TRENDnet®

User's Guide

TV-IP212
TV-IP212W
A1

PREFACE

Thank you for purchasing the TV-IP212/TV-IP212W Wire/Wireless Internet Camera Server, a powerful dual-codec 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 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 computers.

This guide will provide you more information of instruction 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 **Using SecurView™** shows you the detail instructions on operating SecurView™ softare.

Chapter 6 **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.

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CHAPTER 1

INTRODUCTION

1.1 Checking the Package Contents

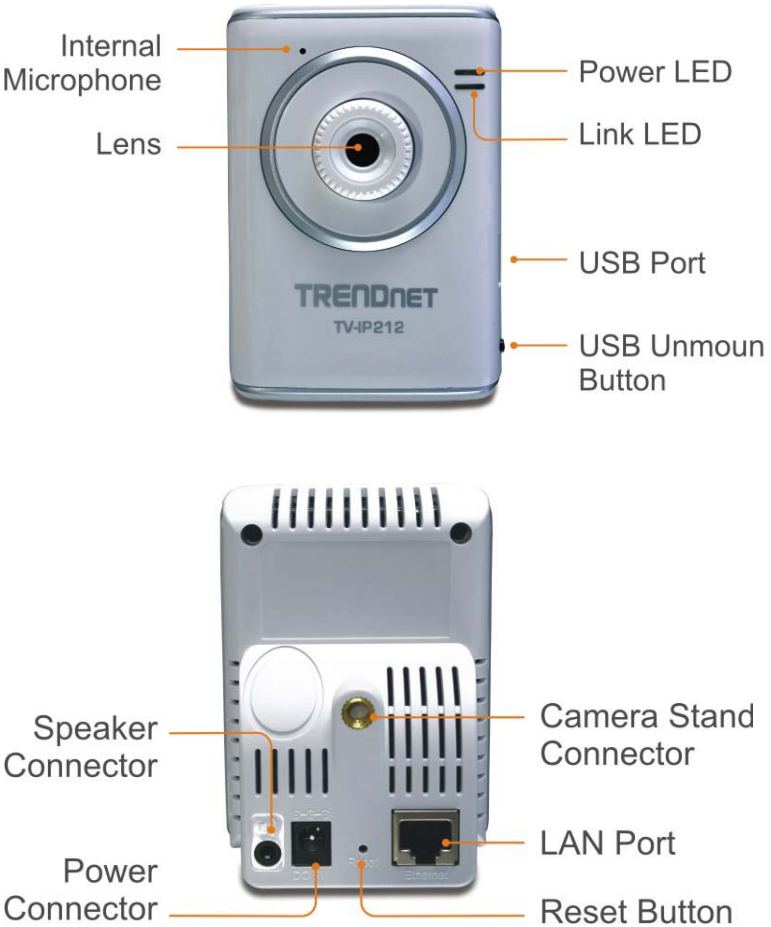
Please check the packaging contents. The packaging should include the following:

- ☑ TV-IP212/TV-IP212W
- ☑ Multi-Language Quick Installation Guide
- ☑ Utility CD-ROM
- ☑ Detachable External Antenna (for TV-IP212W only)
- ☑ Camera Stand.
- ☑ RJ-45 Ethernet Cable
- ☑ AC Power Adapter (5VDC, 2.5A)

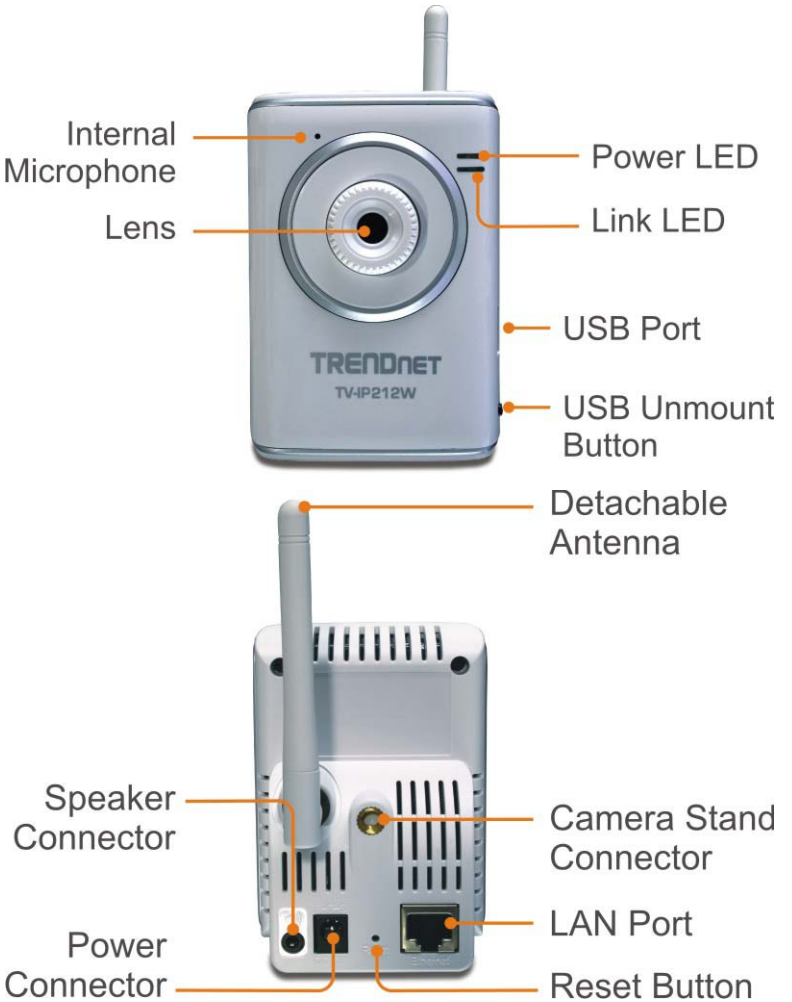
NOTE : If there is any item damage or missing, please contact your local authorized deal for replacement.

1.2 Getting to Know Your Camera

TV-IP212 (Front/Back View)



TV-IP212W (Front/Back View)



- **Internal Microphone:** It allows the camera to receive the sound or voice.

- **Light Sensor:** It is used to trigger on and off the Infrared LEDs according the environmental light level.

- **Power LED:** A steady orange light indicates the camera is powered on.

- **Link LED:** A flash green light indicates the camera's network connection correctly.
-
- **Detachable Antenna (TV-IP212W only):**
  The detachable external antenna allows you to adjust its position to obtain the maximum signal.

- **USB Port:** Connects an external USB Flash Drive, Hard Drive. It provides the power distribution up to 500mA.

- **USB Unmount Button:** Removed the connected USB device safely.

  Pressing the Unmount button for four seconds, the Power LED will start flashing. After the Power LED rsumes the steady orange light, you can remove the USB device safely.

- **Camera Stand Connection:** Connects the camera with the camera stand.

- **Speaker Connector**: Connects a external active speaker to the camera.

- **Power Connector:** Connects the AC power adapter to supply power to the camera.

- **LAN Port:** It is used to connect the network RJ-45 cable, which supports the NWay protocol so that the camera can detect the network speed automatically.

- **Reset Button:** Reset will be initiated when the reset button is pressed once. The power LED begins to flash.

  Factory Reset will be initiated when the reset button is pressed continuously for three seconds or when Power LED begins to light up. Release the reset button and the Power LED will begin to flash.

1.3 Features and Benefits

- **MPEG4/MJPEG Dual-codec Supported**

  The camera provides you with excellent images by the MPEG4/MJPEG dual-codec selectable 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; the camera is embedded with an echo cancellation processor to provide a better sound quality.

- **Supports Multiple Profiles**

  The camera supports multiple profiles simultaneously, so that you can separately set up different image settings (such as image quality and frame rate) for the three video types of the camera: MPEG4, MJPEG, and 3GPP.

- **Supports RTSP**

  The camera supports RTSP (Real Time Streaming Protocol), which is a technology that allows you to view streaming media via the network. You can view the real-time video with the Quick Time player or RealPlayer. To view the real-time streaming image on your computer, open the Web browser and enter the RTSP link: rtsp://(IP address of the camera)/mpeg4.

- **Remote Control Supported**

  By using a standard Web browser or the bundled SecurView™ 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.

- **Supports Connection to the External Devices**

  With the auxiliary Input/Output connectors, you can connect the camera to a variety of external devices, such as the external speaker and the USB Flash Drive or Hard Drive.

- **Multiple Platforms Supported**

  The camera supports multiple network protocols, including TCP/IP, SMTP Email, HTTP, and other Internet related protocols. Therefore, you can use the camera in Windows 2000 and Windows XP, Windows Vista

- **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.

1.4 System Requirement

- **Networking**

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

- **Accessing the Camera using Web Browser**

  Platform: Microsoft® Windows® 2000/XP/Vista/Windows 7
  CPU: Intel Pentium III 350MHz or above
  RAM: 128MB
  Resolution: 800x600 or above
  Browser: Microsoft® Internet Explorer 6.0 or above

- **Accessing the Camera using SecurView™ Software View**

  Platform: Microsoft® Windows® 2000/XP/Vista/Windows 7
  Hardware Requirement:
  1 camera connected: Intel Pentium 4 1GHz; 512MB RAM
  2 ~ 4 cameras connected: Intel Pentium 4 1.3GHz; 512MB RAM
  5 ~ 8 cameras connected: Intel Pentium 4 2.4GHz; 1GB RAM
  9 ~ 16 cameras connected: Intel Pentium 4 3.4GHz; 2GB RAM
  Resolution: 1024x768 or above

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

CHAPTER 2

HARDWARE INSTALLATION

2.1 Installing the Camera Stand

The camera comes with a camera stand, which uses a swivel ball screw head to lock the camera. When the camera stand is attached, you can place the camera anywhere by mounting the camera through the three screw holes located in the base of the camera stand.

The Camera Stand

2.2 Connecting the Camera to LAN/WLAN

Connects an Ethernet cable to the LAN port located on the Camera's real panel, and then attaches it to the network.

Connects an antenna to the antenna connector. (TV-IP212W only)

Attach the external power supply to the DC power input connector located on Camera's real Panel, and then connect it to your local power supply.

NOTE Please configure the wireless setting via the wire connection.

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.

CHAPTER 3

ACCESSING THE CAMERA

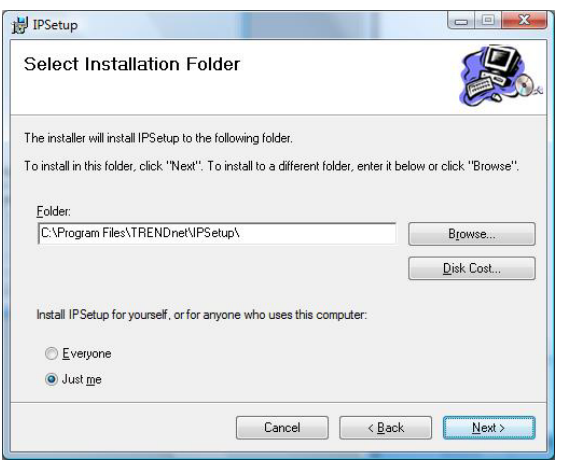
3.1 Using IP Setup

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

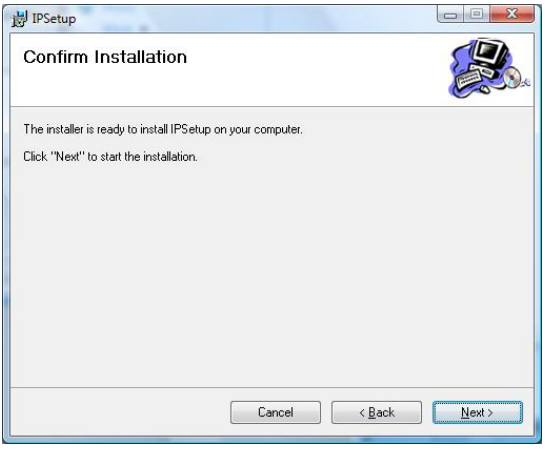
1. Insert the Installation CD-ROM into your computer's CD-ROM drive to initiate the Auto-Run program.

2. Click the **IP Setup** from the Auto-Run menu screen. Then IP Setup Wizard will appear. Click "***Next***" when the **Welcome to the IPSetup Setup Wizard** appears.

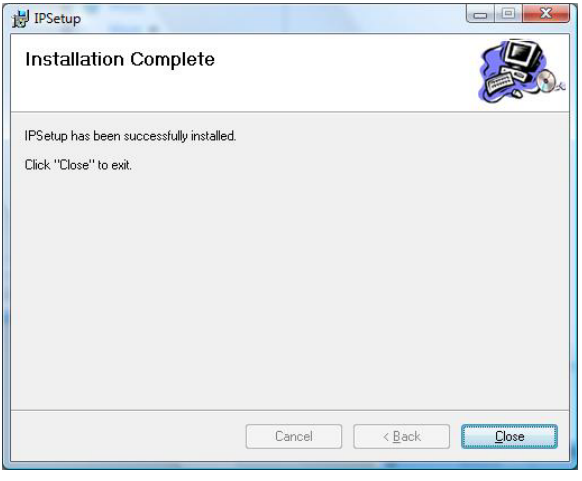
3. Click "***Browse"*** to choose the desired destination location. By default, the destination location is C:\Program Files\TRENDnet\IPSetup. Then Click "***Next***".



4. Click "***Next***" to confirm the IPSetup software to be installed to the computer.

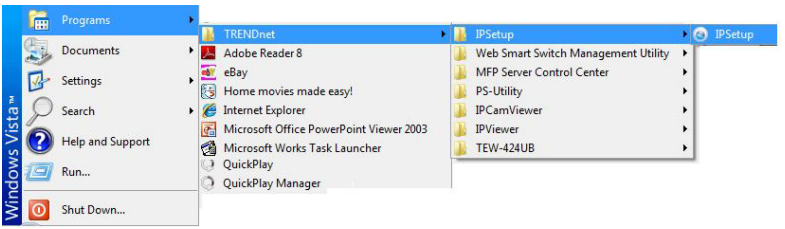


5. When the **Installation Complete** window appears, click "***Finish***".

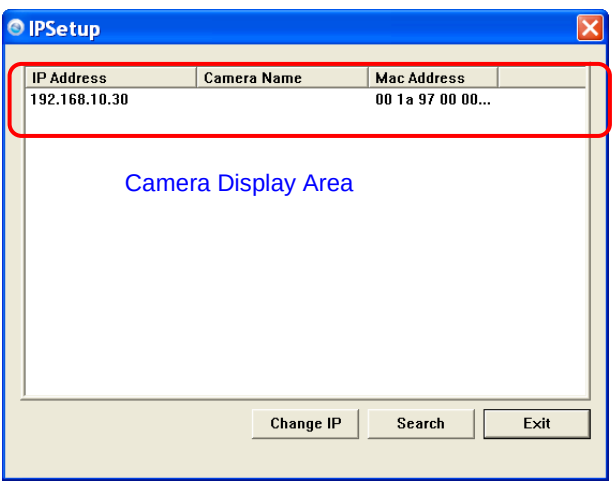


6. After installing the IPSetup utility, the application is automatically installed to your computer, and creates a folder in " ***Start \Program\TRENDnet\IPSetup***".

7. Click **Start > Programs > TRENDnet > IPSetup,** and then click **IPSetup**



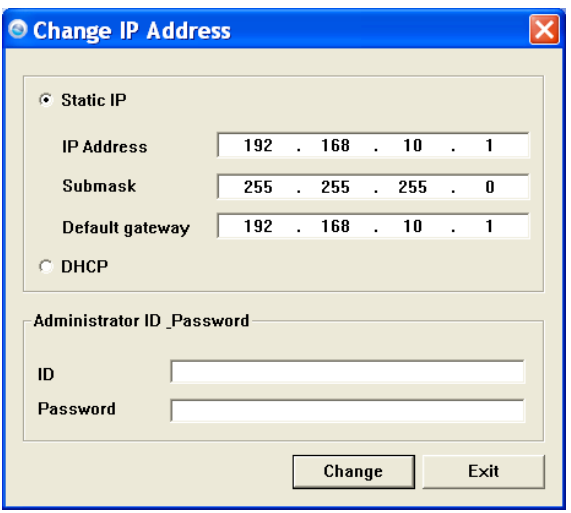
8. The IPSetup window will appear. It will search the Camera within the same network.



- **Camera Display Area:** It shows the connected camera(s) within the same network

  Double click the IP address, it will link to Camera's Web Configuration page.

- **Change IP:** Click this button to bring up the following window. It allows you to change the IP Address. You can select either **Static IP** or click **DHCP.** Then, enter the Administrator ID & password. By default ID/password is: admin. When complete, click "***Change***".



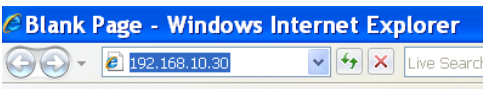
- **Search:** Click this button to search the connected camera in the same network."

- **Exit:** Click this button to exit the program.

3.2 Accessing to the Camera

1. Open the Web browser on your computer (example showed in the User's Guide is based on the Internet Explorer)

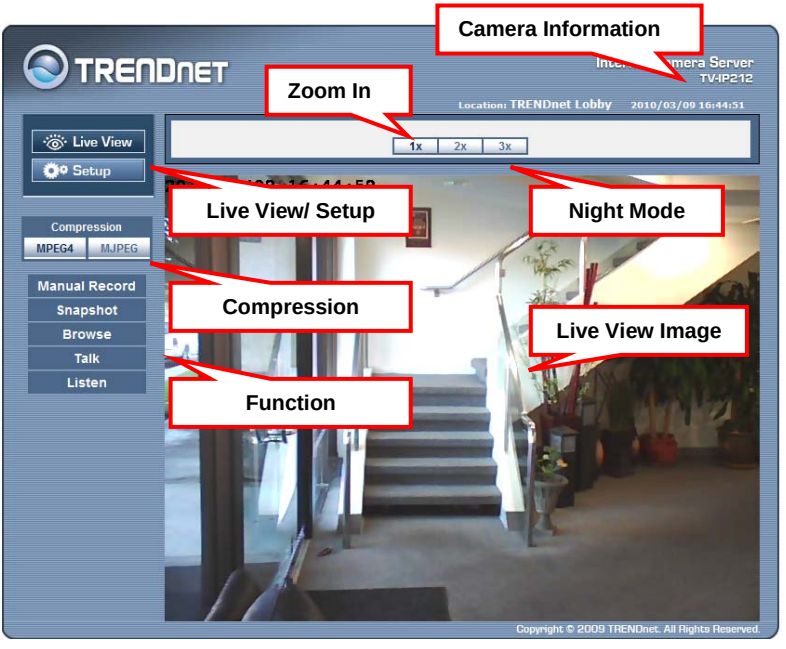
2. Type the default IP address (192.168.10.30) and then press [Enter].



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** – Display the camera's location and the current date & time. The information can be modified in the Web Configuration.
- **Nightmode**– 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 Image** – Displays the real-time image of the connected camera.
- **Zoom In** – Click the buttons to zoom in the live view image by 1x, 2x, and 3x.
- **Live View/Setup Switch** – Click **Setup** to configure the camera. For details, see Chapter 4.
- **Compression Buttons** – Select to transmit and record the video using MPEG4 or MJPEG compression.
- **Function** – Use these buttons to control the audio and video functions.
  - **Manual Record** allows you to record and save a video clip.
  - **Snapshot** allows you to capture and save a still image.
  - **Browse** allows 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 the same time.
  - **Listen** allows you receive the on-site sound and voice from the camera.

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 192.168.10.x (x is 0~254 except 30), and the suggested Subnet mask is 255.255.255.0.
7. When you are finished, click **OK**.

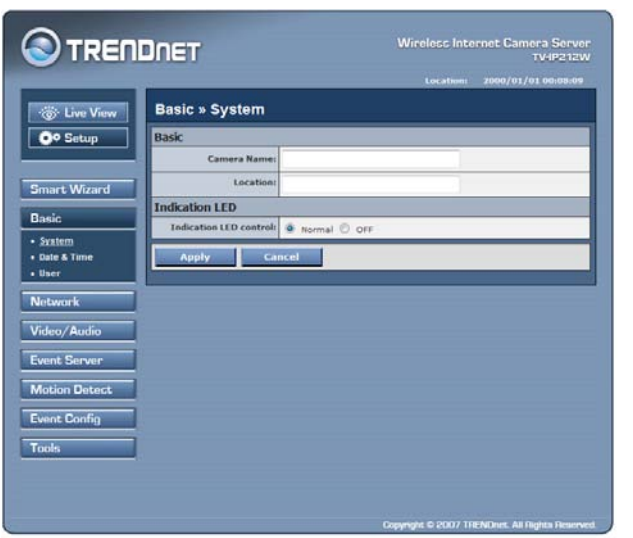
CHAPTER 4

CONFIGURING THE CAMERA

4.1 Using the Web Configuration

You can access and manage the camera through the Web browser or from the SecurView™ software (see chapter 5 in more detail). This chapter describes the Web Configuration, and guides you through the configuration of the camera by using the web browser.

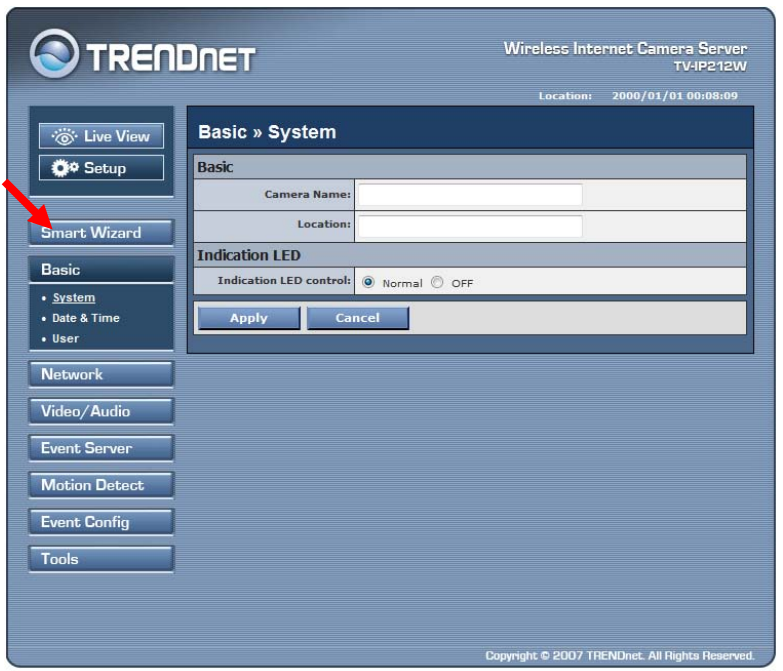
To configure the camera, click **Setup** on the main page of Web Configuration. The Web Configuration will start from the **Basic** page.



The Web Configuration contains the settings that are required for the camera in the left menu bar, including **Smart Wizard**, **Basic**, **Network**, **Video/Audio**, **Event Server**, **Motion detect**, **Event Config**, **Tools**, **USB**, and **Information**.

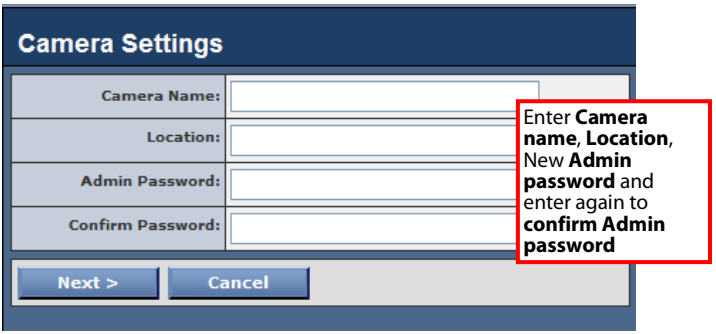
4.2 Using Smart Wizard

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.

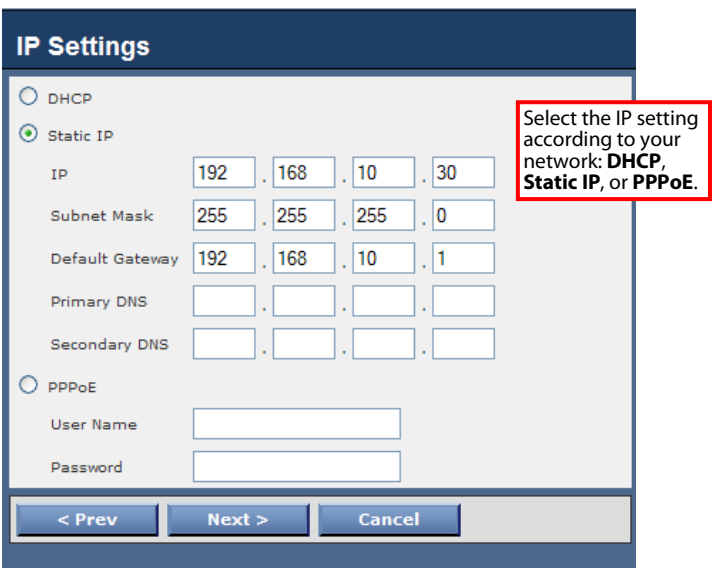


To start the wizard, click **Smart Wizard** in the left menu bar.

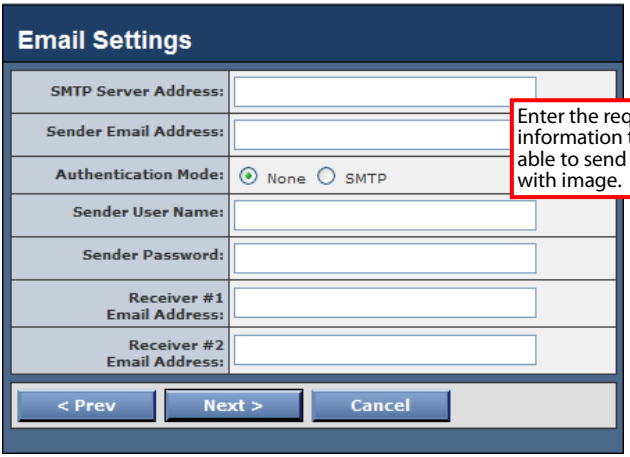
Step 1. Camera Settings



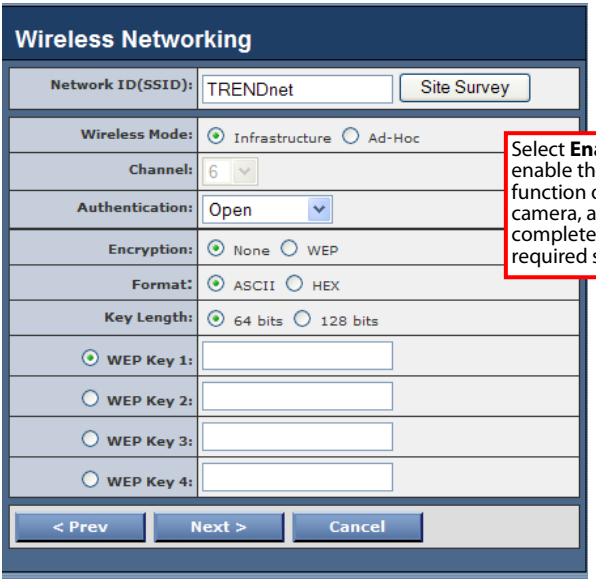
Step 2. IP Settings



Step 3. Email Settings



Step 4. Wireless Networking (for TV-IP212W only)

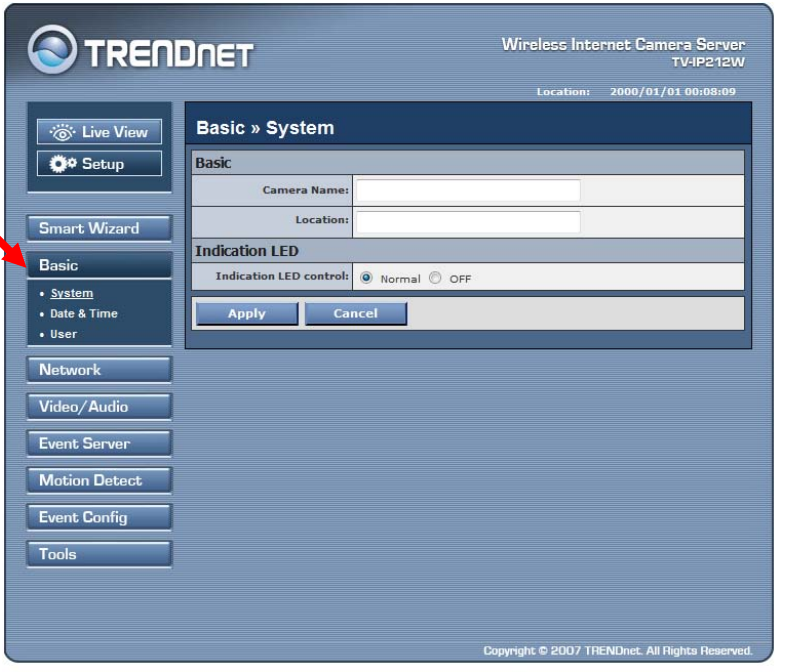


Step 5. Confirm Settings

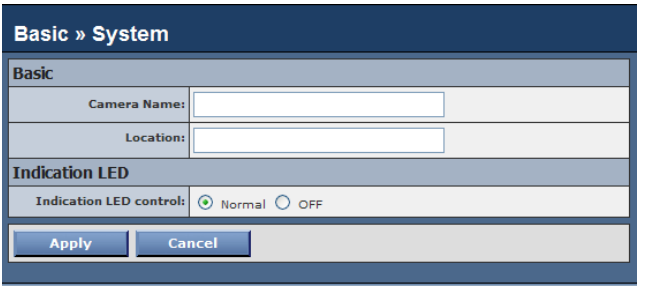
This step shows the configuration of your camera. When you confirm the settings, click **Apply** to finish the wizard and reboot the camera. Otherwise, click **Prev** to go back to the previous step(s) and change the settings; or click **Cancel** to end the wizard and discard the changes.

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.



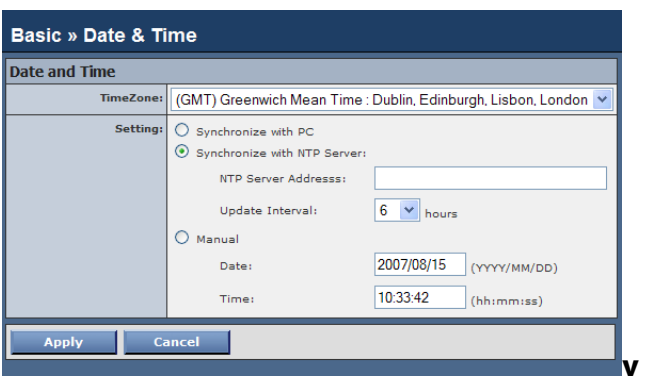
Basic >> System



- **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



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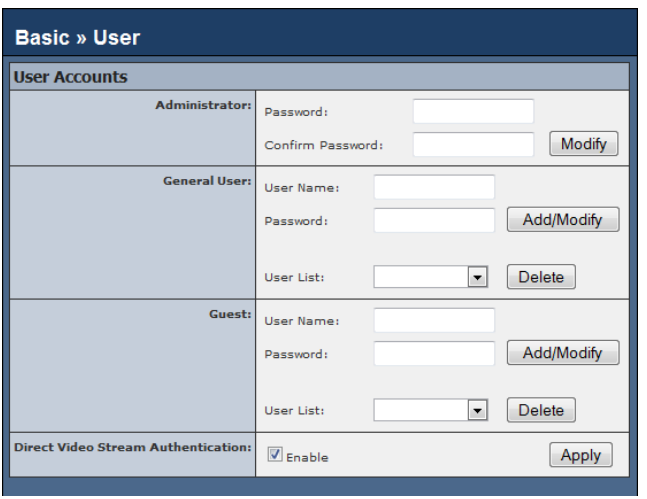
■ **Date & Time**

- **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 **User List** and click **Add/Modify**.

  - **User List:** 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.

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

- **Direct Video Stream Authentication**:

  - **Enabled** = Direct link to the video stream prompts for authentication.

  - **Disable** = Direct link to video does not prompt for authentication for ease of use when implementing or embedding the video stream into a custom application or webpage.

Examples of the Direct Link to video:

MPEG4 Mode
http://camera_ip_address:port number/mpgview.htm

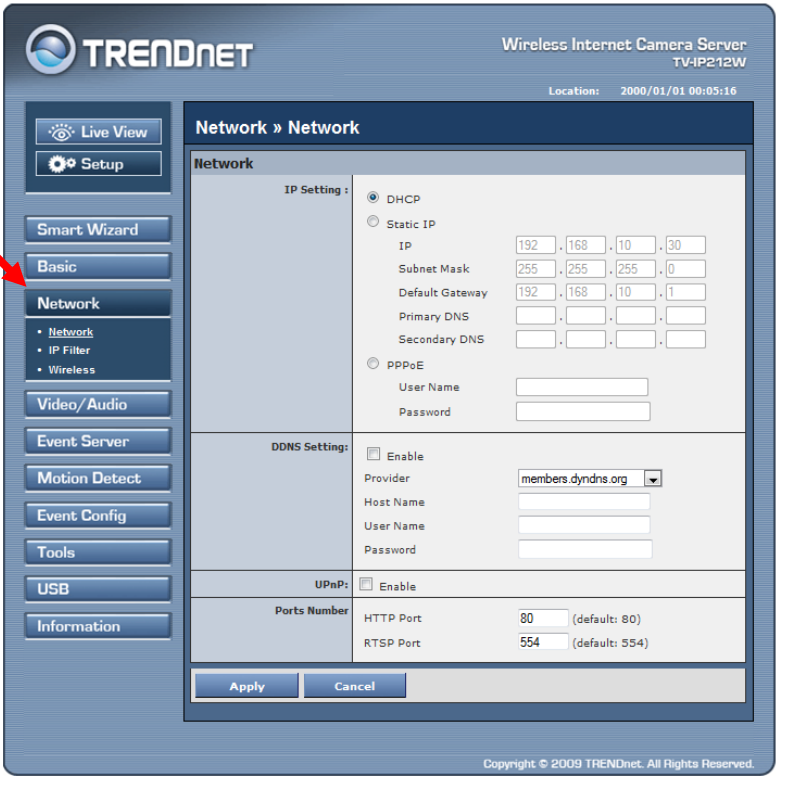
MJPEG Mode
http://camera_ip_address:port number/jpgview.htm

-

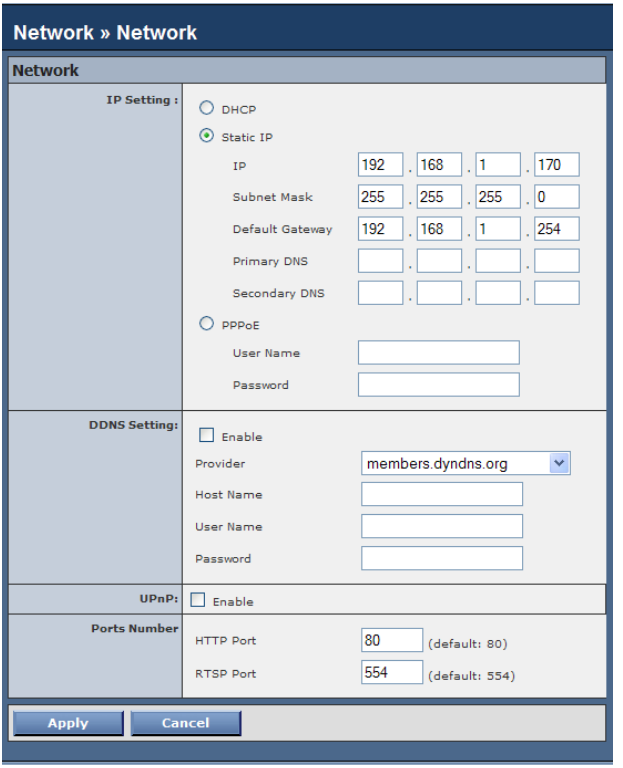
NOTE The "General User" can access the camera and control the Function buttons of the camera's Web Configuration; the "Guest' can only view the live view image from the main page of the Web Configuration while accessing the camera. Only the "Administrator" is allowed to configure the camera through the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



- **IP Setting**

  This item allows you to select the IP address mode and set up the related configuration.

  - **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 IPSetup to obtain the related setting values.

IP	Enter the IP address of the camera. The default setting is 192.168.10.30.
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 192.168.10.1.
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**

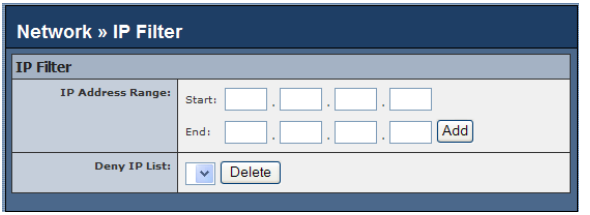
  The camera supports UPnP (Universal Plug and Play), which is a set of computer network protocols that enable the device-to-device interoperability. In addition, it supports port auto mapping function so that you can access the camera if it is behind an NAT router or firewall. Select the **Enable** option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

- **Ports Number**

  - **HTTP Port:** The default HTTP port is **80**.
  - **RTSP Port:** Configure the transmission of streaming data within the network. The default RTSP (Real Time Streaming Protocol) port is **554**.

NOTE If the camera is behind an NAT router of firewall, the suggested to be used is from 1024 to 65535.

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**

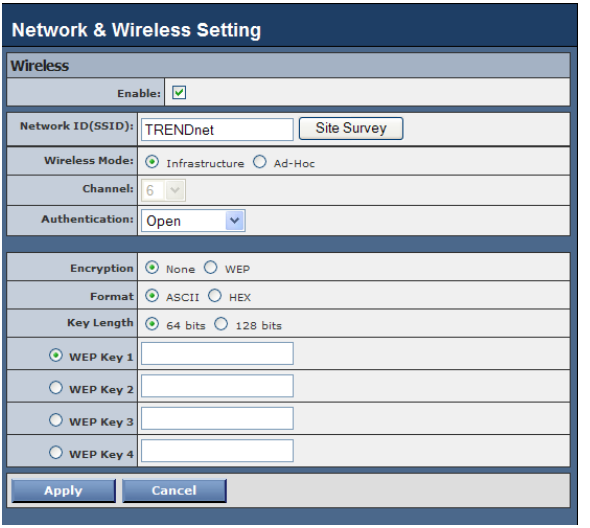
  Assign a range of IP addresses that are not allowed to access the camera by entering the Start IP address and End IP address. When you are finished, click **Add** to save the range setting. You can repeat the action to assign multiple ranges for the camera.

  For example, when you enter 192.168.10.50 in Start IP Address and 192.168.10.80 in End IP Address, the user whose IP address located within 192.168.10.50 ~ 192.168.10.80 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 (for TV-IP212W only)

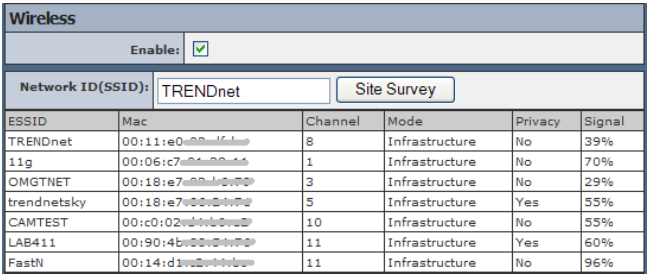


- **Wireless**

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

  - **Network ID (SSID):** The default SSID setting is "TRENDnet". 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.



ESSID	Mac	Channel	Mode	Privacy	Signal
TRENDnet	00:11:e0	8	Infrastructure	No	39%
11g	00:06:c7	1	Infrastructure	No	70%
OMGTNET	00:18:e7	3	Infrastructure	No	29%
trendnetsky	00:18:e7	5	Infrastructure	Yes	55%
CAMTEST	00:c0:02	10	Infrastructure	No	55%
LAB411	00:90:4b	11	Infrastructure	Yes	60%
FastN	00:14:d1	11	Infrastructure	No	96%

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.

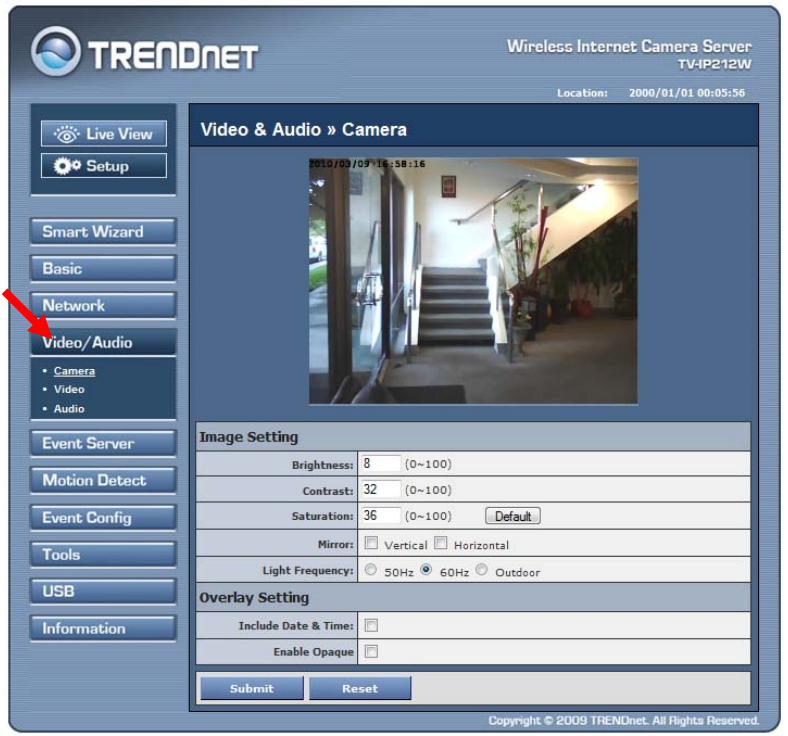
If you select **WPA-PSK** or **WPA2-PSK** as the Authentication mode, you need to complete the following settings:

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.

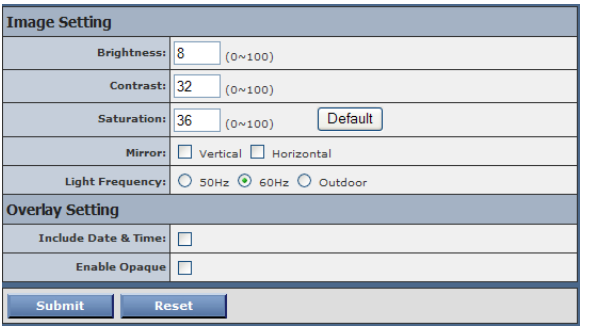
Pre-Shared Key: This is used to identify each other in the network. Enter the name in the box, and this name must match the Pre-shared key value in the remote device.

4.5 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



- **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

- **MPEG4**
  - **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 a proper setting depending on your network status.

- **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 a proper setting depending on your network status.

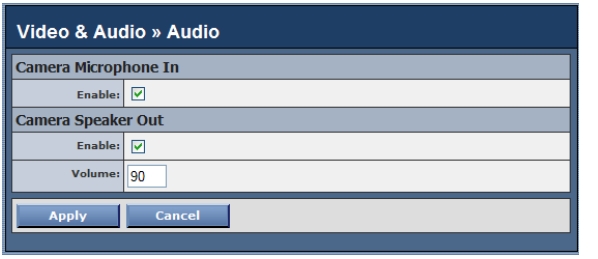
NOTE The camera supports both MPEG4 and MJPEG compression. MJPEG capture the images in JPEG format, which require higher bandwidth to view smooth video. The administrator can control the bandwidth of each connection well through the setting options above.

■ **3GPP**

The camera supports 3GPP specification. Select the **Disable** option to disable this feature. Otherwise, select **3GPP Without Audio** or **3GPP With Audio** to transfer the video clips without or with audio.

If you use a mobile phone that supports 3GPP, you can also view the real-time streaming image captured by the camera on your phone (with the default player on the phone) by entering the RTSP link: rtsp://(IP address of the camera)/3gp.

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.

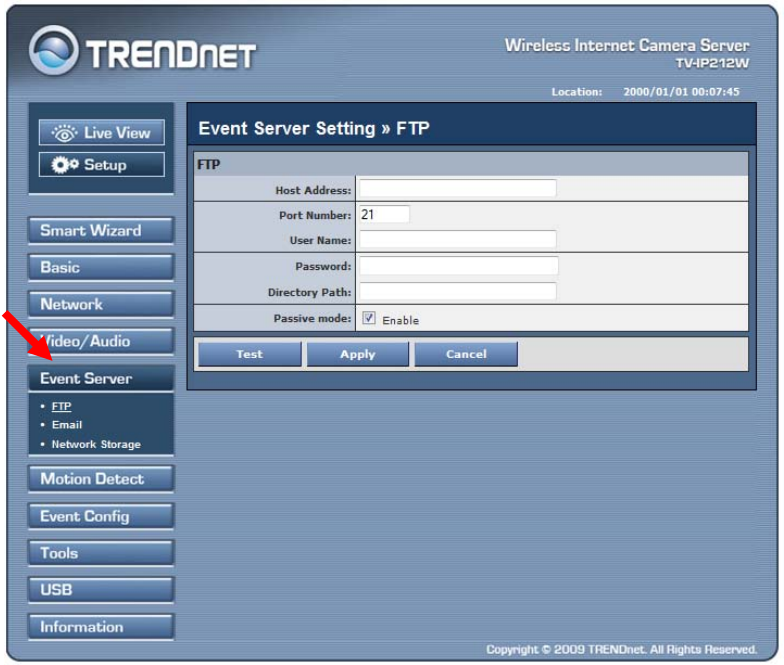
- **Camera Speaker Out**

  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.

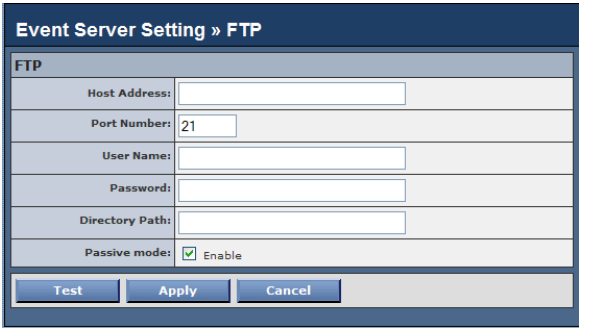
4.6 Event Server Configuration

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



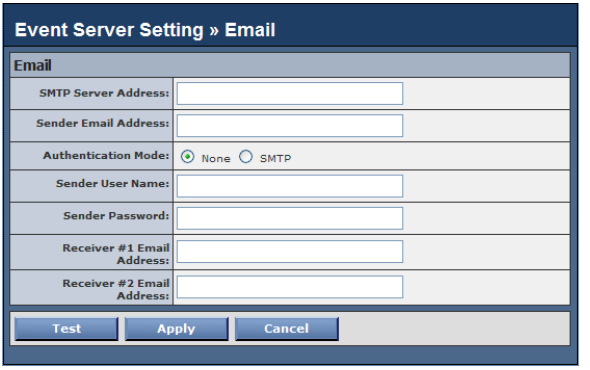
When you complete the required settings for FTP, Email, or Network Storage, click **Test** to test the related configuration is correct or not. Once the camera connects to the server successfully, click **Apply**.

Event Server Setting>> FTP



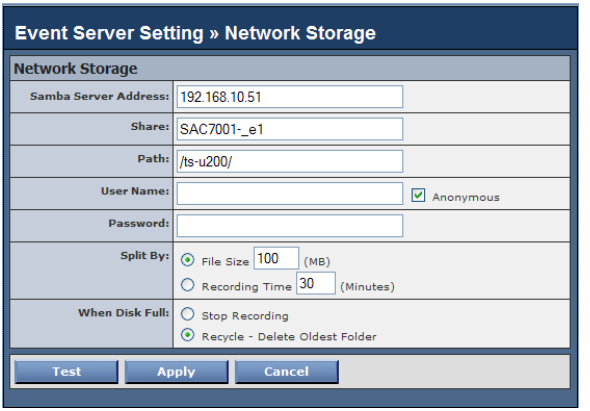
- **FTP**
  - **Host Address:** Enter the IP address of the target FTP server.
  - **Port Number:** Enter the port number used for the FTP server.
  - **User Name:** Enter the user name to login into the FTP server.
  - **Password:** Enter the password to login into the FTP server.
  - **Directory Path:** 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



- **Email**
  - **SMTP Server Address:** Enter the mail server address. For example, mymail.com.
  - **Sender Email Address:** Enter the email address of the user who will send the email. For example, John@mymail.com.
  - **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.

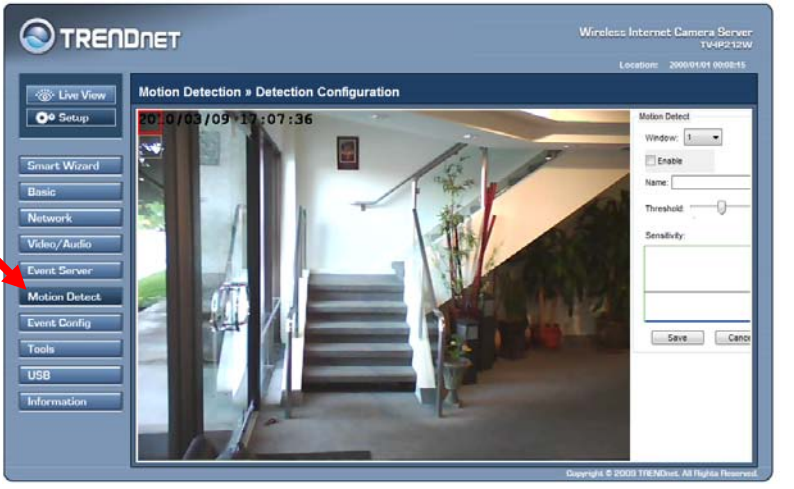
Event Server Setting >> Network Storage



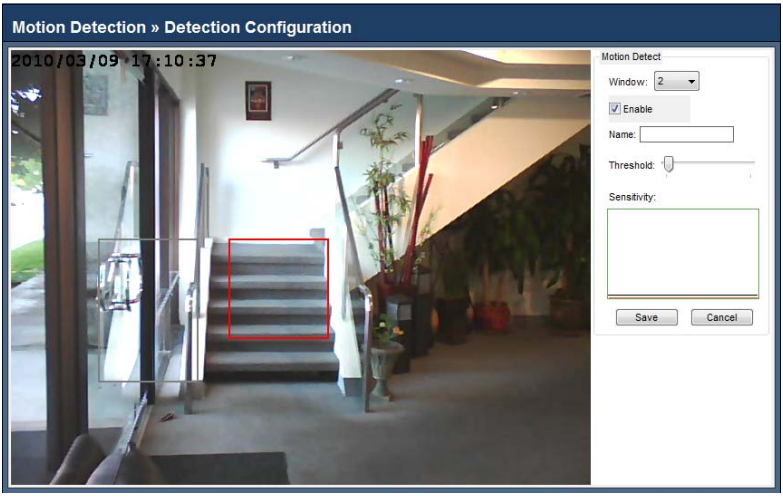
- **Net Storage**
  - **Samba Server Address:** Enter the IP address of the Network Storage server. For example: 192.168.10.51.
  - **Share:** Assign the folder on the Network Storage server to share the files to users. For example, SAC7001-e1.
  - **Path:** Assign the path for uploading the files on the Network Storage server. For example, /ts-u200 /.
  - **User Name:** Enter the user name to login into the Network Storage server.
  - **Password:** Enter the password to login into the Network Storage server.
  - **Split By:** When the file is too large to upload smoothly, use this option to split it by selecting **File Size** or **Recording Time**.
  - **When Disk Full:** Select **Stop Recording** or **Recycle – Delete Oldest Folder of File** when the storage space on the Network Storage server is full.

4.7 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.

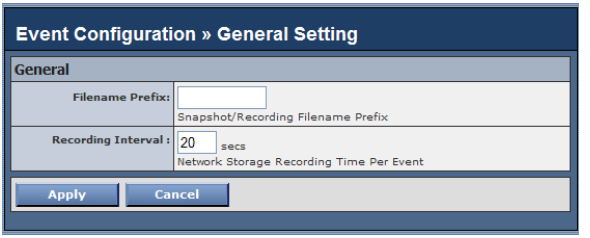


- **Name:** Assign a name to the detecting area.
- **Threshold:** Move the slide bar to adjust the level for detecting motion to record video.

4.8 Event Config

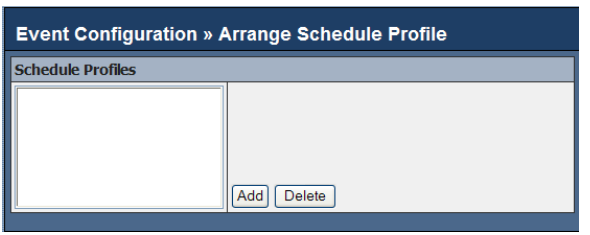
The Event Config menu contains four sub-menus that provide the commands to configure event profiles.

Event Configuration >> General Setting

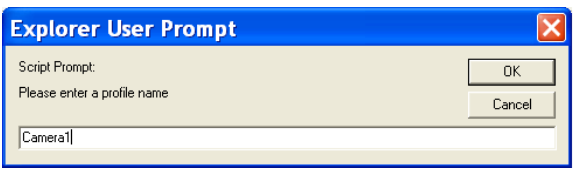


- **Snapshot/Recording Filename Prefix:** You can assign a given prefix to each new captured file. Otherwise, leave this option blank to use the default setting.
- **Network Storage Recording Time Per Even:** Limit the recording time while you are using the Network Storage solution.

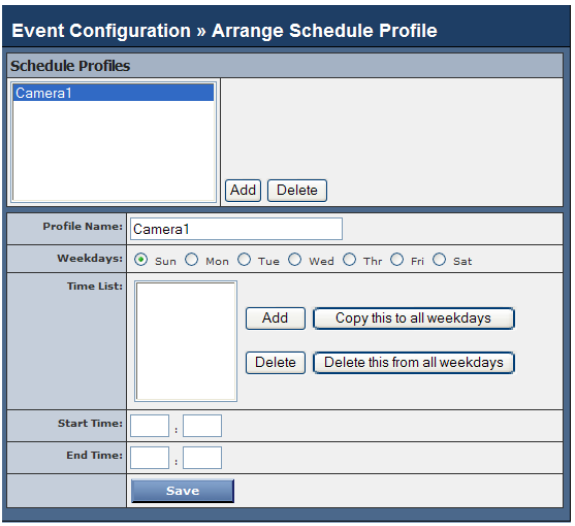
Event Configuration >> Arrange Schedule Profile



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.



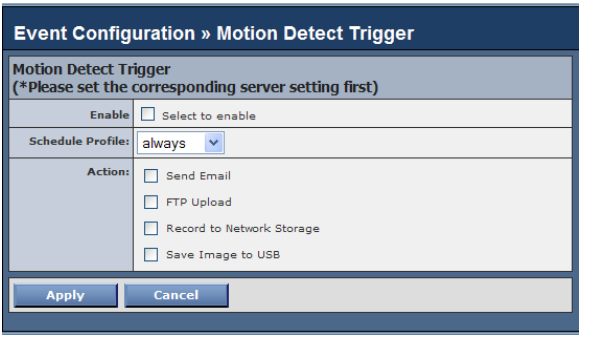
After entering the profile name, click **OK** and the profile is added to the Schedule Profiles list. To delete the profile, select the profile in the list and click **Delete.**



- **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.

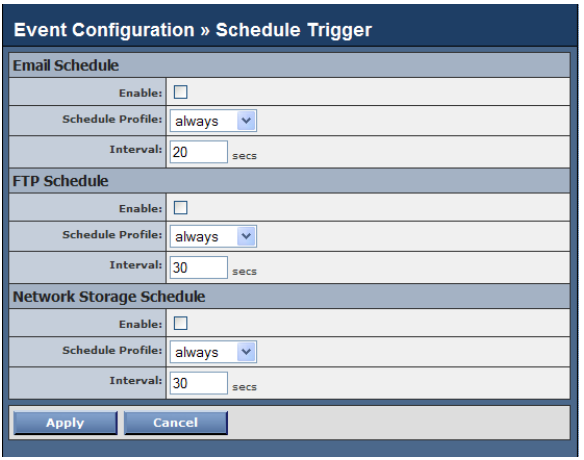
Event Configuration >> Motion Detect Trigger



Select the **Enable** option to enable the trigger function of the camera, so that you can send captured images within the detecting area to the FTP server, email receiver, Network Storage server, or the connected USB device. 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:** Select the destination that the captured images will be sent to: **Send Email**, **FTP Upload**, **Record to Network Storage**, or **Save Image to USB**.

Event Configuration >> Schedule Trigger



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

NOTE If the setting value of the **Network Storage Recording Time per Event** option in General Setting is longer than the **Interval** time in Network Storage Schedule, the recorded file will be a continuous video clip.

For example, if you set the **Network Storage Recording Time Per Event** as 10 seconds and the **Interval** as 5 seconds, recorded file becomes a non-stop video clip because the camera will record a 10-second video clip every 5 seconds.

4.9 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**

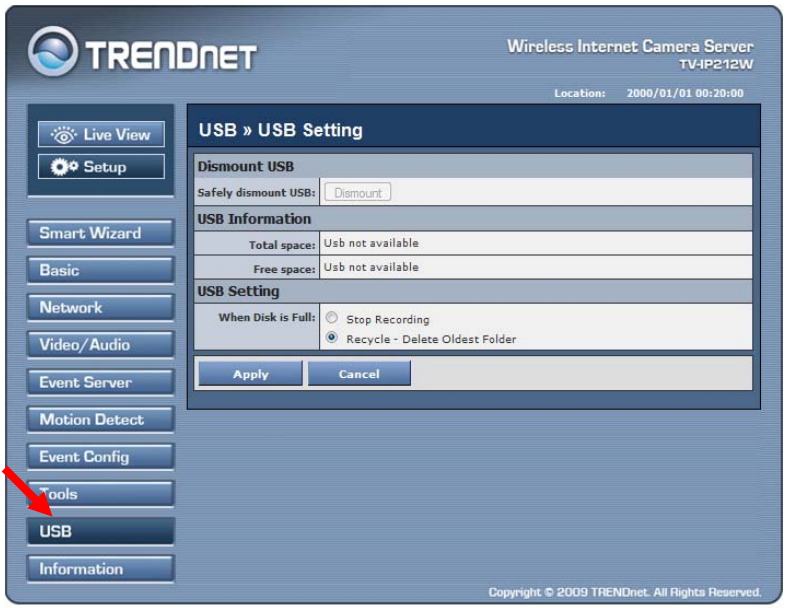
  This item displays the current firmware version. You can upgrade the firmware for your camera once you obtained a latest version of firmware.

  - **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.

4.10 USB

The USB menu provides the information and controls of the connected USB device.



- **USB Dismount**

  To safely remove the connected USB device, you can press the Unmount button for four seconds on the camera or click **Dismount** from this item.

- **USB Information**

  Display the **Total space** and **Free space** of the USB device.

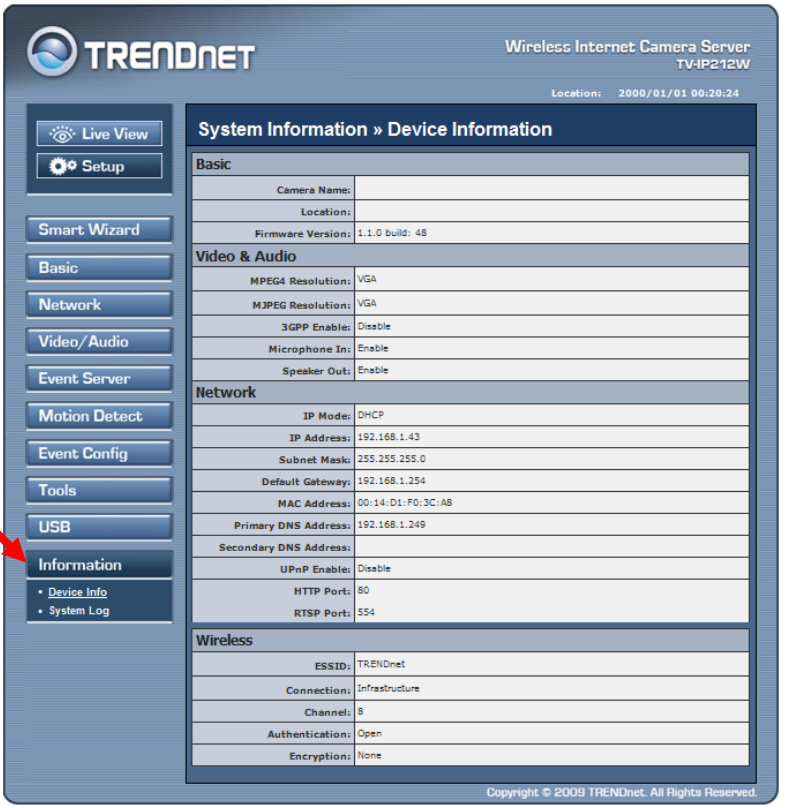
■ **USB Setting**

- **When Disk Full:** Select **Stop Recording** or **Recycle – Delete Oldest Folder of File** when the storage space on the USB device is full.

NOTE The connected USB storage device can be only used to store still images.

4.11 Information

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



- **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.

CHAPTER 5

SECURVIEW™ SOFTWARE

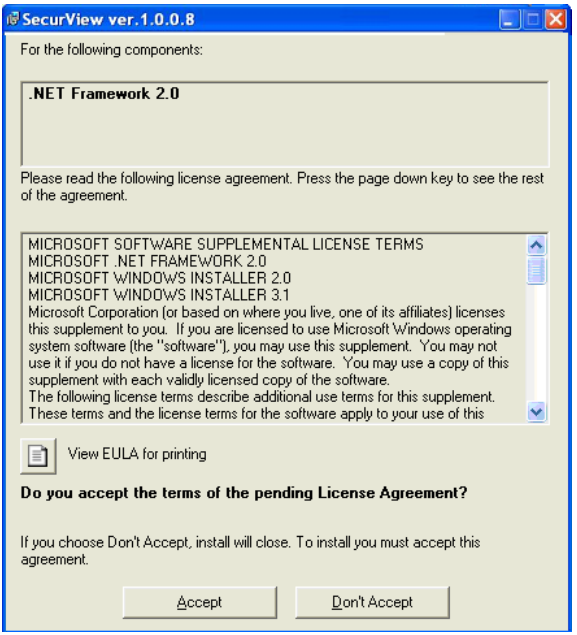
This Chapter describes detail instructions on operating SecurView™ software, a useful friendly application for ease of control and navigation requirement.

5.1 INSTALLATION

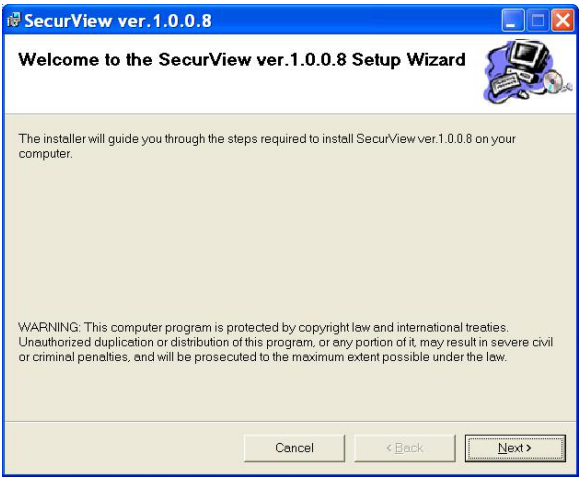
1. Insert the Installation CD-ROM into your computer's CD-ROM drive to initiate the Auto-Run program.

2. Click the **SecurView** from the Auto-Run menu screen.

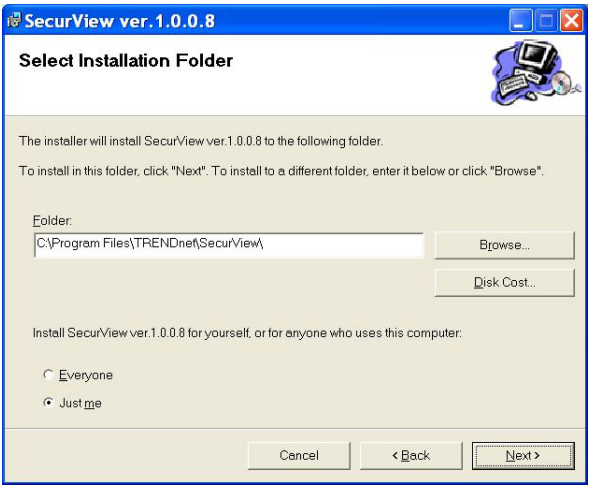
NOTE To use SecurView™, you must have Microsoft .NET Framework 2.0 installed in the computer. The setup wizard will detect it and, if the program is not installed yet, ask you to install it during the process of installing SecurView™.



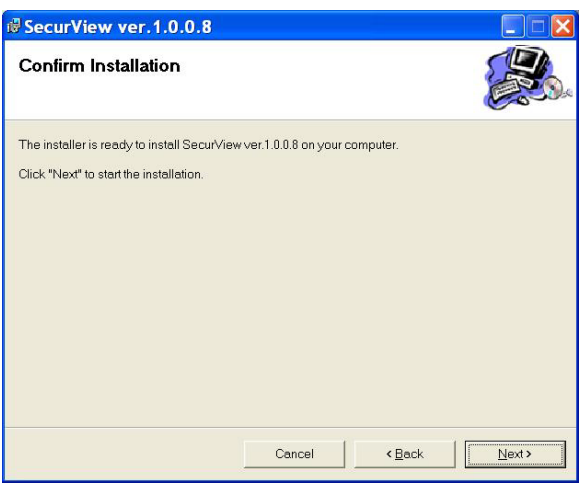
3. Then **SecurView** Setup Wizard will appear. Click "***Next***" when the **Welcome to the SecurView Setup Wizard** appears



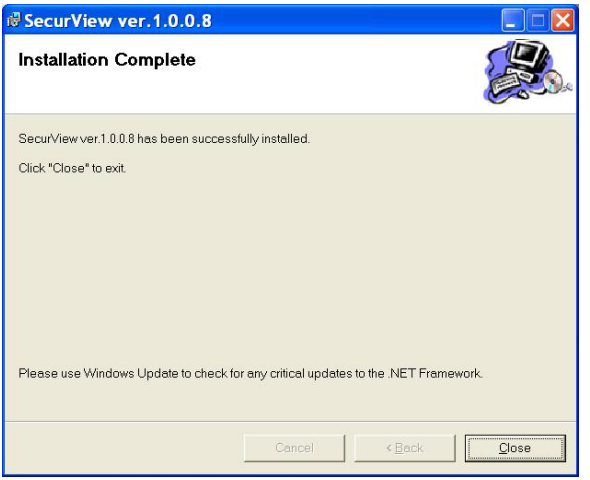
4. Click "***Browse"*** to choose the desired destination location. By default, the destination location is C:\Program Files\TRENDnet\SecurView. Then Click "***Next***".



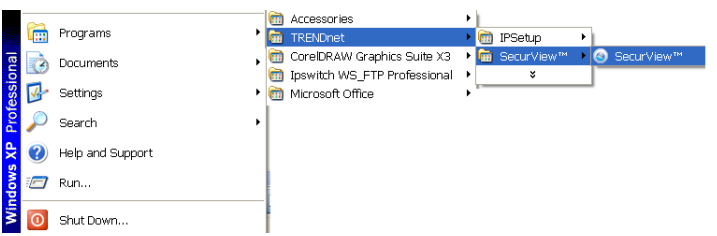
5. Click "***Next***" to confirm the SecurView software to be installed to the computer.



6. Click t When the **Installation Complete** window appears, click "***Close***".

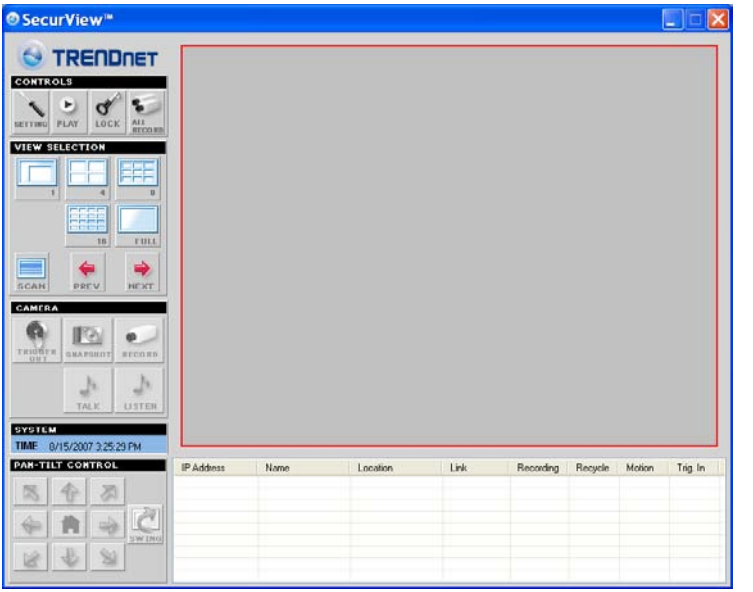


7. After installing the IPSetup utility, the application is automatically installed to your computer, and creates a folder in " ***Start \Program\TRENDnet\SecurView***".



5.2 USING INSTALLATION

1. To launch the program, click **Start** > **Program** > **TRENDnet** > **SecurView,** and then click **SecruView™**. The main screen will appear as below.



NOTE Please set the resolution to 1024x768 or above on your computer while using SecurView™; otherwise, the displayed main screen may be distorted.

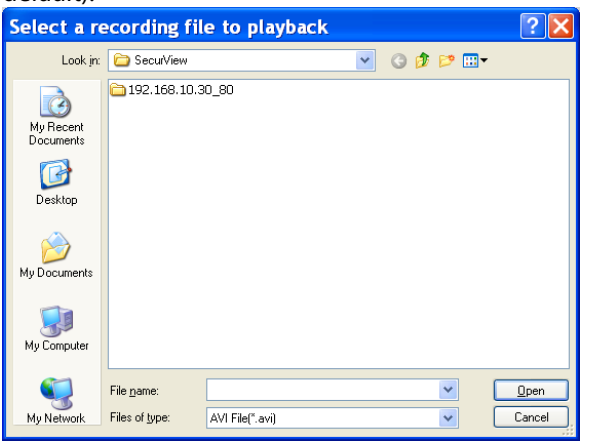
Item features

The following describes the function of each item on the main screen:

■ CONTROLS Panel

- **SETTING:** Click to enter the Setting screen of SecurView™. Click again to return to the main screen of SecurView™.

- **PLAY:** Click to play the recorded video file using the media player on the computer (for example, Windows Media Player by default).

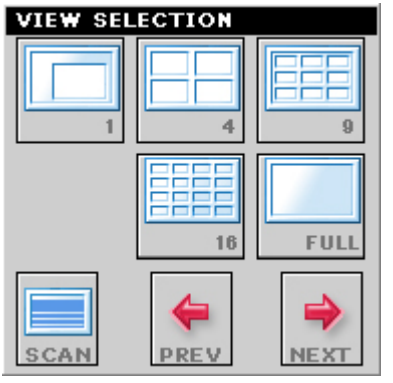


- **LOCK:** Click to lock the camera controls. Click again to resume controls for the camera. If you have set ID and Password in **SETTING > Account**, you will be asked to enter the required information to unlock.

- **ALL RECORD:** Click to start recording video clips using ALL connected cameras. To stop recording, please click Record button to stop the individual camera. Please note: stop recording only stop the manual recording camera. For schedule recording, please change the setting on configuration.

TIP By default, the ID and Password boxes are "blank." Click **SETTING > Account** to change the ID and password of lock/unlock function.

■ **VIEW SELECTION Panel**



- **View mode buttons:** SecurView™ provides multiple view modes, including 1/4/9/16 windows and Full screen mode.
- **SCAN:** When multiple cameras connected, click this button to display the video views between cameras. Click the Scan button again to stop scanning.
- **PREV:** When multiple cameras connected, click this button to switch the video view to the previous camera.
- **NEXT:** When multiple cameras connected, click this button to switch the video view to the next camera.

TIP To set the time interval of scanning, click **SETTING > Other** and then adjust the time from 1 to 10 seconds in the **Time interval of scan** option.

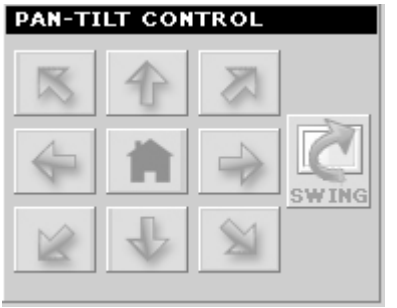
■ **CAMERA Panel**

- **TRIGGER OUT:** Click to turn on the trigger out connector of the camera. This button is available only when the connected camera supports the trigger out connector, which is used to control the external device connected to the camera, such as a light.
- **SNAPSHOT:** Click to capture a still image using the selected camera and save the file in the computer.
- **RECORD:** Click to start recording a video clip using the selected camera. Click again to stop recording and save the file in the computer.
- **TALK:** Click to speak out through the camera. Please note only one user is allowed to use this function at the same time.
- **LISTEN:** Click to receive the on-site sound and voice from the camera.

- **SYSTEM Panel**

This panel displays the current date and time.

- **PAN-TILT CONTROL Panel (optional)**



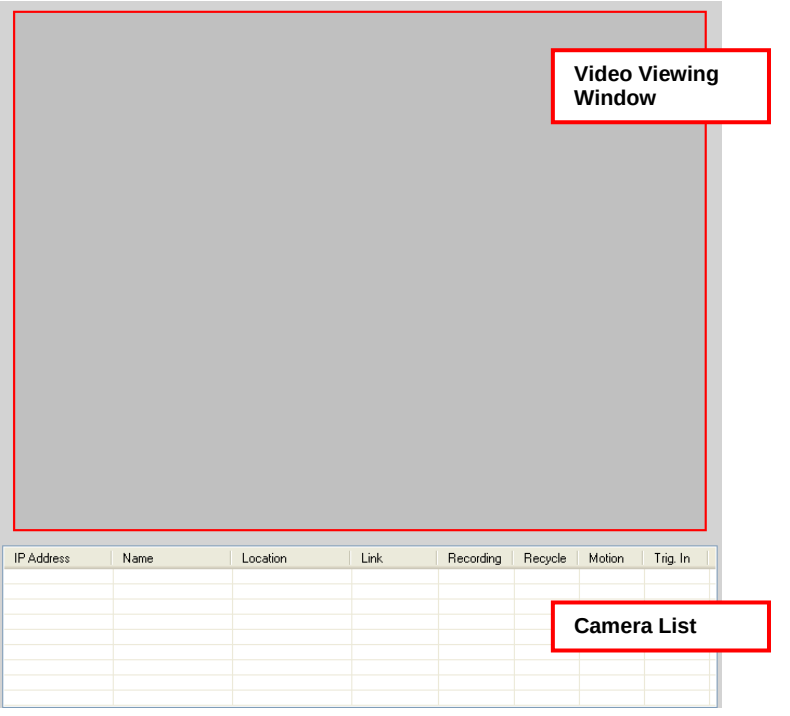
When you connect a pan/tilt camera, the system will detect the camera's function automatically and the PAN-TILT CONTROL buttons will become functional. Otherwise, these buttons are displayed as gray out buttons.

- **Direction/Home buttons:** Click these buttons to adjust the camera's viewing angle to Up ( ) / Down ( ) / Left ( ) / Right ( ) / Left-Up ( ) / Left-Down ( ) / Right-Up ( ) / Right-Down ( ).

  Click the **Home** button ( ) to return the camera to the default position.

- **SWING:** If you have saved two or more positions for the selected camera, click this button to control the camera swinging from one position to another position.

- **Video View Window and Camera List**

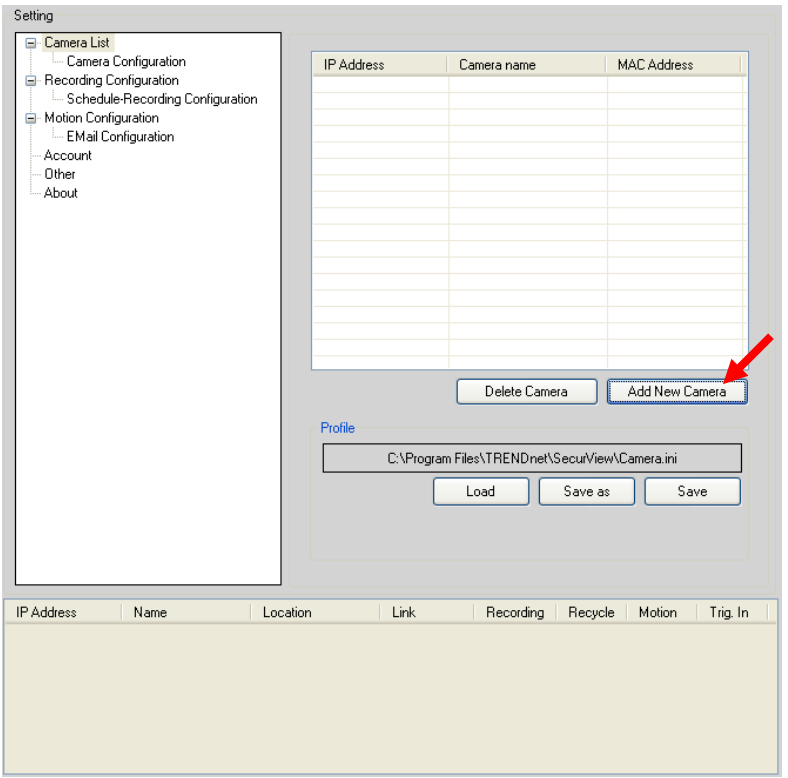


- **Video Viewing Window:** This window displays the video view of the selected camera, which can be divided into 4/9/16 windows according to your selection in VIEW SELECTION panel.
- **Camera List:** This list displays the information of the connected camera(s).

To add a camera

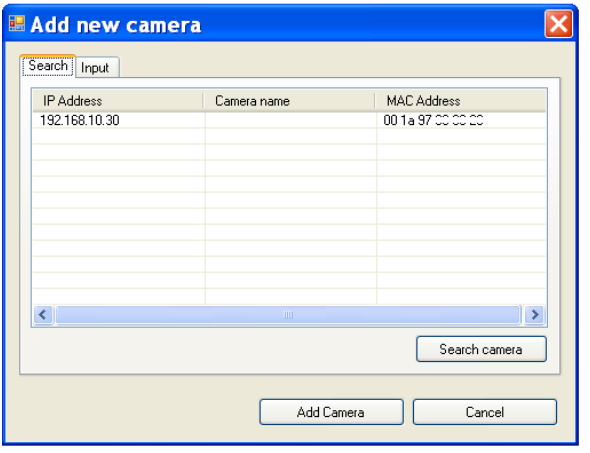
1. Click **SETTING** in the CONTROLS panel to display the Setting screen.

2. Click **Add New Camera**.

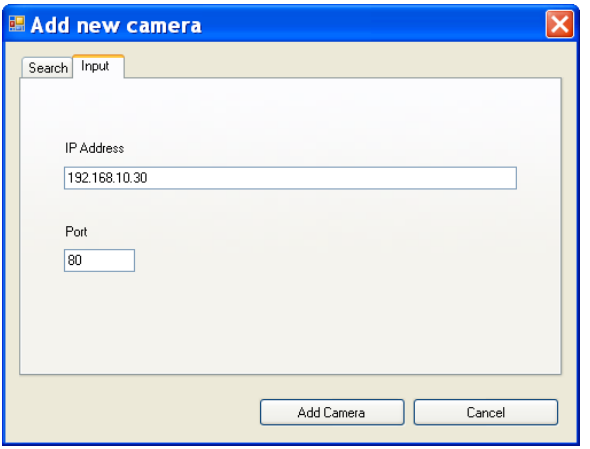


3. In the pop-up Add New Camera dialog window, you can:

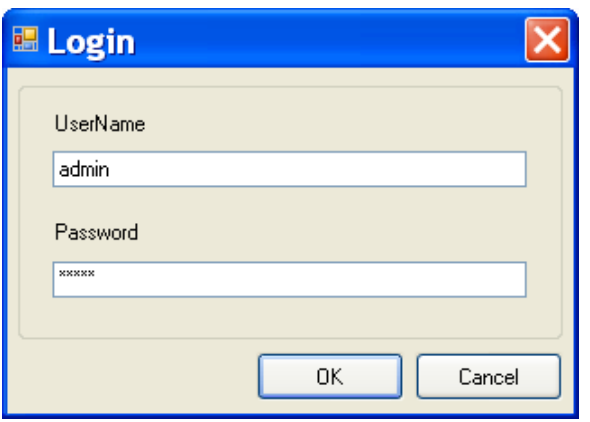
- Select the **Search** tab if you are not sure of the camera's IP address. Click **Search camera** to search the available camera within the network. Once the camera is found and is shown in the list, select it and click **Add Camera**.



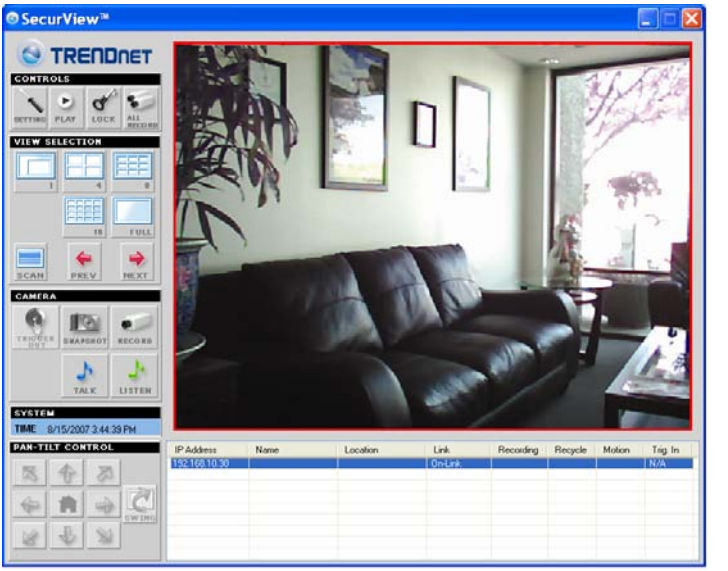
- Select the **Input** tab to add a camera by entering its IP address directly. Enter the camera's IP address (default: 192.168.10.30) and Port (default: 80), and then click **Add Camera**.



4. Enter the User name and Password for the camera, and then click **OK**. The connected camera will be displayed in the Camera List.

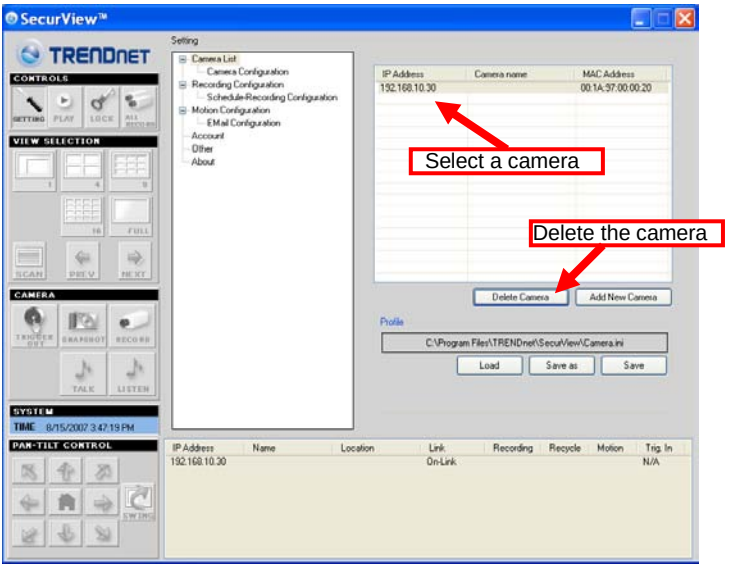


5. Click **SETTING** to return to the Video View Window. The video view of the selected camera will be displayed now.



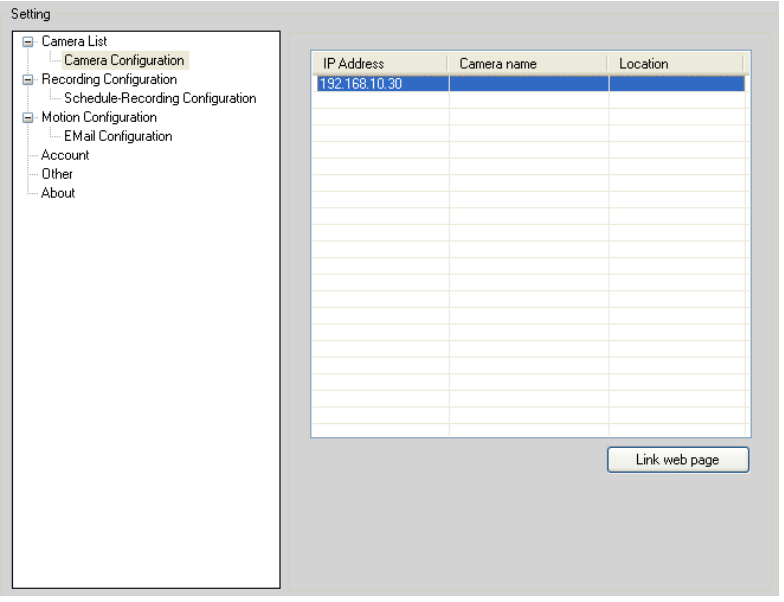
To remove a camera

1. Click **SETTING** in the CONTROLS panel to display the Setting screen.
2. Select a camera from the list and click **Delete Camera**.



To link to the Web page of the camera

Click **SETTING > Camera List > Camera Configuration** and then **Link web page** to launch the Web browser that displays live view image and Web Configuration of the selected camera.

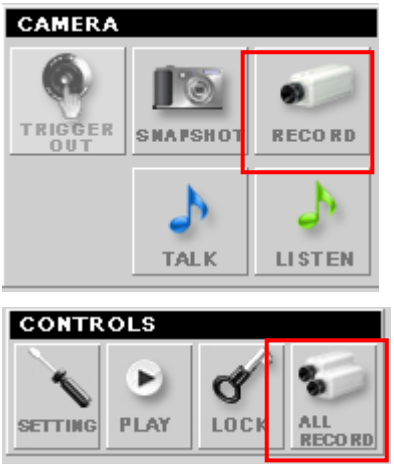


To record video

SecurView™ provides three methods to record video clips: one is to click the **RECORD/All Record** button to record manually; the second is to record by motion detection; the third is to set the recording schedule in **Setting > Recording Configuration > Schedule Recording Configuration**.

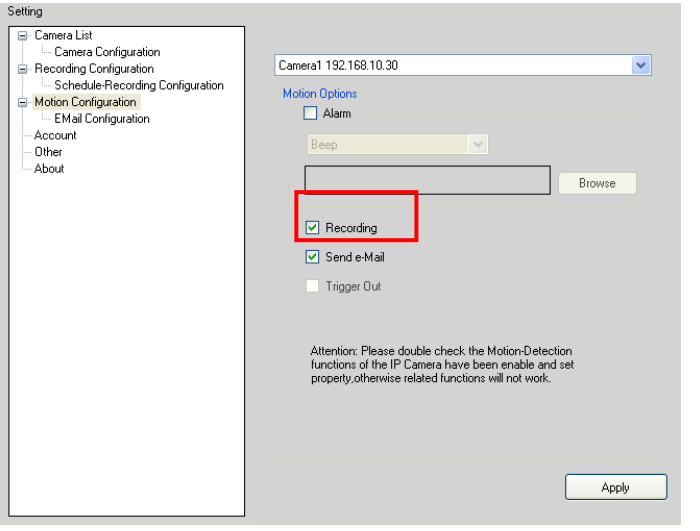
- **Manually recording**

  Click **RECORD/All Record** and it starts recording. Click the button again to stop.



- **Trigger recording by motion detection**

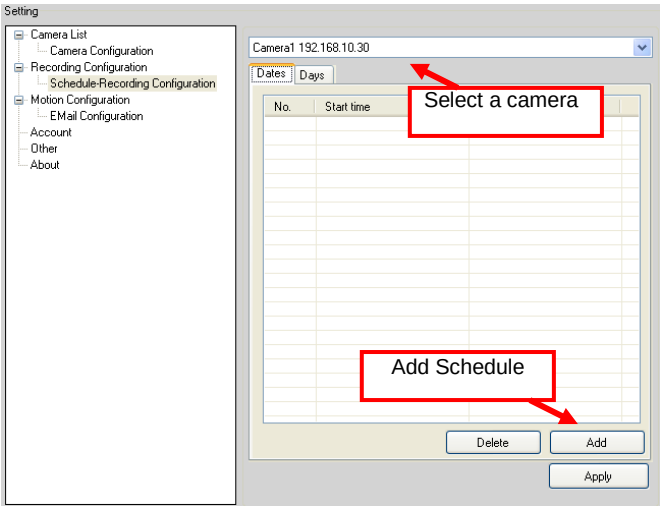
  When the motion detection function of the selected camera is enabled, you can configure the camera to start recording triggered by the motion detected. Click **SETTING > Motion Configuration**, and then select the **Recording** option to enable the selected camera to record by motion detection.



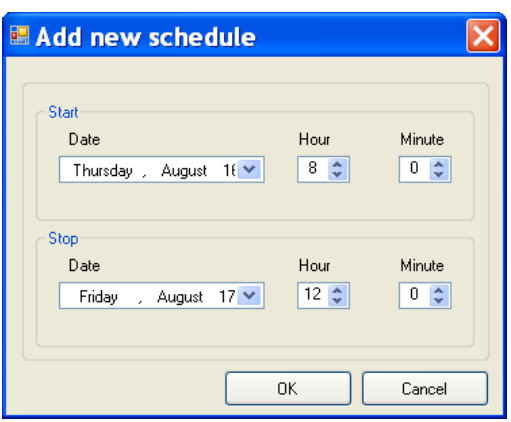
■ **Schedule recording Configuration**

This recording method will work after you have completed the required settings in **Schedule Recording Configuration**. The recording schedule can be defined by **Dates** or **Days**.

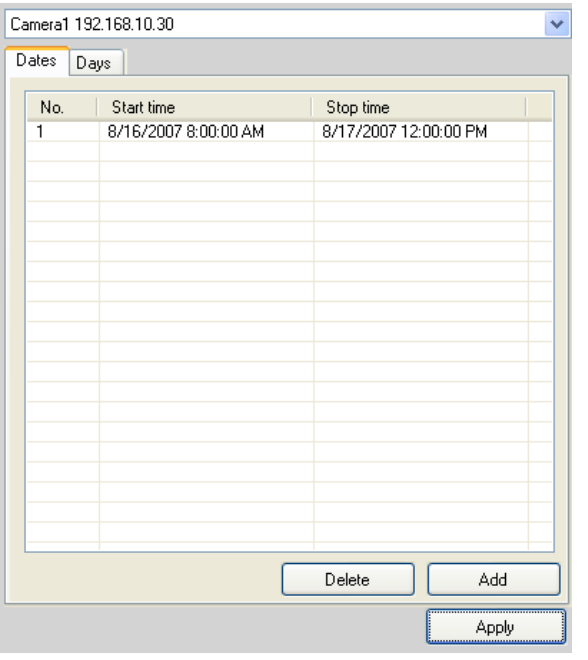
- **Dates:** Select the camera from the pull-down list..



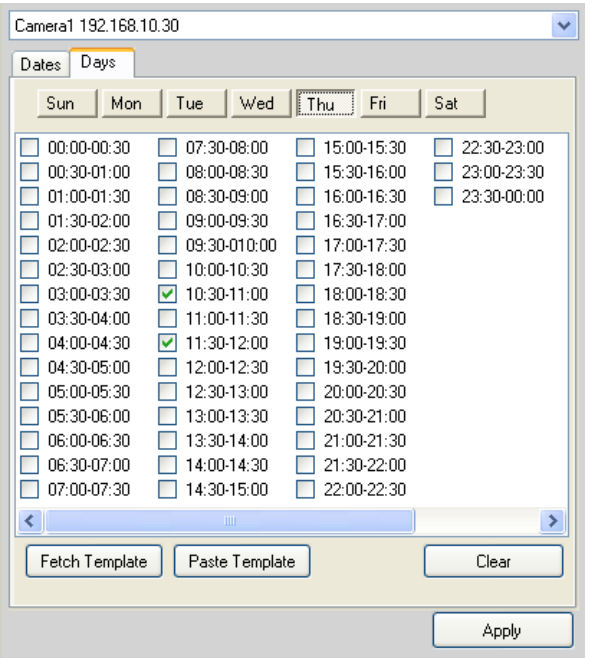
- Then, click **Add** to set the Start/Stop date and time and then click **OK** to add the recording schedule to the list.



- Click **Apply** to save the settings

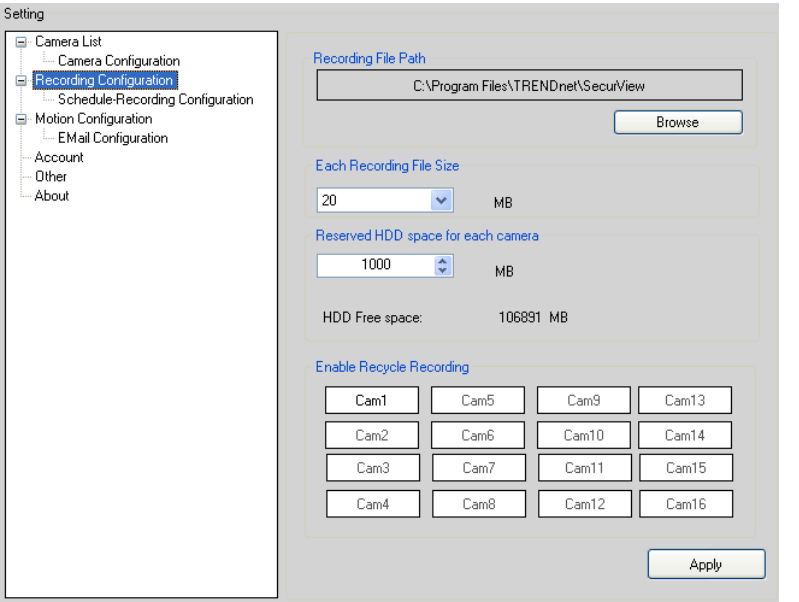

Camera1 192.168.10.30
Dates
Days
No.
Start time
Stop time
1
8/16/2007 8:00:00 AM
8/17/2007 12:00:00 PM
Delete
Add
Apply

Days: First, select the camera from the pull-down list and select **Days** tab. Then, select the weekday from the day buttons and then set the time period. Click **Apply** to save the settings.



To configure the recording settings

To configure the recording settings, including the storage folder and storage options, click **SETTING > Recording Configuration**.



- **Recording File Path:** To change the destination folder to save the recorded video file, click **Browse** under the **Recording File Path** box to assign a new folder.

- **Each Recording File Size:** This option allows you to select from **20** to **100** MB so that the video will be recorded as another file automatically when the recording file reaches the specified size limit.

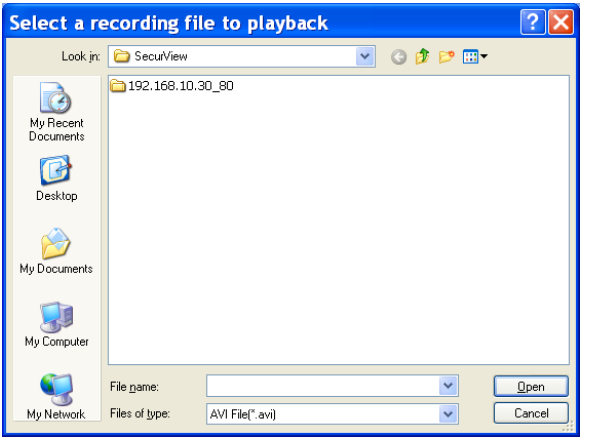
- **Reserved HDD space for each camera:** This option allows you to set to reserve the storage space on the hard disk drive for the recording of each camera. Before setting the reserve space on

the hard disk drive, you can check the available storage space that is displayed in the **HDD Free space** field.

- **Enable Recycle Recording:** Click on the camera number to clear the files when the unreserved space of the hard disk drive is full.

To playback the recorded video

The recorded video clips are saved in your computer, and can be played using the media player on the computer, such as Windows Media Player. To start playback, simply click the **PLAY** button on the CONTROLS panel, and the following dialog screen will appear, allowing you to select the file to playback.

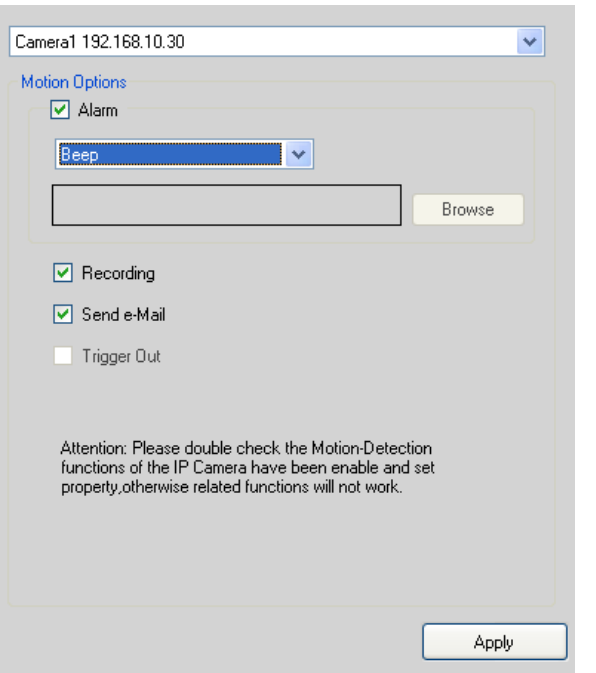


Select the recorded video file under the [camera] path and then click **Open** to launch the media player to playback.

NOTE If your player on the computer don't have video codec to playback the recorded video. You can download video codec from http://www.xvid.org/downloads.15.0.html to support.

To set up motion detection options

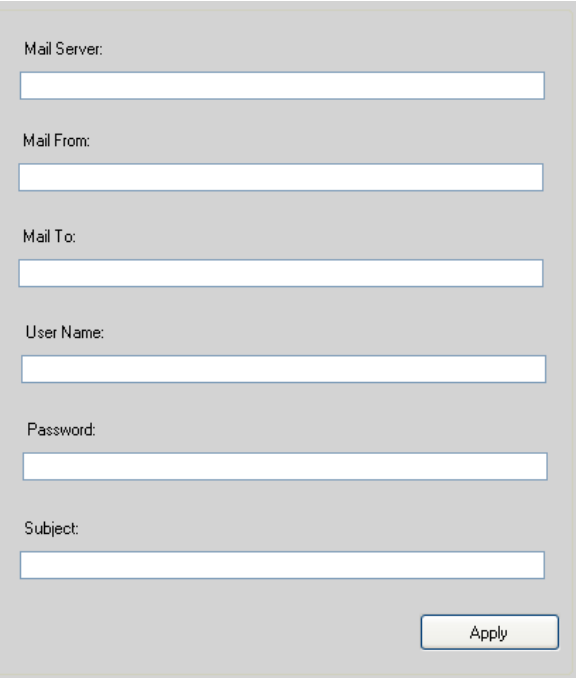
When the motion detection function of the selected camera is enabled, you can set the **Motion Options** by selecting **Alarm**, **Recording**, **Send e-Mail**, and **Trigger Out** under **SETTING > Motion Configuration**.



- **Alarm:** Select **Beep** or **Music** to alert you for the motion detected. When you select **Music**, you can customize the sound

by clicking **Browse** and then selecting your favorite music (*.wav or *.mp3 file) in the computer.

- **Recording:** Select this option to enable the camera to record by motion detected.
- **Send Email:** Select this option so that the system will be able to send an email to the specified receiver. Once the option is selected, you have to complete the required information in **SETTING > Motion Configuration > Email Configuration**.



- **Mail Server:** Enter the mail server address. For example, mymail.com.

- **Mail From:** Enter the email address of the user who will send the email. For example, John@mymail.com.
- **Mail To:** Enter the email address of the user who will receive the email.
- **User Name:** Enter the user name to login the mail server.
- **Password:** Enter the password to login the mail server.
- **Subject:** Enter a subject for the notification email.

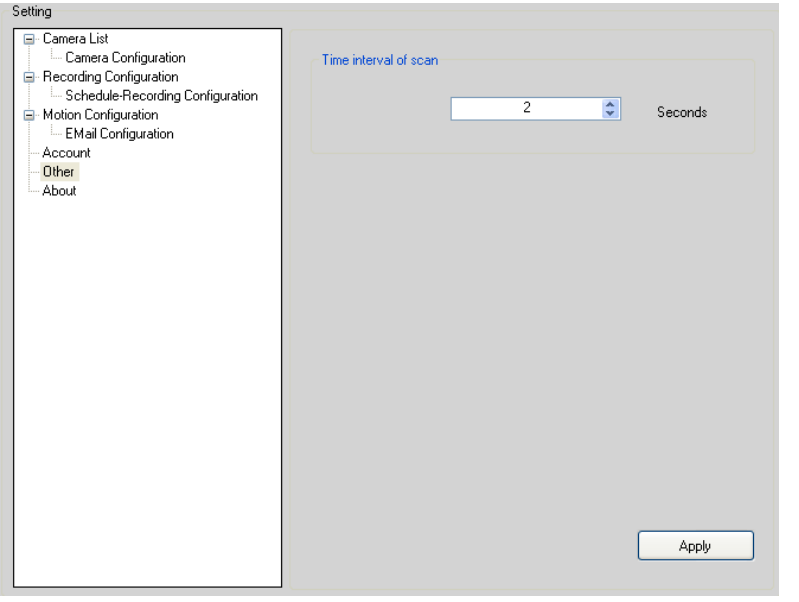
■ **Trigger Out:** If the selected camera supports Trigger Out connector, select this option to enable the Trigger Out function.

Account

Click **SETTING > Account** to setup the username & password to lock & unlock the main screen of the SecurView.

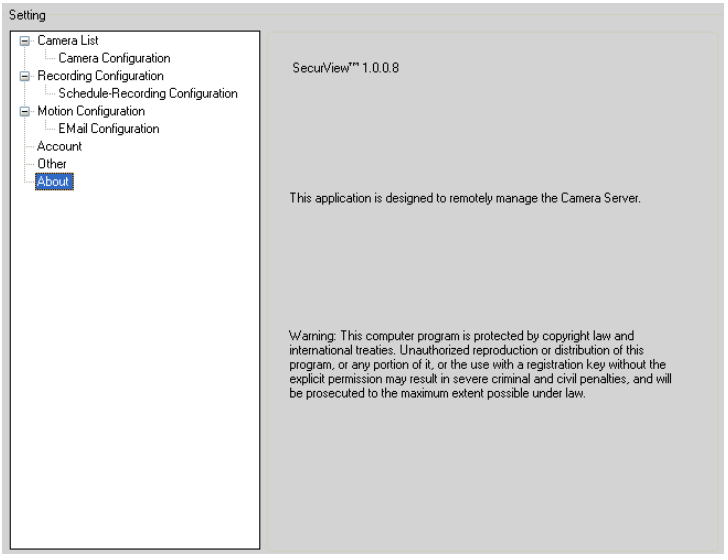
Other

Click **SETTING > Other** to setup the scanning time between cameras. The default setting is 2 seconds. You can set the interval time between 2 ~ 20 seconds.



Information

Click **SETTING > About** to display the information of the software application.


Setting
Camera List
Camera Configuration
Recording Configuration
Schedule-Recording Configuration
Motion Configuration
EMail Configuration
Account
Other
About
SecurView™ 1.0.0.8
This application is designed to remotely manage the Camera Server.
Warning: This computer program is protected by copyright law and international treaties. Unauthorized reproduction or distribution of this program, or any portion of it, or the use with a registration key without the explicit permission may result in severe criminal and civil penalties, and will be prosecuted to the maximum extent possible under law.

CHAPTER 6

APPENDIX

A.1 Specification

- **Image Sensor**

Sensor	1/4" color CMOS
Resolution	640x480

- **Video**

Compression	MPEG4/MJPEG
Video resolution	VGA/QVGA/QQVGA; 30fps max.

- **System Hardware**

Processor	ARM9 base
RAM	32MB SDRAM
ROM	8MB NOR Flash
Power	DC 5V, 2.5AV

- **Communication**

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

- **User Interface**

LAN	One RJ-45 port
Antenna	One detachable antenna
Reset	One reset button
USB	USB 1.1 port, with one unmount button; Power distribution: 500mA Max. Support FAT,FAT32 file system
LEDs	Power LED (orange); Link LED (green)

- **Audio**

Input	Built-in MIC
Output	Headphone 3.5mm output jack (Mono)
Codec	PCM/AMR (AMR is for 3GPP only)

- **SecurView™ Software**

OS Support	Windows 2000/XP/Vista
Feature	playback/recording/configuration features

- **Web Configuration**

OS Support	Windows 2000/XP/Vista
Browser	Internet Explorer 5.0 or above

- **Operating Environment**

Temperature	- Operation: 5°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 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.

AMR AMR (Adaptive Multi-Rate) is an audio data compression scheme optimized for speech coding, which is adopted as the standard speech codec by 3GPP.

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

F

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.

I

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-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.

MPEG4 MPEG4 is designed to enable transmission and reception

of high-quality audio and video over the Internet and next-generation mobile telephones.

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 transferors 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.

T

(TCP/IP) Transmission Control Protocol/Internet Protocol is a widely used transport protocol that connects diverse computers of various transmission methods. It was developed y 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.

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