Speed Dome / IR Speed Dome

MOBOTIX MOVE **SD-330 / SD-340-IR**

Software Installation

BeyondHumanVision

MOBOTIXMOVE

1. Overview

The weatherproof, motor-controlled ONVIF S/G PTZ camera **MOBOTIX MOVE SpeedDome SD-330** is easily adjusted from the control center using a joystick, providing a 360-degree view (continuous) and a 120-degree tilt. The camera also has a powerful 30x optical zoom. MOBOTIX MOVE SpeedDome cameras are therefore perfectly suited for live monitoring of medium-sized to large areas both indoors and outdoors.

Thanks to the motorized panning and tilting function of the **MOBOTIX MOVE SpeedDome SD-340-IR**, the Vario lens can be adjusted very easily and precisely to the area to be monitored. The 40x optical zoom and integrated high-performance IR LEDs enable important details to be captured clearly from 200 m away at an image resolution of up to 3MP – even in total darkness.

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2. Menu Tree

There are six setting tabs, including <Home>, <System>, <Streaming>, <Camera>, <PTZ> and <Logout> on the Home Page.

Home
Users can monitor the live video of the targeted area.

System Setting
The administrator can set host name, system time, root password, network related settings, etc. Further details will be interpreted in chapter System.

Streaming Setting
The administrator can configure video format, video compression, video OCX protocol, video frame rate and audio compression in this page.

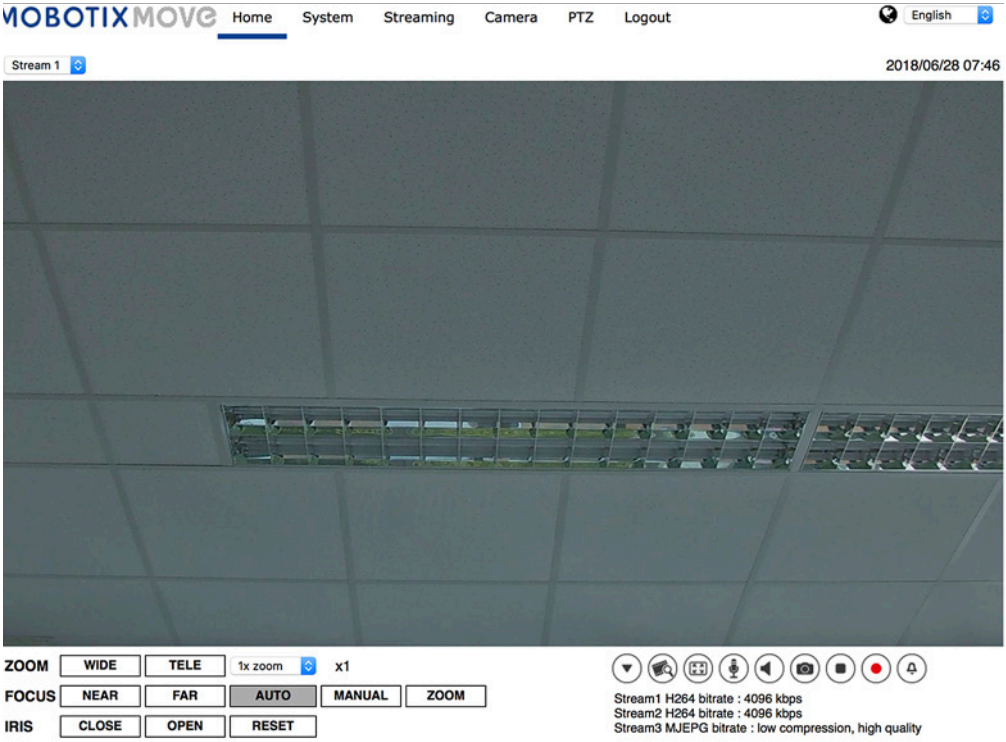
Camera Setting
This setting page is only available for the administrator and user accounts that have been granted the privilege of camera control. The administrator and users can adjust various camera parameters including Exposure, White Balance, Sharpness, IR Function, Digital Zoom, WDR, etc.

PTZ Setting
This setting page is only available for the administrator and user accounts that have been granted the privilege of camera control. The administrator and users can program Preset Point(s), Cruise Line(s), Auto Pan Path(s) and Sequence Line(s) via PTZ controls.

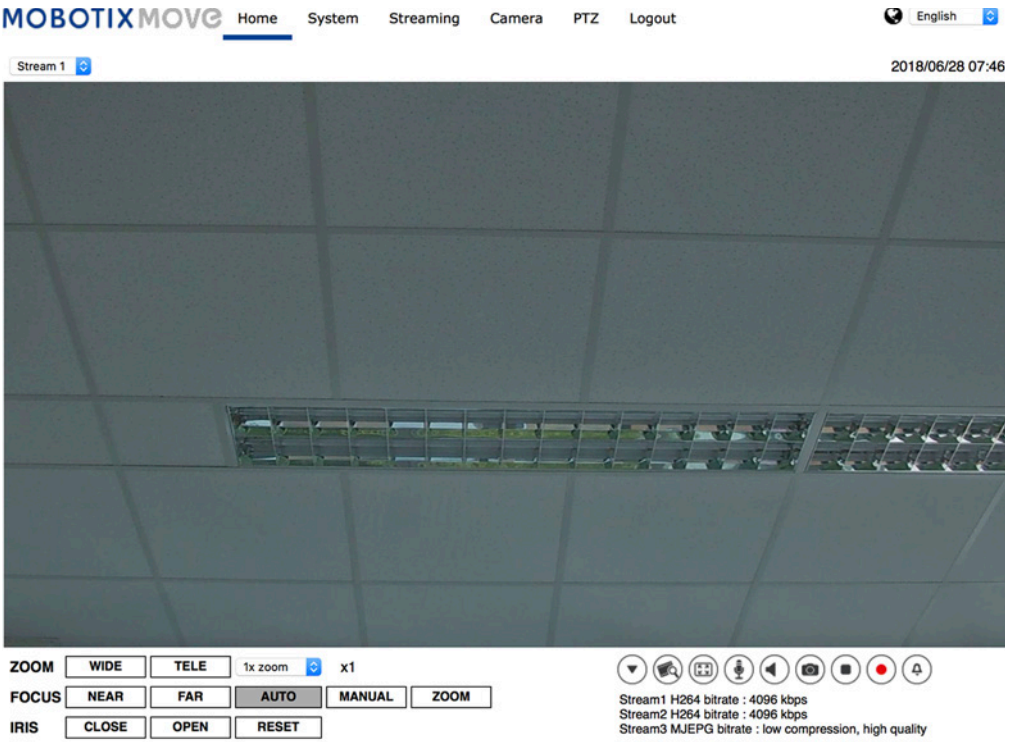
Logout
Click the tab to re-login the camera with another username and password.

2.1 Home Page

Click on the tab <Home> to access the <Home> Page. There are several function buttons on this page. Detailed information of each item is as described in the following section.



2.1.1 Function Items on Home Page



Multiple Languages Support
Multiple languages are supported, including German, English, Spanish, French, Italian, Japanese, Korean, Portuguese, Russian, Simplified Chinese and Traditional Chinese for the viewer window interface.

Display Stream Selection
According to the streaming setting, users can choose the one stream to display from the drop-down menu.

Camera Info
Double click on the live view pane, and the camera info window will pop up. Users can instantaneously check the basic information of the camera, such as IP address, network status, video format, etc.

Digital Zoom Control
In the full screen mode, users can implement digital PTZ by scrolling up/down the mouse wheel (for zoom in / out). Users can click and drag the mouse to check the viewing area.

Zoom Adjustment
Click <WIDE / TELE> to control zoom in / out. Or select any zoom ratio from to the zoom adjustment drop-down menu.

Focus Adjustment

- **Near / Far**
  Click < > first, and users can adjust focus manually via <NEAR> and <FAR> buttons.
- **Auto Focus (Continuous AF)**
  Click < > to enable AF mode. In this mode, the camera will keep in focus automatically and continuously regardless of zoom changes or any view changes.
- **Manual**
  Click < >, and users can adjust focus manually via NEAR / FAR buttons.
- **Zoom (Zoom Triggered AF)**
  Click < >, and AF will be activated every time when zoom is adjusted.

Iris Adjustment
Click < / > to control the brightness of the image. Or click < > to go back to the default value.

Control Panel
(Close / Open)

Click the <Control Panel> button to open and close the control panel.

Click < >, and the control panel will be as shown below.

- **Pan & Tilt Direction and Speed Control**
  The <Pan & Tilt Direction Control> arrows allow users to control the camera to intended direction. And users can set a number between 1 and 10 to determine the pan/tilt speed of the camera from the drop-down list on the control panel. 1 is the slowest and 10 is the fastest.
- **Run Preset / Cruise / Sequence**
  Go to <PTZ> à <Preset>/<Cruise>/<Sequence> to setup the relevant settings beforehand. Select a Preset / Cruise / Sequence line from the dropdown list and the camera will start running.

Video Quality
Click to show/hide bitrate and compression of each stream.

Full Screen
Image display size can be adjusted to full screen. Alternatively, right click the Live Video Pane and select <Fullscreen> to go full screen. To exit full screen mode, users can (1) tap <Esc> on the keyboard; (2) double click the Live Video Pane; (3) right click the Live Video Pane and select <Normal view>.

Talk (On / Off)
Talk function allows the local site talks to the remote site. Click the button to switch it to On / Off. Users must select the suitable transmission mode under this path: Streaming> Audio to enable this function.

NOTE: This function is only available for user accounts that have been granted this privilege by the administrator. Please refer to Security: Add user> Talk/Listen for further details.

Listen (On / Off)
Click the <Listen> button to mute / activate the audio. Users must select the suitable transmission mode under <Streaming> Audio to enable this function.

NOTE: This function is only available for user accounts that have been granted this privilege by the administrator. Please refer to Security: Add user> Talk/Listen for further details.

Snapshot
Click the button and the JPEG snapshots will automatically be saved in the appointed place. The default place of saving snapshots is: C:\. To change the storage location, please refer to section File Location of the next chapter for further details.

NOTE: With Windows 7 operating system or above, to implement the Snapshot function, users must run IE as administrator. To run IE as administrator, right click the IE browser icon and select “Run As Administrator” to launch IE.

Live View Pause / Restart (Pause / Restart)
Click < > to disable video streaming, the live video will be displayed as black. Press < > to show the live video.

Record (On / Off)
Click the <Record> button and the Live View through the web browsing will be directly recorded to the specific location on the local hard drive, which could be configured in the <File Location> page. The default storage location for the web recording is: C:\. Please refer to section File Location of the next chapter for further details.

NOTE: With Windows 7 operating system or above, to implement the Web Recording function, users must run IE as administrator. To run IE as administrator, right click the IE browser icon and select “Run As Administrator” to launch IE.

Manual Trigger (On / Off)
Click the <Manual Trigger > button to turn on and off the manual trigger. Please refer to section Manual Trigger of the next chapter for further details.

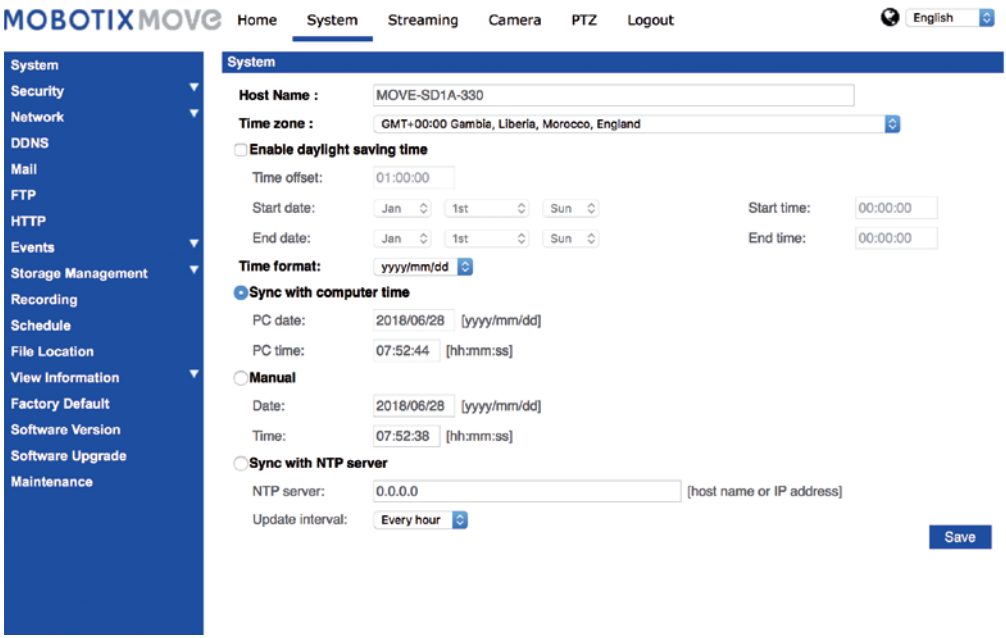
Pan/Tilt Control
Users can implement pan/tilt control by moving the cursor to the live video pane, then left click and drag the pointer in any direction.

Optical Zoom Control
In Full Screen display mode, users can implement zoom in / out by scrolling up/down the mouse wheel.

Set Center Mode
Right click the Live Video Pane and select <Set Center Mode>. Then users can position the interest area in the center of the Live Video Pane automatically by clicking on the point of interest. In <Set Center Mode>, right click the Live Video Pane again and select <Set Emulated Joystick Mode> to return to control the camera direction by left clicking and dragging the pointer on the Live Video Pane.

2.2 System

Under the tab <**System**>, the categories are shown as the configure page below.



NOTE: Only Administrator can access the <System> configuration page.

2.2.1 System

The System setting can be found under the path: **System> System**.

Host Name
The name is for camera identification. If the alarm function (refer to section Events) is enabled and is set to send alarm messages by Mail / FTP, the host name entered here will be displayed in the alarm message.

Time Zone
Select the time zone from the drop-down menu according to the location of the camera.

Enable Daylight Saving Time
To enable DST, please check the item and then specify the time offset and the DST duration. The format for time offset is [hh:mm:ss]; for instance, if the amount of time offset is one hour, please enter “01:00:00” into the field.

Time format
Choose a time format (yyyy/mm/dd or dd/mm/yyyy) from the drop-down menu. The format of the date and time displayed above the live video window will be changed according to the selected format.

Sync with Computer Time
Select the item, and video date and time display will synchronize with the PC’s.

NOTE: Users **MUST** click on <Save> to confirm the setting. Otherwise, the time will not be synced.

Manual
The administrator can set video date and time manually. Entry format should be identical with the examples shown next to the enter fields.

Sync with NTP Server
Network Time Protocol (NTP) is an alternate way to synchronize the camera’s clock with a NTP server. Please specify the server that is wished to synchronize in the entry field. Then select an update interval from the drop-down menu. For further information about NTP, please see the web site: www.ntp.org.

NOTE: The synchronization will be done every time the camera boots up. Click on <Save> to confirm the setting.

2.2.2 Security

The Security setting can be found under this path: **System> Security**.

Click on <Security>, there will be a drop-down menu with tabs including <User>, <HTTPS>, <IP Filter>, and <IEEE 802.1X>.

2.2.2.1 User

The User setting can be found under this path: **System> Security> User**.

Admin Password
This item is for the administrator to reset password. Enter the new password in <Admin password> and <Confirm password>. The maximum length is 14 characters. The input characters / numbers will be displayed as dots for security purposes. Click on <Save> to confirm the changes. After the changes are confirmed, the web browser will ask the administrator to re-login to the camera with the new password.

NOTE: The following characters are valid: A-Z, a-z, 0-9, !#$%&'-.@^_~.

Add User
This item is for the administrator to add new users. Enter the new user's name in <User name> and the password in <User password>. Username can be up to 16 characters, and the maximum length of the password is 14 characters. Tick the boxes below to give privileges for functions, including "**Camera control**", "**Talk**" and "**Listen**". Click on <Add> to add the new user. The name of the new added user will be displayed in the <User name> drop-down menu under <Manage User>. There is a maximum of twenty user accounts.

- **I/O access**
  This item supports fundamental functions that enable users to view the live video when accessing to the camera.
- **Camera control**
  This item allows the appointed user to change camera parameters on the <Camera> setting page.
- **Talk/Listen**
  This item allows the appointed user in the local site (camera site) to communicate with, for instance, the administrator in the remote site.

Manage User

- **Delete user**
  Pull down the <User name> drop-down menu and select the username that is wished to be deleted. Click on <Delete> to remove the selected name.
- **Edit user**
  Pull down the <User name> drop-down menu and select the username. Click on <Edit> and a popup window will appear. In the appeared window, enter the new user password and reset the privileges. Click on <Save> to confirm the changes. Then click on <Close> to complete the editing.

HTTP Authentication Setting
This setting allows secured connections between the IP camera and web browser by enforcing access controls to web resources. When users approach to the web browser, it'll ask for username and password, which protects the camera settings or live streaming information from snooping. There are two security models available: Basic and Digest. Refer to the descriptions below for more details.

- **Basic**
  This mode can only provide basic protection for the connection security. There will still be risks for the password being intercepted.
- **Digest**
  Digest mode is a safer option for protection. The password is sent in an encrypted format to prevent it from being stolen.

NOTE: Users MUST click on <Save> to apply the setting.

Streaming Authentication Setting
This setting provides security against unauthorized users from getting streaming via Real Time Streaming Protocol (RTSP). If the setting is enabled, users will be requested to enter user name and password before viewing the live streams. There are three security modes available: Disable, Basic and Digest. Refer to the descriptions below for more details.

- **Disable**
  If disable mode is selected, there will be no security provided to against unauthorized access. Users will not be asked to input user name and password for authentication.
- **Basic**
  This mode can only provide basic protection for the live streams. There will still be risks for the password being intercepted.
- **Digest**
  Digest mode is a safer option for protection. The password is sent in an encrypted format to prevent it from being stolen.

NOTE: Users **MUST** click on <Save> to apply the setting.

2.2.2.2 HTTPS

The HTTPS setting can be found under this path: **System> Security> HTTPS**.

<HTTPS> allows secure connections between the camera and the web browser using <Secure Socket Layer (SSL)> or <Transport Layer Security (TLS)>, which ensure camera settings or Username / Password info from snooping. It is required to install a self-signed certificate or a CA-signed certificate for implementing HTTPS. To use HTTPS on the camera, an HTTPS certificate must be installed. The HTTPS certificate can be obtained by either creating and sending a certificate request to a Certificate Authority (CA) or creating a self-signed HTTPS certificate, as described below.

Create Self-signed Certificate
Before a CA-issued certificate is obtained, users can create and install a self-signed certificate first. Click on <Create> under “Create self-signed certificate” and provide the requested information to install a self-signed certificate for the camera. Please refer to the last part of this section Provide the Certificate Information for more details.

NOTE: The self-signed certificate does not provide the same high level of security as when using a CA-issued certificate.

Install Signed Certificate
Click on <Create Certificate Request> to create and submit a certificate request in order to obtain a signed certificate from CA. Provide the request information in the create dialog. Please refer to the following section Provide the Certificate Information for more details. When the request is complete, the subject of the Created Request will be shown in the field. Click on <Properties> below the Subject field, copy the PEM-formatted request and send it to the selected CA. When the signed certificate is returned, install it by uploading the signed certificate.

Provide the Certificate Information
To create a Self-signed HTTPS Certificate or a Certificate Request to CA, please enter the information as requested.

Create Self Signed Certificate	Create Certificate Request	
Country	v	v
State or Province	v	v
Locality	v	v
Organization	v	v
Organizational Unit	v	v
Common Name	v	v
Valid Days	v	-

- **Country**
  Enter a two-letter combination code to indicate the country the certificate will be used in. For instance, type in “US” to indicate United States.
- **State or Province**
  Enter the local administrative region.
- **Locality**
  Enter other geographical information.
- **Organization**
  Enter the name of the organization to which the entity identified in “Common Name” belongs.
- **Organization Unit**
  Enter the name of the organizational unit to which the entity identified in “Common Name” belongs.
- **Common Name**
  Indicate the name of the person or other entity that the certificate identifies (often used to identify the website).
- **Valid Days**
  Enter the period in days (1 to 9999) to indicate the valid period of certificate. Click on <OK> to save the Certificate Information after completing the setting.

2.2.2.3 IP Filter

The IP Filter setting can be found under this path: **System> Security> IP Filter**.

With IP Filter, users can allow or deny specific IP addresses from accessing the camera.

- **Enable IP Filter**
  Check the box to enable the IP Filter function. Once enabled, the listed IP addresses (IPv4) in the <Filtered IP Addresses> list box will be allowed / denied to access the camera. Select <Allow> or <Deny> from the drop-down menu and click on <Apply> to determine the IP filter behavior.
- **Add IP Address**
  Input IP address at the blank space below the <Filtered IP Address> list and click <Add>. The newly-added address will be shown in the list. Up to 256 IP address entries can be specified.

In addition, to filter a group of IP addresses, enter an address at the blank space followed with a slash and a number ranging from 1 to 31, e.g. 192.168.2.81/30. The number after the slash can define how many IP addresses will be filtered. For details, please refer to the following example.

➢ **Example:** Filtering a group of consecutive IP addresses
The steps below show what will be filtered when 192.168.2.81/30 is entered.

Step 1: Convert 192.168.2.81 to binary numbers. The binary numbers are 11000000.10101000.00000010.01010001. Users can refer to Appendix B: IP Addresses from Decimal to Binary for converting the IP addresses to binary numbers. The number "30" after the slash is referring to the first 30 digits of the binary numbers.

Step 2: Convert a few IP addresses before and after 192.168.2.81 to binary numbers. Then compare their first 30 digits with the binary numbers of 192.168.2.81.

a. Convert 192.168.2.80 to binary numbers. The binary numbers are 11000000.10101000.00000010.01010000. The first 30 digits are the 18 same with the binary numbers of 192.168.2.81, thus 192.168.2.80 will be filtered.

b. Convert 192.168.2.79 to binary numbers. The binary numbers are 11000000.10101000.00000010.01001111. The first 30 digits are different with the binary numbers of 192.168.2.81, thus 192.168.2.79 will not be filtered. This also means the IP addresses before 192.168.2.79 will not be filtered. Therefore, users can stop converting the IP addresses before 192.168.2.79 to binary numbers.

c. Repeat the same procedure in "a" with the IP addresses after 192.168.2.81. Stop when the situation occurs in "b" happened. Namely, the 30th digit of the binary numbers of IP address 192.168.2.84 is different, and will not be filtered.

As a result, the IP addresses 192.168.2.80 to 192.168.2.83 will be filtered when entering 192.168.2.81/30. The following table clearly shows the 30th digit of the binary numbers of IP addresses 192.168.79 and 192.168.84 are different from the others. Therefore, these two IP addresses will not be filtered.

IP Addresses	Binary Numbers
192.168.2.79	**11000000.10101000.00000010.01001111**
192.168.2.80	**11000000.10101000.00000010.01010000**
192.168.2.81	**11000000.10101000.00000010.01010001**
192.168.2.82	**11000000.10101000.00000010.01010010**
192.168.2.83	**11000000.10101000.00000010.01010011**
192.168.2.84	**11000000.10101000.00000010.01010100**

- **Delete IP Address**
To remove an IP address from the <Filtered IP Address> list, please select the address and click on <Delete>.

2.2.2.4 IEEE 802.1X

The IEEE 802.1X setting can be found under this path: **System> Security> IEEE 802.1X**.

The camera is allowed to access a network protected by 802.1X/EAPOL (Extensible Authentication Protocol over LAN). Users need to contact with the network administrator for gaining certificates, user IDs and passwords.

CA Certificate
The CA certificate is created by the Certification Authority for the purpose of validating itself. Upload the certificate for checking the server's identity.

Client Certificate / Private Key
Upload the Client Certificate and Private Key for authenticating the camera itself.

Settings

- **Identity**
  Enter the user identity associated with the certificate. Up to 16 characters can be used.
- **Private Key Password**
  Enter the password (maximum 16 characters) for user identity.

Enable IEEE 802.1X
Check the box to enable IEEE 802.1X.

Click on <Save> to save the IEEE 802.1X/EAP- TLS setting.

2.2.3 Network

The Network setting can be found under this path: **System> Network**.

Click on <Network>, there will be a drop-down menu with tabs including <Basic>, <QoS>, <SNMP>, and <UPnP>.

2.2.3.1 Basic

The Basic setting can be found under this path: **System> Network> Basic**.

This setting page is for setting a new IP address for the camera, configuring other network-related parameters and activating IPv6 address (if the network supports it).

General
This setting menu is for configuring a new IP address for the camera. To setup an IP address, please find out the network type first. Contact the network provider for it. Then refer to the network type and follow the instructions to setup the IP address.

NOTE: If the network type is Point-to-Point Protocol over Ethernet (PPPoE), please obtain the PPPoE username and password from the network provider.

Get IP address automatically (DHCP)
Select the item and click <Save> to confirm the new setting. A note for camera system reboot will appear. Click <OK> and the camera system will restart. The camera will be assigned with a new IP address.

Use fixed IP address
Select the item and insert the new IP address, e.g. 192.168.7.123. Note that the inserted IP address should be in the same LAN as the PC's IP address. Then go to the Default gateway (explained later) blank and change the setting, e.g. 192.168.7.254. Click on <Save> to confirm the new setting. A note for system restart will appear, click <OK> and

the camera system will restart. Wait for 15 seconds. The camera's IP address in the URL bar will be changed, and users have to login again.

When using a static IP address to connect the camera, users can access the camera by inputting the IP address in the URL bar and hit <Enter> on the keyboard.

IP address
This is necessary for network identification.

- Subnet mask
  It is used to determine if the destination is in the same subnet. The default value is "255.255.255.0".
- Default gateway
  This is the gateway used to forward frames to destinations in different subnet. Invalid gateway setting will fail the transmission to destinations in different subnet.
- Primary DNS
  Primary DNS is the primary domain name server that translates hostnames into IP addresses.
- Secondary DNS
  Secondary DNS is a secondary domain name server that backs up the primary DNS.

- **Use PPPoE**
  For the PPPoE users, enter the PPPoE username and password into the enter fields, and click on <Save> to complete the setting.

Advanced
The following introduces the camera's Web Server port, RTSP port, MJPEG over HTTP port, and HTTPS port.

- **Web Server port**
  The default web server port is 80. With the default web server port '80', users can simply input the IP address of the camera in the URL bar of a web browser to connect the camera. When the web server port is changed to any number other than 80, users have to enter the camera's IP address followed by a colon and the port number. For instance, a camera whose IP address is set as 192.168.0.100 and web server port as 8080 can be connected by entering "http://192.168.0.100:8080" in the URL bar.
- **RTSP port**
  The default setting of RTSP Port is 554; the RTSP Port should be set as 554 or from the range 1024 to 65535.
- **MJPEG over HTTP port**
  The default setting of MJPEG over HTTP Port is 8008; the MJPEG over HTTP Port should be set as 8008 or from the range1024 to 65535.
- **HTTPS port**
  The default setting of HTTPS Port is 443; the HTTPS Port should be set as 443 or from the range 1024 to 65535.

⚠ **NOTE**: Please make sure the port numbers set above are not the same with each other; otherwise, network conflict may occur.

- **RTSP URL**
  When users use RTSP players to view the live streaming, the camera provides the flexibility to configure the streaming access name for stream 1 to stream 4. The streaming format is rtsp://<ip address>:<rtspport>/<access

name>. Take a camera whose IP address is set as 192.168.0.100 for example, if users enter “liveview.1” in the blank of stream 1 access name, the streaming address of stream 1 will be rtsp://192.168.0.100:554/liveview.1.

NOTE: The maximum length of the access name is 32 characters, and the valid characters are A-Z, a-z, 0-9 and !#$%&’-.@^_~.

IPv6 Address Configuration
If the network supports IPv6, users can check the box beside <Enable IPv6> and click <Save>. An IPv6 address will appear beside <Address>, and users can use it to connect to the camera.

2.2.3.2 QoS

The QoS (Quality of Service) setting can be found under this path: **System>Network> QoS**.

QoS allows providing differentiated service levels for different types of traffic packets, which guarantees delivery of priority services especially when network congestion occurs. Adapting the Differentiated Services (DiffServ) model, traffic flows are classified and marked with DSCP (DiffServ Codepoint) values, and thus receive the corresponding forwarding treatment from DiffServ capable routers.

DSCP Settings
The DSCP value range is from 0 to 63. The default DSCP value is 0, which means DSCP is disabled. The camera uses the following QoS Classes: Video, Audio and Management.

- **Video DSCP**
  The class consists of applications such as MJPEG over HTTP, RTP/RTSP and RTSP/HTTP.
- **Audio DSCP**
  This setting is only available for the cameras that support audio.
- **Management DSCP**
  The class consists of HTTP traffic: Web browsing.

NOTE: To enable this function, please make sure the switches / routers in the network support QoS.

2.2.3.3 SNMP

The SNMP (Simple Network Management Protocol) setting can be found under this path: **System> Network> SNMP**.

With Simple Network Management Protocol (SNMP) support, the camera can be monitored and managed remotely by the network management system.

SNMP v1 / v2

- **Enable SNMP v1 / v2**
  Select the version of SNMP to use by checking the box.
- **Read Community**
  Specify the community name that has read-only access to all supported SNMP objects. The default value is “public”.
- **Write Community**
  Specify the community name that has read / write access to all supported SNMP objects (except read-only objects). The default value is “private”.

SNMP v3
SNMP v3 supports an enhanced security system that provides protection against unauthorized users and ensures the privacy of the messages. Users will be requested to enter security name, authentication password and encryption password while setting the camera connections in the network management system. With SNMP v3, the messages sent between the cameras and the network management system will be encrypted to ensure privacy.

- **Enable SNMP v3**
  Enable SNMP v3 by checking the box.
- **Security Name**
  The maximum length of the security name is 32 characters.

NOTE: The valid characters are A-Z, a-z, 0-9 and !#$%&'-.@^_~.

- **Authentication Type**
  There are two authentication types available: MD5 and SHA. Select <SHA> for a higher security level.
- **Authentication Password**
  The authentication password must be 8 characters or more. The input characters / numbers will be displayed as dots for security purposes.

NOTE: The valid characters are A-Z, a-z, 0-9 and !#$%&'-.@^_~.

- **Encryption Type**
  There are two encryption types available: DES and AES. Select <AES> for a higher security level.
- **Encryption Password**
  The minimum length of the encryption password is 8 characters and the maximum length is 512 characters. The input characters / numbers will be displayed as dots for security purposes. The encryption password can also be left blank. However, the messages will not be encrypted to protect privacy.

NOTE: The valid characters are A-Z, a-z, 0-9 and !#$%&'-.@^_~.

Traps for SNMP v1 / v2 / v3
Traps are used by the camera to send messages to a management system for important events or status changes.

- **Enable Traps**
  Check the box to activate trap reporting.
- **Trap address**
  Enter the IP address of the management server.
- **Trap community**
  Enter the community to use when sending a trap message to the management system.

Trap Option

- **Warm Start**
  A Warm Start SNMP trap signifies that the SNMP device, i.e. IP camera, performs software reload.

Click on <Save> when completed.

2.2.3.4 UPnP

The UPnP setting can be found under this path: **System> Network> UPnP**.

UPnP Setting

- **Enable UPnP**
  When the UPnP is enabled, whenever the camera is presented to the LAN, the icon of the connected cameras will appear in My Network Places to allow for direct access.

NOTE: To enable this function, please make sure the UPnP component is installed on the computer. Please refer to Appendix A: Install UPnP Components for UPnP component installation procedure.

- **Enable UPnP port forwarding**
  When the UPnP port forwarding is enabled, the camera is allowed to open the web server port on the router automatically.

NOTE: To enable this function, please make sure that the router supports UPnP and it is activated.

- **Friendly name**
  Set a name for the camera for identity.

Click on <Save> when finished.

2.2.4 DDNS

The DDNS setting can be found under this path: **System> DDNS**.

Dynamic Domain Name System (DDNS) allows a host name to be constantly synchronized with a dynamic IP address. In other words, it allows those using a dynamic IP address to be associated to a static domain name so others can connect to it by name.

Enable DDNS
Check the item to enable DDNS.

Provider
Select one DDNS host from the provider list.

Host name
Enter the registered domain name in the field.

Username/E-Mail
Enter the username or E-mail required by the DDNS provider for authentication.

Password/Key
Enter the password or key required by the DDNS provider for authentication.

2.2.5 Mail

The Mail setting can be found under this path: System> Mail.

The administrator can send an E-mail via Simple Mail Transfer Protocol (SMTP) when an alarm is triggered. SMTP is a protocol for sending E-mail messages between servers. SMTP is a relatively simple, text-based protocol, where one or

more recipients of a message are specified and the message text is transferred. Two sets of SMTP can be configured. Each set includes SMTP Server, Account Name, Password and E-mail Address settings. For SMTP server, contact the network service provider for more specific information.

2.2.6 FTP

The FTP setting can be found under this path: **System> FTP**.

The administrator can set the camera to send the alarm messages to a specific File Transfer Protocol (FTP) site when an alarm is triggered. Users can assign alarm message to up to two FTP sites. Enter the FTP details, which include server, server port, username, password and remote folder, in the fields.

Click on <Save> when finished.

2.2.7 HTTP

The HTTP setting can be found under this path: **System> HTTP**.

An HTTP Notification server can listen for the notification messages from the cameras by triggered events. Enter the HTTP details, which include server name (for instance, http://192.168.0.100/admin.php), username, and password in the fields. <Alarm> triggered and <Motion Detection> notifications can be sent to the specified HTTP server.

Click on <Save> when finished.

⚠ **NOTE**: Please refer to Events> Application> Send HTTP notification for HTTP Notification settings.

2.2.8 Events (Alarm Settings)

The Events setting can be found under this path: **System> Events**.

Click on <Events>, there will be a drop-down menu with tabs including <Application>, <Motion Detection>, <Network Failure Detection>, <Tampering>, <Periodical Event>, <Manual Trigger>, and <Audio Detection>.

2.2.8.1 Application

The Application setting can be found under this path: **System> Events>Application**.

The camera supports one alarm input and one relay output for cooperation with alarm system to catch event images. Refer to alarm pin definition below to connect alarm devices to the camera if needed.

Alarm Switch

The default setting for the Alarm Switch function is <Off>. Enable the function by selecting <On>. Users can also activate the function according to the schedule previously set in the <Schedule> setting page. Select <By schedule> and click <Please select…> to choose the desired schedule from the drop-down menu.

Alarm Type

Select an alarm type, <Normal close> or <Normal open>, that corresponds with the alarm application.

Triggered Action
The administrator can specify alarm actions that will take when the alarm is triggered. All options are listed as follows.

- **Enable Alarm Output (high/low)**
  Select the item to enable alarm relay output.
- **IR Cut Filter**
  Select the item and the IR cut filter (ICR) of the camera will be removed (on) or blocked (off) when alarm input is triggered. This function is only available for models with IR cut filter.

NOTE: The IR Function (refer to section IR Function) could not be set as <Auto> mode if this triggered action is enabled.

- **Send Message by FTP/E-Mail**
  The administrator can select whether to send an alarm message by FTP and/or E-mail when an alarm is triggered.
- **Upload Image by FTP**
  Select this item and the administrator can assign an FTP site and configure various parameters. When the alarm is triggered, event images will be uploaded to the appointed FTP site. Note that to implement this function, one of the streaming MUST be set as MJPEG; otherwise, this function will be grayed out and cannot be accessed.

  <Pre-trigger buffer> function allows users to check what caused the trigger. The <Pre-trigger buffer> frame rate could be pre-determined. <Post-trigger buffer> is for users to upload certain amount of images after the alarm input is triggered.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames. However, the range will change accordingly if the frame rate of MJPEG on Streaming> Video Configuration is 6 or smaller. Check the box <Continue image upload> to upload the triggered images during certain time or keep uploading until the trigger is off. Select <Upload for __ sec> and enter the duration in the blank. The images of the duration will be uploaded to FTP when the alarm input is triggered. The setting range is from 1 to 99999 sec. Select <Upload during the trigger is active> to make the images keep being uploaded to FTP during the trigger active until the alarm is released. Set the Image frequency as the upload frame rate. The setting range is from 1 to 15 frames.

NOTE: Make sure FTP configuration has been completed. Refer to section FTP for further details.

- **Upload Image by E-Mail**
  Select this item and the administrator can assign an E-mail address and configure various parameters. When the alarm input is triggered, event images will be sent to the appointed E-mail address. Note that to implement this function, one of the streaming MUST be set as MJPEG; otherwise, this function will be grayed out and cannot be accessed. <Pre-trigger buffer> function allows users to check what caused the trigger. The <Pre-trigger buffer> frame rate could be pre-determined. On the other hand, <Post-trigger buffer> is for users to upload certain amount of images after alarm input is triggered.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames. However, the range will change accordingly if the frame rate of MJPEG on **Streaming> Video Configuration** is 6 or smaller.

Check the box <Continue image upload> to upload the triggered images during certain time or keep uploading until the trigger is off. Select <Upload for __ sec> and enter the duration in the blank. The images of the duration will be uploading by E-mail when the alarm input is triggered. The setting range is from 1 to 99999 sec. Select <Upload during the trigger active> to make the images keep being uploaded to E-mail during the trigger active until the alarm is released. Set the Image frequency as the upload frame rate. The setting range is from 1 to 15 frames.

NOTE: Make sure SMTP configuration has been completed. Refer to section Mail for further details.

- **Send HTTP Notification**
  Check this item and select the destination HTTP address. Then specify the parameters for event notifications by <Alarm> triggered. When an alarm is triggered, the HTTP notification will be sent to the specified HTTP server.

  For instance, if the custom parameter is set as "action=1&group=2", and the HTTP server name is "http://192.168.0.100/admin.php", the notification will be sent to HTTP server as "http://192.168.0.100/admin.php/action=1&group=2" when alarm is triggered.
- **Record Video Clip**
  Check this item and select a video recording storage type, <SD Card> or <NAS> (Network-Attached Storage). The alarm-triggered recording will be saved into the microSD/SD card or the NAS. <Pre-trigger buffer> recording function allows users to check what caused the trigger. The pre-trigger buffer time range is from 1 to 3 sec. Select <Upload for __ sec> to set the recording duration after alarm is triggered. The setting range is from 1 to 99999 sec. Select <Upload during the trigger is active> to record the triggered video until the trigger is off.

NOTE: Please make sure the local recording (with microSD/SD card) or the remote recording (with NAS) is activated so that this function can be implemented. Refer to section Recording for further details.

File Name
Enter a file name in the blank, e.g. image.jpg. The file name format of the uploaded image can be set in this section. Please select the one that meets the requirements.

- **Add date/time suffix**
  File name: imageYYMMDD_HHNNSS_XX.jpg
  Y: Year, M: Month, D: Day
  H: Hour, N: Minute, S: Second
  X: Sequence Number
- **Add sequence number suffix (no maximum value)**
  File name: imageXXXXXXX.jpg
  X: Sequence Number
- **Add sequence number suffix up to # and then start over**
  File Name: imageXX.jpg
  X: Sequence Number

The file name suffix will end at the number being set. For example, if the setting is up to "10", the file name will start from 00, end at 10, and then start all over again.

Overwrite
The original image in the FTP site will be overwritten by the new uploaded file with a static filename.

Save
After completing all the settings mentioned above, please click on <Save> to save all the settings in this page.

2.2.8.2 Motion Detection

The Motion Detection setting can be found under this path: **System> Events>Motion Detection.**

Motion Detection function allows the camera to detect suspicious motion and trigger alarms by comparing sampling pixels in the detection area of two consecutive live images. When motion volume in the detection area reaches /

exceeds the determined sensitivity threshold value, the alarm will be triggered.

The function supports up to 4 sets of Motion Detection Settings. Settings can be chosen from the Motion Detection drop-down menu.

Motion Detection

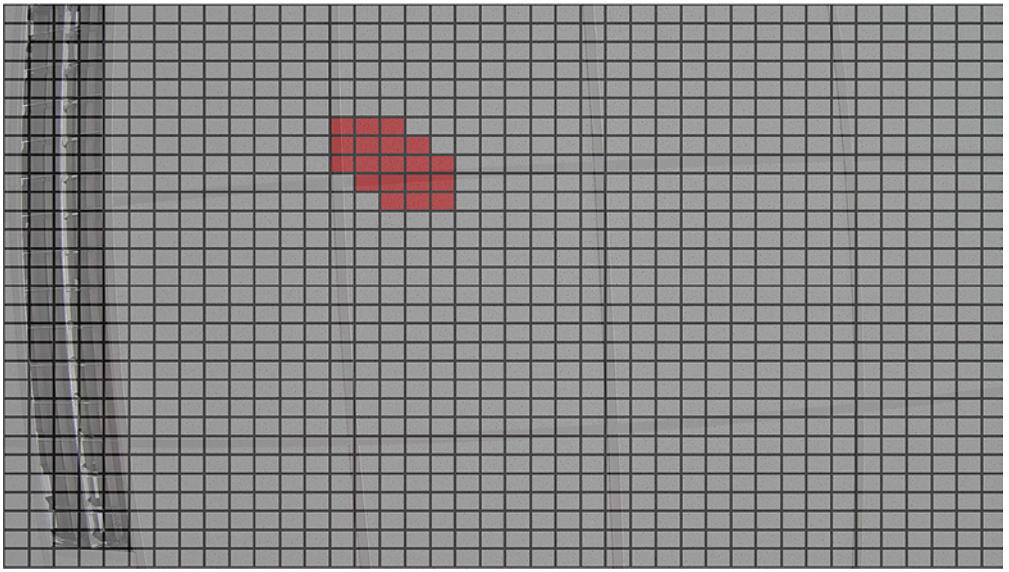
By default, Motion Detection function for each Motion Detection Setting is <Off>.

Select <On> to enable Motion Detection. Users can also activate the function according to the schedule previously set in the <Schedule> setting page. Select <By schedule> and click <Please select…> to choose the desired schedule from the drop-down menu.

Motion Region Setup (Motion Region Paint)

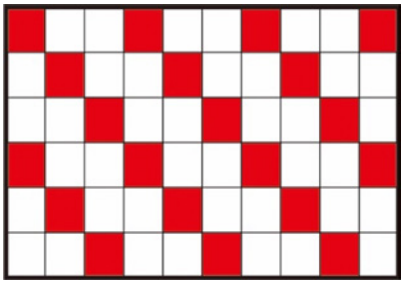
The camera divides the detection area into 1200 (40x30) detection grids; users can draw the motion detection region using the paintbrush.

Check the box <Enable brush> and select the brush size, 1x1, 3x3 or 5x5. Then, left click and drag the mouse cursor to draw the preferred detection region. To erase the drawn detection region, left click and drag the mouse cursor on the colored grids.



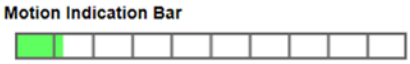
Motion Detection Setting
Users could adjust various parameters of Motion Detection in this section.

- **Sampling pixel interval [1-10]:**
  This item is used to examine the differences between two frames. Users can configure the interval of sampling pixel. The default value is 1. For instance, if users set the interval as 3, IP camera system will take one sampling pixel from every 3 pixels of each row and each column in detection area (refer to the figure below). The alarm will be triggered when differences are detected.

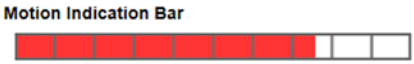


- **Detection level [1-100]:**
  Users can configure detection level for each sampling pixel. Detection level is how much the camera can accept the differences between two sampling pixels. The smaller the value is, the more minor motions it detects. The default level is 10.
- **Sensitivity level [1-100]:**
  The default level is 80, which means if 20% or more sampling pixels are detected differently, system will detect motion. The bigger the value, the more sensitive it is. Meanwhile, when the value is bigger, the red horizontal line in the motion indication window will be lower accordingly.
- **Time interval (sec) [0-7200]:**
  The value is the interval between each detected motion. The default interval is 10.

Motion Indication Bar
When Motion Detection function is activated and the motion is detected, the signals will be displayed on the motion indication bar. The motion indication bar will go green or red when there is any motion occurrence in the detection region. Green suggests the occurring motion is detected and does not exceed the threshold of detection level and sensitivity level. No alarms will be triggered.



Red suggests the ongoing motion exceeds the threshold of detection level and sensitivity level. The alarm will be triggered.



Triggered Action (Multi-option)
The administrator can specify alarm actions that will take when motion is detected.

All options are listed as follows.

- **Enable Alarm Output 1/2 (high/low)**
  Check the item and select the predefined type of alarm output to enable alarm relay output when motion is detected.
- **Send Alarm Message by FTP/E-Mail**
  The administrator can select whether to send an alarm message by FTP and/or E-mail when motion is detected.
- **Upload Image by FTP**
  Select this item and the administrator can assign an FTP site and configure various parameters. When motion is detected, event images will be uploaded to the appointed FTP site. Note that to implement this function, one of the streaming MUST be set as MJPEG; otherwise, this function will be grayed out and cannot be accessed. <Pre-trigger buffer> function allows users to check what caused the trigger. The <Pre-trigger buffer> frame rate could be pre-determined. On the other hand, <Post-trigger buffer> is for users to upload certain amount of images after motion event occurs.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames. However, the range will change accordingly if the frame rate of MJPEG on Streaming> Video Configuration is 6 or smaller.

Check the box <Continue image upload> to upload the triggered images during certain time or keep uploading until the trigger is off. Select <Upload for __sec> and enter the duration in the blank. The images of the duration will be uploaded to FTP when the motion event occurs. The setting range is from 1 sec. to 99999 sec. Select <Upload during the trigger active> to make the images keep being uploaded to FTP during the trigger active until the event stops. Set the Image frequency as the upload frame rate. The setting range is from 1 to 15 frames per second.

NOTE: Make sure FTP configuration has been completed. Refer to section FTP for further details.

- **Upload Image by E-Mail**
  Select this item and the administrator can assign an E-mail address and configure various parameters. When motion is detected, event images will be sent to the appointed E-mail address. Note that to implement this function, one of the streaming MUST be set as MJPEG; otherwise, this function will be grayed out and cannot be accessed. <Pre-trigger buffer> function allows users to check what caused the trigger. The <Pre-trigger buffer> frame rate could be pre-determined. On the other hand, <Post-trigger buffer> is for users to upload certain amount of images after the motion event occurs.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames. However, the range will change accordingly if the frame rate of MJPEG on Streaming> Video Configuration is 6 or smaller.

Check the box <Continue image upload> to upload the triggered images during certain time or keep uploading until the trigger is off. Select <Upload for __sec> and enter the duration in the blank. The images of the duration will be uploaded via E-mail when the motion event occurs. The setting range is from 1 sec. to 99999 sec. Select <Upload during the trigger active> to make images keep being uploaded via E-mail during the trigger active until the event stops. Set the Image frequency as the upload frame rate. The setting range is from 1 to 15 frames per second.

NOTE: Make sure SMTP configuration has been completed. Refer to section Mail for further details.

- **Send HTTP Notification**
  Check this item, select the destination HTTP address, and specify the parameters for event notifications by <Motion Detection> triggered. When an alarm is triggered, the notification can be sent to the specified HTTP server. For instance, if the custom parameter is set as “action=1&group=2”, and the HTTP server name is “http://192.168.0.1/admin.php”, the notification will be sent to HTTP server as “http://192.168.0.1/admin.php? action=1&group=2” when alarm is triggered.
- **Record Video Clip**
  Check this item and select a video recording storage type, <SD Card> or <NAS> (Network-Attached Storage>. The Motion Detection recording will be stored in SD card or the NAS when motion is detected.
  Pre-trigger buffer recording function allows users to check what happened to cause the trigger. The pre-trigger buffer time range is from 1 sec. to 3 sec. Select <Upload for __ sec> to set the recording duration after motion is triggered. The setting range is from 1 sec. to 99999 sec. Select <Upload during the trigger active> to record the triggered video until the trigger is off.

⚠ **NOTE**: Please make sure the local recording (with SD card) or the remote recording (with NAS) is activated so that this function can be implemented. Refer to section Recording for further details.

File Name
Enter a file name in the blank, e.g. image.jpg. The uploaded image’s file name format can be set in this section. Please select the one that meets the requirements.

- **Add date/time suffix**
  File name: imageYYMMDD_HHNNSS_XX.jpg
  Y: Year, M: Month, D: Day
  H: Hour, N: Minute, S: Second
  X: Sequence Number
- **Add sequence number suffix (no maximum value)**
  File name: imageXXXXXXX.jpg
  X: Sequence Number
- **Add sequence number suffix up to # and then start over**
  File Name: imageXX.jpg
  X: Sequence Number

  The file name suffix will end at the number being set. For example, if the setting is up to “10”, the file name will start from 00, end at 10, and then start all over again.

- **Overwrite**
  The original image in the FTP site will be overwritten by the new uploaded file with a static filename.

Save
Click the <Save> button to save the settings.

2.2.8.3 Network Failure Detection

The Network Failure Detection setting can be found under this path: **System> Events> Network Failure Detection**.

Network Failure Detection allows the camera to ping another IP device (e.g. NVR, VSS, Video Server, etc.) within the network periodically and generates some actions in case of network failure occurs, for instance, a Video Server is somehow disconnected.

Being capable of implementing local recording (through SD card) or remote recording (via NAS) when network failure happens, the camera can be a backup recording device for the surveillance system.

Detection Switch

The default setting for the Detection Switch function is <Off>. Enable the function by selecting <On>. Users can also activate the function according to the schedule time that is previously set in the <Schedule> setting page. Select <By schedule> and click the <Please select…> button to choose the desired schedule from the dropdown menu.

Detection Type

Input the IP device address and the period of ping time to ping. The camera will ping the IP device every N minute(s). If it fails up to three times, the alarm will be triggered automatically. The ping time setting range is from 1 to 99 minutes. Triggered Action (Multi-option) The administrator can specify alarm actions that will take when network failure is detected. All options are listed as follows.

- **Enable Alarm Output 1 /2**
  Select the item to enable alarm relay output.
- **Send Alarm Message by FTP/E-Mail**
  The administrator can select whether to send an alarm message by FTP and/or E-mail when an alarm is triggered.
- **Record Video Clip**
  Check the item and select a video recording storage type, <SD Card> or <NAS> (Network-Attached Storage). The alarm-triggered recording will be saved into the SD card.

Pre-trigger buffer recording function allows users to check what happened to cause the trigger. The pre-trigger buffer time range is from 1 sec. to 3 sec. Select <Upload for __ sec> to set the recording duration after alarm is triggered. The setting range is from 1 sec. to 99999 sec. Select <Upload during the trigger active> to record the triggered video until the trigger is off.

NOTE: Please make sure the local recording (with SD card) or the remote recording (with NAS) is activated so that this function can be implemented. Refer to section Recording for further details.

Save

Click the <Save> button to save all the settings mentioned above.

2.2.8.4 2.2.8.4 Periodical Event

The Periodical Event setting can be found under this path: **System> Events> Periodical Event.**

With Periodical Event setting, users can set the camera to upload images periodically to an FTP site or an E-mail address. For example, if the time interval is set to 60 seconds, the camera will upload images to the FTP site or the E-mail address every 60 seconds. The images to be uploaded are the images before and after the triggered moment. Users can define how many images to be uploaded in the <Triggered Action> section of this setting page.

Periodical Event
The default setting for the Periodical Event function is <Off>. Enable the function by selecting <On>.

Time Interval
The default value of the time interval is 60 seconds. The setting range of the time interval is from 60 to 3600 seconds.

Triggered Action

- **Upload Image by FTP**
  Select this item and the administrator can assign an FTP site and configure various parameters. Images will be uploaded to the appointed FTP site periodically. Note that to implement this function, one of the streaming **MUST** be set as **MJPEG**; otherwise, this function will be grayed out and cannot be accessed.
  The <Pre-trigger buffer> function can define how many images to be uploaded before the triggered moment.
  The <Post-trigger buffer> function can define how many images to be uploaded after the triggered moment.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames. However, the range will change accordingly if the frame rate of MJPEG on **Streaming> Video Configuration** is 6 or smaller.

NOTE: Make sure FTP configuration has been completed. Refer to section FTP of this chapter for further details.

- **Upload Image by E-Mail**
  Select this item and the administrator can assign an E-mail address and configure various parameters. Images will be uploaded to the appointed Email address periodically. Note that to implement this function, one of the streaming MUST be set as MJPEG; otherwise, this function will be grayed out and cannot be accessed.
  The <Pre-trigger buffer> function can define how many images to be uploaded before the triggered moment.
  The <Post-trigger buffer> function can define how many images to be uploaded after the triggered moment.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames.

However, the range will change accordingly if the frame rate of MJPEG on Streaming> Video Configuration is 6 or smaller.

NOTE: Make sure SMTP configuration has been completed. Refer to section Mail of this chapter for further details.

File Name
Enter a file name in the blank, e.g. image.jpg. The uploaded image's file name format can be set in this section. Please select the one that meets the requirements.

- **Add date/time suffix**
  File name: imageYYMMDD_HHNNSS_XX.jpg
  Y: Year, M: Month, D: Day
  H: Hour, N: Minute, S: Second
  X: Sequence Number
- **Add sequence number suffix (no maximum value)**
  File name: imageXXXXXXX.jpg
  X: Sequence Number
- **Add sequence number suffix up to # and then start over**
  File Name: imageXX.jpg
  X: Sequence Number
  The file name suffix will end at the number being set. For example, if the setting is up to “10”, the file name will start from 00, end at 10, and then start all over again.
- **Overwrite**
  The original image in the FTP site will be overwritten by the new uploaded file with a static filename.

Save
Click the <Save> button to save all the settings mentioned above.

2.2.8.5 Manual Trigger

The Manual Trigger setting can be found under this path: **System> Events> Manual Trigger**.

With Manual Trigger setting, the current image(s) or video can be uploaded to the appointed destination, such as an FTP site or an E-mail address. The administrator can specify the triggered actions that will take when the users switch the Manual Trigger button to ON. All options are listed as follows.

Manual Trigger
The default setting for the Manual Trigger function is <Off>. Enable the function by selecting <On>. After the Manual Trigger function is enabled, click the Manual Trigger button on the Home page to start uploading data. Click again to stop uploading.

Triggered Action (Multi-option)
The administrator can specify alarm actions that will take at an alarm occurrence. All options are listed as follows.

- **Enable Alarm Output 1/2**
  Select these items to enable alarm relay outputs.
- **Send Message by FTP/E-Mail**
  The administrator can select whether to send an alarm message by FTP and/or E-mail when an alarm is triggered.
- **Upload Image by FTP**
  Select this item and the administrator can assign an FTP site and configure various parameters. When the alarm is triggered, event images will be uploaded to the appointed FTP site. Note that to implement this function, one of the streaming MUST be set as MJPEG; otherwise, this function will be grayed out and cannot be accessed. <Pre-trigger buffer> function allows users to check what happened to cause the trigger. The <Pre-trigger buffer> frame rate could be pre-determined. On the other hand, <Post-trigger buffer> is for users to upload certain amount of images after the alarm input is triggered.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames. However, the range will change accordingly if the frame rate of MJPEG on **Streaming> Video Configuration** is 6 or smaller.

Check the box <Continue image upload> to upload the triggered images during certain time or keep uploading until the trigger is off. Select <Upload for __sec> and enter the duration in the blank. The images of the duration will be uploaded to FTP when the alarm input is triggered. The setting range is from 1 sec. to 99999 sec. Select <Upload during the trigger active> to make the images keep being uploaded to FTP during the trigger active until the alarm is released. Set the Image frequency as the upload frame rate. The setting range is from 1 to 15 frames per second.

NOTE: Make sure the FTP configuration has been completed. Refer to section FTP for further details.

- **Upload Image by E-Mail**
  Select this item and the administrator can assign an E-mail address and configure various parameters. When the alarm is triggered, event images will be sent to the appointed E-mail address. Note that to implement this function, one of the streaming MUST be set as MJPEG; otherwise, this function will be grayed out and cannot be accessed.
  <Pre-trigger buffer> function allows users to check what happened to cause the trigger. The <Pre-trigger buffer> frame rate could be pre-determined. On the other hand, <Post-trigger buffer> is for users to upload certain amount of images after alarm input is triggered.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames.

However, the range will change accordingly if the frame rate of MJPEG on Streaming> Video Configuration 6 or smaller. Check the box <Continue image upload> to upload the triggered images during certain time or keep uploading until the trigger is off. Select <Upload for __sec> and enter the duration in the blank. The images of the duration will be uploaded via E-mail when the alarm input is triggered. The setting range is from 1 sec. to 99999 sec. Select <Upload during the trigger active> to make the images keep being uploaded via E-mail during the trigger active until the alarm is released. Set the Image frequency as the upload frame rate. The setting range is from 1 to 15 frames per second.

NOTE: Make sure SMTP configuration has been completed. Please refer to section Mail for further details.

- **PTZ Function**
  Assign a camera function: Preset, Sequence, Autopan or Cruise, and specify a Preset Point / Sequence Line / Autopan Path / Cruise Line for the camera to perform at an alarm occurrence.

NOTE: Please refer to the sections through Preset Programming to Sequence Line Programming for details of Preset Point / Cruise Line / Autopan Path / Sequence Line setups.

If the selected function is <Preset>, it is required to enter its dwell time (1 sec. to 256 sec.) in the corresponding field. When the alarm is triggered, the camera will go to the selected Preset Point and stay there for a user-defined

period of time. As for other function modes, the camera will keep executing the specified function; to stop the performance, simply change the camera's status.

NOTE:The dwell time is only adjustable when <Preset> is selected. When the dwell time is up, the camera will go back to its trigger position and recheck the alarm pin status.

- **Send HTTP notification**
  Check this item, select the destination HTTP address, and specify the parameters for event notifications by <Alarm> triggered. When an alarm is triggered, the notification can be sent to the specified HTTP server. For

instance, if the custom parameter is set as “action=1&group=2”, and the HTTP server name is “http://192.168.0.1/admin.php”, the notification will be sent to HTTP server as “http://192.168.0.1/admin.php? action=1&group=2” when alarm is triggered.

- **Record Video Clip**
  Check the item and select a video recording storage type, <SD Card> or <NAS> (Network-Attached Storage). The alarm-triggered recording will be saved into the SD card or the NAS.
  Pre-trigger buffer recording function allows users to check what happened to cause the trigger. The pre-trigger buffer time range is from 1 sec. to 3 sec. Select <Upload for __ sec> to set the recording duration after alarm is triggered. The setting range is from 1 sec. to 99999 sec. Select <Upload during the trigger active> to record the triggered video until the trigger is off.

NOTE: Please make sure the local recording (with SD / SDHC card) or the remote recording (with NAS) is activated so that this function can be implemented. Refer to section Recording for further details.

File Name
Enter a file name in the File name field, e.g. image.jpg. The uploaded image’s file name format can be set in this section. Please select the one that meets the requirements.

- **Add date/time suffix**
  File name: imageYYMMDD_HHNNSS_XX.jpg
  Y: Year, M: Month, D: Day
  H: Hour, N: Minute, S: Second
  X: Sequence Number
- **Add sequence number suffix (no maximum value)**
  File name: imageXXXXXXX.jpg
  X: Sequence Number
- **Add sequence number suffix up to # and then start over**
  File Name: imageXX.jpg
  X: Sequence Number
  The file name suffix will end at the number being set. For example, if the setting is up to “10”, the file name will start from 00, end at 10, and then start all over again.
- **Overwrite**
  The original image in the FTP site will be overwritten by the new uploaded file with a static filename.

Save
Click the <Save> button to save all the settings mentioned above.

2.2.8.6 Audio Detection

The Audio Detection setting can be found under this path: **System> Events> Audio Detection**.

Audio Detection function allows the camera to detect audio and trigger alarms when audio volume in the detected area reaches / exceeds the determined sensitivity threshold value.

NOTE: Audio Detection function is only available for models equipped with Audio I/O function.

Audio Detection
In Audio Detection Setting, the default setting for the Audio Detection function is <Off>. Enable the function by selecting <On>.

Audio Detection Setting
Users could adjust various parameters of Audio Detection in this section.

- **Detection level [1-100]:**
  The item is to set detection level for each sampling volume; the smaller the value, the more sensitive it is. The default level is 10.
- **Time interval (sec) [0-7200]:**
  The value is the interval between each detected audio. The default interval is 10.

Triggered Action (Multi-option)
The administrator can specify alarm actions that will take when audio is detected. All options are listed as follows.

- **Enable Alarm Output 1/2**
  Select these items to enable alarm relay outputs.
- **Send Alarm Message by FTP/E-Mail**
  The administrator can select whether to send an alarm message by FTP and/or E-mail when audio is detected.
- **Upload Image by FTP**
  Select this item and the administrator can assign an FTP site and configure various parameters. When audio is detected, event images will be uploaded to the appointed FTP site. Note that to implement this function, one of the streaming MUST be set as MJPEG; otherwise, this function will be grayed out and cannot be accessed. <Pre-trigger buffer> function allows users to check what happened to cause the trigger. The <Pre-trigger buffer> frame rate could be pre-determined. On the other hand, <Post-trigger buffer> is for users to upload certain amount of images after audio event occurs.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames. However, the range will change accordingly if the frame rate of MJPEG on **Streaming> Video Configuration** 6 or smaller.

Check the box <Continue image upload> to upload the triggered images during certain time or keep uploading until the trigger is off. Select <Upload for __sec> and enter the duration in the blank. The images of the duration will be uploaded to FTP when the audio event occurs. The setting range is from 1 sec. to 99999 sec.
Select <Upload during the trigger active> to make the images keep being uploaded to FTP during the trigger active until the event stops. Set the Image frequency as the upload frame rate. The setting range is from 1 to 15 frames per second.

NOTE: Make sure FTP configuration has been completed. Refer to section FTP for further details.

- **Upload Image by E-Mail**
  Select this item and the administrator can assign an E-mail address and configure various parameters. When audio is detected, event images will be sent to the appointed E-mail address. Note that to implement this function, one of the streaming MUST be set as MJPEG; otherwise, this function will be grayed out and cannot be accessed. <Pre-trigger buffer> function allows users to check what happened to cause the trigger. The <Pre-trigger buffer> frame rate could be pre-determined. On the other hand, <Post-trigger buffer> is for users to upload certain amount of images after the audio event occurs.

NOTE: <Pre-trigger buffer> generally ranges from 1 to 20 frames. However, the range will change accordingly if the frame rate of MJPEG on **Streaming> Video Configuration** 6 or smaller.

Check the box <Continue image upload> to upload the triggered images during certain time or keep uploading until the trigger is off. Select <Upload for __sec> and enter the duration in the blank. The images of the duration will be uploaded via E-mail when the audio event occurs. The setting range is from 1 sec to 99999 sec. Select <Upload during the trigger active> to make the images keep being uploaded via E-mail during the trigger active until the event stops. Set the Image frequency as the upload frame rate. The setting range is from 1 frame to 15 frames per second.

NOTE: Make sure SMTP configuration has been completed. Refer to section Mail for further details.

- **Send HTTP Notification**

Check this item, select the destination HTTP address, and specify the parameters for event notifications by <Audio Detection> triggered. When an alarm is triggered, the notification can be sent to the specified HTTP server.
For instance, if the custom parameter is set as “action=1&group=2”, and the HTTP server name is “http://192.168.0.1/admin.php”, the notification will be sent to HTTP server as “http://192.168.0.1/admin.php? action=1&group=2” when alarm is triggered.

- **Record Video Clip**

Check this item and select a video recording storage type, <SD Card> or <NAS> (Network-Attached Storage>. The Audio Detection recording will be stored in SD card or the NAS when audio is detected.

Pre-trigger buffer recording function allows users to check what happened to cause the trigger. The pre-trigger buffer time range is from 1 sec. to 3 sec. Select <Upload for __ sec> to set the recording duration after audio is triggered. The setting range is from 1 sec to 99999 sec. Select <Upload during the trigger active> to record the triggered video until the trigger is off.

NOTE:Please make sure the local recording (with SD card) or the remote recording (with NAS) is activated so that this function can be implemented. Refer to section Recording for further details.

File Name
Enter a file name in the blank, e.g. image.jpg. The uploaded image’s file name format can be set in this section. Please select the one that meets the requirements.

- **Add date/time suffix**
  File name: imageYYMMDD_HHNNSS_XX.jpg
  Y: Year, M: Month, D: Day
  H: Hour, N: Minute, S: Second
  X: Sequence Number
- **Add sequence number suffix (no maximum value)**
  File name: imageXXXXXXX.jpg
  X: Sequence Number
  l Add sequence number suffix up to # and then start over
  File Name: imageXX.jpg
  X: Sequence Number
  The file name suffix will end at the number being set. For example, if the setting is up to “10”, the file name will start from 00, end at 10, and then start all over again.
- **Overwrite**
  The original image in the FTP site will be overwritten by the new uploaded file with a static filename.

Save
Please click the <Save> button to save all the Audio Detection settings mentioned above.

2.2.9 Storage Management

The Storage Management setting can be found under this path: **System> Storage Management**.

Click the <Storage Management> category, there will be a drop-down menu with tabs including <SD Card> and <Network Share>.

2.2.9.1 SD Card

The SD Card setting can be found under this path: **System> Storage Management>SD Card**.

Users can implement local recording to the SD card up to 128GB. This page shows the capacity information of the SD card and a recording list with all the recording files saved on the memory card. Users can also format the SD card and implement automatic recording cleanup through the setting page.

To implement SD card recording, please go to the <Recording> page (refer to section Recording) for activation.

NOTE: Please format the SD card when using it for the first time. Formatting will also be required when a memory card is being used on one camera and later transferred to another camera with different software platform.

NOTE: It is not recommended to record with the SD card for 24/7 continuously, as it may not be able to support long term continuous data read/write. Please contact the manufacturer of the SD card for information regarding the reliability and the life expectancy.

Device Information
When users insert the SD card, the card information such as the memory capacity and status will be shown at the <Device Information> section.

Recording Source
Select a video stream to set as the recording source. The default format of the video stream is <H.264-1>. Select a preferred stream from the drop-down list and click the <Save> button to apply the setting.

Device Setting
Click the <Format> button to format the memory card. Two filesystems are provided, <vfat (default)> and <ext4 (recommended)>. It is recommended to select <ext4> as the filesystem of the memory card for steady and better performances.

Disk Cleanup Setting
Check <Enable automatic disk cleanup> and specify time <1~999 day(s) or 1~142 week(s)> and storage limits <1~99% full> to configure disk cleanup settings. Click the <Save> button to save the settings.

Recording List
Each video file on the SD card will be listed in the Recording list. The maximum file size is 60 MB/per file.

When the recording mode is set as <Always> (consecutive recording) and the SD card recording is also allowed to be enabled by events triggered, once events occur, the system will immediately implement events recording to the memory card. After the recording of the events are finished, the camera will return to the regular recording mode.

- **Remove**
  To remove a file, select the file first, and then click the <Remove> button.
- **Sort**
  Click the <Sort> button, and the files in the Recording list will be listed in name and date order.
  The capital letter A / M / N / R / V / U in the very beginning of name denotes the sort of the recording as below.

Initial	Recording Type	Initial	Recording Type
A	Alarm	**R**	Regular Recording
M	Motion	**V**	Manual Trigger
N	Network Failure	**U**	Audio Detection

- **Download**
  To open / download a video clip, select the file first, and then click the <download> button below the Recording list field. The selected file window will pop up. Click the AVI file to directly play the video in the player or download it to a specified location.

2.2.9.2 Network Share (NAS)

The Network Share setting can be found under this path: **System> Storage Management> Network Share**.

Users can store the recording videos to a network share folder, or NAS (Network-Attached Storage). A NAS device is used for data storage and data sharing via network.

This page displays the capacity information of the network device and a recording list with all the recording files saved on the network device. Users can also format the NAS and implement automatic recording cleanup through the setting page.

Device information
When a NAS is successfully installed, the device information such as the memory capacity and status will be shown at the <Device Information> section.

Storage setting
The administrator can set the camera to send the alarm messages to a specific NAS site when an alarm is triggered. Enter the network device details, which include host (the IP of the NAS), share (the folder name of the NAS), user name, and password, in the fields.

Click the <Save> button when finished.

Storage Tools
Click the <Format> button to format the NAS.

Recording Source
Select a video stream to set as the recording source. The default format of the video stream is <Stream 1>. Select a preferred stream from the drop-down list and click the <Save> button to apply the setting.

Disk cleanup setting
Check <Enable automatic disk cleanup> and specify the time <1~99 day(s) or 1~142 week(s)> and storage limits <1~99% full> to configure disk cleanup settings. Click the <Save> button to confirm the settings.

Recording List
Each video file on the Network Share will be listed in the Recording list. The maximum file size is 60 MB/per file.

When the recording mode is set as <Always> (consecutive recording) and the NAS recording is also allowed to be enabled by events triggered, once events occur, the system will immediately implement events recording to the memory card. After the recording of the events are finished, the camera will return to the regular recording mode.

- **Remove**
  To remove a file, select the file first, and then click the <Remove> button.
- **Sort**
  Click the <Sort> button, and the files in the Recording list will be listed in name and date order.
  The capital letter A / M / N / R / V / U in the very beginning of name denotes the sort of the recording as below.

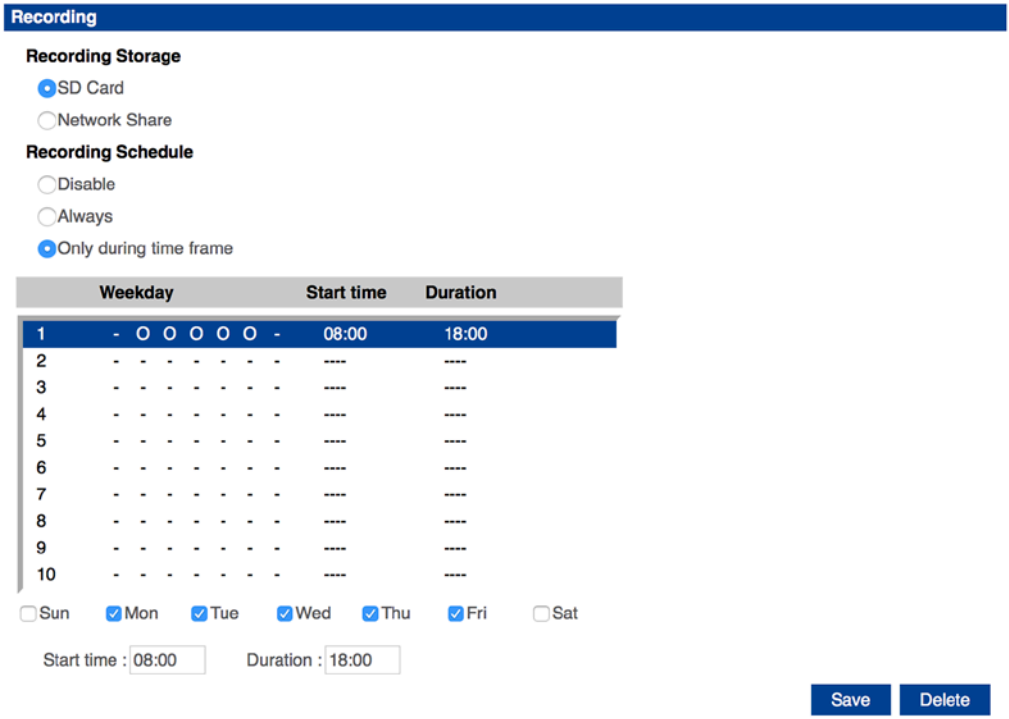
Initial	Recording Type	Initial	Recording Type
A	Alarm	**R**	Regular Recording
M	Motion	**V**	Manual Trigger
N	Network Failure	**U**	Audio Detection

- **Download**
  To open / download a video clip, select the file first, and then click the <download> button below the Recording list field. The selected file window will pop up. Click the AVI file to directly play the video in the player or download it to a specified location.

2.2.10 Recording

The Recording setting can be found under this path: **System> Recording**.

In the <Recording> setting page, users can specify the recording schedule that fits the present surveillance requirement.



Recording Storage
Select a recording storage type, <SD Card> or <Network Share>.

Enable Recording Schedule
Two types of schedule mode are offered: <Always> and <Only during time frame>. Users can select <Always> to activate SD Card or Network Share Recording all the time. Or, select a set of schedule from the time frame blank, check specific weekdays and setup the start time (hour:minute) and time period (hour:minute) to activate the recording at certain time frames. The setting range for the duration time is from 00:00 to 168:59. Click the <Save> button to save the setup.

To delete a schedule, select one from the list, and click the <Delete> button.

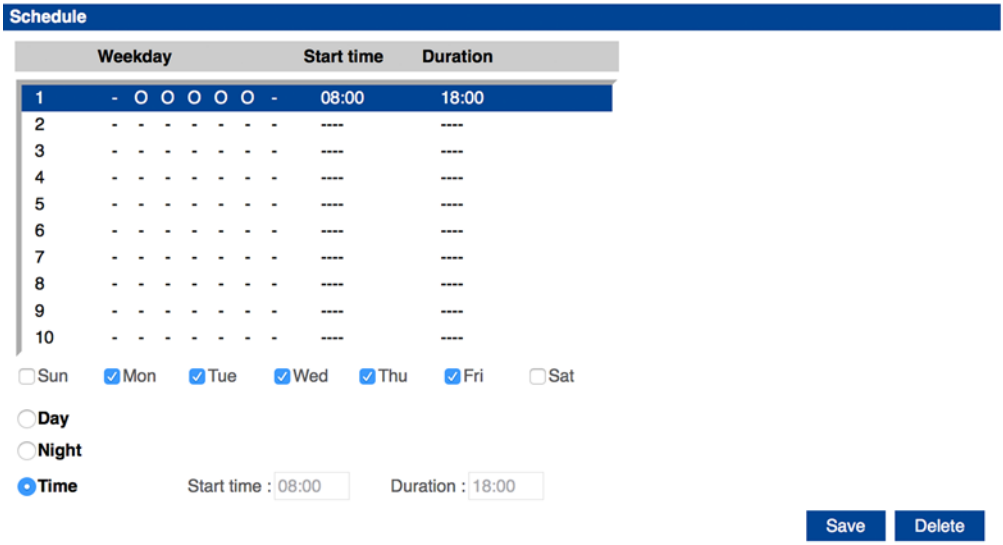
Disable Recording Schedule
Select <Disable> to terminate the recording function.

Click the <Save> button when finished.

2.2.11 Schedule

The Schedule setting can be found under this path: **System> Schedule**.

This function allows users to setup schedules for features including: <Alarm Switch>, <Motion Detection> and <Network Failure Detection>. The function supports up to 10 sets of time frames in the time frame list.



Setting Schedules

Step 1: Select a time frame from the time frame list.

Step 2: Check the weekday boxes below to choose the specific weekdays.

Step 3: Select a time mode, Day, Night or Time. Under Time mode, specify the start time (hour:minute) and the time duration (hour:minute) to activate the schedule triggered features. The setting range for the time duration is from 00:00 to 168:59.

Step 4: Click the <Save> button to save the setup. Alternatively, click the <Delete> button to delete a chosen time frame.

Time Mode

- **Day**
  The camera profile will be loaded when IR cut filter is on.
- **Night**
  The camera profile will be loaded when IR cut filter is off.
- **Time**
  This indicates the start time and the time duration for the schedule.

NOTE: Users MUST select <By schedule> under each feature setting page to enable the schedule function.

2.2.12 File Location (Snapshots and Web Recording)

The File Location setting can be found under this path: **System> File Location**.

Users can specify a storage location on the PC or in the hard drive for the snapshots and the live video recordings. The default setting is: C:\. Once the setting is confirmed, click the <Save> button, and all the snapshots and the web recordings will be saved in the designate location.

NOTE: Make sure the selected file path contains valid characters such as letters and numbers.

NOTE: With Windows 7 operating system or above, to implement the Snapshot and Web Recording functions, users must run IE as administrator.

To run IE as administrator, right click the IE browser icon and select “Run As Administrator” to launch IE.

2.2.13 View Information

The View Information function can be found under this path: **System> View Information**.

Click the category: <View Information>, there will be a drop-down menu with tabs including <Log File>, <User Information>, and <Parameters>.

2.2.13.1 Log File

The Log File function can be found under this path: **System> View Information> Log File**.

Click the tab to view the system log file. The camera keeps a record of the system’s behavior and information related to the camera. These log data can be exported for future use. Click the <generate syslog> button and the Save File As dialog window will pop up. The default file name is named after the model name and the MAC address as “Model Name-MAC-log.tgz”. Select the file destination and click the <Save> button to export the log data.

NOTE: “Save File As” dialog window may not show up immediately for the camera needs some time to process the log data.

2.2.13.2 User Information

The User Information function can be found under this path: **System> View Information> User Information**.

The administrator can view the login information and privileges of each added user (refer to section Security).

User: 1:1:0:1
1:1:0:1= I/O access: Camera control: Talk: Listen (refer to section Security)

“**1**” denotes this user is allowed to access the function; whereas “**0**” suggest no access for this user is allowed.

2.2.13.3 Parameters

The Parameters function can be found under this path: **System> View Information> Parameter**.

Click this item to view the parameter settings of the entire system, such as Camera Settings, Mask Information and Network Information.

2.2.14 Factory Default

The Factory Default setting can be found under this path: **System> Factory Default**.

Users can follow the instructions on this page to reset the camera to factory default settings if needed.

Full Restore

Click the <Full Restore> button to recall the factory default settings. The camera system will restart in 30 seconds. The IP address will be restored to default. After the camera system is restarted, reconnect the camera using the default IP address. The default IP address is **10.x.x.x**.

Partial Restore

Click the <Partial Restore> button to recall the factory default settings (excluding network settings). The camera system will restart in 30 seconds. Refresh the browser page after the camera system is restarted.

NOTE: The IP address will not be restored to default.

Reboot

Click the <Reboot> button and the camera system will restart without changing the current settings. Refresh the browser page after the camera system is restarted.

2.2.15 Software Version

The Software Version can be found under this path: **System> Software Version**.

The software version page displays the current software version, and the pan/tilt/zoom mcu version.

2.2.16 Software Upgrade

The Software Upgrade setting can be found under this path: **System> Software Upgrade**.

NOTE: Make sure the upgrade software file is available before carrying out software upgrade.

The procedure of software upgrade is as below.

Step 1: Click the <Browse> button and locate the upgrade file, for example, “ulmage_userland”.

NOTE: Do not change the name of the upgrade file, or the system will fail to find the file.

Step 2: Pick a file type from the drop-down list. In this case, select “ulmage+userland.img”.

Step 3: Click the <Upgrade> button. Then the system will prepare to start the software upgrade. Subsequently, an upgrade status bar will be displayed on the page to show the current upgrade process. After the upgrade process is finished, the viewer will return to the <Home> page.

Step 4: Close the video browser.

Step 5: Click the <Start> button and activate the <Control Panel>. In the appeared window, double click on <Add or Remove Programs>. A window with the <Currently install programs> list will popup. In the list, select <DCViewer> and click the <Remove> button to uninstall the existing Viewer.

Step 6: Open a new web browser and re-login the camera. Users will be prompted to download the Viewer

Once the Viewer is downloaded and installed, the live video will be available.

2.2.17 Maintenance

The Maintenance setting can be found under this path: **System> Maintenance**.

Users can export configuration files to a specified location and retrieve data by uploading the configuration file to the camera.

Export Files

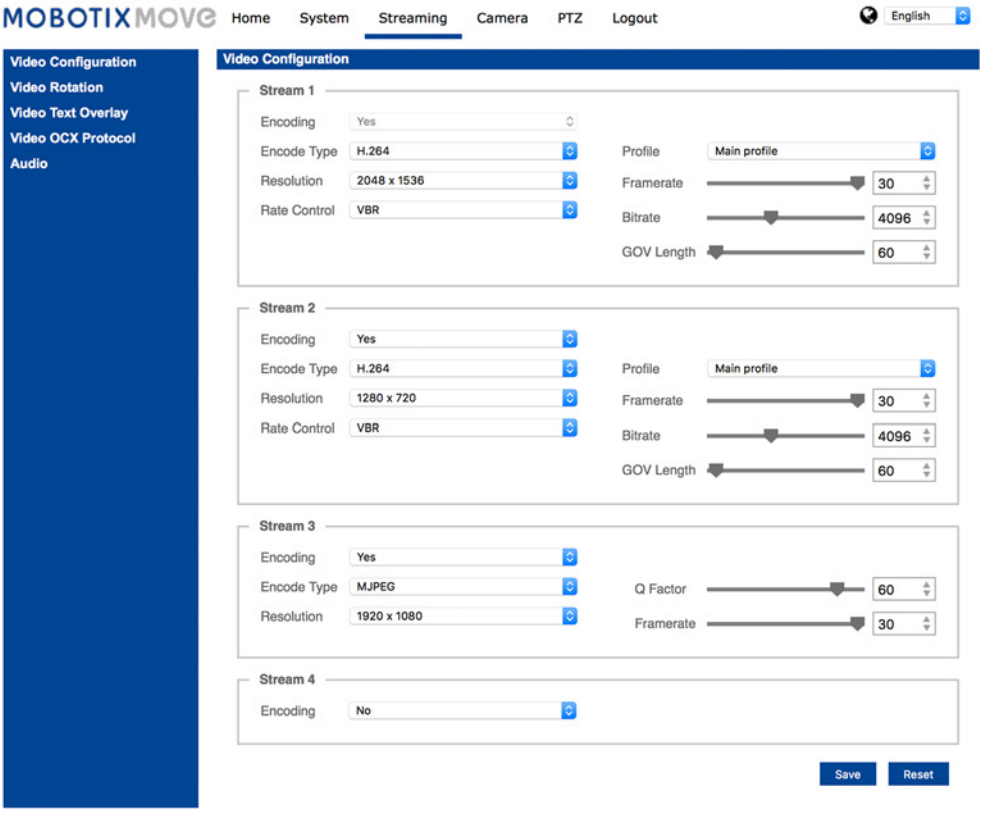
Users can save the system settings by exporting a configuration file (.bin) to a specified location for future use. Click the <Export> button, and the popup File Download window will come out. Click the <Save> button and specify a desired location for saving the configuration file.

Upload Files

To upload a configuration file to the camera, click the <Browse> button to select the configuration file and then click the <Upload> button for uploading.

2.3 Streaming

Under the tab <**Streaming**>, there are categories including: <Video Format>, <Video Compression>, <Video OCX Protocol>, <Video Frame Rate>, and <Audio>.



In the Streaming submenu, the administrator can configure specific video resolution, video compression mode, video protocol, audio transmission mode, etc. Further details of these settings will be specified in the following sections.

NOTE: Only administrator can access the <Streaming> setting page.

2.3.1 Video Configuration (Video Format & Resolution)

The Video Configuration setting can be found under this path: **Streaming> Video Configuration**.

Encoding
Select <Yes> from the drop-down menu to enable Stream 2~Stream 4 encoding. Or select <No> to disable the streaming encoding.

Encode Type
The available video resolution formats include H.264 and MJPEG. Users can select the preferred encode type from the drop-down menu.

Resolution
Video format and resolution combination will vary by user's configuration.

Rate Control
There are three kinds of H.264 bit rate modes provided: CBR (Constant Bit Rate), VBR (Variable Bit Rate) and LBR (Low Bit Rate).

- **CBR**
  The sent-out video bitrate will be fixed and consistent to maintain the bandwidth.
- **VBR**
  Video bitrate varies according to the activity of the monitoring environment to achieve better image quality.
- **LBR**
  LBR keeps low bitrate and ensures superior image quality. To implement LBR control, setup the compression level and dynamic GOV for each streaming accordingly beforehand.

  - Compression
  Based on the current application area and streaming bitrate, select the most suitable compression level, high/mid/low.
  Set <High>, and bitrate will vastly be reduced; however, image quality may be degraded at the same time.
  Set <Low>, and bitrate will stably keep low while image quality remains high.

  - Dynamic GOV
  According to the amount of motion in the application area, the GOV length of the video will be adjusted dynamically to reduce more bitrate, especially for scenes with minor changes. The length of Dynamic GOV is from <GOV Length> to <Max. GOV> (4094).

  Select <Enabled> and set <Max. GOV>. Then, click the <Save> button to activate the setting.

  If there is small or zero activity in the scene, set <Max. GOV> larger, the GOV length will be longer, resulting in lower bitrate and bandwidth.

  If there are constant dynamic changes in the scene, it is suggested just adjust <GOV Length> and disable <Dynamic GOV>.

Click the <Save> button to confirm the setting.

Profile
Users can set H.264 Profile to <High Profile> or <Main Profile> according to its compression needs. With the same bit rate, the higher the compression ratio, the better the image quality is. The default setting is <Main Profile>.

NOTE: Please make sure the higher compression ratio is supported by the system before setup.

Framerate
Video framerate is for setting the frames per second (fps) if necessary. The default setting of Stream 1 is 30 fps (NTSC) or 25 fps (PAL). The maximum framerate range of each stream will change according to the selected video resolution.

NOTE: Low framerate will decrease video smoothness.

Bitrate
The default setting of the H.264 bitrate for Stream 1/ Stream 2 is 4096 kbit/s; for Stream 3/ Stream 4 is 2048 kbit/s. The setting range is from 512 to 10240 kbps, and the total bit rate should not exceed 26624 kbps.

GOV Length
Users can set the GOV length to determine the frame structure (I-frames and P-frames) in a video stream to save bandwidth. Less bandwidth is needed if the GOV length is set to a high value. However, the shorter the GOV length, the better the video quality is. The default setting for Stream 1/ Stream 2 is 50; for Stream 3/ Stream 4 is 30. The setting range of the GOV length is from 1 to 255.

Q (Quality) Factor (MJPEG Only)
The default setting of MJPEG Q factor is 35; the setting range is from 1 to 70.

Click the <Save> button to confirm the setting or click the <Reset> button to return to the previous settings.

2.3.2 Video Rotation

Rotate Function
Users can change video display type if necessary. Selectable video rotate types include Mirror video and 90/180/270 degree clockwise rotate. Refer to the following descriptions for the different video rotate type.

- **Mirror**
  Select <yes> from the drop-down menu, and the image will be rotated horizontally.
- **Rotate Type**
  Users can choose 0, 90, 180, or 270 degree from the drop-down menu to rotate the image.

Click the <Save> button to confirm the setting.

2.3.3 Video Text Overlay

Users can select the items to display data, including date / time / text string / subtitle / image on the live video pane.

Overlay Type

Users can select at most three items out of four options including date & time / text string / subtitle / image to display on the live video pane.

- **Include date & time**
  Check the box to enable date & time display on the Live Video Pane. Users can choose to display date, time, or date & time from the drop-down menu, and decide the string align position (left / right).
- **Include text string**
  Check the box to enable text string display on the Live Video Pane. Type the text to display in the entry field and decide the string align position (left / right). The maximum length of the text string is 25 alphanumeric characters.
- **Include subtitle**
  Check the box to enable subtitle display on the Live Video Pane. Type the text to display in the entry field and decide the string align position (left / right). Users can set at most 5 subtitles, and the maximum length of each subtitle is 16 alphanumeric characters.
- **Include Image**
  Check the box to enable image display on the Live Video Pane. Select an alignment position (left /right) for the image from the drop-down list.
- **Include azimuth**
  Check the box to enable azimuth display on the Live Video Pane and set the azimuth alignment position. Azimuth shows the pan/tilt degree and the shooting position of the camera, such as NE 050/00 (“NE”: the shooting position of the camera; “050”: pan degree, “00”: tilt degree.)

When any Overlay Type item is selected, a Video Text Overlay Window will show up. Move the mouse cursor to the center of the window, click and drag the window to change the display position. When it is done, click the <Set> button to confirm the Text Overlay setting.

Text Overlay Setting

Users can choose the Text Overlay Color (black, white, yellow, red, green, blue, cyan, or magenta) and Text Overlay Size (small, medium, or large) of the display date & time / text string / subtitle.

Click the <Set> button to confirm the setting.

Image Overlay Setting

Users can upload an image and set its transparency to display on the live video pane. The setting range of image transparency is from 0 to 255; the lower the value, the more transparent it is. Users must save the image as an 8-bit BMP file; the length should be the multiple of 32, and the width should be the multiple of 4. The maximum resolution of the image should not exceed 32768 pixels.

Click the <Set> button and the <Upload> button to confirm the setting.

2.3.4 Video OCX Protocol

The Video OCX Protocol setting can be found under this path: **Streaming> Video OCX Protocol**.

In the <Video OCX protocol> setting page, the administrator can select RTP over UDP, RTP over RTSP(TCP), RTSP over HTTP or MJPEG over HTTP, for streaming media over the network. In the case of multicast networking, users can select the Multicast mode.

Click the <Save> button to confirm the setting.

Video OCX protocol setting options include:

- **RTP over UDP / RTP over RTSP(TCP) / RTSP over HTTP / MJPEG over HTTP**
- **Multicast Mode**
  Enter all required data, including <Multicast IP address>, <Multicast H.264-1 / H.264-2 / H.264-3 / H.264-4 Video Port>, <Multicast MJPEG Video Port>, <Multicast Audio Port> and <Multicast TTL> into each blank.

Click the <Save> button to confirm the setting.

2.3.5 Audio (Audio Mode and Bit Rate Settings)

The Audio Mode setting can be found under this path: **Streaming> Audio**.

In this page, the administrator can adjust the sound transmission mode, the audio gain levels and the audio bit rate. Setting for enabling sound recording to the SD card is also available.

Transmission Mode

- **Full-duplex (Talk and Listen simultaneously)**
  In the Full-duplex mode, the local and remote sites can communicate with each other simultaneously, i.e. both sites can speak and listen to the other side at the same time.
- **Half-duplex (Talk or Listen, not at the same time)**
  In the Half-duplex mode, the local / remote site can only talk or listen to the other site at a time.
- **Simplex (Talk only)**
  In the Talk only Simplex mode, the local / remote site can only talk to the other site.
- **Simplex (Listen only)**
  In the Listen only Simplex mode, the local / remote site can only listen to the other site.
- **Disable**
  Select the item to turn off the audio transmission function.

Server Gain Setting

Set the audio input / output gain levels for the sound amplification. The audio input gain value is adjustable from 1 to 10. The audio output gain value is adjustable from 1 to 6. To turn off the sound, set the audio gain to “Mute”.

Bit Rate

Selectable audio transmission bit rate include 16 kbps, 24 kbps, 32 kbps, 40 kbps, uLAW (64 kbps), ALAW (64 kbps), AAC (128 kbps), PCM (128 kbps), PCM (256 kbps), PCM (384 kbps), and PCM (768 kbps). Higher bit rate will let higher audio quality and require bigger bandwidth. Click the <Save> button to confirm the setting.

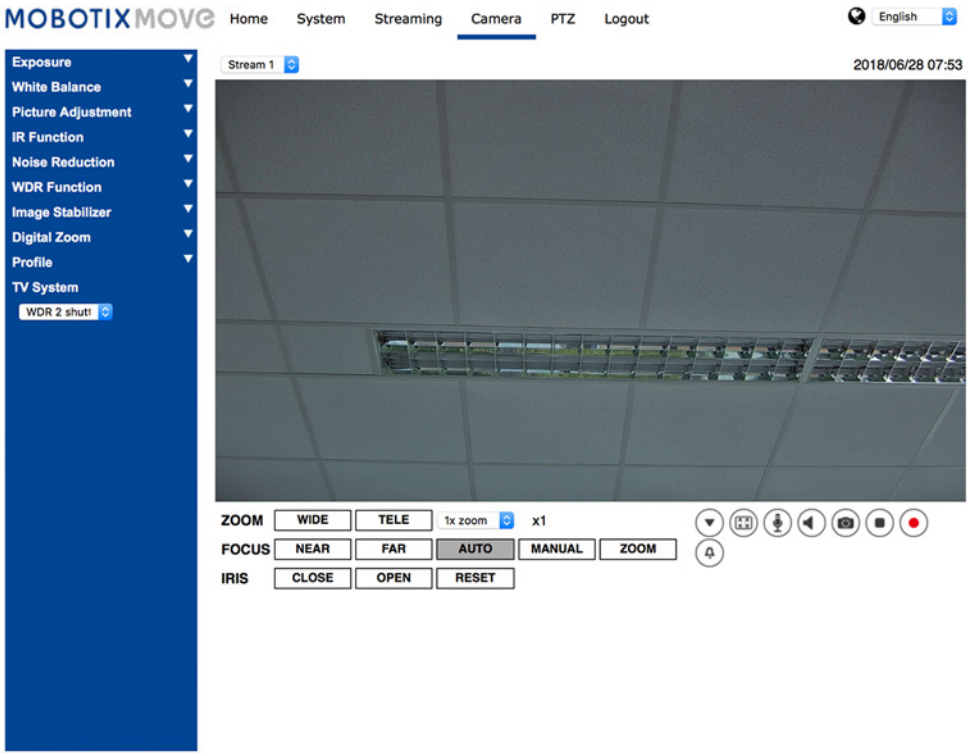
Recording to Storage
Select <Enable> from the drop-down menu to enable audio recording with videos into the SD card or the NAS.

NOTE: If the chosen bit rate is not compatible with the player, there will only be noise instead of audio during playback.

Click the <Save> button to confirm the setting.

2.4 Camera

Under the tab <Camera>, there are categories including: <Exposure>, <White Balance>, <Picture Adjustment>, <IR Function>, <Noise Reduction>, <WDR Function>, <Image Stabilizer>, <Digital Zoom>, <Backlight>, <Profile> and <TV System>.



2.4.1 Exposure

The Exposure setting can be found under this path: **Camera> Exposure**.

In the <Camera-Exposure> setting page, users can select either the <Full Auto> mode or adjust the parameter of the P-Iris Priority / Iris Priority / Shutter Priority mode for optimized video output in accordance with the operating environment.

Auto Mode

- **Max Gain**
  This item is for users to set the maximum limit of gain. The Max Gain ranges from 1 to 3, or select <Off> to disable the function. The default setting is 3.

NOTE: Higher max gain may cause more image noises.

- **Auto Iris**
  In this mode, the camera will automatically adjust the iris to suit the environment illumination. The minimum shutter speed can be set from 1/30 to 1 sec. (NTSC) or 1/25 to 1/1.5 sec. (PAL). AGC (Auto Gain Control) will function automatically according to the light conditions of the subject.
- **P-Iris Priority Mode**
  - Iris Size Setting
  When users select <Auto Detect>, the camera will automatically detect the best iris size for the environment. Alternatively, users can manually adjust the iris size by selecting <Manual>. Click + and − to adjust the iris size.

  - Minimum Shutter Speed
  The minimum shutter speed can be set from 1/30 to 1 sec. (NTSC) or 1/25 to 1/1.5 sec. (PAL).

- **Iris Priority Mode**
  In this mode, it is the iris that has the premier priority in control of the exposure. The value of iris is adjustable from 0 to 10 (Full Open=10). The minimum shutter speed range is configurable from 1/30 to 1 sec. (NTSC) or 1/25 to 1/1.5 sec.(PAL).
- **Auto Shutter Mode**
  In this mode, the camera will automatically adjust the shutter speed and the iris size according to the light intensity. The minimum shutter speed can be set from 1/500 to 1 sec.(NTSC) or 1/425 to 1/1.5 sec.(PAL).
- **Shutter Priority Mode**
  In this mode, it is the shutter speed that takes the main control of the exposure. The range of the shutter speed is from 1/500 sec. to 1/30 sec. (NTSC) or 1/425 sec. to 1/25 sec. (PAL).

Manual Mode

In this mode, users can change the Shutter Speed, Iris Size, and Gain manually. The shutter speed range is from 1/10000 sec. to 1 sec. (NTSC) or from 1/10000 sec. to 1/1.5 sec. (PAL). The range of the iris size is from 0 to 10 (Full Open=10). The gain value range is from 1dB to 9dB, or users can select <Off> to disable the function.

2.4.2 White Balance

The White Balance setting can be found under this path: **Camera> White Balance**.

A camera needs to find reference color temperature, which is a way of measuring the quality of a light source, for calculating all the other colors. The unit for measuring this ratio is in degree Kelvin (K). Users can select one of the White Balance Control modes according to the operating environment. The following table shows the color temperature of some light sources for reference.

Light Sources	Color Temperature in K
Cloudy Sky	6,000 to 8,000
Noon Sun and Clear Sky	6,500
Household Lighting	2,500 to 3,000
75-watt Bulb	2,820
Candle Flame	1,200 to 1,500

Auto Mode

The Auto Balance White mode is suitable for environment with light source having color temperature in the range roughly from 2700K to 7500K.

ATW Mode (Auto Tracing White Balance)

With Auto Tracking White Balance function, the white balance in a scene will be automatically adjusted while temperature color is changing. The ATW Mode is suitable for environments with light source having color temperature in the range roughly from 2500K to 10000K.

One Push

With One Push function, white balance is adjusted and fixed according to the scene the camera sees at the moment. This function is suitable for light sources with any kind of color temperature and situations with minimal scene changes and continuous lighting. Follow the steps below to set the white balance.

Point the camera to the monitoring area. Select <One Push> in the White Balance setting menu.

Click the <Trigger> button to adjust the white balance.

NOTE: In this mode, the value of white balance will not change as the scene or the light source varies. Users might have to re-adjust the white balance by clicking the <Trigger> button again when needed.

Manual Mode
In this mode, users can change the White Balance value manually via specifying R gain and B gain; the range of R/B gain is from 0 to 127.

The following image displays the general color shifts of the scene when different Rgain / Bgain combinations are applied.

Click < ✓ > to confirm the setting.

2.4.3 Picture Adjustment

The Picture Adjustment setting can be found under this path: **Camera> Picture Adjustment**.

Brightness
The brightness level of the images is adjustable from -12 to +13.

Sharpness
The sharpness level of the images is adjustable from +0 to +15. The edge of the objects is enhanced as the sharpness level increases.

Contrast
The contrast level of the images is adjustable from -6 to +19.

Saturation
The saturation level of the images is adjustable from -6 to +19.

Hue
The hue level of the images is adjustable from -12 to +13.

2.4.4 IR Function

The IR Function setting can be found under this path: **Camera> IR Function**.

Day/Night Function

This item is for users to define the action of the IR cut filter and IR LED lights. Refer to the descriptions of each option below to select a suitable mode.

- **Auto Mode**
  With this mode, the camera will decide the occasion to remove the IR cut filter.
- **Night Mode**
  Use this mode when the environment light level is low. The IR cut filter will be removed to allow the camera to deliver clear images in black and white.
- **Day Mode**
  Select this mode to turn on the IR cut filter. The IR cut filter can filter out the IR light and allows the camera to deliver high quality images in color.
- **Light Sensor Mode**
  IR LED lights will be turned on / off depending on the light sensor.
- **Light On Mode**
  In this mode, IR LED lights will always be on.
- **Light Off Mode**
  In this mode, IR LED lights will always be off.
- **Smart Mode**
  With Smart mode, the camera will decide the occasion to remove the IR cut filter. The Smart mode mechanism can judge whether the main light source is from IR illumination. If the main light source is from IR illumination, the IR cut filter will be kept opened (i.e. monochrome/night mode).

Day/Night Threshold

This item is for users to set when the camera should switch from day mode to night mode or vice versa. The camera will sense the surrounding brightness, and the threshold value stands for the level of the light. Once the camera detects the light level reaches the set threshold, the camera will automatically switch to Day/Night Mode. The range of the level is from 0 to 10, (darker = 0; brighter = 10).

- **Night Mode to Day Mode**
  The lower the value, the earlier the camera switches to Day mode. The default value is 7.
- **Day Mode to Night Mode**
  The higher the value, the earlier the camera switches to Night mode. The default value is 3.

NOTE: This function can only be applied under “Auto Mode”.

IR Light Compensation

With the IR Light Compensation function, the camera can prevent the center object close to the camera from being too bright when IR LED lights are turned on.

2.4.5 Noise Reduction

The Noise Reduction setting can be found under this path: **Camera> Noise Reduction**.

The camera provides multiple <Noise Reduction> options for delivering optimized image quality especially in extra low-light conditions.

3DNR

With the 3D Noise Reduction function, the processor analyzes the differences between successive frames to adjust pixels and improve image quality. 3DNR generates better de-noising effects than 2DNR, but might create motion blur on

moving objects in the field of view. Different levels of 3DNR are provided, including Low, Mid and High. Higher level of

3DNR generates relatively enhanced noise reduction.

2DNR

With the 2D Noise Reduction function, the processor analyzes individual frames of video to eliminate environmental noise signal so that the highest quality image can be produced even in low light conditions

Select <On> to turn on 2DNR function; otherwise, select <Off> to turn off 2DNR function.

ColorNR

In a dark or insufficient light environment and the camera is under color mode, ColorNR (Color Noise Reduction) can eliminate color noise. Three levels of ColorNR, including Low, Mid and High, are provided. The higher level of ColorNR generates relatively enhanced noise reduction.

2.4.6 WDR Function

The WDR setting can be found under this path: **Camera> WDR Function**.

The Wide Dynamic Range (WDR) function is for solving high contrast or changing light issues so that enhances better video display.

WDR function is designed to solve contrast or changing light issues and to enhance the video display quality. Different level options for WDR function include Low, Mid and Hi. The higher the level, the wider the dynamic range is. Thus, the camera can catch a greater scale of brightness.

2.4.6 Digital Zoom

The Digital Zoom setting can be found under this path: **Camera> Digital Zoom**.

Select <On> to enable the Digital Zoom function; otherwise, select <Off> to turn off the function.

2.4.7 Backlight

The Backlight setting can be found under this path: **Camera> Backlight**.

This function will be available when the video format is set to “60fps” or “50fps” under <TV System>.

Backlight Compensation prevents the center object from being too dark in surroundings where excessive light is behind the center object. Select <On> to enable the Backlight function; otherwise, select <Off> to turn off the function.

2.4.8 Image Stabilizer

The Image Stabilizer setting can be found under this path: **Camera> Image Stabilizer**.

Image Stabilizer is only available when video format is set as “WDR 2 Shutter” under TV System.

With the Image Stabilizer function, the camera can keep the image steady and suppress vibrating effects on images caused by external vibration. Follow the instructions below to activate the function.

Step 1: Select <On> from the “Stabilizer” drop-down list to enable the Image Stabilizer function.

Step 2: Select <On> from the “Auto Calibration“ drop-down list to activate the auto calibration function.

Step 3: Alternately, users can click the <Calibrate> button for manual calibration. Be sure to keep the camera stand still for 3 seconds for calibration accuracy.

To turn off the function, select <Off> from the “Stabilizer” drop-down list to disable the Image Stabilizer function.

NOTE: Do **NOT** use PTZ functions when activating manual calibration.

NOTE: The Digital Zoom function and the Privacy Mask- Zoom Factor function will be **disabled** when the Image Stabilizer function is activated.

2.4.9 Profile

The Profile setting can be found under this path: **Camera> Profile**.

Camera Profile allows users to setup the desired image parameters for specific environments with different time schedules. Users can setup at most 10 sets of camera parameter configuration under the Camera tab. To enable this function, users must setup the schedules in advance. Refer to section Schedule for further details. Then, follow the steps below to setup a camera profile.

Camera Profile Setup

Step 1: In the “Camera” tab, setup the camera parameters, such as Exposure, White Balance, etc., excluding TV System.

Step 2: Click Profile and its setting menu will be displayed. Select a number from the Num drop-down list.

Step 3: Input a name for the profile in the Name field.

Step 4: Click the <Save> button below the Name field. The camera configuration is saved and applied to the profile.

Step 5: Select a saved camera profile from the Num drop-down list.

Step 6: Tick the By schedule box. Check the desired schedule(s) from the Schedule drop-down list. Multiple schedules can be applied to one profile.

Step 7: Click the <Save> button below <By schedule>.

Step 8: Follow the steps above to set the rest of the profiles. Now, the camera will automatically switch profiles according to the schedule. Alternatively, manually select a number from the Num drop-down list. Click the <Load> button , and the camera will apply the setting of the profile.

NOTE: If users wish to set the camera parameters to factory default setting, select <Normal> from the Num drop-down list. The camera will start loading the default values.

2.4.10 TV System

Select the video format that matches the present TV system.

The following table shows the available video formats of the Network IR PTZ Camera.

Video Format	
NTSC	60 fps
	WDR 2 Shutter
PAL	50 fps
	WDR 2 Shutter

2.5 PTZ

Under the tab <**PTZ**>, there are categories including: <Preset>, <Cruise>, <Auto Pan>, <Sequence>, <Home Function>, <Tilt Range>, <Privacy Mask>, <PTZ Setting> and <RS485>.

2.5.1 Preset

The camera supports up to 256 Preset Points. Please refer to the instructions below to set a Preset Point.

Preset Setting

Follow the steps to setup a Preset Point

Step 1: Move the cursor to the live view pane.

Step 2: Left click and drag the red pointer with the PTZ controls to a desired position and adjust the fine zoom / focus ratio.

Step 3: Assign a number for the current position from the drop-down Number List (click <PrePage> or <NextPage> button to reach number 1 to 256), and enter its descriptive name.

Step 4: Click the <Set> button to save the settings.

Preset Go

To have the camera move to a specified preset position, please select the Preset Point from the drop-down Preset list (click <PrePage> or <NextPage> button to reach preset number 1 to 256). Then the camera shall move to the target position.

2.5.2 Cruise

The Cruise Programming can be found under this path: **PTZ> Cruise**.

The camera supports up to 8 Cruise Paths. Please follow the instructions below for Cruise Path setup.

Cruise Setting

Refer to the steps below to setup a Cruise Path.

Step 1: Select a path number from the drop-down list.

Step 2: Move the cursor to the live view pane, and move the camera to a desired view (PTZ controls) as the start point of a Cruise Path.

Step 3: Click the <Set> button of <Record Start> and start programming the Cruise Path via PTZ controls.

Step 4: When finishing programming, click the <Set> button of <Record End> to complete recording the Cruise Path.

Cruise Run Select the specified Cruise Path from the drop-down list, click the <Run> button, and then the camera will start touring around as recorded. To view the camera touring in full screen mode, please move the cursor onto the live view pane, right-click and left-click to select “Fullscreen”. Then users can view the camera navigation in full screen. To stop running a Cruise Path, simply move the cursor to the live view pane and move the camera in any direction.

2.5.3 Auto Pan

The Auto Pan Programming can be found under this path: **PTZ> Auto Pan**.

The camera supports 4 Auto Pan Paths. Please refer to the instructions below to set an Auto Pan Path.

Auto Pan Setting
Follow the steps to setup an Auto Pan Path.

Step 1: Select a path number from the drop-down list.

Step 2: Select the speed ratio from the <Speed> drop-down list; the speed ratio ranges from 0 (low) to 3 (fast).

Step 3: Choose to run the Auto Pan Path in right / left direction from the <Direction> drop-down list.

Step 4: Move the cursor to the live view pane, and move the camera to a desired view as the Start Point of an Auto Pan Path.

Step 5: Click the <Set> button of <Start Point> and the current view will be automatically saved as the start point of the Auto Pan Path.

Step 6: Move the camera to another desired position as the end point of the Auto Pan Path.

Step 7: Click the <Set> button of <End Point> to save the setting.

⚠ **NOTE**: The zoom ratio of an Auto Pan's Start Point remains the same throughout the path.

Auto Pan Run
Select the specified Auto Pan Path from the drop-down list, click the <Run> button, and then the camera will start moving horizontally as recorded.

To view the camera panning in full screen mode, please move the cursor onto the live view pane, right-click and left-click to select "Fullscreen". Then users can view the camera navigation in full screen.

To stop running an Auto Pan Path, simply move the cursor to the live view pane and move the camera in any direction.

2.5.4 Sequence

The Sequence Line Programming can be found under this path: **PTZ> Sequence**.

The camera supports a total of 8 Sequence Lines; each Sequence Line consists of up to 64 Preset Points. Please refer to the instructions below to program a Sequence Line.

⚠ **NOTE**: Before setting this function, users must pre-define at least two Preset Points.

Sequence Setting
Click the <Edit> button of <Sequence Setting> to enter the Sequence setting menu.

- **Sequence Line**
  Select the number of Sequence Line to be set from the drop-down list in the top of the Sequence setting menu.
- **Sequential Preset Points Setting**
  Setup each Preset Point of the programmed Sequence Line in order. Select a Preset Point from the <Name> list for the specified number of Preset Point and enter both Dwell Time (0 to 127) and Speed (0 to 14) into the

corresponding fields. When finishing the sequential Preset Points setting, click the <Save> button in the top of the Sequence setting menu.

Sequence Run
Select the specified Sequence Line from the drop-down list, click the <Go> button, and then the camera will start moving forward each scene sequentially as programmed. To view the camera executing a Sequence Line in full screen mode, please move the cursor onto the live view pane, right-click and left-click to select “Fullscreen”. Then users can view the camera navigation in full screen. To stop running the Sequence Line, simply move the cursor to the live view pane and move the camera in any direction.

2.5.5 Home Function

The Home Function can be found under this path: **PTZ> Home Function**.

Users are able to set an operation mode to ensure constant monitoring. If the camera idles for a period of time, the selected function will be activated automatically; this is the HOME function. The Home function allows constant and accurate monitoring to avoid the camera idling or missing events.

Home Setting

- **Switch**
  Select <On> or <Off> to activate or disable the Home function. Then click the <Set> button to apply the setting.
- **Time**
  The time here represents the duration of camera idle time previous to running a Preset Point / Cruise Line / Auto Pan Path / Sequence Line. When the Home function is activated, the camera will start to count down when it idles, and then execute the predefined action as time expires. The time period ranges from 1 min. to 128 min.; specify it in the field.

Click the <Set> button to save the settings.

- **Type & Line**
  Select a Home action type (Preset Point / Cruise Line / Auto Pan Path / Sequence Line) and specify the number of Preset Point / Cruise Line / Auto Pan Path / Sequence Line from the drop-down <Type> and <Line> lists.

Click the <Set> button to save the Home settings.

2.5.6 Tilt Range

The Tilt Range setting can be found under this path: **PTZ> Tilt Range**.

The camera’s tilt angle is adjustable from minimum −20° to maximum +100°. Please enter the desired minimum and maximum tilt angle into the corresponding fields respectively.

Click the <Set> button to save the tilt angle settings.

2.5.7 Privacy Mask

The Privacy Mask can be found under this path: **PTZ> Privacy Mask**.

The Privacy Mask function aims to avoid any intrusive monitoring. When setting a mask, it is suggested to set it at least twice bigger (height and width) than the masked object. The camera will assume the center of the selected view as the starting point. Therefore, please keep the target object / region nearly positioned in the center of the scene.

Mask Setting

- **Switch**
  Select <On> or <Off> to activate or disable the Privacy Mask function.
  Click the <Set> button to apply the setting.
- **Color**
  Select a color from the <Color> drop-down list for the specified Privacy Mask.
  Click the <Set> button to apply the setting.
- **Mask Number (1~20)**
  Specify the number of the programmed Privacy Mask in the entry field.
- **Zoom Factor**
  Normally, a privacy mask goes repositioned and resized to cover the masked area whenever the camera is panned/tilted/zoomed. Zoom Factor allows users to hide the mask when zoom ratio is set lower than the original ratio.
  For example, when the privacy mask is set at a certain zoom ratio (e.g. 5x), the privacy mask will be resized when the camera is zoomed in (e.g. from 5x to 20x); however, when the camera zooms out (e.g. from 5x to 2x), the privacy mask will be hidden. Select <On> or <Off> to activate or disable the Zoom Factor function. Follow the steps below to setup a privacy mask.

Step 1: Set Switch to <On> and click the <Set> button to turn on the Privacy Mask function.

Step 2: Select a color for the mask from the <Color> drop-down list and click the <Set> button to apply the color setting.

Step 3: Specify the mask a number, e.g. 17. If Zoom Factor is needed, select <On> to enable this function. Then, click the <Add> button and a privacy mask will be displayed on the Live Video Pane on the right.

Step 4: To shift the mask to the intended location, move the mouse cursor to the center of the mask and click and drag.

Step 5.: To change the shape and the size of the mask, click any edge of the mask and draw it outward/inward.

Step 6: If needed, set up Zoom/Focus/Iris.

Step 7: Click the <Set> button to save and apply the setting. The Privacy Mask will be displayed in the color users set previously. If users wish to edit the previously-set mask, input the Mask number in Mask(1~20) entry field and click the <Edit> button, the camera will go to the set location and display the mask. Then, users can follow Step 4 to Step 6 to edit the mask. To cancel mask editing, just click the <Return> button to exit the editing. Mask Clearing In this section, users can delete an existing Privacy Mask. Please select the Privacy Mask to be removed from the drop-down list, and click the <Clear> button. Then the selected Privacy Mask will readily disappear.

2.5.8 PTZ Setting

The PTZ Setting can be found under this path: **PTZ> PTZ Setting**.

Flip

Users can track an object continuously when it passes under the camera with setting Flip to Mechanical (M.E.) mode.

NOTE: The Flip setting is manual-controlled only. If a Preset Position or a point for other function (e.g. Sequence) is set in the position that can only be reached through FLIP motion, when the Flip function is turned off, the position cannot be reached anymore.

NOTE: To make the camera tilt between a specific range, such as -20° to +100°, please go to the <Tilt Range> setting page to set the tilt angle range. Otherwise, the camera will tilt 90° as the default setting.

- **M.E. Mode**
  M.E. is a standard mechanical operation. As the camera tilts to the maximum angle, it will pan 180°, and then continue tilting to keep tracking objects. Speed by Zoom This function allows the camera to adjust the pan/tilt speed automatically by the internal algorithm when the zoom ratio is changed. The rotating speed will become slower as the zoom ratio gets larger. Click the <Set> button to save the setting.

Auto Calibration (Servo Feedback)

Integrating Servo Feedback technology, the camera would calibrate and precisely return to the previous position without stalling when the deviation of dome pivot is detected. Select <On> and click the <Set> button to activate the setting. Set Pan Zero Click the <Set> button to set the camera's currently shooting position as the start point for panning (0 degree).

2.5.9 RS485

The RS485 setting can be found under this path: **PTZ> RS485**.

This page is for users to activate the pan/tilt function and select the RS-485 protocol which the Joystick/Keyboard uses.

RS-485 Protocol Type

With the correct RS-485 protocol selected, users can remotely control the PTZ function of the camera using Joystick/Keyboard. Check the RS-485 protocol type of the Joystick/Keyboard. Then select the RS-485 protocol which the Joystick/Keyboard uses from the drop-down list. The available types are DSCP / PelcoD / PelcoP. Please refer to the following descriptions. After the protocol type is selected, users can adjust the parameters from the drop-down lists on the right. Click the <Save> button to confirm the setting.

2.6 Logout

Click the tab <Logout> on the top of the page, and the login window will pop up. This enables login with another username.

Appendix A: Install UPnP Components

Please follow the instructions below to install UPnP components on Windows Vista / Windows XP / Windows 7.

Step 1: In Windows, go to <Start>, click <Control Panel>, and then double click <Add or Remove Programs>.

Step 2: Click <Add/Remove Windows Components> in the <Add or Remove Programs> page.

Step 3: Select <Networking Services> from the Components list in Components Wizard window of the Windows, and then click <Details>.

Step 4: Select <UPnP User Interface> in the Networking Services' subcomponents list and then click <OK>.

Step 5: Click <Next> in the Windows Components Wizard window.

Step 6: Click <Finish> to complete installation.

Appendix B: IP Addresses from Decimal to Binary

Follow the example below to convert the IP addresses to binary numbers. Use the calculator on the computer for conversion. The calculator can be found under this path: Start> All Programs> Accessories> Calculator. For Windows XP and Windows Vista, click <View> on the calculator and click <Scientific>. For Windows 7 or above, click <View> on the calculator and click <Programmer>. Then follow the steps in the following example to convert the IP addresses.

The example below shows how to convert 192.168.2.81 to binary numbers.

Step 1: On the left of the calculator, select <Dec>. Then enter the first decimal number of the IP address, “192”. Select <Bin> and the number will be converted to binary number. Repeat the same procedure with the rest of decimal numbers. Remember to select <Dec> before entering the next decimal number. Otherwise a decimal number cannot be entered. The table below shows the binary number of each decimal number.

Decimal Numbers	Binary Numbers
192	11000000
168	10101000
2	10
81	1010001

Step 2: Each binary number should have eight digits. If a binary number does not have eight digits, please add 0 in front of it until it does. The binary number of each decimal number should be as follow.

Decimal Numbers	Binary Numbers
192	11000000
168	10101000
2	00000010
81	01010001

Step 3: Therefore, the binary numbers of IP address 192.168.2.81 is 11000000.10101000.00000010.01010001.

EN_08/18
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