



11n Wireless Pan-Tilt MJPEG Network Camera



Advanced Installation Guide

Version 1.0

PREFACE

Thank you for purchasing the Wireless Pan-Tilt MJPEG Network Camera, a powerful wireless network camera with the 2-way audio function that provides the high-quality image and on-the-spot audio via the Internet connection. The camera's pan/tilt functions allow you to control the camera to monitor everywhere remotely. Through the GPIO connectors, the camera can attach a variety of external devices for your specific purposes. The camera can be installed as a standalone system within your application environment easily and quickly, and supports remote management function so that you can access and control it using a Web browser on your PC.

This *Advanced Installation Guide* provides you with the instructions and illustrations on how to use your camera, which includes:

- Chapter 1 Introduction to Your Camera** describes the features of the camera. You will also know the components and functions of the camera.
- Chapter 2 Hardware Installation** helps you install the camera according to your application environment. You can use this camera at home, at work, at any where you want.
- Chapter 3 Accessing the Camera** lets you start using your camera without problem. The camera can be set up easily and work within your network environment instantly.
- Chapter 4 Configuring the Camera** guides you through the configuration of the camera using the Web browser on your PC.
- Chapter 5 Appendix** provides the specification of the camera and some useful information for using your camera.

NOTE The illustrations and configuration values in this guide are for reference only. The actual settings depend on your practical application of the camera.

Contents

| | |
|--|----|
| Preface | 1 |
| Chapter 1 Introduction To Your Camera..... | 3 |
| 1.1 Checking the Package Contents..... | 3 |
| 1.2 Getting to Know Your Camera | 4 |
| 1.3 Features and Benefits | 6 |
| 1.4 System Requirement..... | 8 |
| Chapter 2 Hardware Installation | 9 |
| 2.1 Installing the Wall Mount Kit..... | 9 |
| 2.2 Connecting the Camera to LAN/WLAN..... | 10 |
| 2.3 Applications of the Camera | 11 |
| Chapter 3 Accessing The Camera..... | 12 |
| 3.1 Using IPFinder | 12 |
| 3.2 Accessing to the Camera | 13 |
| 3.3 Configuring the IP Address of the PC | 17 |
| Chapter 4 Configuring The Camera..... | 18 |
| 4.1 Using the Web Configuration | 18 |
| 4.2 Using Smart Wizard | 19 |
| 4.3 Basic Setup | 22 |
| 4.4 Network Settings | 26 |
| 4.5 Pan/Tilt Settings | 35 |
| 4.6 Setting up Video & Audio | 36 |
| 4.7 Event Server Configuration | 40 |
| 4.8 Motion Detect | 42 |
| 4.9 Event Config..... | 43 |
| 4.10 Tools | 48 |
| 4.11 Information | 50 |
| Appendix..... | 51 |
| A.1 Specification..... | 51 |
| A.2 GPIO Terminal Application..... | 53 |
| A.3 Glossary of Terms..... | 54 |

CHAPTER 1

INTRODUCTION TO YOUR CAMERA

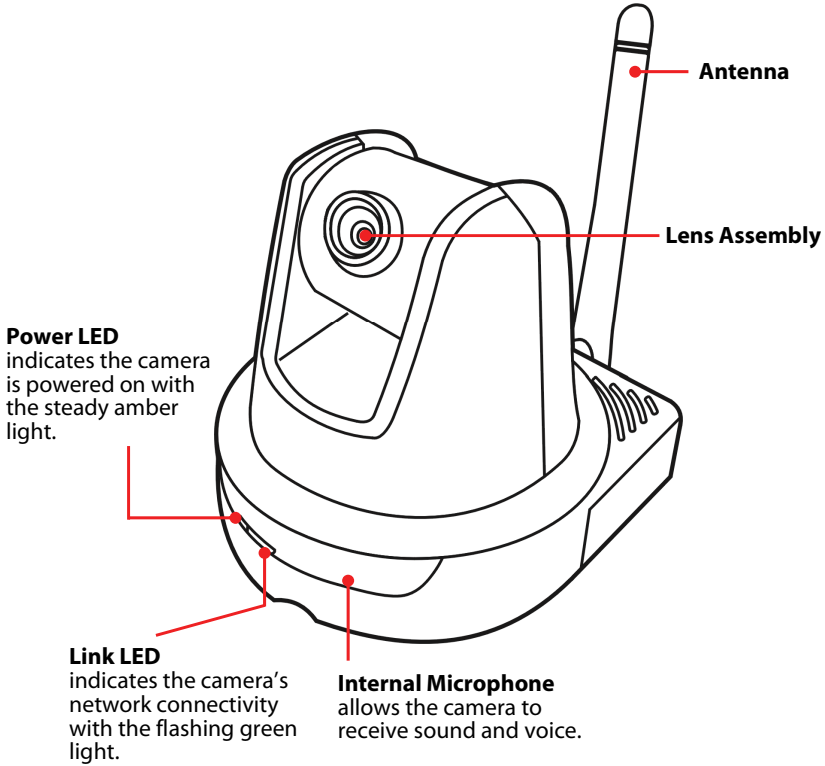
1.1 Checking the Package Contents

Check the items contained in the package carefully. You should have the following:

- One Wireless Pan-Tilt MJPEG Network Camera.
- One AC Power Adapter
- One External Antenna.
- One Wall Mount Kit.
- One GPIO Connector
- One Ethernet Cable (RJ-45 type).
- One Installation CD-ROM.
- One *Quick Installation Guide*.

NOTE Once any item contained is damaged or missing, contact the authorized dealer of your locale.

1.2 Getting to Know Your Camera



Front View

Ethernet Cable Connector connects the network cable, which supports the NWay protocol so that the camera can detect the network speed automatically.

External Antenna Connector connects the external antenna.

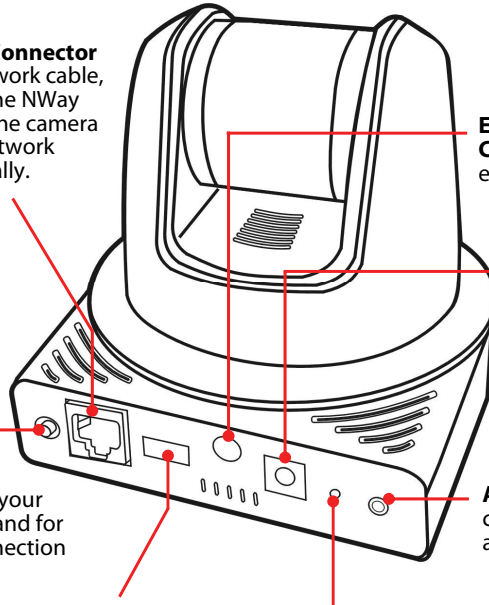
DC Power Connector connects the AC power adapter, in order to supply power to the camera.

WPS Button* is used to protect your wireless network and for easy wireless connection setup.

Audio-out Connector connects an external active speaker.

GPIO Connectors is used to connect the external devices.

Reset Button will restart the camera when it is pressed quickly; when it is pressed and held for five seconds, the camera will resume the factory default settings.



Rear View

* For more information of the WPS button, refer to the instruction of the Web Configuration, Network >> Wireless >> WPS Setting.

1.3 Features and Benefits

■ MJPEG codec Supported

The camera provides you with excellent images by the MJPEG codec technology, allowing you to adjust image size and quality, and bit rate according to the networking environment.

■ 2-way Audio Capability

The built-in microphone of the camera provides on-the-spot audio via the Internet, allowing you to monitor the on-site voice. In addition, you can connect an external speaker to the camera to speak through the camera.

■ Optimal Viewing

With the pan/tilt functions, you can easily monitor everywhere via the camera by moving the camera lens to the left/right (165/165 degrees) or up/down (90/15 degrees). In addition, you can assign up to eight positions for the camera, enabling you to move the camera lens to the desired position quickly.

■ I/O Connectors Provided

The camera provides the I/O connectors on the rear panel (IN/OUT), which provide the physical interface to send and receive digital signals to a variety of external alarm devices. You can connect a special featured device, and then configure the settings and control the device from the **GPIO Trigger** window of Web Configuration.

■ Remote Control Supported

By using a standard Web browser or the bundled UltraView Pro software application, the administrator can easily change the configuration of the camera via Intranet or Internet. In addition, the camera can be upgraded remotely when a new firmware is available. The users are also allowed to monitor the image and take snapshots via the network.

- **Multiple Platforms Supported**

The camera supports multiple network protocols, including TCP/IP, SMTP e-mail, HTTP, and other Internet related protocols. Therefore, you can use the camera in a mixed operating system environment, such as Windows Vista and Windows 7.

- **Multiple Applications Supported**

Through the remote access technology, you can use the cameras to monitor various objects and places for your own purposes.

For example, babies at home, patients in the hospital, offices and banks, and more. The camera can capture both still images and video clips, so that you can keep the archives and restore them at any time.

- **WPS Supported**

WPS (Wi-Fi Protected Setup) standard is a new solution that simplifies the process of configuring Wi-Fi security settings, allowing you to establish a secure wireless network by simply pressing a button.

1.4 System Requirement

■ Networking

LAN: 10Base-T Ethernet or 100Base-TX Fast Ethernet.
WLAN: IEEE 802.11b/g/n.

■ Accessing the Camera using Web Browser

Platform: Microsoft® Windows® 2000/XP/Vista/Win7
CPU: Intel Pentium III 800MHz or above
RAM: 512MB
Resolution: 800x600 or above
User Interface: Microsoft® Internet Explorer 6.0 or above
Apple Safari 2 or above
Mozilla Firefox 2.00 or above
Google Chrome

■ Accessing the Camera using UltraView Pro

Platform: Microsoft® Windows® XP/Vista/Win7
Resolution: 1024x768 or above

■ Hardware Requirement:

1~8 cameras: Intel Core 2 Duo E6400; 1GB RAM
8~32 cameras: Intel Core 2 Duo E8400; 2GB RAM

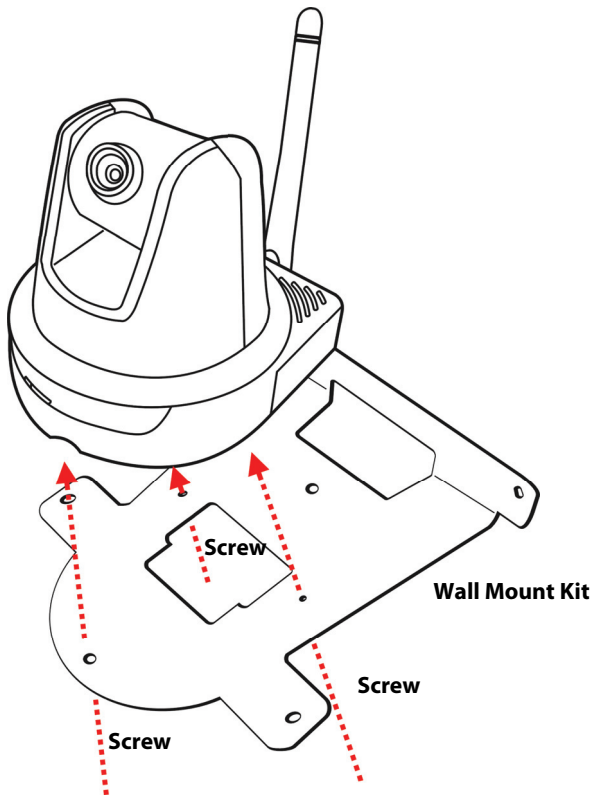
NOTE If you connect multiple cameras to monitor various places simultaneously, you are recommended to use a computer with higher performance.

CHAPTER 2

HARDWARE INSTALLATION

2.1 Installing the Wall Mount Kit

The camera comes with a Wall Mount Kit, which allows you to place your camera anywhere by mounting the camera through the three screw holes located in the base of the Wall Mount Kit.

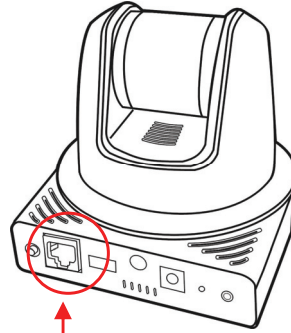


2.2 Connecting the Camera to LAN/WLAN

Use the provided Ethernet cable to connect the camera to your local area network (LAN).

When you connect the AC power adapter, the camera is powered on automatically. You can verify the power status from the Power LED on the front panel of the camera.

Once connected, the Link LED starts flashing green light and the camera is on standby and ready for use now.



Connecting the Ethernet Cable

If you use a wireless network in your application environment, you need to attach the included external antenna to the camera.

When the camera is powered on, the camera will automatically search any access point with “default” SSID.



Connecting the External Antenna

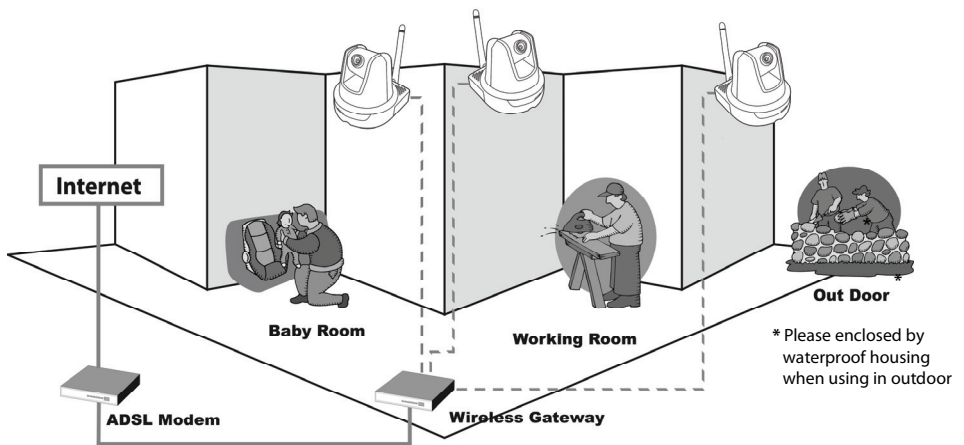
NOTE If the camera cannot to your wireless network, you need to install the camera in LAN and proceed with WLAN settings.

2.3 Applications of the Camera

The camera can be applied in multiple applications, including:

- Monitor local and remote places and objects via Internet or Intranet.
- Capture still images and video clips remotely.
- Upload images or send email messages with the still images attached.

The following diagram explains one of the typical applications for your camera and provides a basic example for installing the camera.



Home Applications

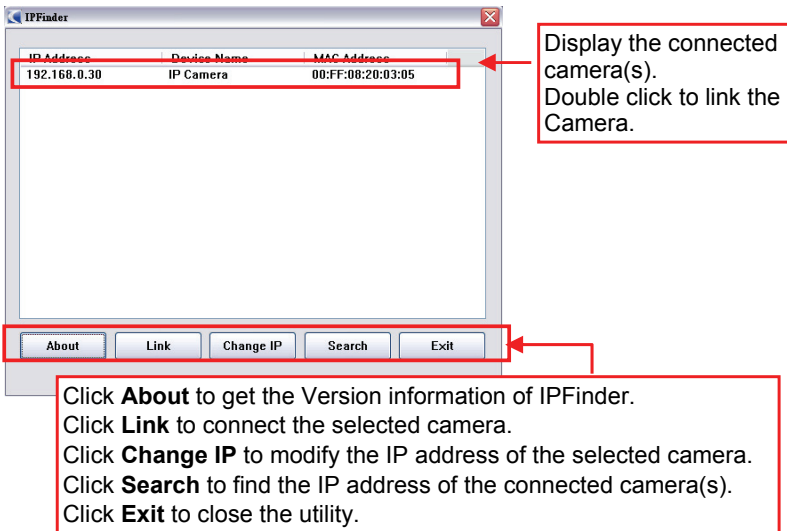
CHAPTER 3

ACCESSING THE CAMERA

3.1 Using IPFinder

The camera comes with a conveniently utility, IPFinder, which is included in the Installation CD-ROM, allowing you to search the camera on your network easily.

1. Insert the Installation CD-ROM into your computer's CD-ROM drive to initiate the Auto-Run program.
2. Click the **IPFinder** item to launch the utility. The control panel will appear as below.

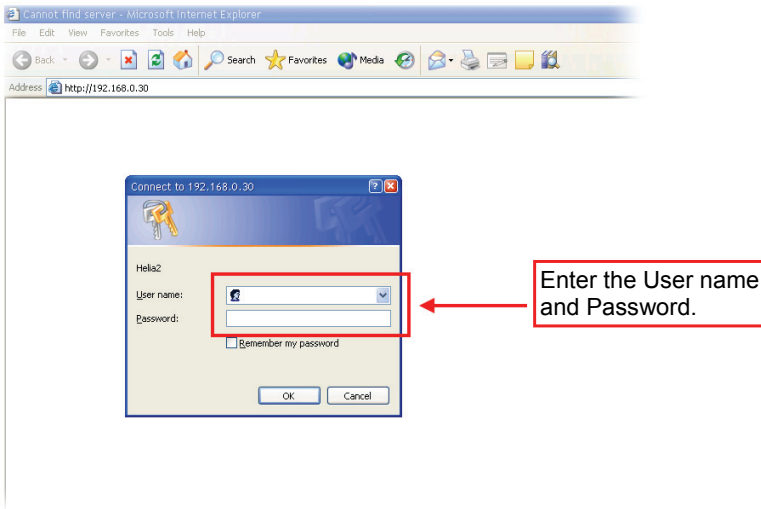


3. Once you get the IP address of the camera, launch the Web browser or UltraView Pro to access your camera.

3.2 Accessing to the Camera

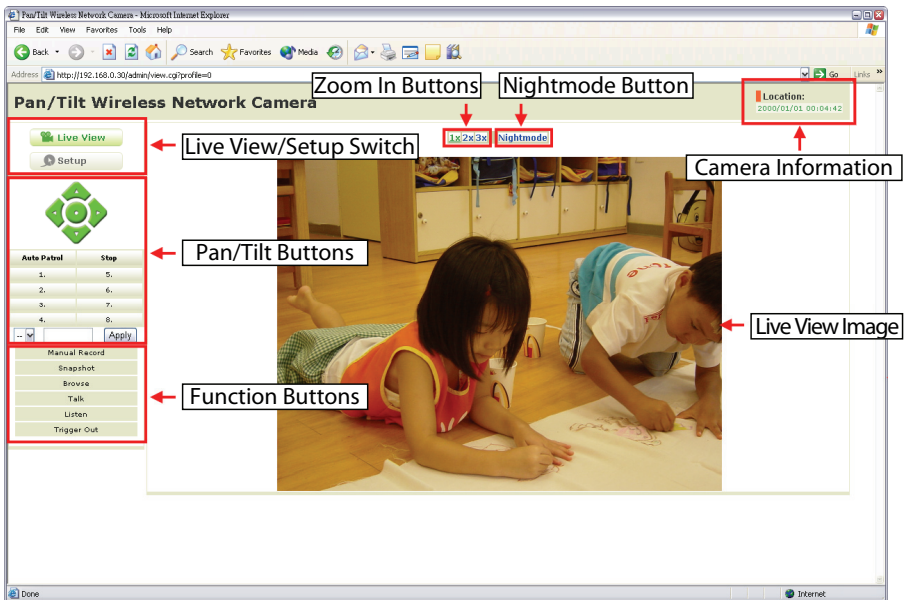
Whenever you want to access the camera:

1. Since the default configuration of the camera is DHCP mode enabled, you are recommended to launch IPFinder to search the IP address that is assigned to the camera by the DHCP server, and then click **Link** to access the camera via the Web browser.
2. If Network Camera can't get IP Address under DHCP mode, the default IP Address will be **192.168.0.30**.
3. When the login window appears, enter the default User name (**admin**) and password (**admin**) and press **OK** to access to the main screen of the camera's Web Configuration.



NOTE If you are initially access to the camera, you will be ask to install a new plug-in for the camera. Permission request depends on the Internet security settings of your computer. Click **Yes** to proceed.

After you login into the Web Configuration of the camera, the main page will appear as below:

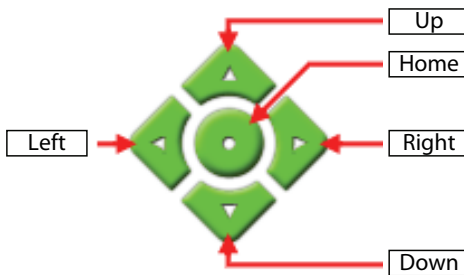


The main page of the Web Configuration provides you with many useful information and functions, including:

- **Camera Information** – Displays the camera’s location and the current date & time. The information can be modified in the Web Configuration.
- **Live View Image** – Displays the real-time image of the connected camera.
 - Move your mouse to the Live View area and click on anywhere, the camera lens will then move to the position where you clicked to display it in the central part of Live View area.
 - When you enlarge the Live View by clicking the Zoom In buttons (2x or 3x), you can move the displayed zoom image by right-clicking your mouse on the Live View area. The position

where you right-clicked will be displayed in the central part of Live View area.

- **Zoom In Buttons** – Click the buttons to zoom in the live view image by 1x, 2x, and 3x.
- **Nightmode Button** – Click the button to enable the “nightshot mode” to deliver clearer images in the dark environment. However, this will reduce the frame rate of video setting.
- **Live View/Setup Switch** – Click **Setup** to configure the camera. For details, see Chapter 4 and Click the **Live View** button to return to the Main screen to view the live view image.
- **Pan/Tilt Buttons** – Provides the buttons to control the camera lens:
 - **Left/Right/Up/Down/Home** buttons allow you to move the camera lens position. Clicking the **Home** button will move the camera lens to the assigned home position.



- **Auto Patrol** button controls the camera to automatically scan the preset positions once. Click **Stop** to stop patrolling.
- Click the **Number button** (1~8) to move the camera lens to the preset position immediately.

To set up the preset positions, move the camera lens by clicking the Left/Right/Up/Down buttons to the desired position first, then select the number (1~8) from the pull-down list and click the **Apply** button. You can enter a descriptive name for the assigned position in the text box to identify it easily.

- **Function Buttons** – Use these buttons to control the audio, video, and trigger functions.
 - **Manual Record** allows you to record and save a video clip.
 - **Snapshot** allows you to capture and save a still image.
 - **Browse** allows you to assign the destination folder to store the video clips and still images.
 - **Talk** allows you to speak out through the camera. Please note only one user is allowed to use this function at a time.
 - **Listen** allows you to receive the on-site sound and voice from the camera.
 - **Trigger Out** allows you to trigger on/off the GPIO output manually.

NOTE If your PC use Microsoft Vista platform. Maybe you can't find these recorded files what stored by **Snapshot** or **Manual Record**. That you need to disable the protected mode of Security in the IE Browser. Please follow as below Steps:

1. Open IE Browser
2. Select **Tools**→ **Internet Options**
3. Select **Security**
4. Disable the “**Enable Protected Mode**” then press **OK**

3.3 Configuring the IP Address of the PC

If you are failed to access to the camera, please check the IP address of your computer. When you connect the camera to your computer directly to proceed with configuration of the camera, you need to set up the IP addresses to be in the same segment for the two devices to communicate.

1. On your computer, click **Start > Control Panel** to open the Control Panel window.
2. Double-click **Network Connection** to open the Network Connection window.
3. Right-click **Local Area Connection** and then click **Properties** from the shortcut menu.
4. When the Local Area Connection Properties window appears, select the **General** tab.
5. Select **Internet Protocol [TCP/IP]** and then click **Properties** to bring up the Internet Protocol [TCP/IP] Properties window.
6. To configure a fixed IP address that is within the segment of the camera, select the **Use the following IP address** option. Then, enter an IP address into the empty field. The suggested IP address is **192.168.0.x** (x is 1~254 except 30), and the suggested Subnet mask is **255.255.255.0**.
7. When you are finished, click **OK**.

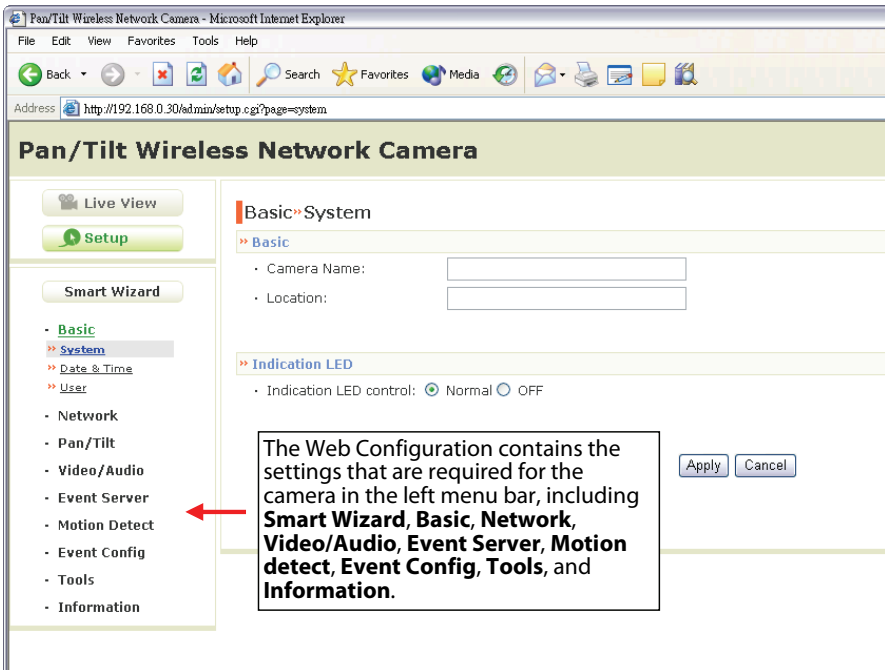
CHAPTER 4

CONFIGURING THE CAMERA

4.1 Using the Web Configuration

You can access and manage the camera through the Web browser and the provided software application UltraView Pro. This chapter describes the Web Configuration, and guides you through the configuration of the camera by using the Web browser.

To configure the camera, click **Setup** on the main page of Web Configuration. The Web Configuration will start from the **Basic** page.



4.2 Using Smart Wizard

The camera's Smart Wizard lets you configure your camera easily and quickly. The wizard will guide you through the necessary settings with detailed instructions on each step.

To start the wizard, click **Smart Wizard** in the left menu bar.

Step 1. Camera Settings

Camera Settings

·Camera Name: ← Enter the name for the camera and place.

·Location:

·Admin Password:

·Confirm Password: ← Enter the administrator password.

Step 2. IP Settings

IP Setting

· DHCP

· Static IP

· IP: . . .

· Subnet Mask: . . .

· Default Gateway: . . .

· Primary DNS: . . .

· Secondary DNS: . . .

· PPPoE

· User Name:

· Password:

Select the IP setting according to your network: **DHCP**, **Static IP**, or **PPPoE**.

Step 3. Email Settings

Email Setting

- SMTP Server Address:
- Port Number:
- Sender Email Address:
- Authentication Mode: None SMTP
- Sender User Name:
- Sender Password:
- Receiver #1 Email Address:
- Receiver #2 Email Address:

Enter the required information to be able to send email with image.

Step 4. Wireless Networking

Wireless Networking

- Network ID(SSID):
- Wireless Mode: Infrastructure Ad-Hoc
- Channel:
- Authentication:
- Encryption: None WEP
- Format: ASCII HEX
- Key Length: 64 bits 128 bits
- WEP Key 1
- WEP Key 2
- WEP Key 3
- WEP Key 4

Complete the required settings for wireless networking.

Step 5. Confirm Settings

Confirm Settings

- Camera Name: wireless network camera 1
- Location: classroom 1
- IP Mode: DHCP
- IP Address: 192.168.0.30
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.0.1
- Primary DNS:
- Secondary DNS:
- SMTP Server Address: mail.com
- Port Number: 25
- Sender Email Address: mymail@mail.com
- Authentication Mode: None
- Sender User Name:
- Receiver #1 Email Address:
- Receiver #2 Email Address:

- ESSID: default
- Connection: Infrastructure
- Channel: 6
- Authentication: Open
- Encryption : None

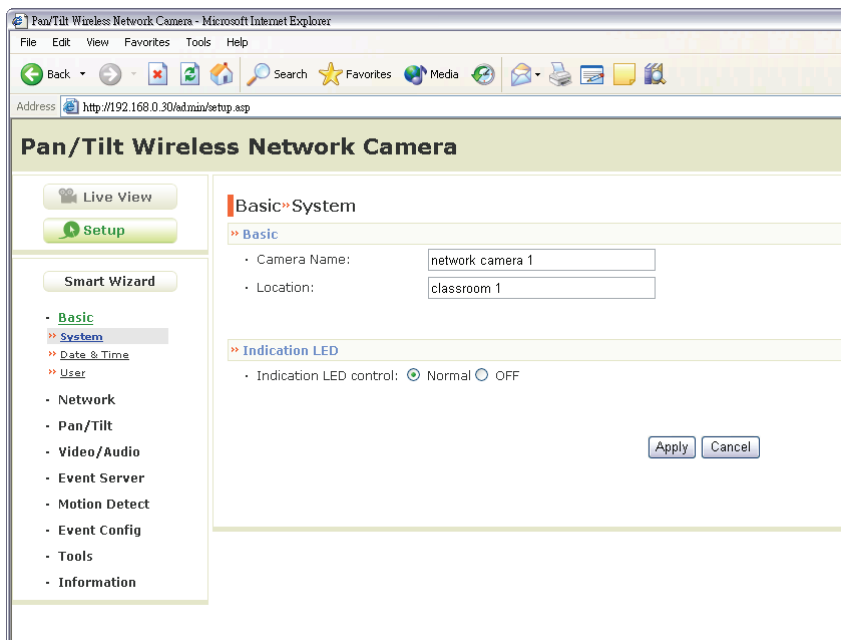
< Prev Apply Cancel

This step shows the configuration of your camera. When you confirm the settings, click **Apply** to finish the wizard and reboot the camera. Otherwise, click **Prev** to go back to the previous step(s) and change the settings; or click **Cancel** to end the wizard and discard the changes.

4.3 Basic Setup

The Basic menu contains three sub-menus that provide the system settings for the camera, such as the Camera Name, Location, Date & Time, and User management.

Basic >> System



■ Basic

- **Camera Name:** Enter a descriptive name for the camera.
- **Location:** Enter a descriptive name for the location used by the camera.

■ Indication LED

This item allows you to set the LED illumination as desired. There are two options: **Normal** and **OFF**.

Basic >> Date & Time

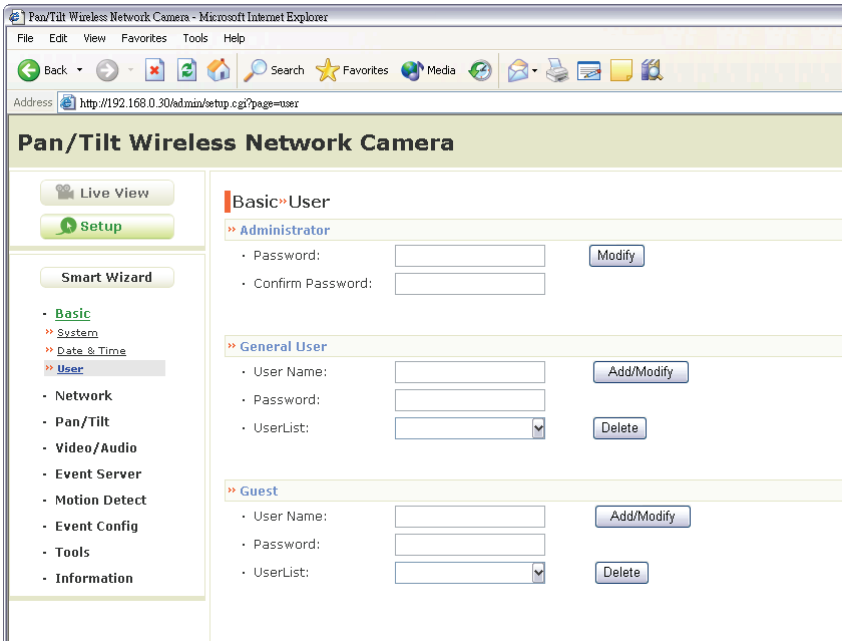
The screenshot shows the web interface for a Pan/Tilt Wireless Network Camera. The browser address bar indicates the URL is `http://192.168.0.30/admin/setup.cgi?page=dateTime`. The page title is "Pan/Tilt Wireless Network Camera". On the left sidebar, there are buttons for "Live View", "Setup", and "Smart Wizard". Below these are navigation links: "Basic", "System", "Date & Time" (highlighted), "User", "Network", "Pan/Tilt", "Video/Audio", "Event Server", "Motion Detect", "Event Config", "Tools", and "Information". The main content area is titled "Basic >> Date & Time" and contains a sub-section "Date and Time". It features several configuration options:

- TimeZone:** A pull-down menu showing "(GMT) Greenwich Mean Time : Dublin, Edinburgh, Lisbon, London".
- Synchronize with PC:** An unselected radio button.
- Synchronize with NTP Server:** A selected radio button. Below it are:
 - NTP Server Address:** An empty text input field.
 - Update Interval:** A dropdown menu set to "6" with the unit "hours".
- Manual:** An unselected radio button. Below it are:
 - Date:** A text input field containing "2000/01/01" with a "(YYYY/MM/DD)" label.
 - Time:** A text input field containing "00:14:26" with a "(hh:mm:ss)" label.

At the bottom right of the configuration area, there are "Apply" and "Cancel" buttons.

- **TimeZone:** Select the proper time zone for the region from the pull-down menu.
- **Synchronize with PC:** Select this option and the date & time settings of the camera will be synchronized with the connected computer.
- **Synchronize with NTP Server:** Select this option and the time will be synchronized with the NTP Server. You need to enter the IP address of the server and select the update interval in the following two boxes.
- **Manual:** Select this option to set the date and time manually.

Basic >> User



■ Administrator

To prevent unauthorized access to the camera's Web Configuration, you are strongly recommend to change the default administrator password. Type the administrator password twice to set and confirm the password.

■ General User

- **User Name:** Enter the user's name you want to add to use the camera.
- **Password:** Enter the password for the new user.

When you are finished, click **Add/Modify** to add the new user to the camera. To modify the user's information, select the one you want to modify from **UserList** and click **Add/Modify**.

- **UserList:** Display the existing users of the camera. To delete a user, select the one you want to delete and click **Delete**.

■ **Guest**

- **User Name:** Enter the guest's name you want to add to use the camera.
- **Password:** Enter the password for the new guest.
- **UserList:** Display the existing guests of the camera. To delete a user, select the one you want to delete and click **Delete**.

NOTE The "General User" can access the camera and control the Function buttons of the camera's Web Configuration; the "Guest" can only view the live view image from the main page of the Web Configuration while accessing the camera. Only the "Administrator" is allowed to configure the camera through the Web Configuration.

4.4 Network Settings

The Network menu contains three sub-menus that provide the network settings for the camera, such as the IP Setting, DDNS Setting, IP Filter, and Wireless network.

Network >> Network

Pan/Tilt Wireless Network Camera

Live View

Setup

Smart Wizard

- Basic
- Network
 - Network
 - IP Filter
 - Wireless
- Pan/Tilt
- Video/Audio
- Event Server
- Motion Detect
- Event Config
- Tools
- Information

Network >> Network

IP Setting

- DHCP
- Static IP
 - IP:
 - Subnet Mask:
 - Default Gateway:
 - Primary DNS: . . .
 - Secondary DNS: . . .
- PPPoE
 - User Name:
 - Password:

DDNS Setting

- Enable
- Provider:
- Host Name:
- User Name:
- Password:

UPnP

- Enable

Ports Number

- HTTP Port: (default: 80)

■ IP Setting

This item allows you to select the IP address mode and set up the related configuration. The default setting is **DHCP** mode enabled.

- **DHCP:** Select this option when your network uses the DHCP server. When the camera starts up, it will be assigned an IP address from the DHCP server automatically.
- **Static IP:** Select this option to assign the IP address for the camera directly. You can use IPFinder to obtain the related setting values.

| | |
|-----------------------------------|---|
| IP | Enter the IP address of the camera. The default setting is 192.168.0.30 . |
| Subnet Mask | Enter the Subnet Mask of the camera. The default setting is 255.255.255.0 . |
| Default Gateway | Enter the Default Gateway of the camera. The default setting is 192.168.0.1 . |
| Primary/ Secondary DNS | DNS (Domain Name System) translates domain names into IP addresses. Enter the Primary DNS and Secondary DNS that are provided by ISP. |

- **PPPoE:** Select this option when you use a direct connection via the ADSL modem. You should have a PPPoE account from your Internet service provider. Enter the **User Name** and **Password**. The camera will get an IP address from the ISP as starting up.

NOTE Once the camera get an IP address from the ISP as starting up, it automatically sends a notification email to you. Therefore, when you select PPPoE as your connecting type, you have to set up the email or DDNS configuration in advance.

■ **DDNS Setting**

With the Dynamic DNS feature, you can assign a fixed host and domain name to a dynamic Internet IP address. Select the **Enable** option to enable this feature. Then, select the Provider from the pull-down list and enter the required information in the **Host Name**, **User Name**, and **Password** boxes. Please note that you have to sign up for DDNS service with the service provider first.

■ **UPnP**

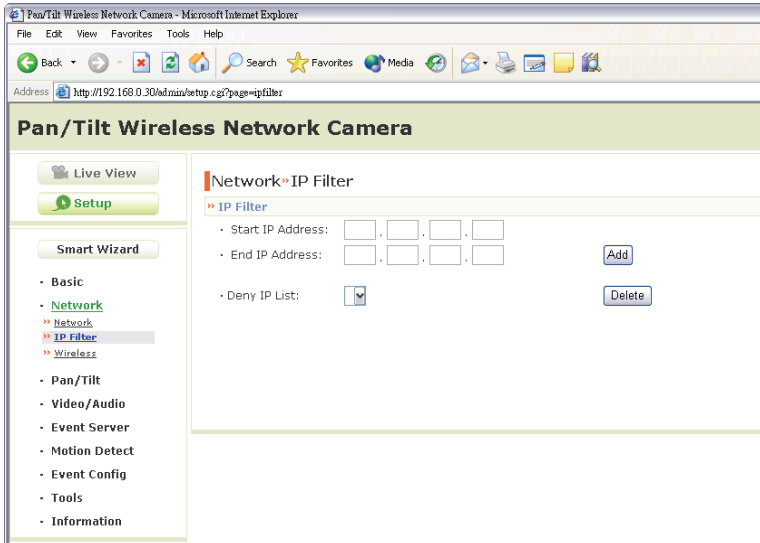
The camera supports UPnP (Universal Plug and Play), which is a set of computer network protocols that enable the device-to-device interoperability. In addition, it supports port auto mapping function so that you can access the camera if it is behind an NAT router or firewall. Select the **Enable** option to enable this feature.

■ **Ports Number**

- **HTTP Port:** The default HTTP port is **80**.

Network >> IP Filter

The IP Filter setting allows the administrator of the camera to limit the users within a certain range of IP addresses to access the camera.



■ Start/End IP Address

Assign a range of IP addresses that are not allowed to access the camera by entering the Start IP address and End IP address. When you are finished, click **Add** to save the range setting. You can repeat the action to assign multiple ranges for the camera.

For example, when you enter 192.168.0.50 in Start IP Address and 192.168.0.80 in End IP Address, the user whose IP address located within 192.168.0.50 ~ 192.168.0.80 will not be allowed to access the camera.

■ Deny IP List

The list displays the range setting(s) of IP addresses that are not allowed to access the camera. To clear the setting, select a range of IP addresses from the list and click **Delete**.

Network >> Wireless Setting

The camera supports WLAN while you use the wireless network. Select the **Enable** option to enable this feature.

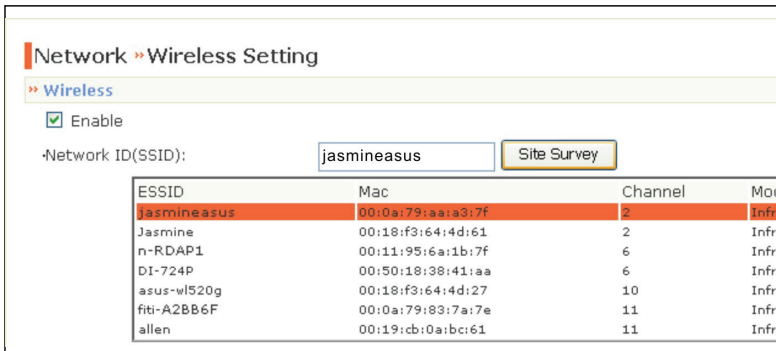
The screenshot shows the configuration interface for a Pan/Tilt Wireless Network Camera. The main title is "Pan/Tilt Wireless Network Camera". On the left, there is a navigation menu with options: Live View, Setup, Smart Wizard, Basic, Network (selected), IP Filter, Wireless (sub-selected), WPS, Video/Audio, Event Server, Motion Detect, Event Config, Tools, and Information. The main content area is titled "Network >> Wireless Setting" and contains the following settings:

- Enable
- Network ID(SSID): default [Site Survey]
- Wireless Mode: Infrastructure Ad-Hoc
- Channel: 6
- Authentication: Open
- Encryption: None WEP
- Format: ASCII HEX
- Key Length: 64 bits 128 bits
- WEP Key 1: []
- WEP Key 2: []
- WEP Key 3: []
- WEP Key 4: []

At the bottom right, there are "Apply" and "Cancel" buttons.

- **Network ID (SSID):** Keep the default setting of this option to connect the camera to any access point under the infrastructure network mode. To connect the camera to a specified access point, set a SSID for the camera to correspond with the access point's ESS-ID. To connect the camera to an Ad-Hoc wireless workgroup, set the same wireless channel and SSID to match with the computer's configuration.

Click **Site Survey** to display the available wireless networks, so that you can easily connect to one of the listed wireless networks.



List of searching results

- **Wireless Mode:** Select the type of wireless communication for the camera: **Infrastructure** or **Ad-Hoc**.
- **Channel:** Select the appropriate channel from the list.
- **Authentication:** Select the authentication method to secure the camera from being used by unauthorized user: **Open**, **Shared-key**, **WPA-PSK**, and **WPA2-PSK**. The following table explains the four options:

| | |
|------------------------------|--|
| Open | The default setting of Authentication mode, which communicates the key across the network. |
| Shared-key | Allow communication only with other devices with identical WEP settings. |
| WPA-PSK/ WPA2-PSK | WPA-PSK/WPA2-PSK is specially designed for the users who do not have access to network authentication servers. The user has to manually enter the starting password in their access point or gateway, as well as in each PC on the wireless network. |

If you select **Open** or **Shared-key** as the Authentication mode, you need to complete the following settings:

Encryption: Select the **WEP** option to enable the data encryption feature to secure the camera within the wireless network.

Format: Once you enable the Encryption feature, you need to determine the encryption format by selecting **ASCII** or **HEX**. ASCII format causes each character you type to be interpreted as an eight-bit value. Hex format causes each pair of characters you type to be interpreted as an eight-bit value in hexadecimal (base 16) notation.

Key Length: Select the WEP key length you use: **64 bits** or **128 bits**.

WEP Key 1/2/3/4: Enter the WEP key(s) in the following boxes.

If you select **WPA-PSK** or **WPA2-PSK** as the Authentication mode, you need to complete the following settings:

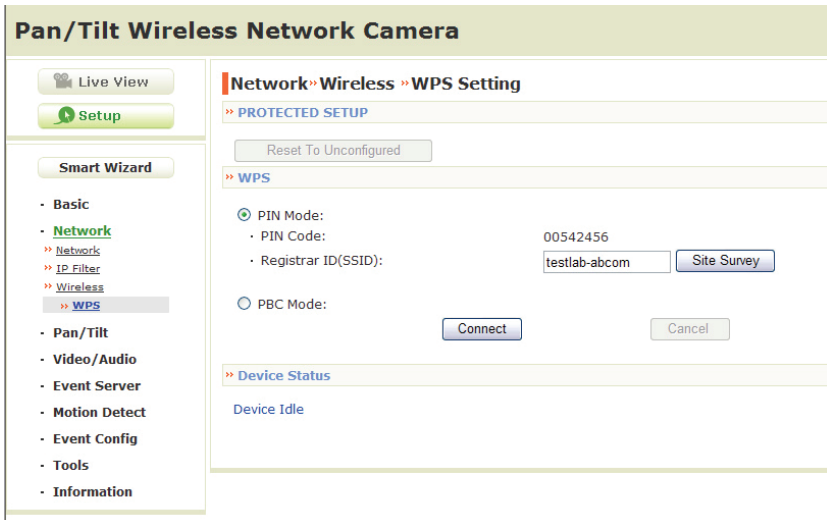
Encryption: Select **TKIP** or **AES**. TKIP (Temporal Key Integrity Protocol) changes the temporal key every 10,000 packets to insure much greater security than the standard WEP security. AES (Advanced Encryption Standard) is used to ensure the highest degree of security and authenticity for digital information.

Pre-Shared Key: This is used to identify each other in the network. Enter the name in the box, and this name must match the Pre-shared key value in the remote device.

Network >> Wireless >> WPS Setting

WPS (Wi-Fi Protected Setup) sets a new standard of Wi-Fi security, providing a simplified secure network setup solution for the end users. WPS can be enabled by the following two options:

1. PIN Mode
2. PBC Mode (or WPS button on the device, depending on hardware design)



■ PROTECTED SETUP

Press the **Reset To Unconfigured** button to reset the WPS configuration of the camera.

■ WPS

- **PIN Mode:** The PIN (Personal Information Number) mode builds the connection by entering the PIN Code directly.
 - a. Click the **PIN Mode** option.

- b. Click **Site Survey** button to select the router (or access point) you want to connect.
 - c. Click the **Connect** button to start WPS function of the camera.
 - d. You need to enter the PIN Code displayed on the camera to the router (or access point) within **120 seconds** to complete the setup.
- **PBC Mode:** The PBC (Push-Button-Configuration) mode builds the connection by simply pressing a button on the device.
- a. Click the **PBC Mode** option.
 - b. Click the **Connect** button to start WPS function of the camera.
- TIP** Instead of clicking the **Connect** button of Configuration Utility, you can press the WPS button if the camera is designed with a hardware button of WPS function.
- c. You need to press the WPS button on the router (or access point) within **120 seconds** to complete the setup.

■ **Device Status**

Display the WPS configuration of the camera.

- TIP** The Power LED indicates the WPS connection status by:
- blinking 3 times when the connection is built successfully.
 - repeating 3 times of short-short-long blink when the connection is failed.

4.5 Pan/Tilt Settings

The Pan/Tilt menu allows you to configure the pan/tilt functions of the camera.

Pan & Tilt >> Pan & Tilt Settings

Pan/Tilt Wireless Network Camera

Live View
Setup

Smart Wizard

- Basic
- Network
- **Pan/Tilt**
- Video/Audio
- Event Server
- Motion Detect
- Event Config
- Tools
- Information

Pan & Tilt >> Pan & Tilt Setting

>> Pan & Tilt

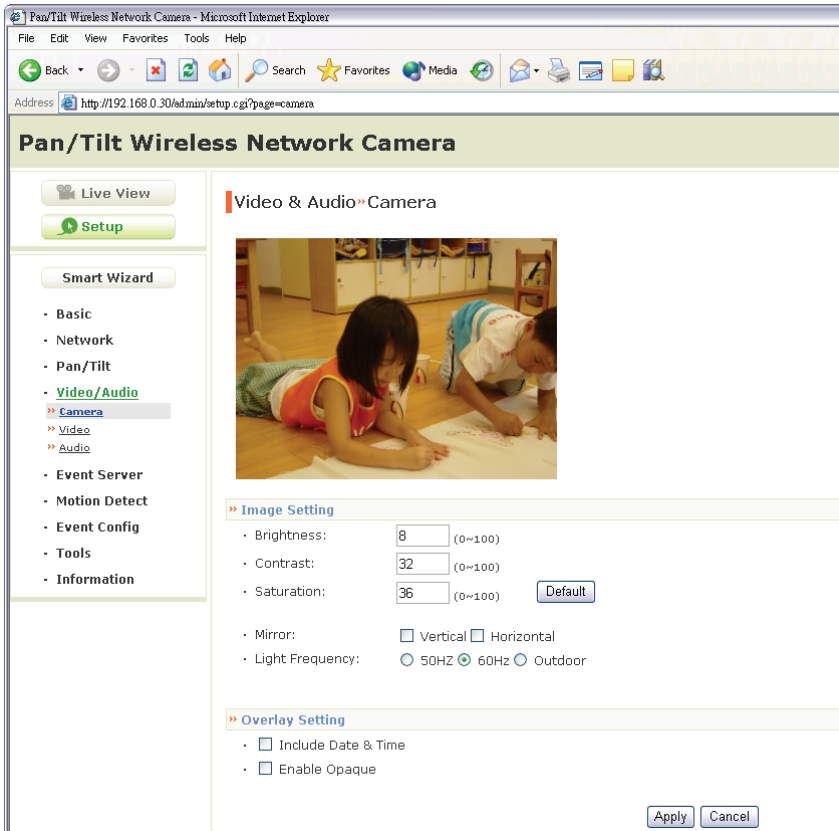
- Pan/Tilt Calibration:
- Pan Steps: (1~20) degrees
- Tilt Steps: (1~20) degrees
- Auto Patrol Stay Time: (1~999) sec(s)
- Startup Preset: (Dropdown menu: None, 1, 2, 3, 4, 5, 6, 7, 8)

- **Pan/Tilt Calibration:** Click **Calibration** to calibrate the position of the camera lens.
- **Pan Steps:** Set the changing range (1~20 degrees) when you click the Left/Right button.
- **Tilt Steps:** Set the changing range (1~20 degrees) when you click the Up/Down button.
- **Auto Patrol Stay Time:** Set the stay time (1~999 seconds) of each preset positions when the camera is patrolling.
- **Startup Preset:** Set the position (1~8, or None) to start patrolling.

4.6 Setting up Video & Audio

The Video & Audio menu contains three sub-menus that provide the video and audio settings for the camera.

Video & Audio >> Camera



The screenshot shows a web browser window titled "Pan/Tilt Wireless Network Camera - Microsoft Internet Explorer". The address bar shows "http://192.168.0.30/ed/min/setup.cgi?page=camera". The page has a green header with the title "Pan/Tilt Wireless Network Camera". On the left, there is a "Smart Wizard" menu with options: Basic, Network, Pan/Tilt, Video/Audio (selected), Camera (sub-selected), Video, Audio, Event Server, Motion Detect, Event Config, Tools, and Information. The main content area is titled "Video & Audio >> Camera" and features a live video feed of two children on a floor. Below the feed are two sections: "Image Setting" and "Overlay Setting". The "Image Setting" section includes: Brightness (8), Contrast (32), Saturation (36), Mirror (Vertical/Horizontal checkboxes), and Light Frequency (50Hz, 60Hz, Outdoor radio buttons). The "Overlay Setting" section includes: Include Date & Time (checkbox) and Enable Opaque (checkbox). "Apply" and "Cancel" buttons are at the bottom right.

■ Image Setting

- **Brightness:** Adjust the brightness level from 0 ~ 100.
- **Contrast:** Adjust the contrast level from 0 ~ 100.
- **Saturation:** Adjust the colors level from 0 ~ 100.

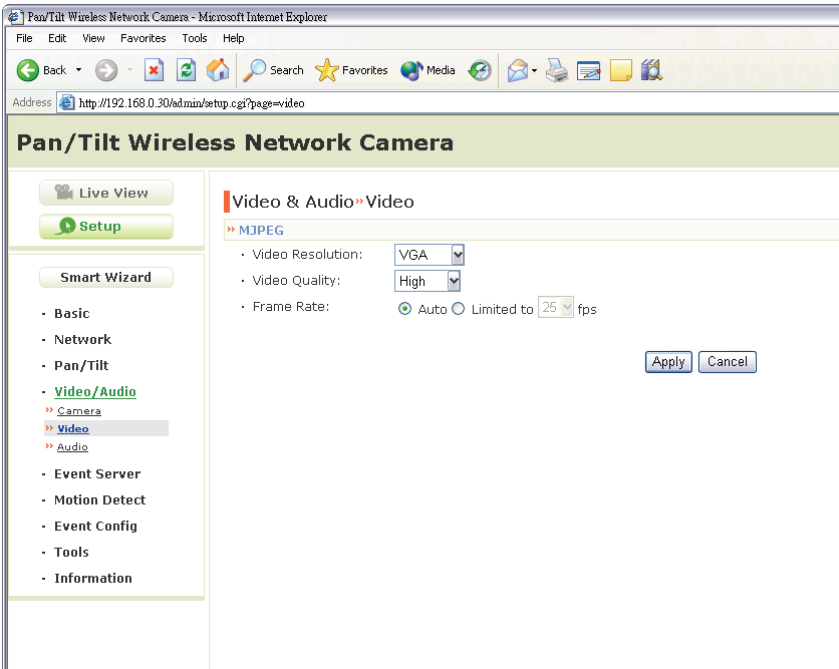
Click **Default** to restore the default settings of the three options above.

- **Mirror:** Select the **Horizontal** option to mirror the image horizontally. Select the **Vertical** option to mirror the image vertically.
- **Light Frequency:** Select the proper frequency according to the camera's location: **50Hz**, **60Hz**, or **Outdoor**.

■ **Overlay Setting**

- **Includes Date & Time:** Select this option to display the date & time stamp on the live view image.
- **Enable Opaque:** Select this option to set a black background to the displayed date & time stamp.

Video & Audio >> Video



■ MJPEG

- **Video Resolution:** Select the desired video resolution from the three formats: **VGA**, **QVGA** and **QQVGA**. The higher setting (VGA) obtains better video quality while it uses more resource within your network.
- **Video Quality:** Select the desired image quality from five levels: **Lowest**, **Low**, **Medium**, **High**, and **Highest**.
- **Frame Rate:** Select **Auto** or a proper setting depending on your network status.

Video & Audio >> Audio



■ Camera Microphone In

Select the **Enable** option to enable the camera's audio function, so that you can receive the on-site sound and voice from the camera.

■ Camera Speaker Out

Select the **Enable** option to enable the camera's external speaker function, so that the connected speaker can play the sound and voice through the camera.

- **Volume:** Set the speaker's volume.

4.7 Event Server Configuration

The Event Server menu contains two sub-menus that allow you to upload images to FTP, send emails that include still images, and store the images to a NAS system.

When you complete the required settings for FTP or Email, click **Test** to test the related configuration is correct or not. Once the camera connects to the server successfully, click **Apply**.

Event Server Setting>> FTP

The screenshot shows the configuration interface for a Pan/Tilt Wireless Network Camera. The main title is "Pan/Tilt Wireless Network Camera". On the left, there is a "Smart Wizard" menu with options: Basic, Network, Pan/Tilt, Video/Audio, Event Server (selected), FTP (selected), Email, Motion Detect, Event Config, Tools, and Information. The main content area is titled "Event Server Setting>>FTP" and contains the following fields:

- Host Address: [Empty text box]
- Port Number: [21]
- User Name: [Empty text box]
- Password: [Empty text box]
- Directory Path: [Empty text box]
- Passive mode: Enable

At the bottom right of the configuration area, there are three buttons: Test, Apply, and Cancel.

- **Host Address:** Enter the IP address of the target FTP server.
- **Port Number:** Enter the port number used for the FTP server.
- **User Name:** Enter the user name to login into the FTP server.
- **Password:** Enter the password to login into the FTP server.
- **Directory Path:** Enter the destination folder for uploading the images. For example, */Test/*.
- **Passive Mode:** Select the **Enable** option to enable passive mode.

Event Server Setting >> Email

Pan/Tilt Wireless Network Camera

Live View
Setup

Smart Wizard

- Basic
- Network
- Pan/Tilt
- Video/Audio
- Event Server**
 - ETP
 - Email**
- Motion Detect
- Event Config
- Tools
- Information

Event Server Setting >> Email

> Email

- SMTP Server Address:
- Port Number:
- Sender Email Address:
- Authentication Mode: None SMTP
- Sender User Name:
- Sender Password:
- Receiver #1 Email Address:
- Receiver #2 Email Address:

Test Apply Cancel

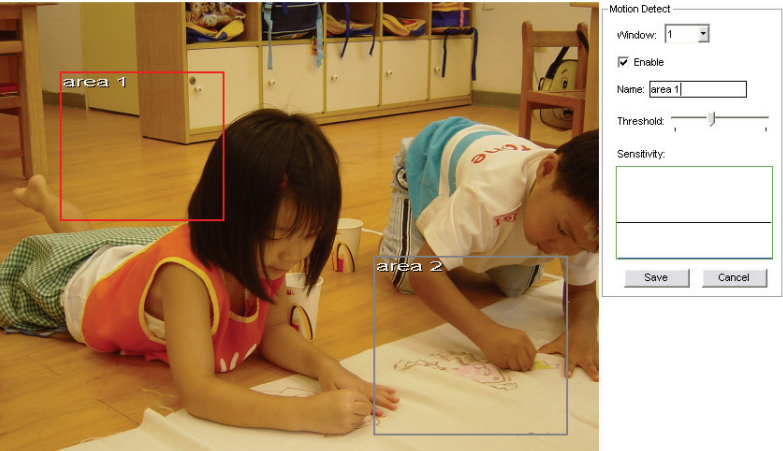
- **SMTP Server Address:** Enter the mail server address. For example, mymail.com.
- **Port number:** Assign the SMTP port in the text box. The default SMTP port is **25**.
- **Sender Email Address:** Enter the email address of the user who will send the email. For example, John@mymail.com.
- **Authentication Mode:** Select **None** or **SMTP** according to the mail server configuration.
- **Sender User Name:** Enter the user name to login the mail server.
- **Sender Password:** Enter the password to login the mail server.
- **Receiver #1 Email Address:** Enter the first email address of the user who will receive the email.
- **Receiver #2 Email Address:** Enter the second email address of the user who will receive the email.

4.8 Motion Detect

The Motion Detect menu contains the command and option that allow you to enable and set up the motion detection feature of the camera. The camera provides two detecting areas.

To enable the detecting area, select **Window 1** or **2** from the pull-down list, and then select **Enable**. When the detecting area is enabled, you can use the mouse to move the detecting area and change the area coverage.

Motion Detection » Detection Configuration



Motion Detect

Window: 1

Enable

Name: area 1

Threshold: [Slider]

Sensitivity:

[Save] [Cancel]

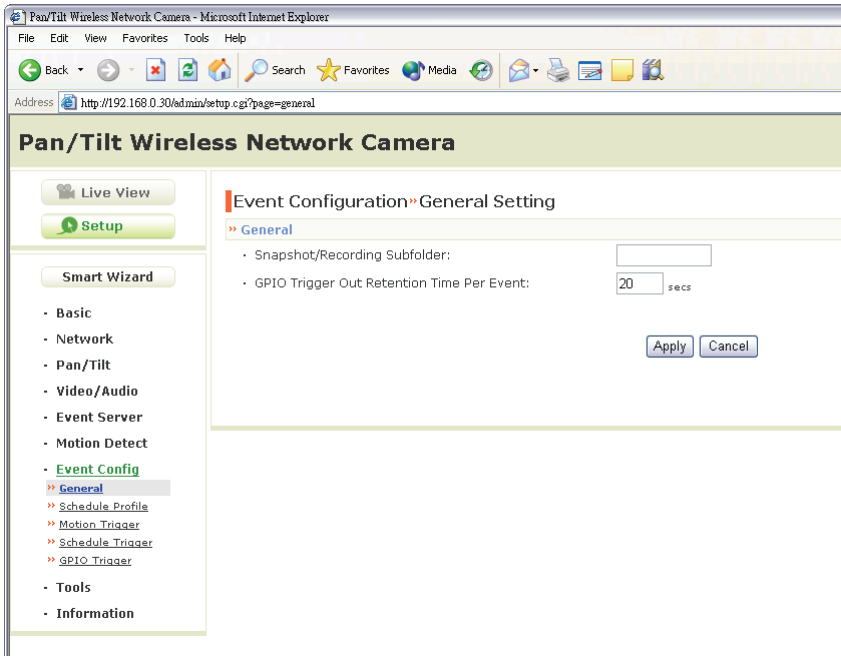
- **Name:** Assign a name to the detecting area.
- **Threshold:** Move the slide bar to adjust the level for detecting motion to record video.

NOTE Sliding the Threshold bar to the right will decrease the sensitivity of motion detection; sliding the Threshold bar to the left will increase the sensitivity of motion detection

4.9 Event Config

The Event Config menu contains five sub-menus that provide the commands to configure event profiles.

Event Configuration >> General Setting



- **Snapshot/Recording Subfolder:** You can assign a descriptive name for the subfolder to save the captured image/video files. Otherwise, leave this option blank to use the default setting.
- **GPIO Trigger Out Retention Time Per Event:** Limit the retention time of the GPIO Trigger Out function.

Event Configuration >> Arrange Schedule Profile

This sub-menu displays the scheduled profile(s). To customize the profile, click **Add** and then enter a descriptive name for the profile in the prompt dialog window. After entering the profile name, click **OK** and the profile is added to the Schedule Profiles list. To delete the profile, select the profile in the list and click **Delete**.

Event Configuration >> Arrange Schedule Profile

Schedule Profiles

classroom1

Add Delete

Profile Name: classroom1

Weekdays: Sun Mon Tue Wed Thr Fri Sat

Time List: 09:00 - 12:00
13:00 - 17:00

Add Add this to all weekdays

Delete Delete this from all weekdays

Start Time: 13 : 00

End Time: 17 : 00

Save

- **Profile Name:** Display the profile name that you select in the Schedule Profiles list.
- **Weekdays:** Select the weekday(s) that you want to separately assign in the schedule profile. The weekday that has been assigned will be displayed with green color.
- **Time List:** Display the time period that you have assigned within the selected weekday. To assign the same time period to every weekday, click **Add this to all weekdays**; click **Delete this from all weekdays** to remove the selected time period from every weekday. Click Delete to remove the selected time period.
- **Start/End Time:** Enter the start and end time and then click **Add** to assign a time period within in the selected weekday.

Event Configuration >> Motion Detect Trigger

Select the **Enable** option to enable the motion detect trigger function of the camera, so that you can set Trigger Out function or send captured images within the detecting area to the FTP server or email receiver. You have to configure corresponding settings, such as FTP server and email server, to enable this feature.



- **Schedule Profile:** Select a schedule profile from the pull-down list.
- **Action:** Set the **Trigger Out** function or select the destination of the captured images: **Send Email** or **FTP Upload**.

Event Configuration >> Schedule Trigger

You can separately configure the schedule for trigger function of the camera by **Email** or **FTP**. Select the **Enable** option on each item, and then select a **Schedule Profile** from the pull-down list and set the **Interval** time.

Pan/Tilt Wireless Network Camera - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media Print Mail

Address: http://192.168.0.30/admin/setup.cgi?page=scheduletrigger

Pan/Tilt Wireless Network Camera

Live View

Setup

Smart Wizard

- Basic
- Network
- Pan/Tilt
- Video/Audio
- Event Server
- Motion Detect
- Event Config
- General
- Schedule Profile
- Motion Trigger
- Schedule Trigger
- GPIO Trigger
- Tools
- Information

Event Configuration >> Schedule Trigger

Email Schedule

Enable

• Schedule Profile: always

• Interval: 20 secs

FTP Schedule

Enable

• Schedule Profile: always

• Interval: 30 secs

1 frame(s)/sec

Apply Cancel

■ Email/FTP Schedule

- **Schedule Profile:** Select a schedule profile from the pull-down list.
- **Interval:** Enter a number in this box to setup the time (in second) to send Email or upload to FTP regularly.

Event Configuration >> GPIO Trigger

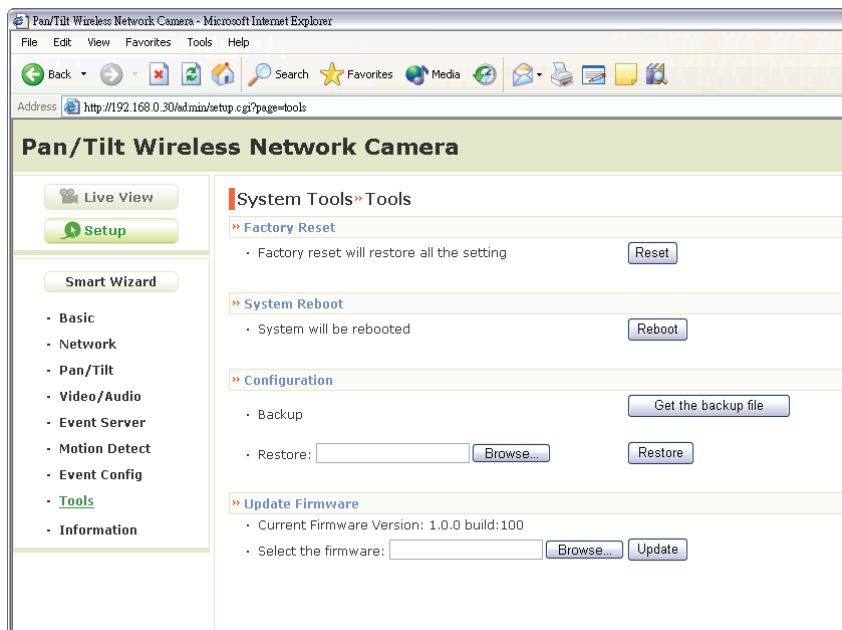
Select the **Enable** option to enable the GPIO trigger function of the camera, so that you can set Trigger Out function or send captured images within the detecting area to the FTP server or email receiver. You have to configure corresponding settings, such as FTP server and email server, to enable this feature.



- **Schedule Profile:** Select a schedule profile from the pull-down list.
- **Action:** Set the **Trigger Out** function or select the destination of the captured images: **Send Email** or **FTP Upload**.

4.10 Tools

The Tools menu provides the commands that allow you to restart or reset the camera. You can also backup and restore your configuration, and upgrade the firmware for the camera.



■ Factory Reset

Click **Reset** to restore all factory default settings for the camera.

■ System Reboot

Click **Reboot** to restart the camera just like turning the device off and on. The camera configuration will be retained after rebooting.

■ Configuration

You can save your camera configuration as a backup file on your computer. Whenever you want to resume the original settings, you can restore them by retrieving the backup file.

- **Backup:** Click **Get the backup file** to save the current configuration of the camera.
- **Restore:** Click **Browse** to locate the backup file and then click **Restore**.

■ **Update Firmware**

This item displays the current firmware version. You can upgrade the firmware for your camera once you obtained a latest version of firmware.

- **Select the firmware:** Click **Browse** to locate the backup file and then click **Update**.

NOTE Make sure to keep the camera connected to the power source during the process of upgrading firmware. Otherwise, the camera might be damaged because of failure of upgrading firmware.

4.11 Information

The Information menu displays the current configuration and events log of the camera.

The screenshot shows a web browser window titled "Pan/Tilt Wireless Network Camera - Microsoft Internet Explorer". The address bar shows "http://192.168.0.30/admin/setup.cgi?page=deviceinfo". The page title is "Pan/Tilt Wireless Network Camera".

On the left side, there is a navigation menu with the following items:

- Live View
- Setup
- Smart Wizard
- Basic
- Network
- Pan/Tilt
- Video/Audio
- Event Server
- Motion Detect
- Event Config
- Tools
- Information
 - Device Info (highlighted)
 - System Log

The main content area is titled "System Information » Device Information". It contains the following sections:

- Basic**
 - Camera Name: network camera 1
 - Location: classroom 1
 - Firmware Version: 1.0.0 build: 100
- Video & Audio**
 - MJPEG Resolution: VGA
 - Microphone In: Enable
 - Speaker Out: Enable
- Network**
 - IP MODE: DHCP
 - IP Address: 192.168.0.30
 - Subnet Mask: 255.255.255.0
 - Default Gateway: 192.168.0.1
 - MAC Address: 00:FF:CS:08:01:09
 - Primary DNS Address: 168.95.1.1
 - Secondary DNS address:
 - UPnP Enable: Enable
 - HTTP Port: 80
- Wireless**
 - ESSID: default
 - Connection: Infrastructure
 - Channel: 6
 - Authentication: Open
 - Encryption: None

■ Device Info

Display the Basic, Video & Audio, Network, and Wireless settings of the camera.

■ System Log

The Logs table displays the events log recorded by the system.

APPENDIX

A.1 Specification

■ Image Sensor

Sensor 1/4" color CMOS

Resolution 640x480

■ Video

Compression MJPEG

Video resolution VGA/QVGA/QQVGA; 30fps max.

■ Audio

Input Built-in MIC

Output Headphone output jack (Mono)

Codec PCM

■ User Interface

LAN One RJ-45 port

Antenna One external antenna

WPS One WPS button

Reset One reset button

GPIO 1 in/1 out connectors

Input: active high: 9~40V DC; dropout: 0V DC

Output: close circuit current 70mA AC or

100mA DC maximum, 30 Ohm; open circuit
voltage 240V AC or 350V DC maximum

LEDs Power LED (amber); Link LED (green)

■ **System Hardware**

| | |
|------------------|---------------|
| Processor | ARM9 base |
| RAM | 32MB SDRAM |
| ROM | 4MB NOR Flash |
| Power | DC 12V |

■ **Communication**

| | |
|-------------------------|---|
| LAN | 10/100Mbps Fast Ethernet, auto-sensed, Auto-MDIX |
| WLAN | IEEE 802.11b/g/n |
| Protocol support | TCP/IP, UDP, ICMP, DHCP, NTP, DNS, DDNS, SMTP, FTP, HTTP, PPPoE, UPnP |

■ **Pan/Tilt**

| | |
|-------------|---|
| Pan | 165 degree (left) to 165 degree (right) |
| Tilt | 90 degree (up) to 15 degree (down) |

■ **Software**

| | |
|-------------------|---|
| OS Support | Windows 2000/XP/Vista/Win7 |
| Browser | Internet Explorer 6.0 or above Apple Safari 2 or above Mozilla Firefox 2.00 or above Google Chrome |
| Software | UltraView Pro for playback/recording/ configuration features |

■ **Operating Environment**

| | |
|--------------------|---|
| Temperature | - Operation: 0°C ~ 45°C - Storage: -15°C ~ 60°C |
| Humidity | - Operation: 20% ~ 85% non-condensing - Storage: 0% ~ 90% non-condensing |

■ **EMI**

FCC Class B, CE Class B

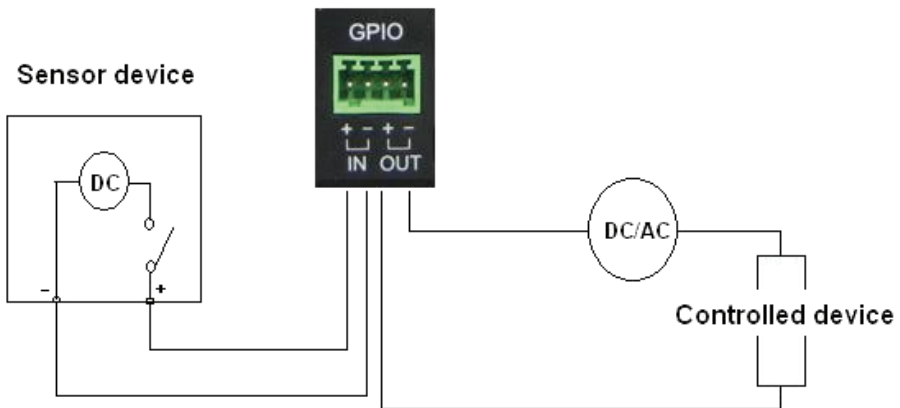
A.2 GPIO Terminal Application

Typically used in association with programming scripts for developing applications for motion detection, event triggering, alarm notification via e-mail, and a variety of external control functions. The GPIO connectors are located on the rear panel of the camera, which provide the interface of connecting the sensor device (IN) and controlled device (OUT).

Connector Pin Assignment

| PIN | SPECIFICATION |
|-----|--|
| IN | Active High voltage 9~40V DC; Dropout-out voltage 0V DC |
| OUT | Close circuit current 70mA AC or 100mA DC maximum, Output resistance 30 Ohm; Open circuit voltage 240V AC or 350V DC maximum |

Interface Schematic



A.3 Glossary of Terms

NUMBERS

- 10BASE-T** 10BASE-T is Ethernet over UTP Category III, IV, or V unshielded twisted-pair media.
- 100BASE-TX** The two-pair twisted-media implementation of 100BASE-T is called 100BASE-TX.

A

- ADPCM** Adaptive Differential Pulse Code Modulation, a new technology improved from PCM, which encodes analog sounds to digital form.
- Applet** Applets are small Java programs that can be embedded in an HTML page. The rule at the moment is that an applet can only make an Internet connection to the computer from that the applet was sent.
- ASCII** American Standard Code For Information Interchange, it is the standard method for encoding characters as 8-bit sequences of binary numbers, allowing a maximum of 256 characters.
- ARP** Address Resolution Protocol. ARP is a protocol that resides at the TCP/IP Internet layer that delivers data on the same network by translating an IP address to a physical address.
- AVI** Audio Video Interleave, it is a Windows platform audio and video file type, a common format for small movies and videos.

B

- BOOTP** Bootstrap Protocol is an Internet protocol that can automatically configure a network device in a diskless workstation to give its own IP address.

C

- Communication** Communication has four components: sender, receiver,

message, and medium. In networks, devices and application tasks and processes communicate messages to each other over media. They represent the sender and receivers. The data they send is the message. The cabling or transmission method they use is the medium.

Connection

In networking, two devices establish a connection to communicate with each other.

D

DHCP

Developed by Microsoft, DHCP (Dynamic Host Configuration Protocol) is a protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network. In some systems, the device's IP address can even change while it is still connected. It also supports a mix of static and dynamic IP addresses. This simplifies the task for network administrators because the software keeps track of IP addresses rather than requiring an administrator to manage the task. A new computer can be added to a network without the hassle of manually assigning it a unique IP address. DHCP allows the specification for the service provided by a router, gateway, or other network device that automatically assigns an IP address to any device that requests one.

DNS

Domain Name System is an Internet service that translates domain names into IP addresses. Since domain names are alphabetic, they're easier to remember. The Internet however, is really based on IP addresses every time you use a domain name the DNS will translate the name into the corresponding IP address. For example, the domain name *www.network_camera.com* might translate to *192.167.222.8*.

E

Enterprise

An enterprise network consists of collections of networks connected to each other over a geographically dispersed

network area. The enterprise network serves the needs of a widely distributed company and operates the company's mission-critical applications.

Ethernet The most popular LAN communication technology. There are a variety of types of Ethernet, including 10Mbps (traditional Ethernet), 100Mbps (Fast Ethernet), and 1,000Mbps (Gigabit Ethernet). Most Ethernet networks use Category 5 cabling to carry information, in the form of electrical signals, between devices. Ethernet is an implementation of CSMA/CD that operates in a bus or star topology.

E

Fast Ethernet Fast Ethernet, also called 100BASE-T, operates at 10 or 100Mbps per second over UTP, STP, or fiber-optic media.

Firewall Firewall is considered the first line of defense in protecting private information. For better security, data can be encrypted. A system designed to prevent unauthorized access to or from a private network. Firewalls are frequently used to prevent unauthorized Internet users from accessing private networks connected to the Internet, especially Intranets all messages entering or leaving the intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria.

G

Gateway A gateway links computers that use different data formats together.

Group Groups consist of several user machines that have similar characteristics such as being in the same department.

H

HEX Short for hexadecimal refers to the base-16 number system,

which consists of 16 unique symbols: the numbers 0 to 9 and the letters A to F. For example, the decimal number 15 is represented as F in the hexadecimal numbering system. The hexadecimal system is useful because it can represent every byte (8 bits) as two consecutive hexadecimal digits. It is easier for humans to read hexadecimal numbers than binary numbers.

!

Intranet

This is a private network, inside an organization or company that uses the same software you will find on the public Internet. The only difference is that an Intranet is used for internal usage only.

Internet

The Internet is a globally linked system of computers that are logically connected based on the Internet Protocol (IP). The Internet provides different ways to access private and public information worldwide.

Internet address

To participate in Internet communications and on Internet Protocol-based networks, a node must have an Internet address that identifies it to the other nodes. All Internet addresses are IP addresses

IP

Internet Protocol is the standard that describes the layout of the basic unit of information on the Internet (the *packet*) and also details the numerical addressing format used to route the information. Your Internet service provider controls the IP address of any device it connects to the Internet. The IP addresses in your network must conform to IP addressing rules. In smaller LANs, most people will allow the DHCP function of a router or gateway to assign the IP addresses on internal networks.

IP address

IP address is a 32-bit binary digit number that identifies each sender or receiver of information that is sent in packets across the Internet. For example 80.80.80.69 is an IP address. When you “call” that number, using any connection methods, you get connected to the computer that “owns” that IP address.

ISP

ISP (Internet Service Provider) is a company that maintains a network that is linked to the Internet by way of a dedicated communication line. An ISP offers the use

of its dedicated communication lines to companies or individuals who can't afford the high monthly cost for a direct connection.

J

JAVA

Java is a programming language that is specially designed for writing programs that can be safely downloaded to your computer through the Internet without the fear of viruses. It is an object-oriented multi-thread programming best for creating applets and applications for the Internet, Intranet and other complex, distributed network.

L

LAN

Local Area Network a computer network that spans a relatively small area sharing common resources. Most LANs are confined to a single building or group of buildings.

M

MJPEG

MJPEG (Motion JPEG) composes a moving image by storing each frame of a moving picture sequence in JPEG compression, and then decompressing and displaying each frame at rapid speed to show the moving picture.

N

NAT

Network Address Translator generally applied by a router that makes many different IP addresses on an internal network appear to the Internet as a single address. For routing messages properly within your network, each device requires a unique IP address. But the addresses may not be valid outside your network. NAT solves the problem. When devices within your network request information from the Internet, the requests are forwarded to the Internet under the router's IP address. NAT

distributes the responses to the proper IP addresses within your network.

Network

A network consists of a collection of two or more devices, people, or components that communicate with each other over physical or virtual media. The most common types of network are:

LAN – (local area network): Computers are in close distance to one another. They are usually in the same office space, room, or building.

WAN – (wide area network): The computers are in different geographic locations and are connected by telephone lines or radio waves.

NWay Protocol

A network protocol that can automatically negotiate the highest possible transmission speed between two devices.

P

PCM

PCM (Pulse Code Modulation) is a technique for converting analog audio signals into digital form for transmission.

PING

Packet Internet Groper, a utility used to determine whether a specific IP address is accessible. It functions by sending a packet to the specified address and waits for a reply. It is primarily used to troubleshoot Internet connections.

PPPoE

Point-to-Point Protocol over Ethernet. PPPoE is a specification for connecting the users on an Ethernet to the Internet through a common broadband medium, such as DSL or cable modem. All the users over the Ethernet share a common connection.

Protocol

Communication on the network is governed by sets of rules called protocols. Protocols provide the guidelines devices use to communicate with each other, and thus they have different functions. Some protocols are responsible for formatting and presenting and presenting data that will be transferred from file server memory to the file server's net work adapter Others are responsible

for filtering information between networks and forwarding data to its destination. Still other protocols dictate how data is transferred across the medium, and how servers respond to workstation requests and vice versa. Common network protocols responsible for the presentation and formatting of data for a network operating system are the Internetwork Packet Exchange (IPX) protocol or the Internet Protocol (IP). Protocols that dictate the format of data for transfers over the medium include token-passing and Carrier Sense Multiple Access with Collision Detection (CSMA/CD), implemented as token-ring, ARCNET, FDDI, or Ethernet. The Router Information Protocol (RIP), a part of the Transmission Control Protocol/Internet Protocol (TCP/IP) suite, forwards packets from one network to another using the same network protocol.

R

RJ-45

RJ-45 connector is used for Ethernet cable connections.

Router

A router is the network software or hardware entity charged with routing packets between networks.

RTP

RTP (Real-time Transport Protocol) is a data transfer protocol defined to deliver **live media** to the clients at the same time, which defines the transmission of video and audio files in real time for Internet applications.

RTSP

RTSP (Real-time Streaming Protocol) is the standard used to transmit **stored media** to the client(s) at the same time, which provides client controls for random access to the content stream.

S

Server

It is a simple computer that provides resources, such as files or other information.

SIP

SIP (Session Initiated Protocol) is a standard protocol that delivers the real-time communication for Voice over IP (VoIP), which establishes sessions for features such as audio and video conferencing.

| | |
|--------------------|---|
| SMTP | The Simple Mail Transfer Protocol is used for Internet mail. |
| SNMP | Simple Network Management Protocol. SNMP was designed to provide a common foundation for managing network devices. |
| Station | In LANs, a station consists of a device that can communicate data on the network. In FDDI, a station includes both physical nodes and addressable logical devices. Workstations, single-attach stations, dual-attach stations, and concentrators are FDDI stations. |
| Subnet mask | In TCP/IP, the bits used to create the subnet are called the subnet mask. |

I

| | |
|--------------------|--|
| (TCP/IP) | Transmission Control Protocol/Internet Protocol is a widely used transport protocol that connects diverse computers of various transmission methods. It was developed by the Department of Defense to connect different computer types and led to the development of the Internet. |
| Transceiver | A transceiver joins two network segments together. Transceivers can also be used to join a segment that uses one medium to a segment that uses a different medium. On a 10BASE-5 network, the transceiver connects the network adapter or other network device to the medium. Transceivers also can be used on 10BASE-2 or 10BASE-T networks to attach devices with AUI ports. |

U

| | |
|------------------|---|
| UDP | The User Datagram Protocol is a connectionless protocol that resides above IP in the TCP/IP suite |
| User Name | The USERNAME is the unique name assigned to each person who has access to the LAN. |
| Utility | It is a program that performs a specific task. |
| UTP | Unshielded twisted-pair. UTP is a form of cable used by |

all access methods. It consists of several pairs of wires enclosed in an unshielded sheath.

W

WAN

Wide-Area Network. A wide-area network consists of groups of interconnected computers that are separated by a wide distance and communicate with each other via common carrier telecommunication techniques.

WEP

WEP is widely used as the basic security protocol in Wi-Fi networks, which secures data transmissions using 64-bit or 128-bit encryption.

Windows

Windows is a graphical user interface for workstations that use DOS.

WPA

WPA (Wi-Fi Protected Access) is used to improve the security of Wi-Fi networks, replacing the current WEP standard. It uses its own encryption, Temporal Key Integrity Protocol (TKIP), to secure data during transmission.

WPA2

Wi-Fi Protected Access 2, the latest security specification that provides greater data protection and network access control for Wi-Fi networks. WPA2 uses the government-grade AES encryption algorithm and IEEE 802.1X-based authentication, which are required to secure large corporate networks.