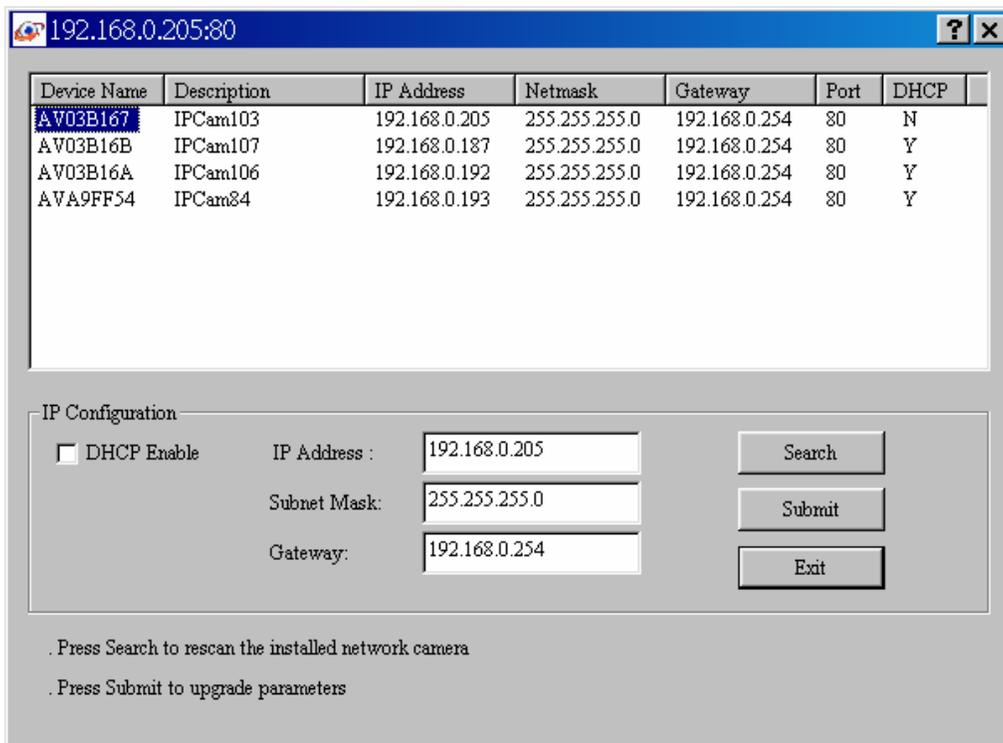
# Logging in to Homepage

## Before Operation

### Install the IP Address of Network Camera

When you installed your Network camera on your LAN environment, you may execute "MP4 IP Finder.exe" to discover Network camera's IP address.

"MP4 IP Finder.exe" is used to scan the Installed Network Camera on a LAN, setting the Network Camera Name, IP address settings and so on.



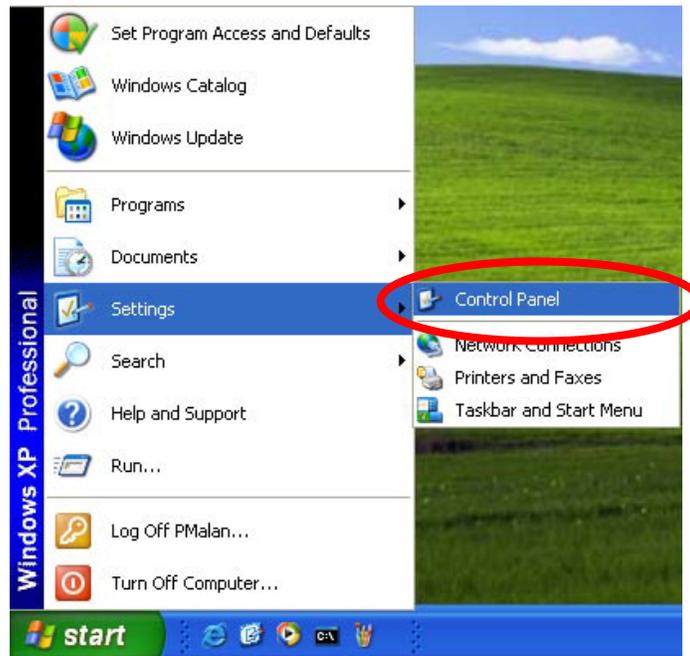
Using your mouse to select any one of the Network Cameras within your LAN environment, you can search out its IP address and other IP parameters as follows:

1. Edit the IP address of this Network Camera.
2. Edit the Gateway Address if necessary.
3. Edit the Network Mask if necessary.
4. 'Submit' it.
5. The Network Camera will restart the system to validate the new setting after seconds.

Alternatively, user can use another approach to search out the Network Camera on the LAN by UPnP as bellow:

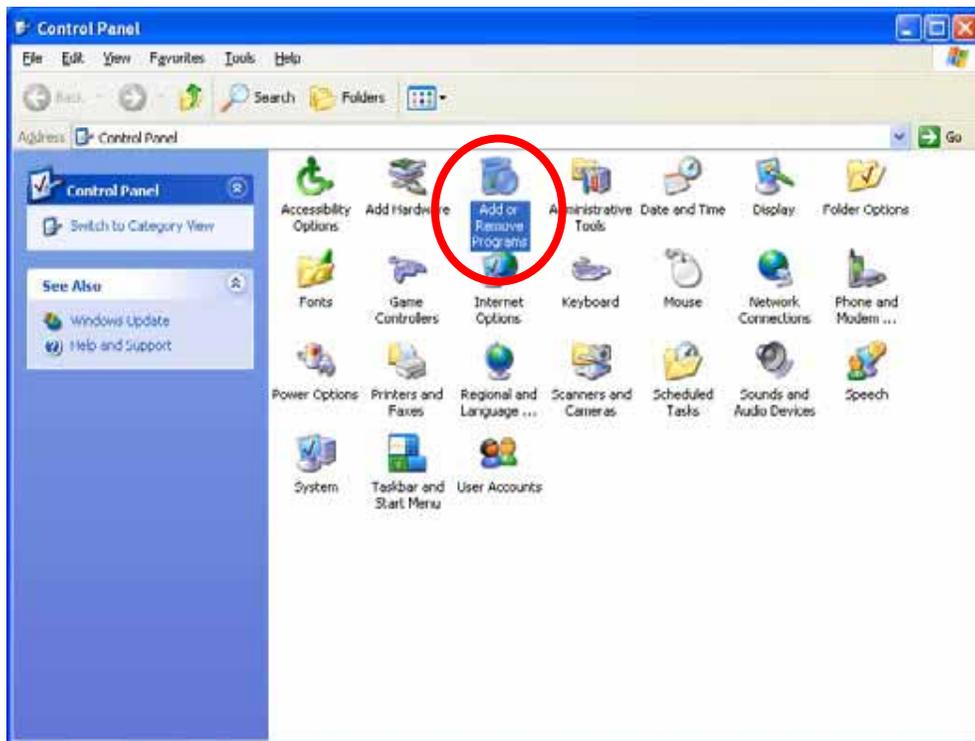
## Enabling UPnP for Windows® XP™

UPnP™ is short for Universal Plug and Play, which is a networking architecture that provides compatibility among networking equipment, software, and peripherals. This device is an UPnP enabled Network Camera. If the operating system, Windows XP, of your PC is UPnP enabled, the device will be very easy to configure. Use the following steps to enable UPnP settings only if your operating system of PC is running Windows XP. **Note** that Windows 2000 does not support UPnP feature.

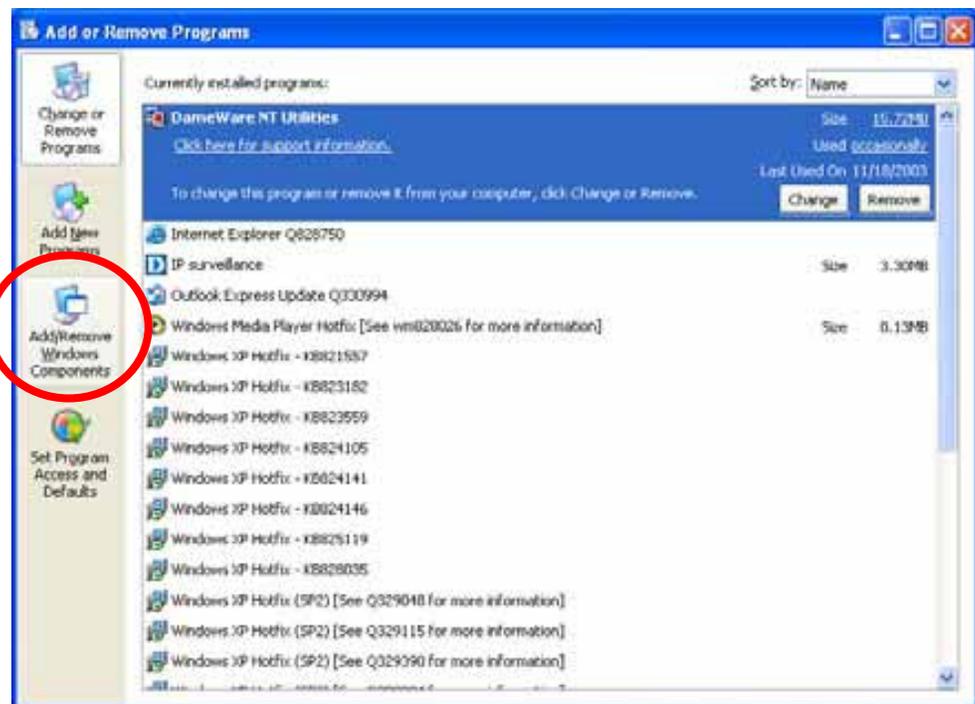


Go to **Start > Settings**.

Click **Control Panel**

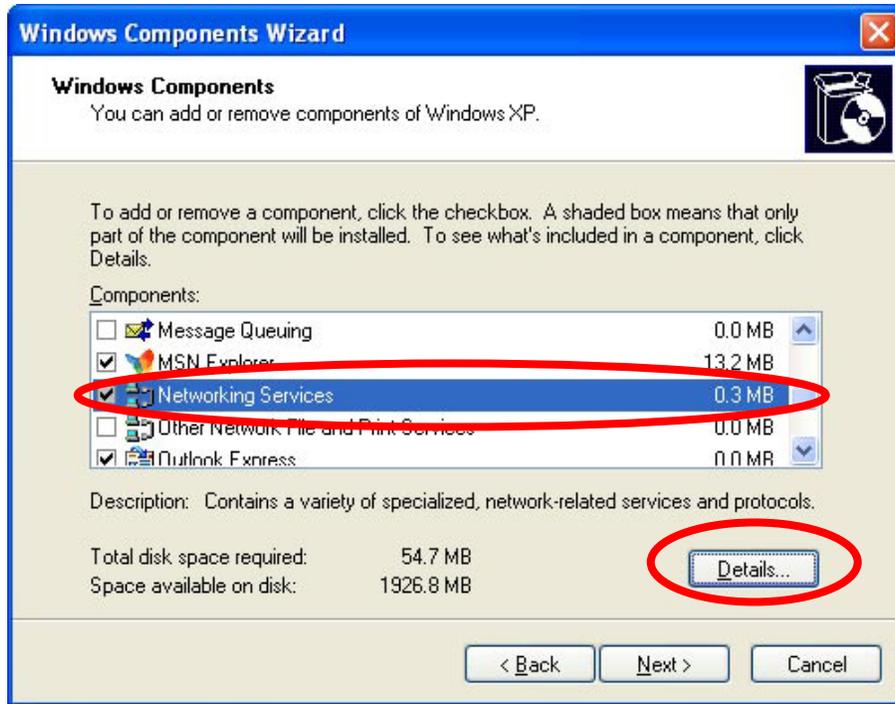


Click **Add or Remove Programs**



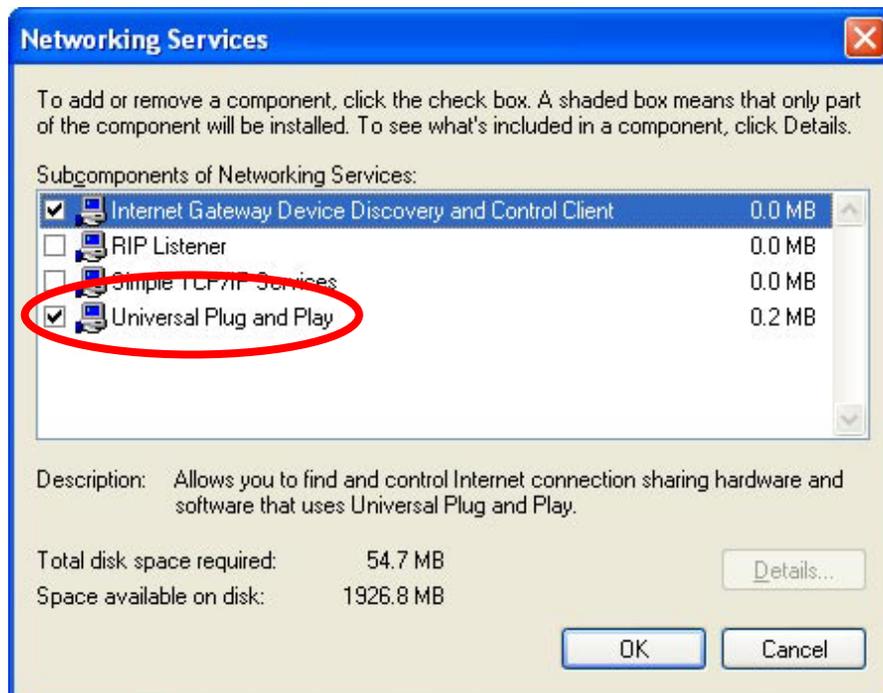
Click **Add/Remove Windows Components**

The following screen will appear:



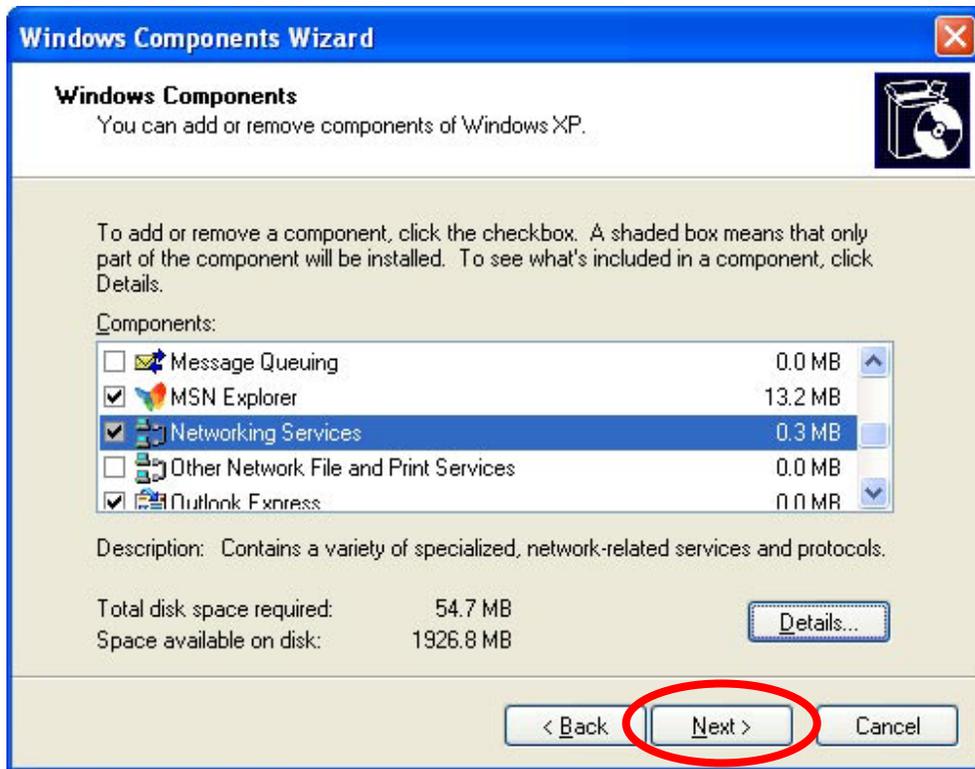
Select **Networking Services**

Click **Details**

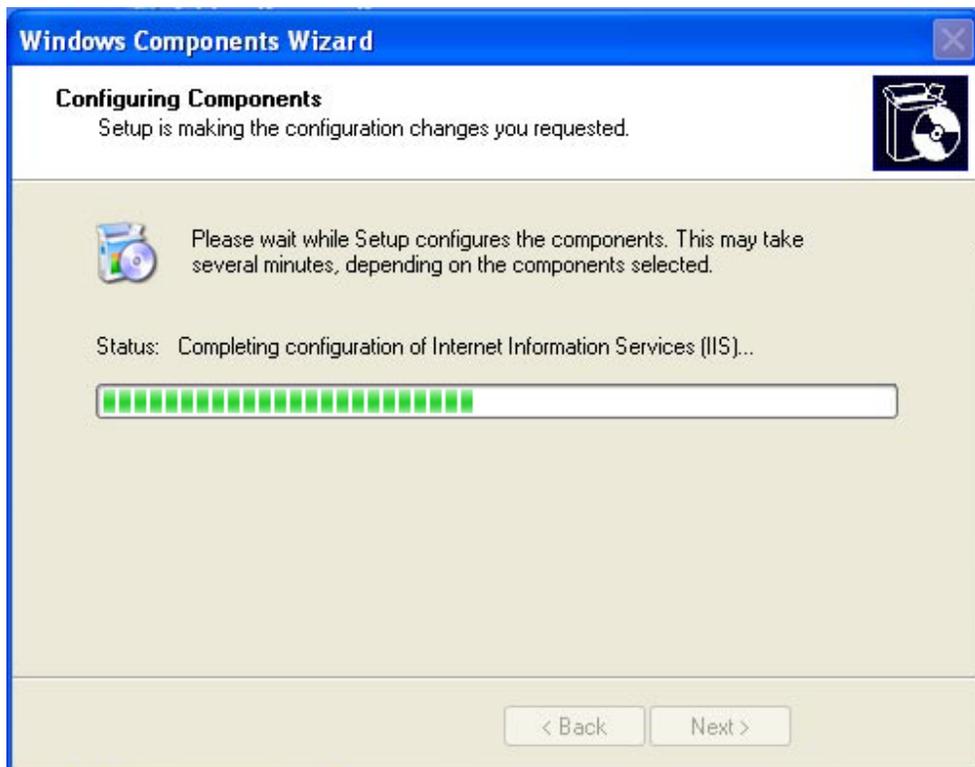


Select **Universal Plug and Play**

Click **OK**



Click **Next**



Please wait while Setup configures the components.



Click **Finish**

To view your Network Camera in an Internet browser, go to your Desktop and click **My Network Places**.

Click **My Network Places**



Click the targeted **Network Camera**

The last digits (20), represent the fourth octet of your Network Camera's IP address (in this example, 198.168.0.20).

# Install the Camera behind a NAT

## Router

The Network Camera can be used with a router. This section explains how to view the camera from either the Internet or from inside your LAN. If the Network Camera was installed on the LAN with a router, then it can get a dynamic IP address from the DHCP server. However, if the Network Camera wants to be accessed from the WAN, its IP address needs to be setup as fixed IP, also the Virtual Server function of router needs to be setup.

Installing a Network Camera with a router on your network is an easy 3–step procedure:

- (1) Assign a local IP Address to your Network Camera
- (2) Access the Router with Your Web browser
- (3) Open Virtual Server Ports for Your Router (Enable Remote Viewing)

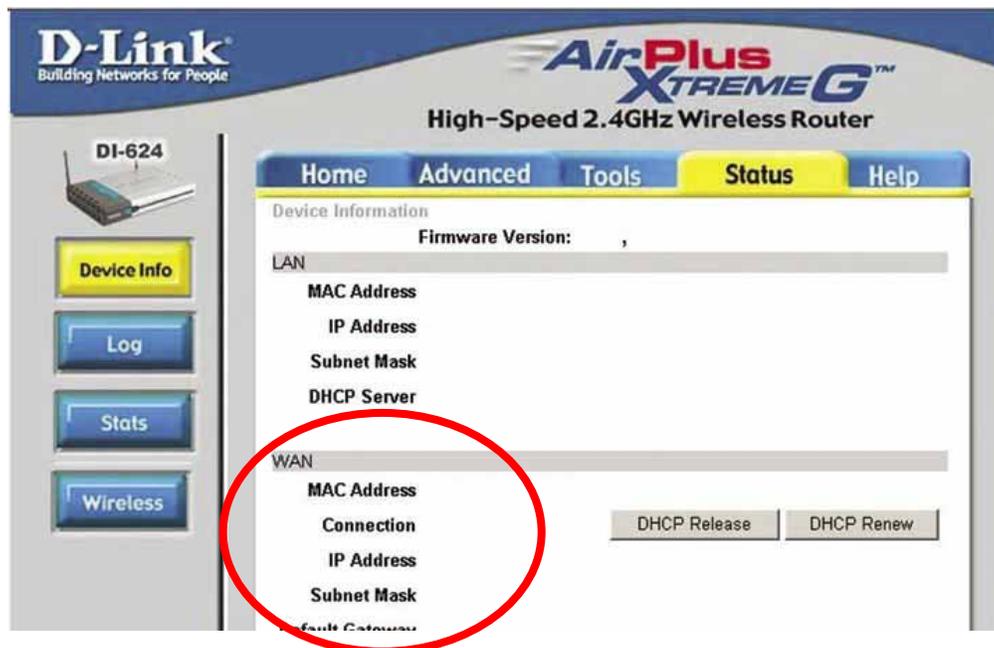
### **(1) Assign a local fixed IP address to your Network Camera**

Follow the steps in the **Quick Installation Guide** to configure the Network Camera. The camera will be assigned a local fixed IP Address that allows it to be recognized by the router. Manually setup the Network Camera as fixed IP, for example, such as *192.168.0.120*.

### **(2) Access the Router with Your Web browser**

The following steps generally apply to any router that you have on your network. The D-Link DI-624 is used as an example to clarify the configuration process. Configure the initial settings of the DI-624 by following the steps outlined in the **DI-624 Quick Installation Guide**.

If you have cable or DSL service, you will most likely have a dynamically assigned WAN IP Address. 'Dynamic' means that your router's WAN IP address can change from time to time depending on your ISP. A dynamic WAN IP Address identifies your router on the public network and allows it to access the Internet. To find out what your router's WAN IP Address is, go to the **Status** screen on your router and locate the WAN information for your router. As shown on the following page the WAN IP Address will be listed. This will be the address that you will need to type in your web browser to view your camera over the Internet. Be sure to uncheck the **Reset IP address at next boot** button at the top of the screen after modifying the IP address. Failure to do so will reset the IP address when you restart your computer.



Your WAN IP Address will be listed here.

**Note:** Because a dynamic WAN IP can change from time to time depending on your ISP, you may want to obtain a Static IP address from your ISP. A Static IP address is a fixed IP address that will not change over time and will be more convenient for you to use to access your camera from a remote location. If you could not get a Static IP address from your ISP, the DDNS is a solution alternatively. Please refer to Appendix G for more information.

### (3) Open Virtual Server Ports to enable remote image viewing

The firewall security features built into the DI-624 and most routers prevent users from accessing the video from the Network Camera over the Internet. The router connects to

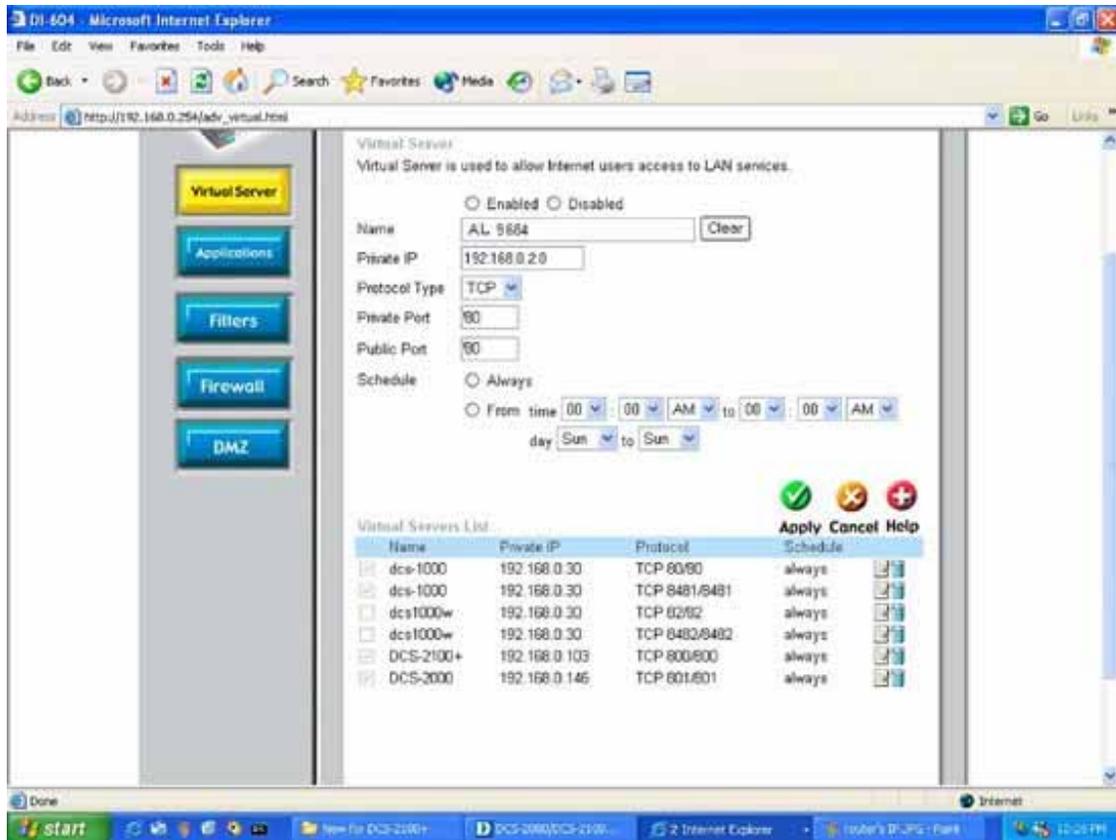
the Internet over a series of numbered ports. The ports normally used by the Network Camera are blocked from access over the Internet. Therefore, these ports need to be made accessible over the Internet. This is accomplished using the **Virtual Server** function on the router. The Virtual Server ports used by the camera must be opened through the router for remote access to your camera. Virtual Server is accessed by clicking on the **Advanced** tab of the router screen.

Follow these steps to configure your router's Virtual Server settings

- Click **Enabled**.
- Enter a unique name for each entry.
- Select **Both** under **Protocol Type (TCP and UDP)**
- Enter your camera's local IP Address (e.g., **192.168.0.20**, for example) in the **Private IP** field.
- If you are using the default camera port settings, enter **80** into the **Public** and **Private Port** section, click **Apply**.
- **Scheduling** should be set to **Always** so that the camera images can be accessed at any time.

A check mark appearing before the entry name will indicate that the ports are enabled.

**Important:** Some ISPs block access to port 80. Be sure to check with your ISP so that you can open the appropriate ports accordingly. Some ISPs block traffic on commonly used ports to conserve bandwidth. If your ISP does not pass traffic on port 80, you will need to change the port the camera uses from 80 to something else, such as 8080. Not all routers are the same, so refer to your user manual for specific instructions on how to open ports.



Enter valid ports in the **Virtual Server** section of your router

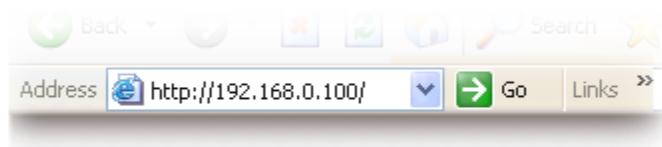
Please make sure to check the box on this line to enable settings

Then the Network Camera can be access from WAN by the router's WAN IP Address.

By now, you have finished your entire PC configuration for Network Camera.

# Access the Network Camera from the Internet Explorer for the first time

1. Start the web browser on the computer and type the IP address of the Network Camera you want to monitor as below:



The Login Window of the Network Camera is displayed:



2. Type in your login name and password under "USERNAME" and "PASSWORD" textbox.

For the first time use (default value), input the

User Name: **admin**

Password: **admin**

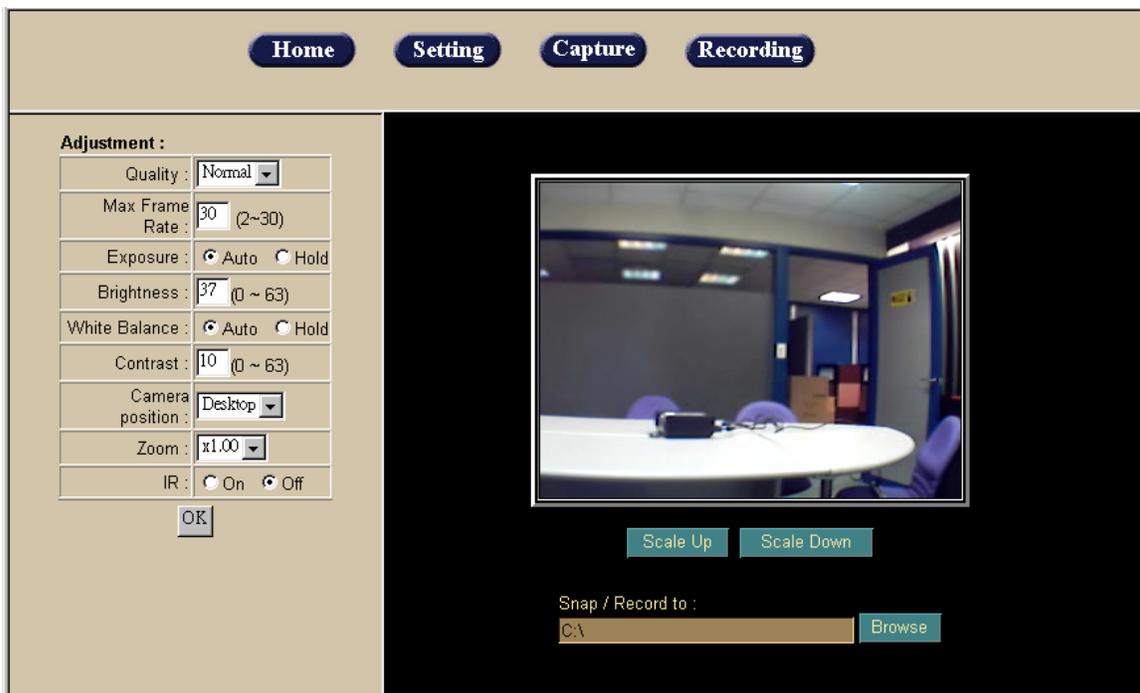
That's, type in "admin" on the "User Name" as a default name and "admin" on "Password". Click "OK" button to start the main menu.

Now, you login to the Network Camera as a full-authorized administrator. You can enter "Setting" to change the password and setup "Administrator" or "User" authority. Please refer to "Setting" → "User"

**3.** If it's the first time to access CMOS IR Network Camera, the IE web page will display the "Security Warning" window, select "Yes" to install and run the ActiveX control into your PC by following instructions.

The Network Camera web page communicates with the Network Camera using an ActiveX control. The ActiveX control component must be installed on your PC in advance. Otherwise, the IE web page can not display live video.

**4.** The video will be displayed.



## Logging in as a User

There are two levels of privilege, "view" and "config", if you log in the Network Camera as a user.

The first one is a user with "view" privilege. The "view" user can only view the video and or audio streaming. Can not do anything else.

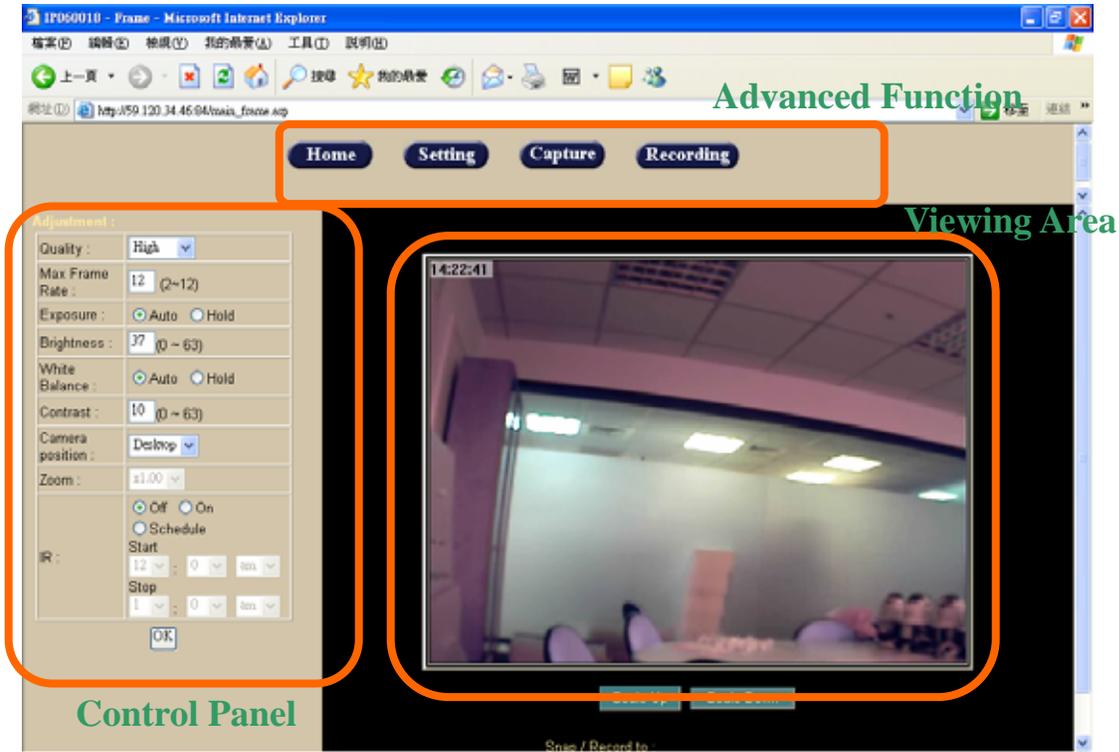
The second one is a user with "config" privilege. The "config" user can view the video and or audio streaming. Also user can change the settings in the "Home" and "Setting" pages except "user" and "Factory Default" options. Furthermore, "Capture" and "Recording" will be not available.

## **Logging in as an Administrator**

If you log in the Network Camera as the Administrator, you can perform all the settings provided within the software. The Administrator may be logged in at any time, regardless of the number of the users being accessed.

# Operating the Network Camera

Start-up screen will be as follow no matter an ordinary users or an administrator.



**Viewing Area:** Images from the Network Camera

**Scale UP:** Click this button to scale up the image on the screen

**Scale Down:** Click this button to scale down the image on the screen

**Snap / Record to:** Enter the path to save the image or files.

# Control Panel

**Control Panel Area:** Network Camera Manipulation and picture quality control

**Adjustment :**

|                   |  |
|-------------------|--|
| Quality :         | High ▾   |
| Max Frame Rate :  | 30 (2~30)  |
| Exposure :        | <input checked="" type="radio"/> Auto <input type="radio"/> Hold |
| Brightness :      | 37 (0 ~ 63)  |
| White Balance :   | <input checked="" type="radio"/> Auto <input type="radio"/> Hold |
| Contrast :        | 10 (0 ~ 63)  |
| Camera position : | Desktop ▾  |
| Zoom :            | x1.00 ▾  |
| IR :              | <input checked="" type="radio"/> On <input type="radio"/> Off    |

OK

| Item | Button         | Meaning  |
|------|----------------|--|
| 1    | Quality        | Adjust video quality.<br>High: Video is better but frame rate may be slower<br>Low: Video is poor but frame rate may be higher<br>Normal: System default value |
| 2    | Max Frame Rate | Adjust the frame rate of video stream  |

|   |                 |  |
|---|-----------------|--|
| 3 | Exposure        | Choose auto or fixed exposure of camera  |
| 4 | Brightness      | Adjust picture brightness of camera  |
| 5 | White Balance   | Choose auto or fixed white balance of camera   |
| 6 | Contrast        | Adjust picture contrast of camera  |
| 7 | Camera position | <ul style="list-style-type: none"> <li>- Desktop</li> <li>- Ceiling</li> <li>- Mirror</li> </ul> |
| 8 | Zoom            | Adjust ratio of digital zoom in  |
| 9 | IR              | Turn on, off or schedule the built-in IR LEDS  |

**Note:** Select "OK" to save and activate the setting.

# Advanced Function Area

**Advanced function area:** only available for administrator. It has contained four categories.

- Home      The home page of the Network Camera.
- Setting    System Configuration
- Capture    Capture current screen and save to HDD or other media
- Recording   Record current video stream and save to HDD or other media

Setting menu consists of some sub-menu. Click on each menu to display its setting page.

## Setting

| Setting   |                  |   |
|---|------------------|---|
| Symbol  | Item             | Action  |
|  | System           | Define camera name. Set time and date of the Network Camera. Enable/disable NTP function. System power on notification. |
|  | Network          | Configure Network setting such as DHCP On/Off, DDNS and UPnP.   |
|  | Video/Audio      | Adjust camera parameters and video / audio settings.  |
|  | User             | Setup user name, password and login privilege   |
|  | Motion Detection | Setup motion detection and triggered SMTP and/or FTP accounts.  |

|   |                 |  |
|---|-----------------|--|
|  | Status          | System information, status, and log.                 |
|  | Factory Default | Recall the Network Camera to factory default setting |
|  | Restart         | Reboot this device                                   |
|  | Upgrade         | Firmware upgrade                                     |



**System:** Define system parameters, NTP, and notification

**System Settings :**

|               |                               |
|---------------|-------------------------------|
| Device Name : | AV060007                      |
| Description : | IR_IP_Camera                  |
| Time :        | 2 : 6 pm                      |
| Date :        | Jun 17, 2006 (mth, day, year) |
| Timezone :    | (GMT+08:00) Taipei            |

**NTP :**

|                   |   |
|-------------------|---|
| Time Server :     | <input type="radio"/> Enable <input checked="" type="radio"/> Disable |
| Server Address :  |   |
| Update Schedule : | Every at 12 : 0   |

**IP Address Notification :**

Notify by E-Mail

|                        |   |
|------------------------|---|
| E-Mail To :            |   |
| From :                 |   |
| Subject :              | IP Address Change Notification  |
| Outbound SMTP Server : | <input checked="" type="checkbox"/> Need Authentication<br>Username: <input type="text"/><br>Password: <input type="text"/> |

OK Cancel

**System Settings:**

**- Device Name:**

It's a unique number for each Network Camera for identification.

**- Description:**

You can enter the name of this unit here. It's very useful to identify the specific device from multiple units. Note that use “\_” or “-“ to replace “space” character to separate the name string. For example, “IP\_CAM” or “IP-CAM” will be ok but “PT IP” will not work here.

You can setup the Network Camera time manually or make it synchronized with remote server. Also, you may select your time zone in order to synchronize time locally.

**- Time:**

Change the time according to the "hh:mm" and by 12 hours format.

**- Date:**

Change the date according to the "mm/dd/yyyy" format

**- Time zone:**

Select the time zone setting accordingly.

**NTP:**

**- Time Server:**

Choose "enable" will get the time for NTP server periodically.

**- Server Address:**

Key in the IP address of NTP server.

**- Update Schedule:**

Choose the update schedule with NTP server by daily, weekly, or monthly.

**IP Address Notification:**

**- Notify by E-Mail:**

If enable this option, then when Network Camera connected to Internet, a mail that contains related information will be mailed to preset e-Mail address.

**- E-Mail To:**

E-Mail address of the destination.

**- From:**

E-Mail address of the source, this Network Camera.

**- Subject:**

It's a unique number for each Network Camera for identification.

**- Outbound SMTP Server:**

The address of SMTP server.

Select "OK" to save and enable the setting.



**Network:** Configure Network setting such as DHCP On/Off, DDNS and UPnP

|   |   |     |     |     |
|---|---|-----|-----|-----|
| IP Setting :  |   |     |     |     |
| DHCP :  | <input checked="" type="radio"/> On <input type="radio"/> Off         |     |     |     |
| IP Address :  | 192   | 168 | 3   | 14  |
| Subnet Mask:  | 255   | 255 | 255 | 0   |
| Gateway:  | 192   | 168 | 3   | 254 |
| DNS Server:   | 0   | 0   | 0   | 0   |
| Secondary DNS Server:   | 0   | 0   | 0   | 0   |
| DDNS :  |   |     |     |     |
| DDNS :  | <input checked="" type="radio"/> Enable <input type="radio"/> Disable |     |     |     |
| Service Provider :  | www.dynip.com   |     |     |     |
| Host Name :   |   |     |     |     |
| Account :   |   |     |     |     |
| Password :  |   |     |     |     |
| UPnP :  |   |     |     |     |
| UPnP :  | <input checked="" type="radio"/> Enable <input type="radio"/> Disable |     |     |     |
| Option :  |   |     |     |     |
| HTTP Aux. Port Number :   | 80  |     |     |     |
| <input type="button" value="OK"/> <input type="button" value="Cancel"/> |   |     |     |     |

**IP Setting:**

- **DHCP:** DHCP: Stands for Dynamic Host Configuration Protocol.

The Network Camera will be assigned an IP address and related information by DHCP server while “*DHCP ON*”. Otherwise, user needs to specify IP address and related information to the Network Camera manually.

- **IP address, Subnet mask, Default gateway, Primary DNS, Secondary DNS:**

If turns DHCP off, then user should enter these network parameters by

manual.

**Note:** Network Camera will reboot automatically make this setting to take effect.

**DDNS:** Stands for Dynamic Domain Name Server

The Network Camera supports DDNS. DDNS allows the Network Camera to use an easier way to remember naming format rather than an IP address. The name of the domain is like the name of a person, and the IP address is like his phone number. On the Internet we have IP numbers for each host (computer, server, router, and so on), and we replace these IP numbers to easy remember names, which are organized into the domain name. As to ADSL environment, most of the users will use dynamic IP addresses. If users want to set up a web or a FTP server, then the Dynamic Domain Name Server is necessary. For more DDNS configuration, please consult your local dealer.

Your Internet Service Provider (ISP) provides you at least one IP address which you use to connect to the Internet. The address you get may be static, meaning it never changes, or dynamic, meaning it's likely to change periodically. Just how often it changes, depends on your ISP. A dynamic IP address complicates remote access since you may not know what your current WAN IP address is when you want to access your network over the Internet. The solution to the dynamic IP address problem comes in the form of a dynamic DNS service.

The Internet uses DNS servers to lookup domain names and translates them into IP addresses. Domain names are just easy to remember aliases for IP addresses. A dynamic DNS service is unique because it provides a means of updating your IP address so that your listing will remain current when your IP address changes. There are several excellent DDNS services available on the Internet and best of all they're free to use. One of the services you can use is [www.DynDNS.org](http://www.DynDNS.org). You'll need to register with the service and set up the domain name of your choice to begin using it. Please refer to the home page of the service for detailed instructions or refer to Appendix G for more information.

**- DDNS:**

To enable or disable the DDNS service here.

**- Service Provider:**

Choose the built-in DDNS server.

**- Host Name:**

The domain name is applied of this Network Camera.

**- Account:**

The account is used to log into DDNS.

**- Password:**

The password is used to log into DDNS.

**UPnP:**

UPnP is short for Universal Plug and Play, which is a networking architecture that provides compatibility among networking equipment, software, and peripherals. This device is a UPnP enabled Network Camera. If your operating system is UPnP enabled, the device will be easier to configure. If you do not want to use the UPnP functionality, it can be disabled by clicking “Disable” option.

**HTTP Port:**

The Network Camera supports two HTTP ports. The first one is default port 80 and this is one is fixed. This port is very useful for Intranet usage. The other HTTP port is setting able. Users could assign the port number of http protocol, and the WAN users should follow the port number to login. If the http port is not assigned as 80, users have to add the port number in back of IP address. For example: <http://192.168.0.20:8080>.

**Wireless Setting:**

If your Network Camera is built-in WLAN module, you could assign the related parameter into Wireless Setting as below:

| Wireless Setting :  |                |
|---|----------------|
| Mode :  | Infrastructure |
| Authentication Type :   | Open System    |
| SSID :  | Any            |
| Domain :  | FCC            |
| Channel No :  |                |
| WEP :   |                |
| WEP Encryption :  | None           |
| Default Key   | Key Value      |
| <input type="radio"/> Key 1:  |                |
| <input type="radio"/> Key 2:  |                |
| <input type="radio"/> Key 3:  |                |
| <input type="radio"/> Key 4:  |                |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> <input type="button" value="Clear"/> |                |

**- Mode:**

To select one of WLAN modes from Infrastructure, AdHoc, or Access Point.

**- Authentication Type:**

To select one of Authentication Type from Open System or Shared Key.

**- SSID:**

The name of Access Point is connected to this Network Camera. The default value is “Any”

- **Domain:**  
Frequency domain based on different country/area.
- **Channel No:**  
Frequency channel of WLAN.
- **WEP:**  
64bit or 128bit is available.
- **WEP Encryption:**  
To choose 64bit or 128bit key.
- **Default Key (password of Access Point):**  
Key value for WEP.

Select "Apply" to save and enable the setting.

**Note:** To enable WLAN function, user must set these related parameters correctly at first. Then power off the Network Camera and remove Ethernet cable from Network Camera. Power on the Network Camera again and WLAN mode should be available accordingly.



## Video/Audio: Adjust Camera parameters

| Video Settings :       |  |
|------------------------|--|
| Resolution :           | 320*240  |
| Power line frequency : | 60Hz   |
| Quality :              | <input type="radio"/> by bit rate control<br>1024 K bps (32 ~ 1024)<br><input checked="" type="radio"/> by compress ratio<br>Normal  |
| Video Output :         | NTSC   |
| Message Display :      | <input type="checkbox"/> Date<br><input type="checkbox"/> Time<br><input type="checkbox"/> Text :<br><input checked="" type="radio"/> IP Address<br><input type="radio"/> Device Name<br><input type="radio"/> Description |
| Video Type :           | MPEG 4   |
| Audio :                | Disable  |
| Video Enable :         | <input checked="" type="checkbox"/> Yes  |
| IR :                   | <input checked="" type="radio"/> Off <input type="radio"/> On <input type="radio"/> Schedule<br>Start : [ ] : [ ] : [ ]<br>Stop : [ ] : [ ] : [ ]  |

### Video / Audio Setting:

#### - Resolution:

The Network Camera supports 3 kind resolutions:

- 160x120
- 320x240
- 640x480

#### - Power line frequency:

User should choose either 50 or 60 Hz to meet the power line frequency in your country.

**Note:** If you found the video image is flash, you may need to choose correct frequency. World wide frequency table is in Appendix H.

#### - Quality:

There are two modes of video quality. User can adjust the video quality by either bit-rate control or compression ratio:

- Bit-rate control: from 32kbps to 1024kbps
- Compression ratio:
  - High: Video is better but frame rate may be slower
  - Low: Video is poor but frame rate may be higher
  - Normal: System default value.

**- Video Output:**

This function is for Video Server only. It's no function here.

**- Message Display:**

Select information such as Data, Time, and/or Text to be shown overlay on live video.

**- Video Type:**

The Network Camera supports two kind of video compression mode: MPEG4 or JPEG. User can choose one of the two compression mode based on requirement or application.

**- Audio:**

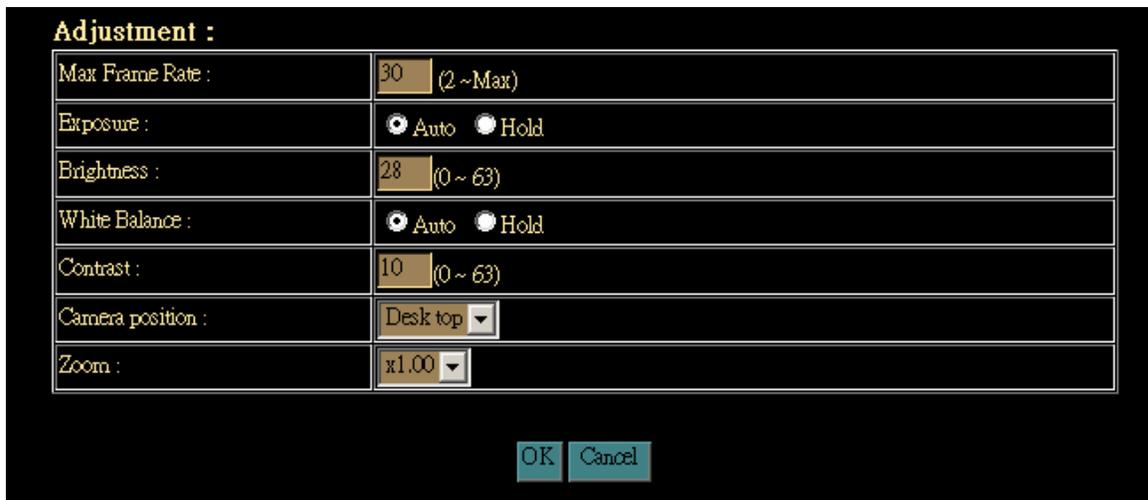
The Network Camera supports ADPCM for audio compression. User can enable or disable this audio streaming.

**- Video Enable:**

Enable this option will allow stream video to remote clients. Otherwise, the Network Camera will not stream video out.

**- IR:**

User can turn on, off or scheduling the built-in IR LED. This function is very useful under low illumination environment.



**Adjustment:**

**- Max Frame Rate:**

User can set the desired max frame rate to match the limitation of bandwidth or other requirement.

**- Exposure:**

Auto: will adjust the internal gain automatically.  
Hold: will fix the internal gain.

**- Brightness:**

Large value will brighten Camera.

**- White Balance:**

Auto: will adjust the white balance automatically.  
Hold: will fix the white balance.

**- Contrast:**

Large value will contrast Camera heavily.

**- Sharpness:**

There are three options: Soft Edge, Strong Edge, and Normal Edge.

**- Camera Position:**

There are three options: Desktop, Ceiling and Mirror.

**- Zoom:**

The Camera supports smoothly digital zoom in function. The ratio of digital zoom is varying based on video resolution:

- 100%~400% for QQVGA resolution
- 100%~200% for QVGA resolution
- 100% (no zoom in) for QVGA resolution

Select "OK" to save and enable the setting.



## User: Setup user name, password and login privilege

Admin Login :

|                    |       |
|--------------------|-------|
| Administrator ID : | admin |
| Password :         | ***** |
| Verify Password :  | ***** |

User Database :

|  |                     |        |
|--|---------------------|--------|
|  | Add / Modify User : |        |
|  | User Name :         |        |
|  | User Password :     |        |
|  | Verify Password :   |        |
|  | Privilege :         | View ▾ |

There are 3 levels of privilege supported in the Network Camera:

- Admin: This account can do anything in the Network Camera.
- User Config: This account can set some parameters of Network Camera.
- User View: This account can only view the video stream from the Network Camera.

User only can change or modify the username and password of "Administrator".

You also can set up usernames and passwords for users. The privilege of each user can be "config" or "view".

Select "OK" to save and enable the setting.



## Motion Detection: Setup motion detection and sensor sensitivity

The motion detection is implemented by a patented software algorithm, it runs on the Network Camera, due to a larger processing power of motion detection, the overall performance of Network Camera will be degraded; the frame rate may be reduced.

**Note:** The motion detection is available only for MPEG4 mode. JPEG mode is not supported yet.

|   |   |
|---|---|
| <b>Alerts :</b> <input type="checkbox"/> Enable |   |
| Detect Method :                                 | <input checked="" type="checkbox"/> Movement on image    Sensitivity : <input type="text" value="Normal"/>  |
| Video Record :                                  | <input checked="" type="radio"/> No, e-mail notify only<br><input type="radio"/> Yes, and send recordings by :<br><input checked="" type="radio"/> E-mail<br><input type="radio"/> FTP <input type="checkbox"/> with e-mail notify<br><input type="radio"/> Yes, and send snaps by :<br><input checked="" type="radio"/> E-mail<br><input type="radio"/> FTP <input type="checkbox"/> with e-mail notify<br>snap resolution : <input type="text" value="320*240"/><br>number of snaps : <input type="text" value="5"/> (1~30)<br>gap between snaps : <input type="text" value="800"/> milli-seconds (70~5000) |
| <b>Recording :</b>                              |   |
| Pre-record time :                               | <input type="text" value="0"/> second(s)  |
| Record time :                                   | <input type="text" value="15"/> second(s)   |
| Gap to next detect :                            | <input type="text" value="15"/> second(s)   |
| <b>E-mail :</b>                                 |   |
| E-Mail To :                                     | <input type="text"/>  |
| From :  | <input type="text"/>  |
| Subject :                                       | <input type="text"/>  |
| Outbound SMTP Server :                          | <input checked="" type="checkbox"/> Need Authentication<br>Username: <input type="text"/><br>Password: <input type="text"/>   |

The screenshot shows a dark-themed dialog box titled "FTP :". It contains three input fields stacked vertically: "FTP Server :", "Login Name :", and "Password :". Each field has a light-colored rectangular input area. At the bottom center of the dialog, there are two buttons: "OK" and "Cancel".

You can enable or disable motion detection function. If you enable motion detection, you can also setup detection sensitivity from one of five sensitivity levels.

When alarm was enabled, user can send the captured images to the pre-set E-Mail or FTP server.

**Alert:**

**- Enable:**

You can enable or disable motion detection function.

**- Detect Method:**

If you enable motion detection, you can also setup detection sensitivity from one of five sensitivity levels.

**- Video Record:**

While alerted, the Network Camera can send out the recorded file and images to pre-defined e-Mail or FTP.

**Recording:**

**- Pre-record time:**

The Network Camera can record the video for seconds before alerted. This function is very useful to know the situation before event happened.

**- Record time:**

You can choose the duration of the record file.

**- Gap to next detect:**

You can choose the gap between two events.

**E-mail:**

**- E-Mail To:**

E-Mail address of the destination.

**- From:**

E-Mail address of the source, this Network Camera.

**- Subject:**

It's a unique number for each Network Camera for identification.

**- Outbound SMTP Server:**

The address of SMTP server.

**FTP:**

**- FTP Server:**

Type the FTP server name or the IP address of the FTP server to upload still images and video file (video file in only in MPEG4 mode).

**- Login Name:**

Type the user name for the FTP server.

**- Password:**

Type the password for the FTP server.

Select "OK" to save and enable the setting.



**Status:** System information, status and log

Status :

|                   |   |
|-------------------|---|
| Device Name :     | AV030405                                      |
| Description :     | IPCam5  |
| MAC Address :     | 00:01:02:03:04:05                             |
| IP Address :      | 192.168.3.14                                  |
| Network Mask :    | 255.255.255.0                                 |
| Gateway :         | 192.168.3.254                                 |
| F/W version :     | V1.13 U0.4                                    |
| Built Date :      | Jan 4 2006 / 21:26:44                         |
| Startup Date :    | Tue Sep 17 02:35:16 2002                      |
| Current Viewers : | 0 (Max. 4 view connections at the same time.) |

System Log :

```
09/17/2002 07:26:07 [192.168.5.253] View Stop
09/17/2002 07:26:05 [192.168.5.253] View Start
09/17/2002 07:25:10 [192.168.5.253] View Stop
09/17/2002 07:18:00 [192.168.5.253] View Start
09/17/2002 07:17:34 [192.168.5.253] View Stop
09/17/2002 07:16:37 [192.168.5.253] View Start
09/17/2002 07:16:07 [192.168.5.253] View Stop
09/17/2002 07:16:04 [192.168.5.253] View Start
09/17/2002 07:15:55 [192.168.5.253] View Stop
09/17/2002 07:14:09 [192.168.5.253] View Start
```

**Status:**

User can find out a lot of information about the system such as MAC address, IP address, firmware version, and so on. User also can get the number of current viewer of the Network Camera here.

**System Log:**

User can check the log information of the Network Camera.



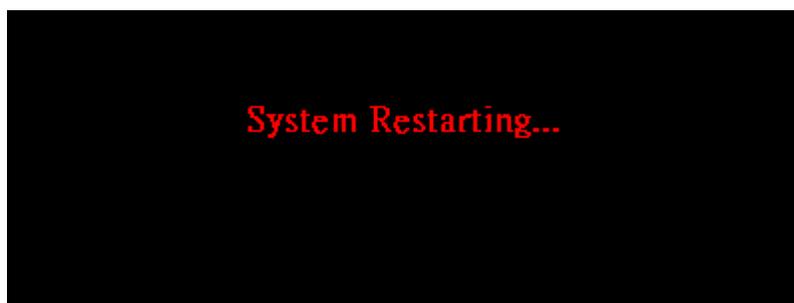
**Factory Default:** Recall the Network Camera factory default setting



The "*Factory Default*" button will restore to the factory default configuration, all information changed and saved on the flash will be lost, and restore to the factory default setting.

You will be prompt before restore to factory default setting.

Select "*Factory Default*" to continue.



The Network Camera will restore to factory default and reboot again. The Network

Camera be connectable again after 20~30 seconds. **Note** that the IP address of this Network Camera will restore to default value: 192.168.0.20.



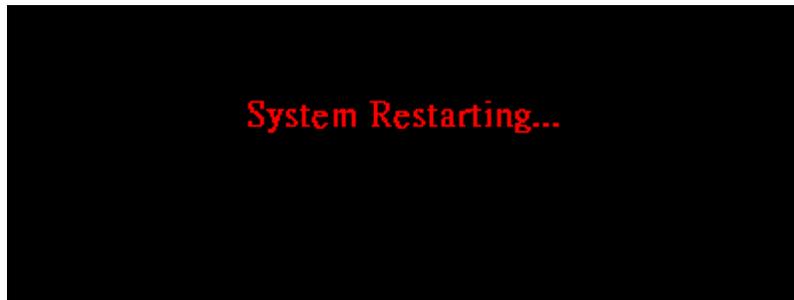
**Restart:** Reboot the Network Camera by hardware reset



The “*Reboot*” button will reboot the Network Camera. It's useful while the Network Camera got problem.

You will be prompt before restart the Network Camera.

Select “*Restart*” to continue.



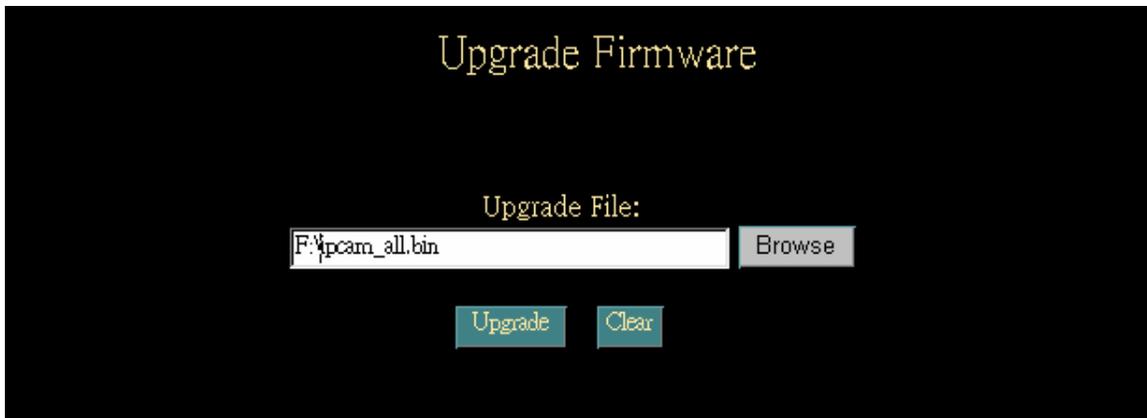
The Network Camera will reboot and be connectable again after 20~30 seconds.



## Upgrade:

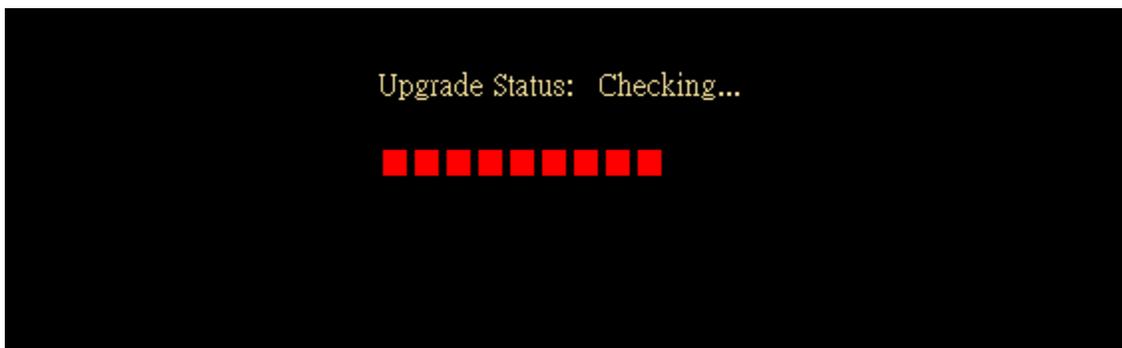
The Network Camera supports firmware upgrades online. Please contact your dealer for the latest firmware version. Unzip this firmware file to binary file and store it into your PC. Then follow the steps as bellows carefully:

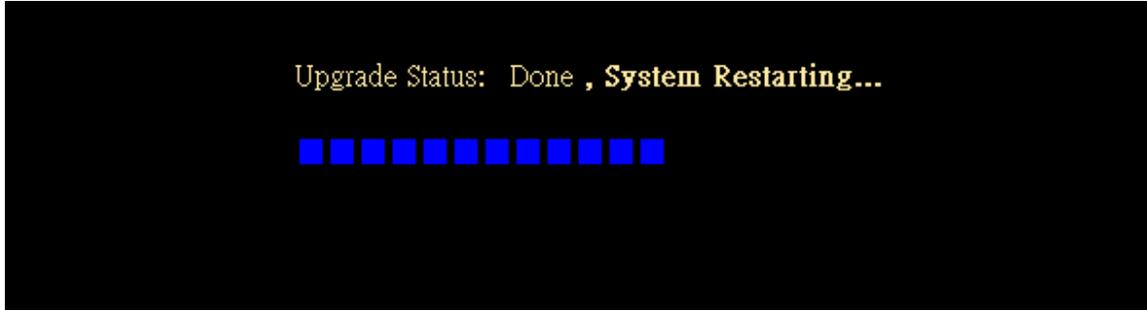
1. Close all other application programs which are not necessary for firmware update.
2. Disable "Motion Detection" function.
3. De-select "Video Enable" option.
4. Select "Upgrade"
5. Link to the Firmware Upgrade menu as below:



6. Select the Firmware binary file. (It must be make sure that the Firmware only apply to the Network Camera, once update, it will be burned into FLASH ROM of system.)

7. Once the firmware file has been selected, select "Upgrade" button to start it.





The upgrade progress status information will be displayed on the screen.

**Warning:** The download firmware procedure can not be interrupted. If the power and/or network connection are broken during the download procedure, it might possibly cause serious damage to the Network Camera. Suggest that do not upgrade firmware via Wireless LAN due to high error rate possibly.

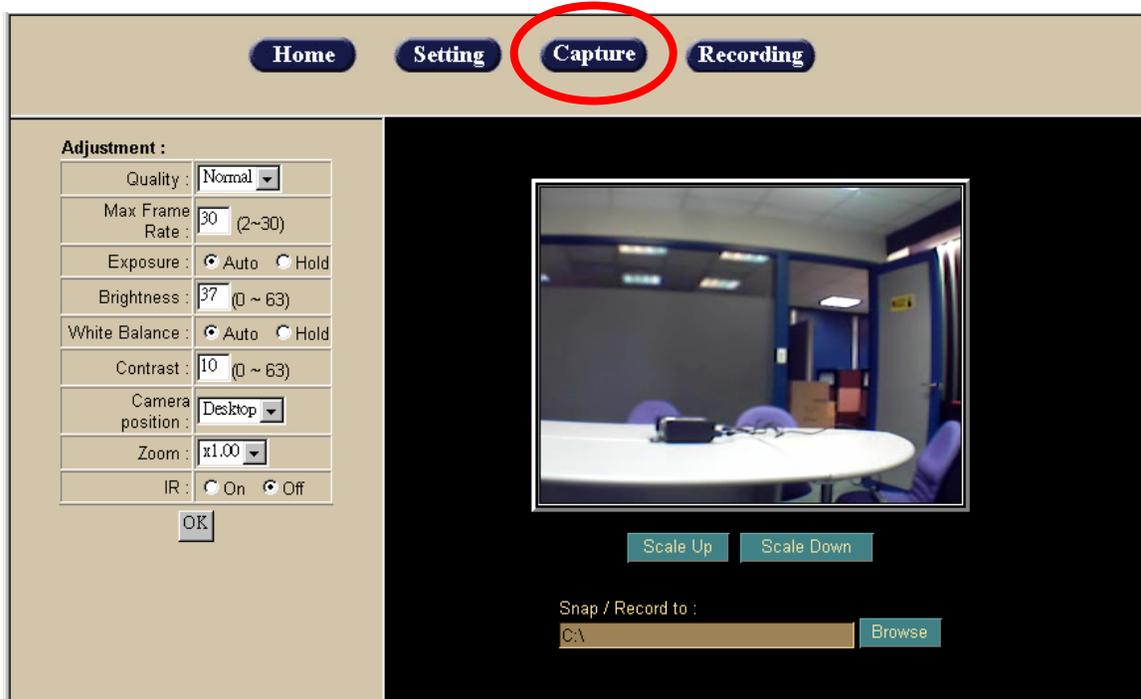
Please be aware that you should not turn off the power during updating the firmware and wait for finish message.

Once the upgrading process completed, the Network Camera will reboot the system automatically.

**Note:** please wait for 20~30 seconds, and then you can connect to Network Camera again.

# Capture

You can capture current image and save it to storage media. The image is saved in the Bitmap format. Click the "Capture" button to save the current display image into the local PC



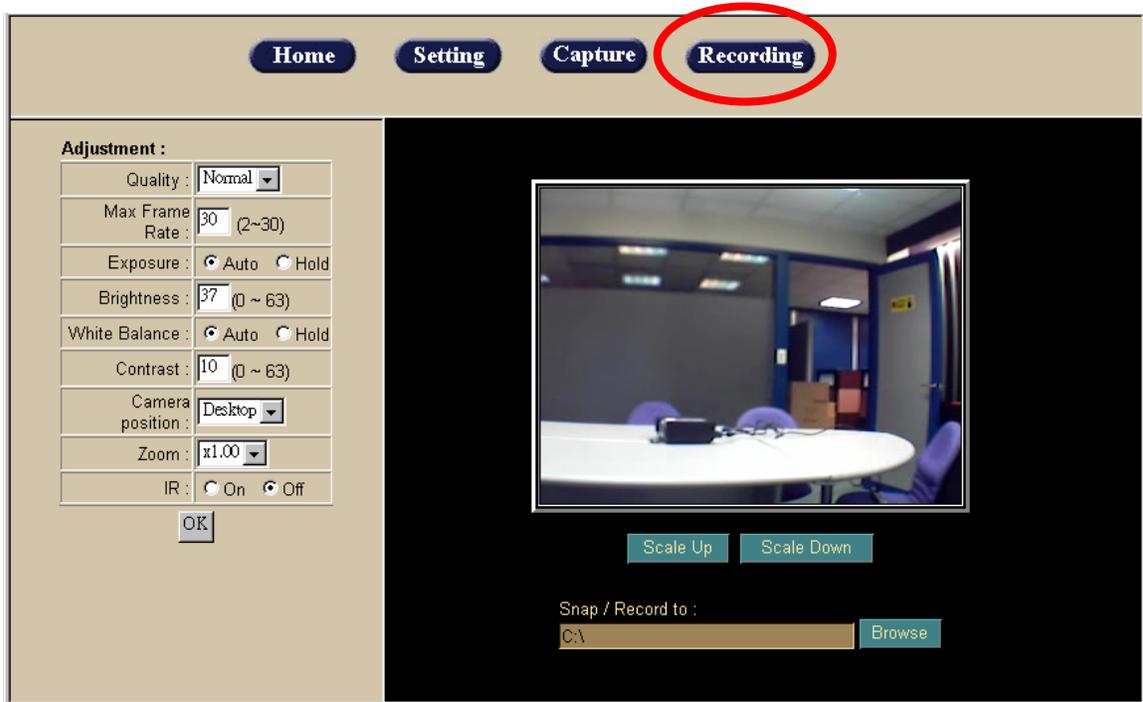
If you like to retrieve the saved image, select the file to display it by using any one of graph editing tools.

**Note:**  
**This function is available for logging-in as an administrator only.**

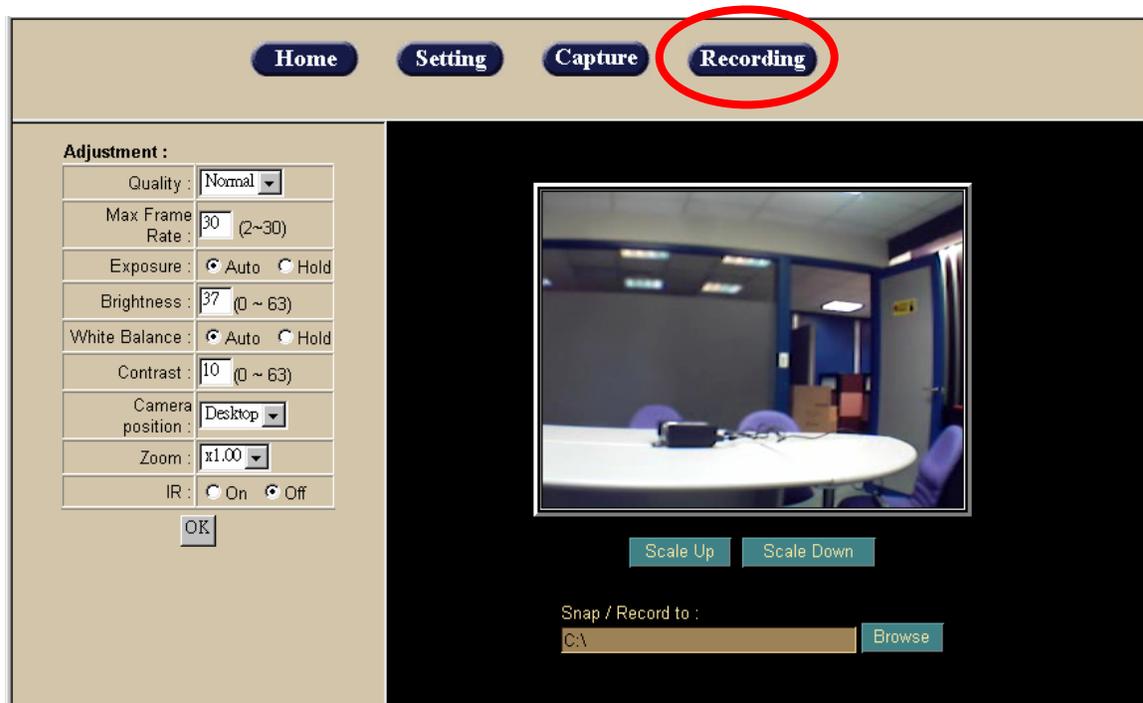
# Recording

You can record the current video stream to storage media. The recorded file is saved in the ASF format.

Press the “Recording” button to start video recording.



Press the “Stop Recording” button to stop video recording.



After the “*Stop Recording*”, list the file on the selected saved directory, the file were saved in ASF format.

The ASF files can be display by the standard Windows Media Player, but it needs the DixectX 9.0 or higher version to be installed.

**Note:**

**This function is available for logging-in as an administrator only.**

# Appendix A: Restore Factory Default Settings

There is a switch hidden in the pinhole under the bottom of Network Camera. It is used to restore the factory default settings. While the Network Camera got problem, sometimes, restarting the Network Camera will make the system back to a normal state. In case the system still got problems after reset, user can restore the factory default settings and install it again.

## Restore the Network Camera:

1. Power off the Network Camera.
2. Insert the paper clip or other tool and press and hold the button down continuously.
3. Power on the Network Camera again.
4. Wait at least 10 seconds and release the tool. Then the Network Camera has been restored to default settings.
5. Reconfigure the Network Camera



**Factory  
Default Reset**

**Note:** Restoring the factory default setting will lose the all previous settings forever. User needs to run the IP Finder program to search the Network Camera and configure it to let the Network Camera work properly again.

# Appendix B: Troubleshooting & Frequently Asked Questions

| Question   | Answer or Resolution   |
|--|--|
| <b>Features</b>  |  |
| The video and audio codec is adopted in the Network Camera.                        | The Network Camera utilizes MPEG4 and JPEG dual compression to providing high quality images. MPEG4 is a standard for video compression and JPEG is a standard for image compression.<br>The audio codec is ADPCM compression.   |
| The maximum number of users access Network Camera simultaneously.                  | The maximum number of users is 4 clients for video streaming.  |
| The Network Camera can be used outdoors or not.                                    | This Network Camera is not weatherproof. It needs to be equipped with a weatherproof case for outdoors using. However, equipped with a weatherproof case might disable the audio function of Network Camera.   |
| <b>Install Network Camera</b>  |  |
| Status LED does not light up.  | <ul style="list-style-type: none"> <li>• Check and confirm that the standard AC adaptor, included in packaged, is used. Secure the power connector and re power it on again.</li> <li>• If the problem is not solved, the Network Camera might be faulty. Contact your dealer for further help.</li> </ul> |
| The network cabling is required for the Network Camera.                            | The Network Camera uses Category 5 UTP cable allowing 10 and/or 100 Base-T networking.   |
| The Network Camera will be installed and work if a firewall exists on the network. | If a firewall exists on the network, port 80 is open for ordinary data communication. The Network Camera uses port 80(default) only. This port (or the port you specify from the Configuration screen if you change the default port) needs to be opened on the firewall.                                  |
| The username and password for the first time or after factory default reset        | Username = <b>admin</b> and Password = <b>admin</b> .<br>Note that it's all case sensitivity.  |
| Forgot the username and password   | Follow the steps below. <ol style="list-style-type: none"> <li>1. Restore the factory default setting by press pressing and holding down more than 10 seconds when power on Network Camera.</li> <li>2. Reconfigure the Network Camera.</li> </ol>   |
| Forgot the IP address of the Network Camera.                                       | Check IP address of Network Camera by using the MP4 IP Finder.exe program.   |

MP4 IP Finder.exe program cannot find Network Camera.

- Re power the Network Camera if cannot find the unit within 1 minutes.
- Do not connect Network Camera over a router. MP4 IP Finder.exe program cannot detect Network Camera over a router.
- If IP address is not assigned to the PC which running MP4 IP Finder.exe program, then the program cannot find Network Camera. Make sure that IP address is assigned to the PC properly.
- Antivirus software on the PC might interfere with the setup program. Disable the firewall of the antivirus software during setting up Network Camera.

Internet Explorer does not seem to work well with the Network Camera

Make sure that your Internet Explorer is version 5.5 or later. If you are experiencing problems, try upgrading to the latest version of Microsoft's Internet Explorer from the Microsoft webpage at: <http://www.microsoft.com/windows/ie>.

MP4 IP Finder.exe program fails to save the network parameters.

- Network may have trouble. Confirm the parameters and connections of the Network Camera.

### Access Network Camera

Cannot access the login page and other web pages of Network Camera from Internet Explorer

- Maybe the IP Address of the Network Camera is already being used by another device or computer. To confirm this possible problem, disconnect the Network Camera from the network first, and then run the PING utility to check it out.
  - Maybe due to the network cable. Try correcting your network cable and configuration. Test the network interface by connecting a local computer to the Network Camera via a crossover cable.
  - Make sure the Internet connection and setting is ok.
  - Make sure enter the IP address of Internet Explorer is correct. If Network Camera has a dynamic address, it may have changed since you last checked it.
  - Network congestion may prevent the web page appearing quickly. Wait for a while.
- The IP address and Subnet Mask of the PC and Network Camera must be in the same class of the private IP address on the LAN.
- Make sure the http port used by the Network Camera, default=80, is forward to the Network Camera's private IP address.
  - The port number assigned in your Network Camera might not be available via Internet. Check your ISP for available port.
  - The proxy server may prevent you from connecting directly to Network Camera, set up not to use the proxy server.
  - Confirm that Default Gateway address is correct.
  - The router needs Port Forwarding feature. Refer to your router's manual for details.
  - Packet Filtering of the router may prohibit access from an

|  |   |
|--|---|
| <p>Image or video does not appear in the main page.</p>                                    | <p>external network. Refer to your router's manual for details.</p> <ul style="list-style-type: none"><li>• Access Network Camera from the Internet with the global IP address of the router and port number of Network Camera.</li><li>• Some routers reject the global IP address to access Network Camera on the same LAN. Access with the private IP address and correct port number of Network Camera.</li><li>• When you use DDNS, you need to set Default Gateway and DNS server address.</li><li>• If it's not working after above procedure, reset Network Camera to default setting and installed it again.</li><li>• If the problem is not solved, the Network Camera might be faulty. Contact your dealer for further help.</li></ul> |
| <p>The Network Camera work locally but not externally.</p>                                 | <ul style="list-style-type: none"><li>• The first time the PC connects to Network Camera, a pop-up <b>Security Warning window</b> will appear to download ActiveX Controls. When using Windows NT, Windows 2000 or Windows XP, log on with an appropriate account that is authorized to install applications.</li><li>• Network congestion may prevent the Image screen from appearing quickly. You may choose lower resolution to reduce the required bandwidth.</li></ul>   |
| <p>The unreadable characters are displayed.<br/>Frame rate is slower than the setting.</p> | <ul style="list-style-type: none"><li>• Might be caused from the firewall protection. Check the Internet firewall with your system or network administrator. The firewall may need to have some settings changed in order for the Network Camera to be accessible outside your LAN.</li><li>• Make sure that the Network Camera isn't conflicting with any other web server running on your LAN.</li><li>• Check the configuration of the router settings allow the Network Camera to be accessed outside your local LAN. Use the operating system of the selected language. Set the Encoding or the Character Set of the selected language on the Internet Explorer.</li></ul>   |
| <p>Blank screen or very slow video when audio is enabled.</p>                              | <ul style="list-style-type: none"><li>• The traffic of the network and the object of the image affect the frame rate. The network congestion causes frame rate slower than the setting.</li><li>• When more than one client was viewing, the frame rate becomes slower.</li><li>• Ethernet switching hub can smooth the frame rate especially in viewing on the Multi-Camera screen.</li></ul>  |
| <p>Image Transfer on e-mail or FTP does not work.</p>                                      | <ul style="list-style-type: none"><li>• Your connection to the Network Camera does not have enough bandwidth to support a higher frame rate for the streamed image size. Try reducing the video streaming size to 160x120 or 320x240 and/or disabling audio.</li><li>• Audio will consume 32 kbps. Disable audio to improve video. Your Internet connection may not have enough bandwidth to support streaming audio from the Network Camera.</li></ul>   |

### Video Quality of Network Camera

|  |  |
|--|--|
| The focus on the Network Camera is bad.    | <ul style="list-style-type: none"><li>• The lens is dirty or dust is attached. Clean the lens with lens cleaner. Or adjust the camera focus manually.</li><li>• The image may be out of focus, if the object is too near. Move the object away from Network Camera.</li></ul>  |
| The color of the image is poor or strange. | <ul style="list-style-type: none"><li>• Adjust White Balance.</li><li>• To insure the images you are viewing are the best they can be, set the Display property setting (color quality) to 16bit at least and 24 bit or higher if possible within your computer.</li><li>• The configuration on the Network Camera image display is incorrect. You need to adjust the image related parameters such as brightness and contrast properly.</li></ul> |
| Image flickers.                            | <ul style="list-style-type: none"><li>• Wrong power line frequency makes images flicker. Make sure the 50 or 60Hz format of your Network Camera.</li></ul>   |
| Noisy images occur.                        | The video images might be noisy if the Network Camera is located in a low light environment. Make the condition around the Network Camera brighter.  |

### Miscellaneous

|                                    |   |
|------------------------------------|---|
| How to Reboot the Network Camera   | If you just want to reboot system without change anything. Go to <b>Setting</b> page and click Restart linking directly, then system will reboot again. |
| Can not play the recorded ASF file | Have installed Microsoft®'s DirectX 9.0 or later and use the Windows Media Player 9 or later to play the ASF filed recorded by the Network Camera.      |

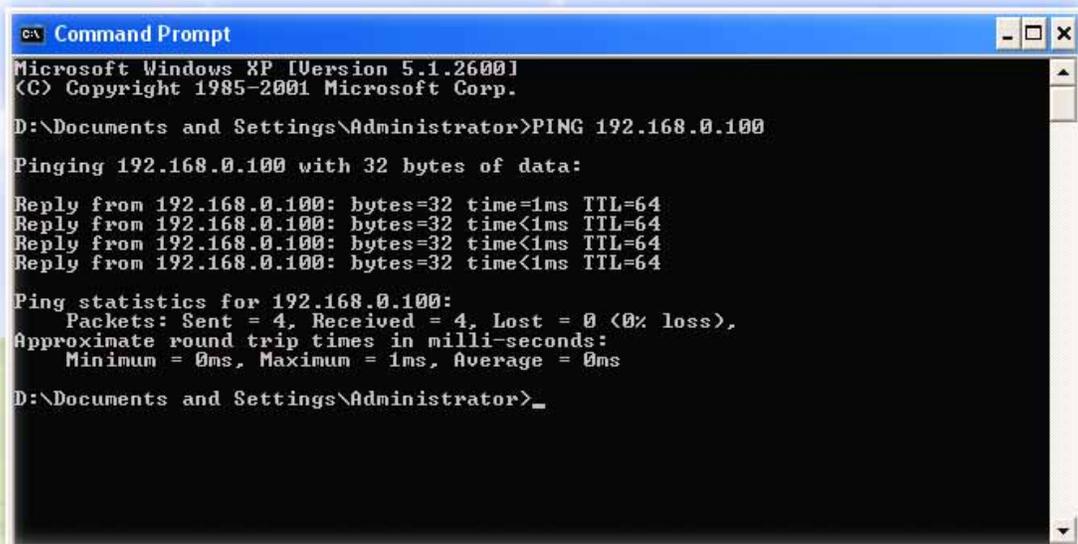
## Appendix C: PING IP Address

The PING (stands for Packet Internet Groper) command is used to detect whether a specific IP address is accessible by sending a packet to the specific address and waiting for a reply. It's also a very useful tool to confirm Network Camera installed or if the IP address conflicts with any other devices over the network.

If you want to make sure the IP address of Network Camera, utilize the PING command as follows:

- Start a DOS window.
- Type ping x.x.x.x, where x.x.x.x is the IP address of the Network Camera.

The replies, as illustrated below, will provide an explanation to the problem.



```
c:\ Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

D:\Documents and Settings\Administrator>PING 192.168.0.100

Pinging 192.168.0.100 with 32 bytes of data:

Reply from 192.168.0.100: bytes=32 time=1ms TTL=64
Reply from 192.168.0.100: bytes=32 time<1ms TTL=64
Reply from 192.168.0.100: bytes=32 time<1ms TTL=64
Reply from 192.168.0.100: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.0.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

D:\Documents and Settings\Administrator>_
```

If you want to detect any other devices conflicts with the IP address of Network Camera, also can utilize the PING command but you must disconnect the Network Camera from the network first.

# Appendix D: Bandwidth

## Estimation

The frame rate of video transmitted from the Network Camera depends on connection bandwidth between client and server, video resolution, and quality setting of server. Here is a guideline to help you roughly estimate the bandwidth requirements form your Network Camera.

The required bandwidth depends on content of video source. The slow motion video will produce smaller bit rate generally and fast motion will produce higher bit rate vice versa. Actual results generated by the Network Camera may be varying.

| Image Resolution  | Average range of Data Sizes for JPEG mode | Average bit rate for MPEG4 mode |
|-------------------|---|---------------------------------|
| 160 x 120 (QQVGA) | 3 ~ 6k byte per frame                     | 100kbps~256kbps @ 30fps         |
| 320 x 240 (QVGA)  | 8 ~ 20k byte per frame                    | 300kbps~600kbps @ 30fps         |
| 640 x 480 (VGA)   | 20 ~ 50K byte per frame                   | 400kbps~1000kbps @ 12fps        |

**Note:** Audio streaming will take bandwidth around 32 kbps. Most ADSL/Cable modem upload speeds may not even reach up to 128 kbps. Thus, you may not be able to receive any video while streaming audio on a 128 kbps or lower connection. Even though the upload speed is more than 128kbps, for optimal video performance, disabling audio streaming will get better video performance.

## Appendix E: Specifications

| <b>Model</b>                      | <b>Network Camera</b>  |
|-----------------------------------|--|
| <b>Control Interface</b>          | Internet Explorer or Multi-channel software player                           |
| <b>Operating Humidity</b>         | 10% ~ 80%  |
| <b>Operating Temperature</b>      | 5°C to 40°C  |
| <b>Power Consumption</b>          | 4W max. (WLAN model and IR LEDs on)  |
| <b>Power Supply</b>               | 5V DC ± 10%  |
| <b>Dimension</b>                  | Main body: 100*62mm (DXH)  |
| <b>Camera Module</b>              |  |
| <b>Image Pick-up Device</b>       | 1/4" Micron CMOS image sensor  |
| <b>Effective Picture Elements</b> | 640*480 (H*V)  |
| <b>S/N Ratio</b>                  | More than 45 dB  |
| <b>Auto Exposure</b>              | Yes  |
| <b>Auto White Balance</b>         | Yes  |
| <b>Camera Position</b>            | Desktop / Ceiling /Mirror  |
| <b>Power Line Frequency</b>       | 50 / 60 Hz   |
| <b>Sharpness</b>                  | Strong / Normal / Soft   |
| <b>IP Module</b>                  |  |
| <b>Codec</b>                      | MPEG4 and JPEG, 3 levels   |
| <b>Resolution</b>                 | 640*480, 320*240, 162*120  |
| <b>Frame Rate</b>                 | Up to 30fps for QQVGA and QVGA resolutions<br>Up to 12fps for VGA resolution |
| <b>Audio Streaming</b>            | Yes  |
| <b>Compatibility</b>              | Windows 2000, XP   |
| <b>LAN I/F</b>                    | 10/100M  |
| <b>Wireless LAN</b>               | 802.11 (Option)  |
| <b>Image Storing Memory</b>       | By RAM   |
| <b>Operating System</b>           | eCos   |

|                                  |   |
|----------------------------------|---|
| <b>Type Of IP Address Needed</b> | Statistic or Dynamic  |
| <b>Notification</b>              | Email, FTP  |
| <b>Firmware Upgrade</b>          | Via Ethernet  |
| <b>Security</b>                  | 3 Levels  |
| <b>Viewer</b>                    | Microsoft® Internet Explorer 5.5 or later                   |
| <b>Digital zoom</b>              | 400% (Maximum)  |
| <b>Networking Protocol</b>       | TCP/IP, HTTP, SMTP, FTP, NTP, DNS, DDNS, ARP and DHCP, UPnP |

## ***Appendix F: Time Zone Table***

GMT stands for Greenwich Mean Time which is the global time that all time zones are measured from.

(GMT-12:00) International Date Line West  
(GMT-11:00) Midway Island, Samoa  
(GMT-10:00) Hawaii  
(GMT-09:00) Alaska  
(GMT-08:00) Pacific Time (US & Canada); Tijuana  
(GMT-07:00) Arizona  
(GMT-07:00) Chihuahua, La Paz, Mazatlan  
(GMT-07:00) Mountain Time (US & Canada)  
(GMT-06:00) Central America  
(GMT-06:00) Central Time (US & Canada)  
(GMT-06:00) Guadalajara, Mexico City, Monterrey  
(GMT-06:00) Saskatchewan  
(GMT-05:00) Bogota, Lima, Quito  
(GMT-05:00) Eastern Time (US & Canada)  
(GMT-05:00) Indiana (East)  
(GMT-04:00) Atlantic Time (Canada)  
(GMT-04:00) Caracas, La Paz  
(GMT-04:00) Santiago  
(GMT-03:30) Newfoundland  
(GMT-03:00) Brasilia  
(GMT-03:00) Buenos Aires, Georgetown  
(GMT-03:00) Greenland  
(GMT-02:00) Mid-Atlantic  
(GMT-01:00) Azores  
(GMT-01:00) Cape Verde Is.  
(GMT) Casablanca, Monrovia  
(GMT) Greenwich Mean Time : Dublin, Edinburgh, Lisbon, London  
(GMT+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna  
(GMT+01:00) Belgrade, Bratislava, Budapest, Ljubljana, Prague  
(GMT+01:00) Brussels, Copenhagen, Madrid, Paris  
(GMT+01:00) Sarajevo, Skopje, Warsaw, Zagreb  
(GMT+01:00) West Central Africa  
(GMT+02:00) Athens, Istanbul, Minsk  
(GMT+02:00) Bucharest  
(GMT+02:00) Cairo  
(GMT+02:00) Harare, Pretoria  
(GMT+02:00) Helsinki, Kyiv, Riga, Sofia, Tallinn, Vilnius  
(GMT+02:00) Jerusalem  
(GMT+03:00) Baghdad  
(GMT+03:00) Kuwait, Riyadh  
(GMT+03:00) Moscow, St. Petersburg, Volgograd  
(GMT+03:00) Nairobi

(GMT+03:30) Tehran  
(GMT+04:00) Abu Dhabi, Muscat  
(GMT+04:00) Baku, Tbilisi, Yerevan  
(GMT+04:30) Kabul  
(GMT+05:00) Ekaterinburg  
(GMT+05:00) Islamabad, Karachi, Tashkent  
(GMT+05:30) Chennai, Kolkata, Mumbai, New Delhi  
(GMT+05:45) Kathmandu  
(GMT+06:00) Almaty, Novosibirsk  
(GMT+06:00) Astana, Dhaka  
(GMT+06:00) Sri Jayawardenepura  
(GMT+06:30) Rangoon  
(GMT+07:00) Bangkok, Hanoi, Jakarta  
(GMT+07:00) Krasnoyarsk  
(GMT+08:00) Beijing, Chongqing, Hong Kong, Urumqi  
(GMT+08:00) Irkutsk, Ulaan Bataar  
(GMT+08:00) Kuala Lumpur, Singapore  
(GMT+08:00) Perth  
(GMT+08:00) Taipei  
(GMT+09:00) Osaka, Sapporo, Tokyo  
(GMT+09:00) Seoul  
(GMT+09:00) Yakutsk  
(GMT+09:30) Adelaide  
(GMT+09:30) Darwin  
(GMT+10:00) Brisbane  
(GMT+10:00) Canberra, Melbourne, Sydney  
(GMT+10:00) Guam, Port Moresby  
(GMT+10:00) Hobart  
(GMT+10:00) Vladivostok  
(GMT+11:00) Magadan, Solomon Is., New Caledonia  
(GMT+12:00) Auckland, Wellington  
(GMT+12:00) Fiji, Kamchatka, Marshall Is.  
(GMT+13:00) Nuku'alofa

# ***Appendix G: DDNS Application***

## **1. Preface**

If you have a Cable modem, xDSL, ISDN or Dialup, this is a great way to host your own Network Camera. Get your own domain like `www.yourname.com*`, `www.yourname.com.tw*` etc. (Note: This domain must be registered via registration authorities such as Network Solutions, DirectNIC, Register.com etc). Your domain name's dynamic IP address is automatically tracked by a DDNS server.

Host your own Network Camera and much more no matter what your computer's IP address may be and even if you have dialup, DSL or cable modem internet connection where your computer's IP address changes all the time!! DDNS service supports all top level domain names including but not limited to .com, .net, .org, .to, .uk etc.

## **2. Ethernet Network Environment**

Normally, a DDNS service is only necessary for the users that could only obtain dynamic IP addresses. As to the users that could obtain the static valid IP address, they do not usually have to apply the DDNS service. Before we decide if DDNS is necessary for the users, we have to check what kind of Ethernet network environment we have to install our Network Camera on.

### **(1) Environment of Fixed Valid IP Network**

If users could obtain valid IP addresses, they could save the effort to apply DDNS service. Because the IP address in this environment is fixed, users could input the IP address or domain name of demo site directly in the IE browser.

### **(2) Environment of Dynamic IP Network**

If users is under an environment of dynamic IP network (Dial-up ADSL), they have to apply a domain name in advance. Then apply DDNS service. Finally setup the necessary information of DDNS of the Network Camera in order to let the outside administrator be able to access through internet.

## **3. Application Steps—DDNS & Domain Name**

(1). Visit the following web site: <http://www.dyndns.org/> (Pink No.1)

(2). Click "**Account**" (Pink No. 2)



(3). After the columns show up at the left side, click **“Create Account”**.



- (4). Fill the application agreement and necessary information.
- a. Input Name
  - b. E-mail input and confirmation
  - c. Password input and confirmation
  - d. Submit all the input information and finish creating a account

### Create Account

Please complete the form below to create your account. You will receive an e-mail containing instructions to activate your account. If you do not follow these directions within 48 hours, you will need to recreate your account.

Policy Last Modified: May 4, 2004

**1. ACKNOWLEDGMENT AND ACCEPTANCE OF TERMS OF SERVICE**

All services provided by Dynamic Network Services, Inc. ("DynDNS") are provided to you (the "Member") under the Terms and Conditions set forth in this Acceptable Use Policy ("AUP") and any other operating rules and policies set forth by DynDNS. The AUP comprises

I have read and agree to the Acceptable Use Policy above  ✓

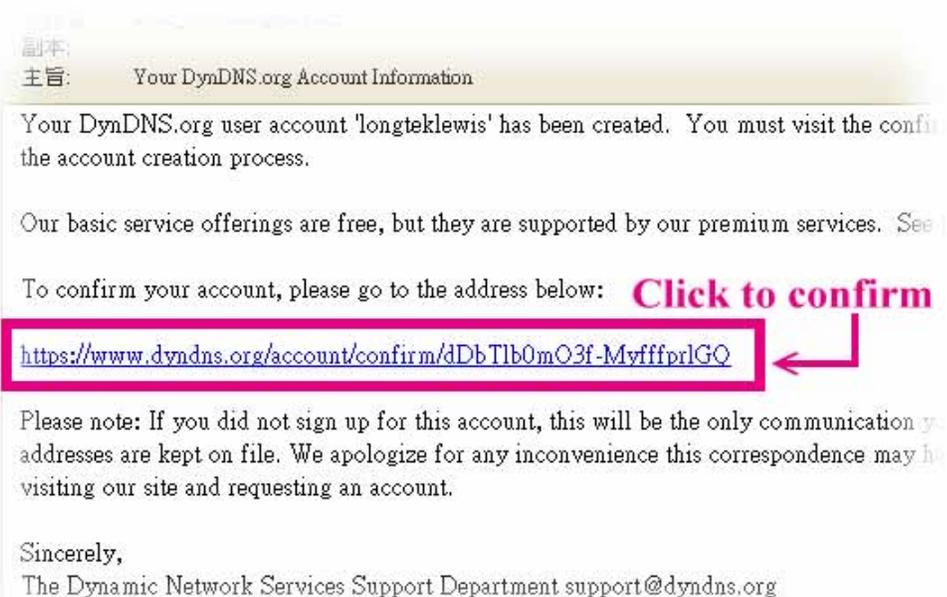
**Username**  
Your username will be used to login to your account and make changes.  
Username:  ← **Input login name**

**E-mail Address**  
The e-mail address you enter must be valid. Instructions to activate your account will be sent to the e-mail address provided. You must keep this address current and accounts with invalid e-mail addresses will be removed with no warning. We do not sell our list to anyone. Read more about our [privacy policy](#).  
E-Mail Address:  ← **Input e-mail address**  
Confirm E-Mail Address:  ← **Confirm e-mail address**

**Password**  
The password you enter will be used to access your account. It must be more than 5 characters and cannot be your username.  
Password:  ← **Input login password**  
Confirm Password:  ← **Confirm login password**

**Submit** →

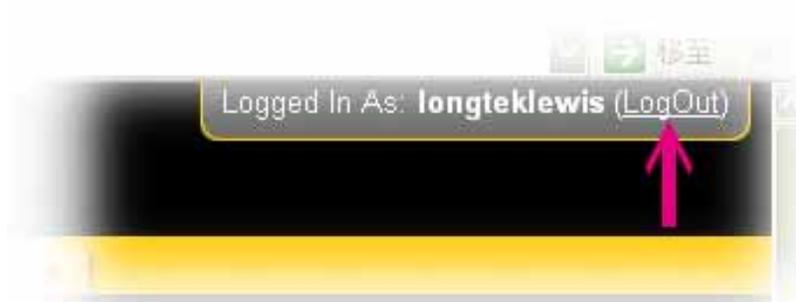
- (5). Check your e-mail mailbox. There will be an e-mail with a title "Your DynDNS.org Account Information ". Click the hyperlink address to confirm the DDNS service that you just applied. Then DDNS you applied activated.



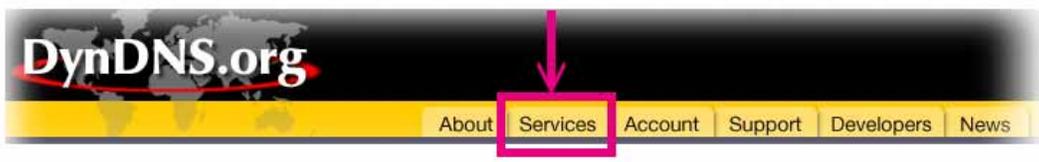
- (6). Enter the web page <http://www.dyndns.org/> again. Input your username and password that you just applied to login administration interface of DDNS service.



- (7). If the correct username and password are input, you can see the following picture at the top-right of the login page.



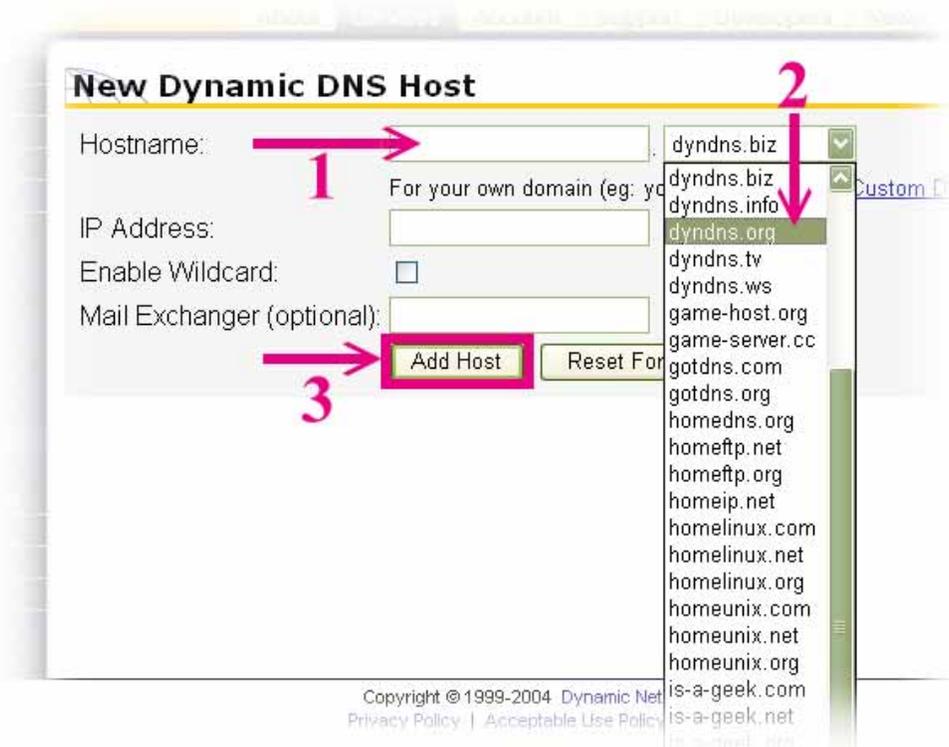
- (8). Click the "Services".



- (9). Click the "Dynamic DNS" and then click the "Add a host".



(10). We could create a domain name without any charge at this step. First, we input the host name. (Pink No.1) Then we pick a domain that is easy to remember. (Pink No.2) Finally, click the “Add Host” to submit the domain name information. (Pink No.3)



#### **4. Setup the DDNS**

At last, users have to enter the web page of Network Camera and setup the necessary information of DDNS after the application of DDNS service. Please check the user manual to access the DDNS pages. After saving the modification, restart the device. The external users could browse the Network Camera by the input of their domain name.

# Appendix H: Power Line Frequency

| COUNTRY          | VOLTAGE   | FREQUENCY | COMMENTS   |
|------------------|-----------|-----------|--|
| Afghanistan      | 220V      | 50 Hz     | Other reports indicate voltage variances from 160V to 280V.  |
| Albania          | 220V*     | 50 Hz     | *Voltage variations common   |
| Algeria          | 230V      | 50 Hz     |  |
| American Samoa   | 120V      | 60 Hz     |  |
| Andorra          | 230V      | 50Hz      |  |
| Angola           | 220V      | 50 Hz     |  |
| Anguilla         | 110V      | 60Hz      |  |
| Antigua          | 230V*     | 60 Hz     | *Airport area is reportedly Antigua power is 110V.   |
| Argentina        | 220V      | 50 Hz     | *Neutral and line wires are reversed from that used in Australia and elsewhere.  |
| Armenia          | 220V      | 50 Hz     |  |
| Aruba            | 127V*     | 60 Hz     | *Lago Colony 115V  |
| Australia        | 230V*     | 50 Hz     | *Outlets typically controlled by adjacent switch. Though <i>nominal</i> voltage has been officially changed to 230V, 240V is within tolerances and commonly found. |
| Austria          | 230V      | 50 Hz     |  |
| Azerbaijan       | 220V      | 50 Hz     |  |
| Azores           | 220V*     | 50 Hz     | *Ponta Delgada 110V; to be converted to 220V   |
| Bahamas          | 120V      | 60 Hz     |  |
| Bahrain          | 230V*     | 50 Hz*    | *Awali 110V, 60 Hz   |
| Balearic Islands | 220V      | 50 Hz     |  |
| Bangladesh       | 220V      | 50 Hz     |  |
| Barbados         | 115V      | 50 Hz     |  |
| Belarus          | 220V      | 50 Hz     |  |
| Belgium          | 230V      | 50 Hz     |  |
| Belize           | 110/220V  | 60 Hz     |  |
| Benin            | 220V      | 50 Hz     |  |
| Bermuda          | 120V      | 60 Hz     |  |
| Bhutan           | 230V      | 50 Hz     |  |
| Bolivia          | 220/230V* | 50 Hz     | *La Paz & Viacha 115V  |

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|                                    |           |       |   |
|------------------------------------|-----------|-------|---|
| Bosnia                             | 220V      | 50 Hz |   |
| Botswana                           | 231V      | 50 Hz |   |
| Brazil                             | 110/220V* | 60 Hz | *127V found in states of Bahia, Parana (including Curitiba), Rio de Janeiro, São Paulo and Minas Gerais (though 220V may be found in some hotels). Other areas are 220V only, with the exception of Fortaleza (240V).   |
| Brunei                             | 240V      | 50 Hz |   |
| Bulgaria                           | 230V      | 50 Hz |   |
| Burkina Faso                       | 220V      | 50 Hz |   |
| Burundi                            | 220V      | 50 Hz |   |
| Cambodia                           | 230V      | 50 Hz |   |
| Cameroon                           | 220V      | 50 Hz |   |
| Canada                             | 120V      | 60 Hz |   |
| Canary Islands                     | 220V      | 50 Hz |   |
| Cape Verde                         | 220V      | 50 Hz |   |
| Cayman Islands                     | 120V      | 60 Hz |   |
| Central African Republic           | 220V      | 50 Hz |   |
| Chad                               | 220V      | 50Hz  |   |
| Channel Islands                    | 230V      | 50 Hz |   |
| Chile                              | 220V      | 50 Hz |   |
| China, People's Republic of        | 220V      | 50 Hz |   |
| Colombia                           | 110V      | 60Hz  |   |
| Comoros                            | 220V      | 50 Hz |   |
| Congo, People's Rep. of            | 230V      | 50 Hz |   |
| Congo, Dem. Rep. of (former Zaire) | 220V      | 50 Hz |   |
| Cook Islands                       | 240V      | 50 Hz |   |
| Costa Rica                         | 120V      | 60 Hz |   |
| Côte d'Ivoire (Ivory Coast)        | 220V      | 50 Hz |   |
| Croatia                            | 230V      | 50Hz  |   |
| Cuba                               | 110/220V  | 60Hz  | Most older hotels 110V. Some newer hotels 220V.   |
| Cyprus                             | 240V      | 50 Hz |   |
| Czech Republic                     | 230V      | 50 Hz |   |
| Denmark                            | 230V      | 50 Hz | Denmark's connectors have slight differences from those used elsewhere. While pin diameter and spacing is standard, outlets may have different housing depths which could interfere with standard adaptors -- one report says this is due to "childproofing." |

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|                        |          |        |  |
|------------------------|----------|--------|--|
| Djibouti               | 220V     | 50 Hz  |  |
| Dominica               | 230V     | 50 Hz  |  |
| Dominican Republic     | 110V     | 60 Hz  |  |
| East Timor             | 220V     | 50 Hz  | A UN correspondent reports "power is poor in the country with frequent brownouts and blackouts. I suspect that surges are frequent as we go through a lot of surge-protecting power bars." Further he reports than |
| Ecuador                | 120-127V | 60 Hz  |  |
| Egypt                  | 220V     | 50 Hz  |  |
| El Salvador            | 115V     | 60 Hz  |  |
| Equatorial Guinea      | 220V*    | 50 Hz  | *Voltage varies between 150 & 175V with frequent outages   |
| Eritrea                | 230V     | 50 Hz  |  |
| Estonia                | 230V     | 50 Hz  |  |
| Ethiopia               | 220V     | 50 Hz  |  |
| Faeroe Islands         | 220V     | 50 Hz  |  |
| Falkland Islands       | 240V     | 50 Hz  |  |
| Fiji                   | 240V     | 50 Hz  |  |
| Finland                | 230V     | 50 Hz  |  |
| France                 | 230V     | 50 Hz  |  |
| French Guiana          | 220V     | 50 Hz  |  |
| Gaza                   | 230V     | 50 Hz  |  |
| Gabon                  | 220V     | 50 Hz  |  |
| Gambia                 | 230V     | 50 Hz  |  |
| Germany                | 230V     | 50 Hz  |  |
| Ghana                  | 230V     | 50 Hz  |  |
| Gibraltar              | 240V     | 50 Hz  |  |
| Greece                 | 220V     | 50 Hz  |  |
| Greenland              | 220V     | 50 Hz  |  |
| Grenada (Windward Is.) | 230V     | 50 Hz  |  |
| Guadeloupe             | 230V     | 50 Hz  |  |
| Guam                   | 110V     | 60Hz   |  |
| Guatemala              | 120V     | 60 Hz  |  |
| Guinea                 | 220V     | 50 Hz  |  |
| Guinea-Bissau          | 220V     | 50 Hz  |  |
| Guyana                 | 240V*    | 60 Hz* | *Inside the capital city of Georgetown, both 120V and 240V at either 50 or 60Hz are found, depending on the part of the city (50Hz most common). Actual voltage may vary from area to area.                        |

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|                |           |           |  |
|----------------|-----------|-----------|--|
| Haiti          | 110V      | 60 Hz     |  |
| Honduras       | 110V      | 60 Hz     |  |
| Hong Kong      | 220V*     | 50 Hz     |  |
| Hungary        | 230V      | 50 Hz     |  |
| Iceland        | 220V      | 50 Hz     |  |
| India          | 230V      | 50 Hz     |  |
| Indonesia      | 127/230V* | 50 Hz     | *Conversion to 230V in progress; complete in principal cities  |
| Iran           | 230V      | 50 Hz     |  |
| Iraq           | 230V      | 50 Hz     |  |
| Ireland (Eire) | 230       | 50 Hz     |  |
| Isle of Man    | 240V      | 50 Hz     |  |
| Israel         | 230V      | 50 Hz     |  |
| Italy          | 230V      | 50 Hz     |  |
| Jamaica        | 110V      | 50 Hz     |  |
| Japan          | 100V      | 50/60 Hz* | *Eastern Japan 50 Hz (Tokyo, Kawasaki, Sapporo, Yokohama, and Sendai); Western Japan 60 Hz (Osaka, Kyoto, Nagoya, Hiroshima) |
| Jordan         | 230V      | 50 Hz     |  |
| Kenya          | 240V      | 50 Hz     |  |
| Kazakhstan     | 220V      | 50 Hz     |  |
| Kiribati       | 240V      | 50 Hz     |  |
| Korea, South   | 220V      | 60 Hz     |  |
| Kuwait         | 240V      | 50 Hz     |  |
| Laos           | 230V      | 50 Hz     |  |
| Latvia         | 220V      | 50 Hz     |  |
| Lebanon        | 110/220V  | 50 Hz     |  |
| Lesotho        | 220V      | 50 Hz     |  |
| Liberia        | 120V      | 60 Hz     |  |
| Libya          | 127V*     | 50 Hz     | *Barce, Benghazi, Derna, Sebha & Tobruk 230V   |
| Lithuania      | 220V      | 50 Hz     |  |
| Liechtenstein  | 230V      | 50 Hz     |  |
| Luxembourg     | 220V      | 50 Hz     |  |
| Macau          | 220V      | 50 Hz     |  |
| Macedonia      | 220V      | 50 Hz     |  |
| Madagascar     | 220V      | 50 Hz     |  |
| Madeira        | 220V      | 50 Hz     |  |

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|                                |           |       |   |
|--------------------------------|-----------|-------|---|
| Malawi                         | 230V      | 50 Hz |   |
| Malaysia                       | 240V      | 50 Hz |   |
| Maldives                       | 230V      | 50 Hz |   |
| Mali                           | 220V      | 50 Hz |   |
| Malta                          | 240V      | 50 Hz |   |
| Martinique                     | 220V      | 50 Hz |   |
| Mauritania                     | 220V      | 50 Hz |   |
| Mauritius                      | 230V      | 50 Hz |   |
| Mexico                         | 127V      | 60 Hz |   |
| Micronesia (Federal States of) | 120V      | 60 Hz |   |
| Monaco                         | 127/220V  | 50 Hz |   |
| Mongolia                       | 230V      |       |   |
| Montserrat (Leeward Is.)       | 230V      | 60 Hz |   |
| Morocco                        | 127/220V* | 50 Hz | *Conversion to 220V only underway                         |
| Mozambique                     | 220V      | 50 Hz |   |
| Myanmar (formerly Burma)       | 230V      | 50 Hz |   |
| Namibia                        | 220V      | 50 Hz |   |
| Nauru                          | 240V      | 50 Hz |   |
| Nepal                          | 230V      | 50 Hz |   |
| Netherlands                    | 230V      | 50 Hz |   |
| Netherlands Antilles           | 127/220V* | 50 Hz | *St. Martin 120V 60 Hz; Saba & (St. Eustatius 110V 60 Hz) |
| New Caledonia                  | 220V      | 50 Hz |   |
| New Zealand                    | 230V      | 50 Hz |   |
| Nicaragua                      | 120V      | 60 Hz |   |
| Niger                          | 220V      | 50 Hz |   |
| Nigeria                        | 240V      | 50 Hz |   |
| Norway                         | 230V      | 50 Hz |   |
| Okinawa                        | 100V*     | 60 Hz | *Military facilities 120V                                 |
| Oman                           | 240V*     | 50 Hz | *Voltage variations common                                |
| Pakistan                       | 230V      | 50 Hz |   |
| Palmyra Atoll                  | 120V      | 60Hz  |   |
| Panama                         | 110V*     | 60 Hz | *Panama City 120V   |
| Papua New Guinea               | 240V      | 50 Hz |   |
| Paraguay                       | 220V      | 50 Hz |   |

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|                                   |           |        |  |
|-----------------------------------|-----------|--------|--|
| Peru                              | 220V*     | 60 Hz* | *Talara 110/220V; Arequipa 50 Hz   |
| Philippines                       | 220V      | 60 Hz  |  |
| Poland                            | 230V      | 50 Hz  |  |
| Portugal                          | 230V      | 50 Hz  |  |
| Puerto Rico                       | 120V      | 60 Hz  |  |
| Qatar                             | 240V      | 50 Hz  |  |
| R 徽 nion Island                   | 220V      | 50Hz   |  |
| Romania                           | 230V      | 50 Hz  |  |
| Russian Federation                | 220V      | 50 Hz  | A correspondent notes: "Plug type E can also be used (because the mains outlets do not have the protruding pin). Plug type F can sometimes be used but with reservation because in many places the mains outlet will not allow to connect such plug as the outlets have smaller hole diameters than F-plug pins. |
| Rwanda                            | 230V      | 50 Hz  |  |
| St. Kitts and Nevis (Leeward Is.) | 230V      | 60 Hz  |  |
| St. Lucia (Windward Is.)          | 240V      | 50 Hz  |  |
| St. Vincent (Windward Is.)        | 230V      | 50 Hz  |  |
| Saudi Arabia                      | 127/220V  | 60 Hz  |  |
| Scotland (See United Kingdom)     |           |        |  |
| Senegal                           | 230V      | 50 Hz  |  |
| Serbia-Montenegro                 | 220V      | 50 Hz  |  |
| Seychelles                        | 240V      | 50 Hz  |  |
| Sierra Leone                      | 230V      | 50 Hz  |  |
| Singapore                         | 230V      | 50 Hz  |  |
| Slovak Republic                   | 230V      | 50 Hz  |  |
| Slovenia                          | 220V      | 50 Hz  |  |
| Somalia                           | 220V*     | 50 Hz  | *Berbera 230V; Merca 110/220V  |
| South Africa                      | 220/230V* | 50 Hz  | *Grahamstad & Port Elizabeth 250V; also found in King Williams   |
| Spain                             | 230V      | 50 Hz  |  |
| Sri Lanka                         | 230V      | 50 Hz  |  |
| Sudan                             | 230V      | 50 Hz  |  |
| Suriname                          | 127V      | 60 Hz  |  |
| Swaziland                         | 230V      | 50 Hz  |  |
| Sweden                            | 230V      | 50 Hz  |  |
| Switzerland                       | 230V      | 50 Hz  |  |

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|                                   |           |       |  |
|-----------------------------------|-----------|-------|--|
| Syria                             | 220V      | 50 Hz |  |
| Tahiti                            | 110/220V  | 60 Hz | Information is based mainly on hotel experiences reported by travelers.  |
| Tajikistan                        | 220V      | 50 Hz |  |
| Taiwan                            | 110V      | 60 Hz |  |
| Tanzania                          | 230V      | 50 Hz |  |
| Thailand                          | 220V      | 50 Hz |  |
| Togo                              | 220V*     | 50 Hz | *Lome 127V   |
| Tonga                             | 240V      | 50 Hz |  |
| Trinidad & Tobago                 | 115V      | 60 Hz |  |
| Tunisia                           | 230V      | 50 Hz |  |
| Turkey                            | 230V      | 50 Hz |  |
| Turkmenistan                      | 220V      | 50 Hz |  |
| Uganda                            | 240V      | 50 Hz |  |
| Ukraine                           | 220V      | 50 Hz |  |
| United Arab Emirates              | 220V*     | 50 Hz |  |
| United Kingdom                    | 230V*     | 50 Hz | *Outlets typically controlled by adjacent switch. Though <i>nominal</i> voltage has been officially changed to 230V, 240V is within tolerances and commonly found. |
| United States of America          | 120V      | 60 Hz |  |
| Uruguay                           | 220V      | 50 Hz |  |
| Uzbekistan                        | 220V      | 50 Hz |  |
| Vanuatu                           | 230V      | 50 Hz |  |
| Venezuela                         | 120V      | 60 Hz |  |
| Vietnam                           | 127/220V* | 50 Hz | *To be standardized at 220V.   |
| Virgin Islands (British and U.S.) | 115V      | 60 Hz |  |
| Western Samoa                     | 230V      | 50 Hz |  |
| Yemen, Rep. of                    | 220/230V  | 50 Hz |  |
| Yugoslavia ( <i>Former</i> )      | 220V      | 50 Hz |  |
| Zambia                            | 230V      | 50 Hz |  |
| Zimbabwe                          | 220V      | 50 Hz |  |