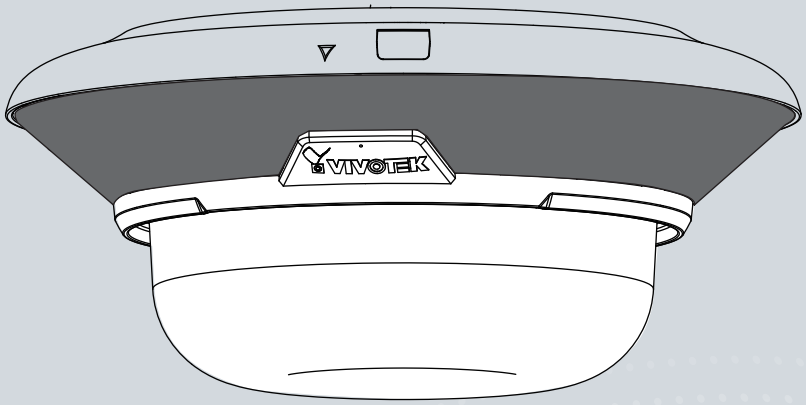
VIVOTEK
A Delta Group Company

MA9322-EHTVL Panoramic Multi-sensor Network Camera

User's Manual

20MP • 360° Surround View • IP66 • IK10 • Remote Focus • SNV
Smart Stream III • PoE • -40°C ~ 60°C Wide Operating Temperature



Rev. 1.0

SUPREME

Table of Contents

Overview

The new MA9322-EHTVL is the most versatile product offering to date from VIVOTEK. The MA9322-EHTVL expands on the already versatile MA9321-EHTVL by adding IR illumination up to 30 meters, providing high resolution images through four independent sensors, and remote focus lenses. By having each sensor independent of each other, the MA9322-EHTVL can view four different regions simultaneouslyand therefore reduce the total number of cameras needed for surveillance, helping to lower total installation time and costs.

Featuring four independent 5MP CMOS Sensors with IR illuminators, the MA9322-EHTVL network camera can provide the most flexibility in surveillance monitoring. Each sensor utilizes a 3.7 to 7.7 mm remote focus lens and 3-axis design along a circular track to enable full 360° coverage. This enables the MA9322-EHTVL to capture every angle for comprehensive video coverage from a single IP address, making this camera ideally suited for surveillance in areas such as hallway intersections, building corners, parking garages/ lots, and shopping malls. Now with added IR illuminators, areas of low light visibility are no longer an issue either.

The MA9322-EHTVL is equipped with a removable IR-cut filter and WDR Pro technology, enabling the camera to maintain optimal image quality and unparalleled visibility in high contrast lighting environments. Furthermore, the MA9322-EHTVL employs VIVOTEK's Smart Stream III technology and H.265 compression codec, reducing bandwidth more than 90%* while still maintaining excellent image quality compared to traditional H.264 without smart streaming.

In addition to its versatile coverage, the MA9322-EHTVL is armed with a robust IP66 and IK10-rated housing to enable the multidirectional camera to withstand rain and dust as well as to protect against vandalism or tampering.

Revision History

■ Rev. 1.0: Initial release.

Read Before Use

The use of surveillance devices may be prohibited by law in your country. The Network Camera is not only a high-performance web-ready camera but can also be part of a flexible surveillance system. It is the user's responsibility to ensure that the operation of such devices is legal before installing this unit for its intended use.

It is important to first verify that all contents received are complete according to the Package Contents listed below. Take note of the warnings in the Quick Installation Guide before the Network Camera is installed; then carefully read and follow the instructions in the Installation chapter to avoid damage due to faulty assembly and installation. This also ensures the product is used properly as intended.

The Network Camera is a network device and its use should be straightforward for those who have basic networking knowledge. It is designed for various applications including video sharing, general security/surveillance, etc. The Configuration chapter suggests ways to best utilize the Network Camera and ensure proper operations. For creative and professional developers, the URL Commands of the Network Camera section serves as a helpful reference to customizing existing homepages or integrating with the current web server.

Package Contents

- MA9322-EHTVL
- Screws / desiccant bag
- IR light cover
- Alignment sticker
- Quick Installation Guide
- T10 torx wrench
- Waterproof cable gland

IMPORTANT:

1. Wiring methods used for the connection of the equipment to earth shall be in accordance with the National Electrical Code, ANSI/NFPA 70, and the Canadian Electrical Code, Part I, CSA C22.1.
2. Use the camera only with a DC power supply that is UL listed, and limited power source (LPS) certified. The power supply should bear the UL listed and LPS marks. The power supply should also meet any safety and compliance requirements for the country of use.

セキュリティ基準（新規則第34条の10)

「本製品は　電気通信事業者（移動通信会社、固定通信会社、インターネットプロバイダ等）の通信回線（公衆無線 LAN を含む　）
に直接接続することができません。本製品をインターネットに接続する場合は、必ずルータ等を経由し接続してください。」

NOTE:

Camera Hardware Preventative Maintenance:

1. Visual inspection of all major components including accessories, cabling and connections where accessible for signs of deterioration or damage.
2. Check and clean cameras, lenses and housings inside and out as needed.

- Please do not scratch, damage, or leave fingerprints on the dome/front cover and/or lens because this may decrease image quality.
- For general cleaning of dirty areas, it is suggested to use compressed air to remove dust and/or other debris in order not to damage the on-board components.
- In order to clean oil stains, it is recommended to use a spray-type decomposing cleaner (absolutely avoid reciprocating wipes on the surface). After the oil has decomposed, spray it with water, dry with air, and/or absorb water with a cotton cloth or a soft cloth (dab, please avoid wiping).
- Do not use harsh detergents, gasoline, benzene or acetone, etc. to clean as they may deform or cause damage to the product. Also, excessive cleaning could damage the surface.

3. Check images for correct field of view (pan, tilt and zoom focus) and adjust as necessary.
4. Check and replace the Micro SD memory card as needed.

- Stop edge recording before removing the Micro SD memory card.
- Make sure that the Micro SD memory card is right side up and do not insert it with force, otherwise it may be damaged.
- When it is raining or the humidity is high, insertion or ejection of the Micro SD memory card is not recommended.

5. Disassembly of the dome/front cover carries the risk of internal dew condensation, so please remember to replace the desiccant bags on the inside of the cameras before reassembly.
6. Check that the camera view has not been blocked by obstacles and that you can see the property perimeter clearly.
7. Make sure the interiors of cameras and accessories, like mounting kits and/or enclosures, are clean and dry.
8. Make sure cameras are securely attached to the wall/ceiling/mounting kits.

IMPORTANT:

1. Please contact VIVOTEK's certified dealers for power adapters.
2. Installation and maintenance service should only be performed by qualified technicians.
3. If powered by a power adapter, the adapter should be properly grounded.
4. The power cord must be connected to a socket or outlet with a ground connection.

⚠ IMPORTANT:

The product shall be grounded properly with a screw type of 3.5mm min. for protective earthing terminal, and connected using a green-yellow protective earthing conductor with 20 AWG min.

⚠ IMPORTANT:

1. The product must be installed and protected in a location that is not easily accessible, and is away from impacts or heavy vibration. For example, at the location where the surveillance cameras are looking down or installed at high positions such as on a wall, or at least 3 meters above the ground.
2. The camera should be installed at least 10 centimeters away from the eave of a building.
3. If powered by a power adapter, the adapter should be properly grounded.
4. Maintenance and repair work must always be carried out by qualified technical personnel.
5. Disconnect power from the unit when performing a maintenance task.
6. Please contact VIVOTEK's certified dealers for power adapters.

⚠ IMPORTANT:

1. The camera is only to be connected to PoE networks without routing to outside plants.
2. For PoE connection, use only UL listed I.T.E. with PoE output.

1. La caméra ne doit être raccordée qu'à des réseaux PoE, sans routage vers des installations extérieures.
2. Pour les raccordements PoE, utilisez uniquement un équipement de TI homologué UL, avec une sortie PoE.

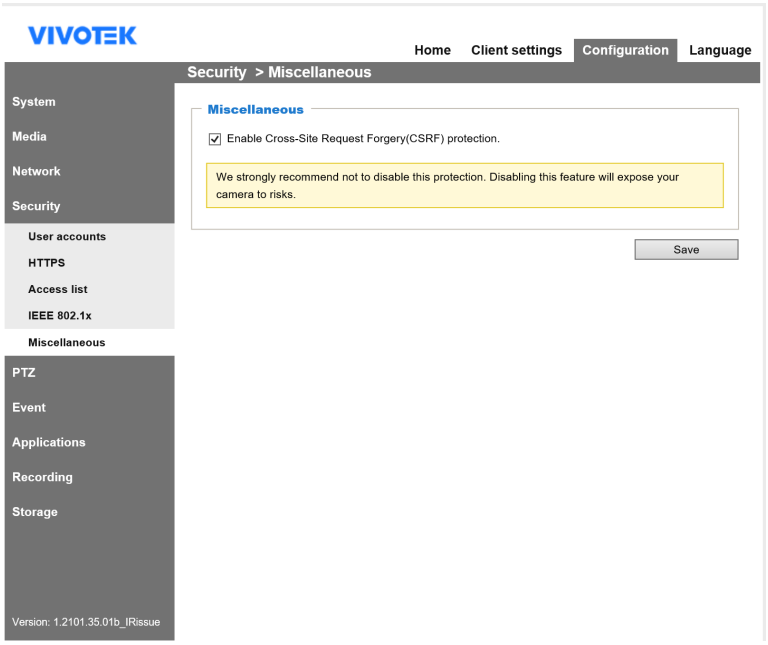
Use the camera only with a DC power supply that is UL listed, and limited power source (LPS) certified. The power supply should bear the UL listed and LPS marks. The power supply should also meet any safety and compliance requirements for the country of use.

n'utilisez la caméra qu'avec un bloc d'alimentation CC homologué UL, ainsi qu'avec une alimentation limitée (LPS) certifiée. Le bloc d'alimentation doit porter les indications d'homologation UL et LPS. Il doit également répondre aux exigences en matière de sécurité et de conformité relatives au pays d'utilisation.

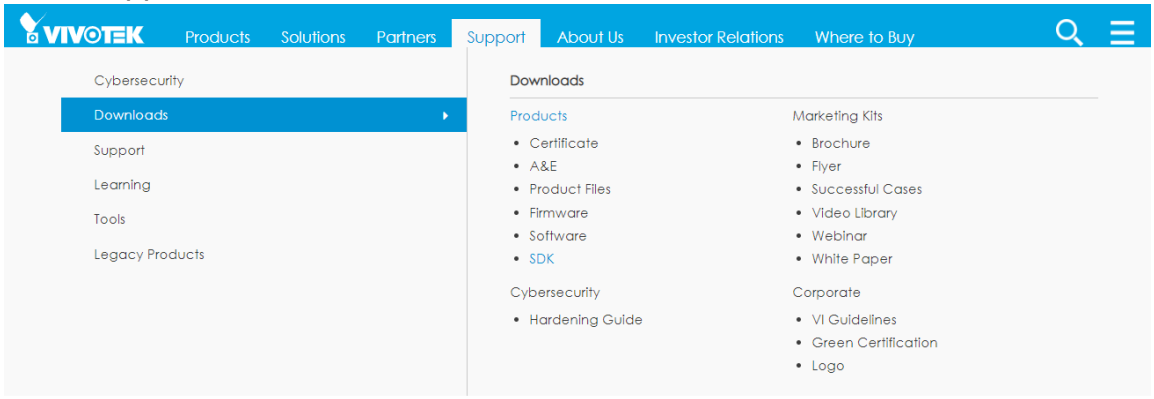
⚠ IMPORTANT:

For some customers who already have their own web site or web control application, the Network Camera/Video Server can be easily integrated through URL syntax. This section specifies the external HTTP-based application programming interface. The HTTP-based camera interface provides the functionality to request a single image, control camera functions (PTZ, output relay etc.), and get and set internal parameter values. The image and CGI-requests are handled by the built-in Web server.

- To send URL commands in the address bar of your web browser, please remember to disable the Cross-Site Request Forgery (CSRF) protection in Configuration > Security > Miscellaneous.



- For up-to-date documentation of URL commands, please go to VIVOTEK's website, register an account with a business mail address and submit for authorization for SDK in Support > Downloads > SDK.



- For any further technical support, please contact our technical support department.

Symbols and Statements in this Document

INFORMATION: provides important messages or advices that might help prevent inconvenient or problem situations.

NOTE: Notices provide guidance or advices that are related to the functional integrity of the machine.

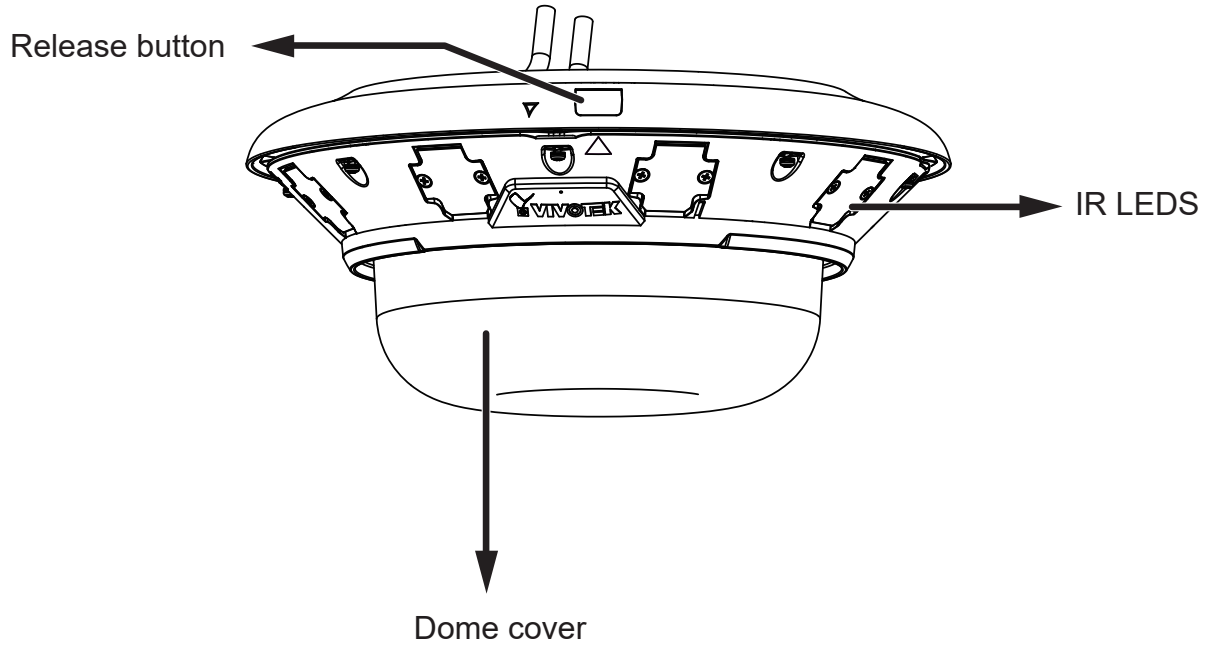
Tips: Tips are useful information that helps enhance or facilitae an installation, function, or process.

WARNING: or IMPORTANT:: These statements indicate situations that can be dangerous or hazardous to the machine or you.

Electrical Hazard: This statement appears when high voltage electrical hazards might occur to an operator.

Physical Description

Outer View

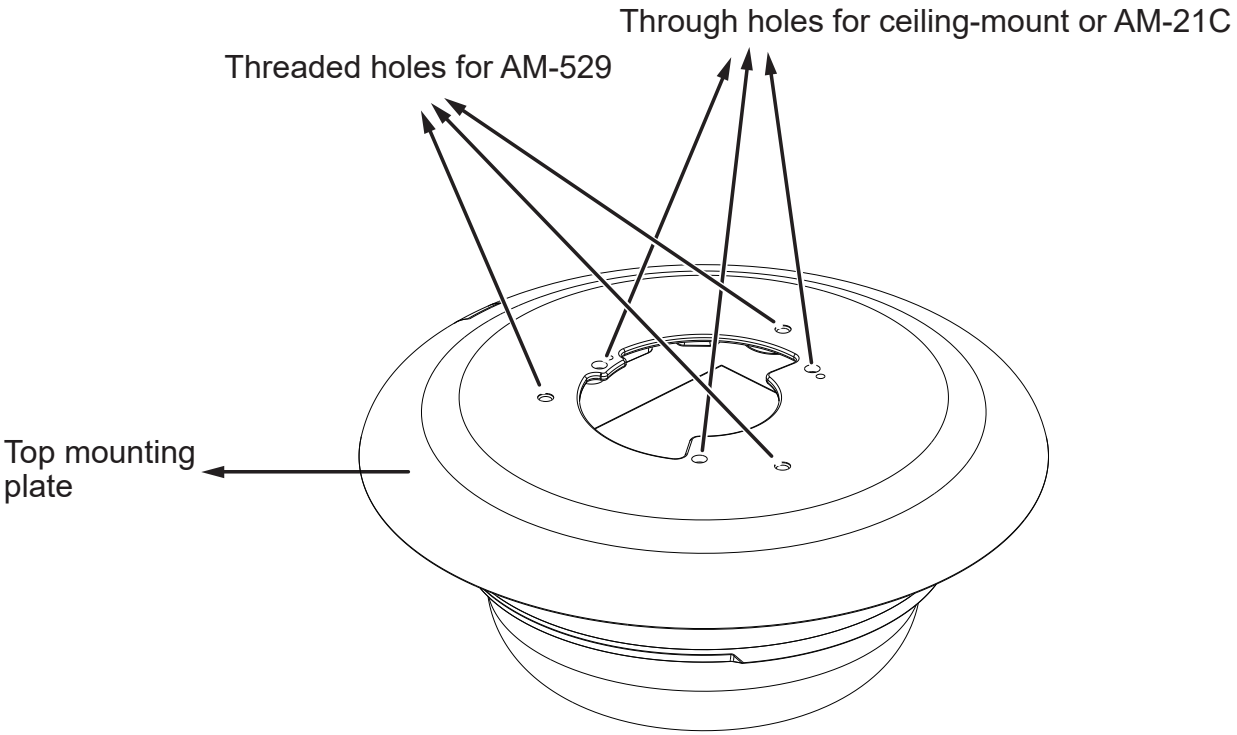


NOTE:

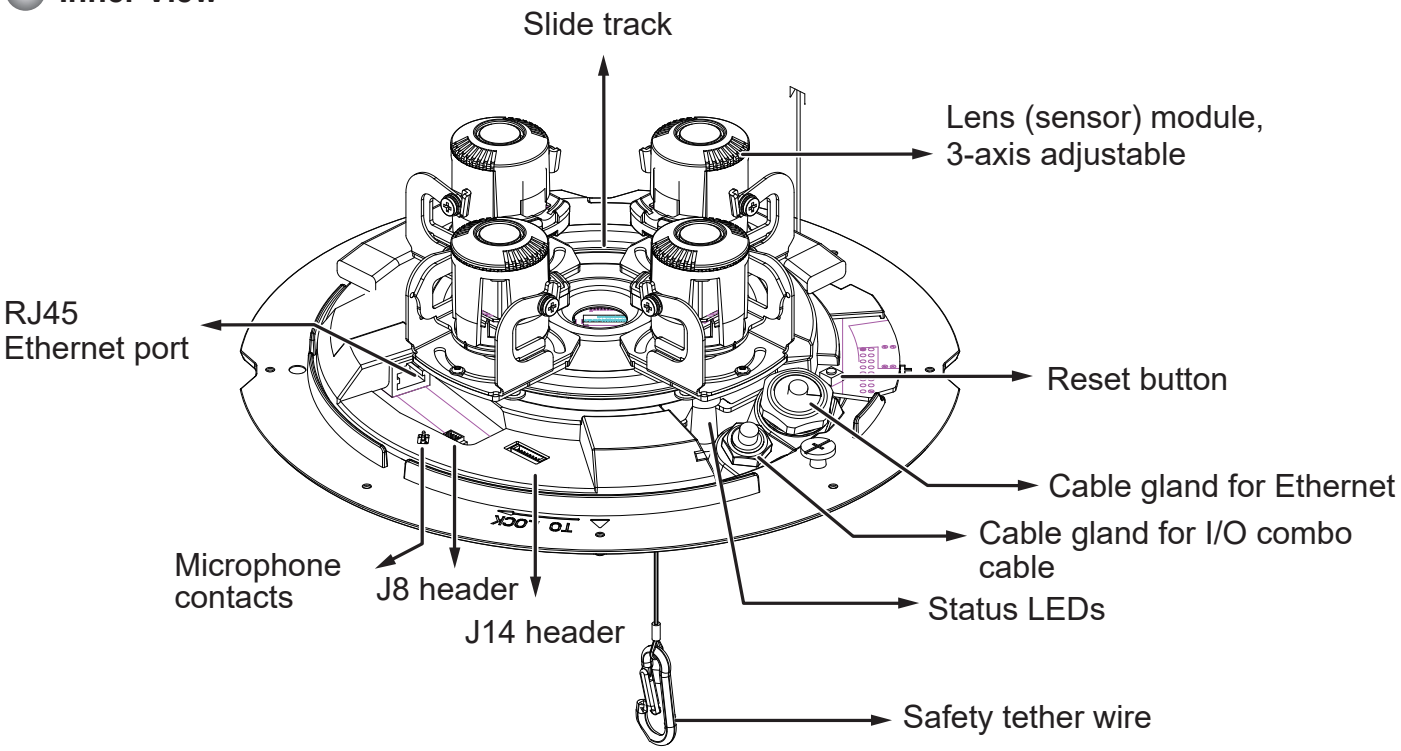
Some of the suffix syntax used in model naming are listed below:

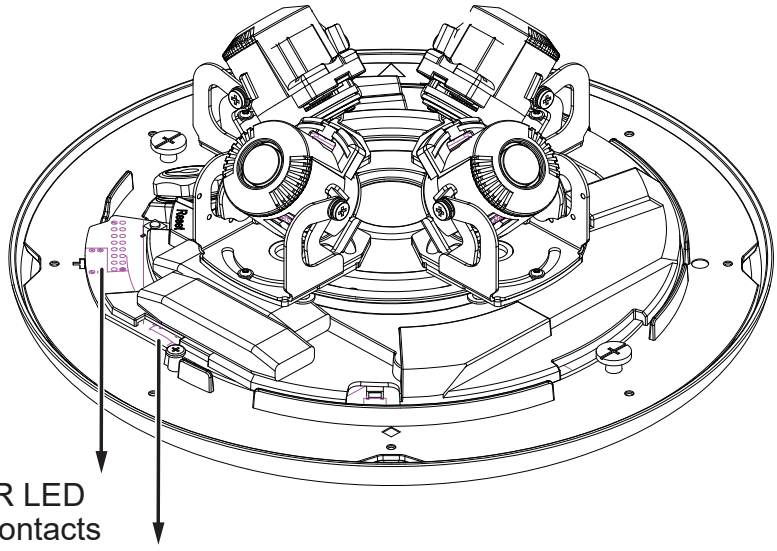
E	w/ heater for extreme weather
Fx	Focal length w/ number
T	w/ Remote focus lens
R	w/ PoE repeater
H	w/ High Dynamic Range functionality

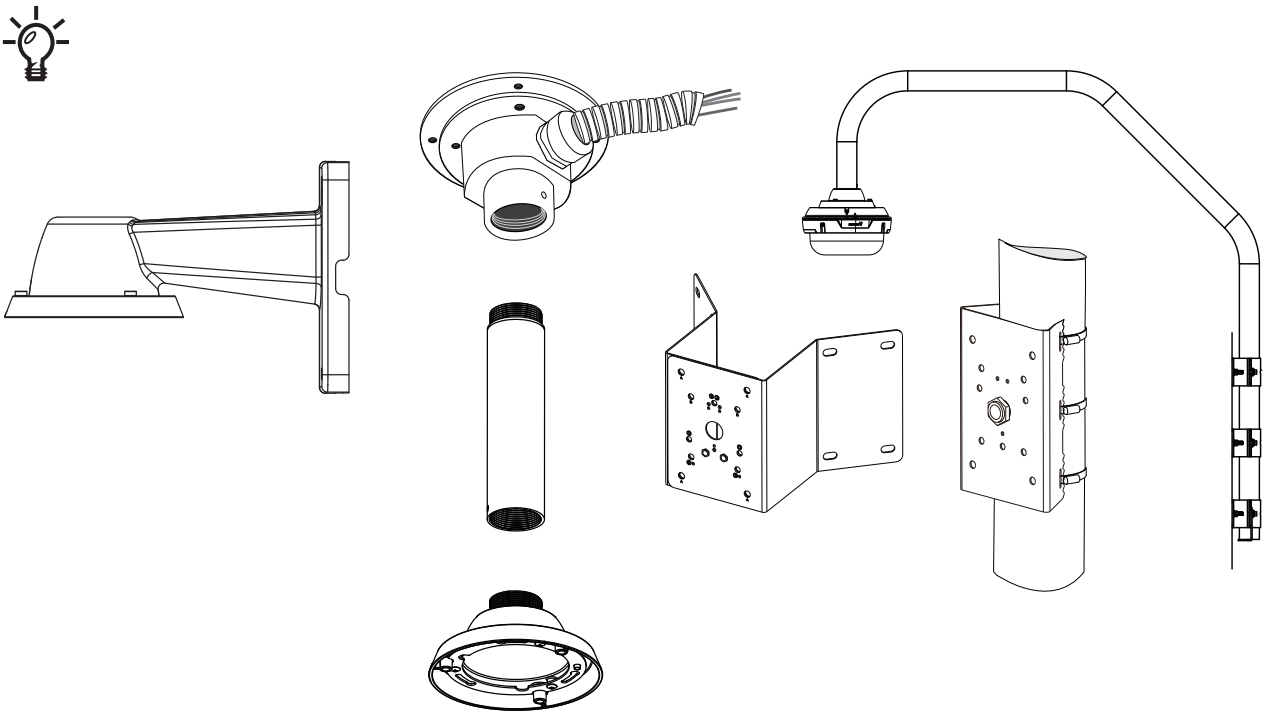
Top View

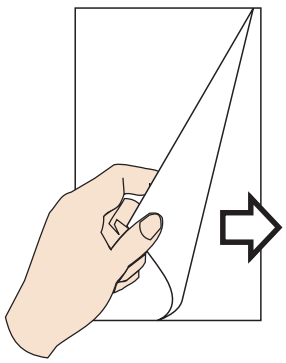


Inner View



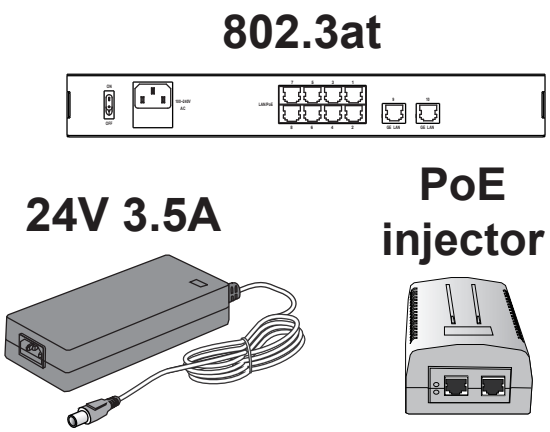






For the installation using optional accessories, refer to the Optional Accessories Installation Guide

Power Consumption



Due to its onboard heater for operation in the low temperature environments, care should be taken when selecting the power source for the camera. Listed below are the requirements for powering the camera:

Use conditions	Power consumption & Input
-40ºC ~ 50ºC (IR ON), 60ºC (IR OFF)	PoE+: 25W (PoE Plus mid-span or switch)
-40ºC ~ 50ºC (IR ON), 60ºC (IR OFF)	AC 24V input: 28W

In warmer areas that do not need a heater, a PoE+ switch can drive the camera. In areas where temperature can drop below -20ºC, an AC 24V power adaptor is required.

IMPORTANT:

- Many copper coated aluminum (CCA) and other non-standard conductors cabling products are masqueraded as CAT5E or CAT6 cables. Please avoid using these CCA products especially when cascading PoE cameras. It is a must to use Ethernet cables compliant with the 3P/ETL standard.

- The camera is able to operate in low temperature environments. However, when starting these cameras in a very low temperature condition, e.g., -40ºC, the embedded heater may take half an hour to warm up the camera. When the temperature within the canister reaches -10ºC, the camera automatically starts.

Hardware Reset

The reset button is used to reset the system or restore the factory default settings. Sometimes resetting the system can return the camera to normal operation. If the system problems remain after reset, restore the factory settings and install again.
Reset: Press the recessed reset button. Wait for the Network Camera to reboot.
Restore: Press and hold the reset button until the status LED rapidly blinks. Note that all settings will be restored to factory default. Upon successful restore, the status LED will blink green and red during normal operation.

MicroSD/SDHC/SDXC Card Capacity

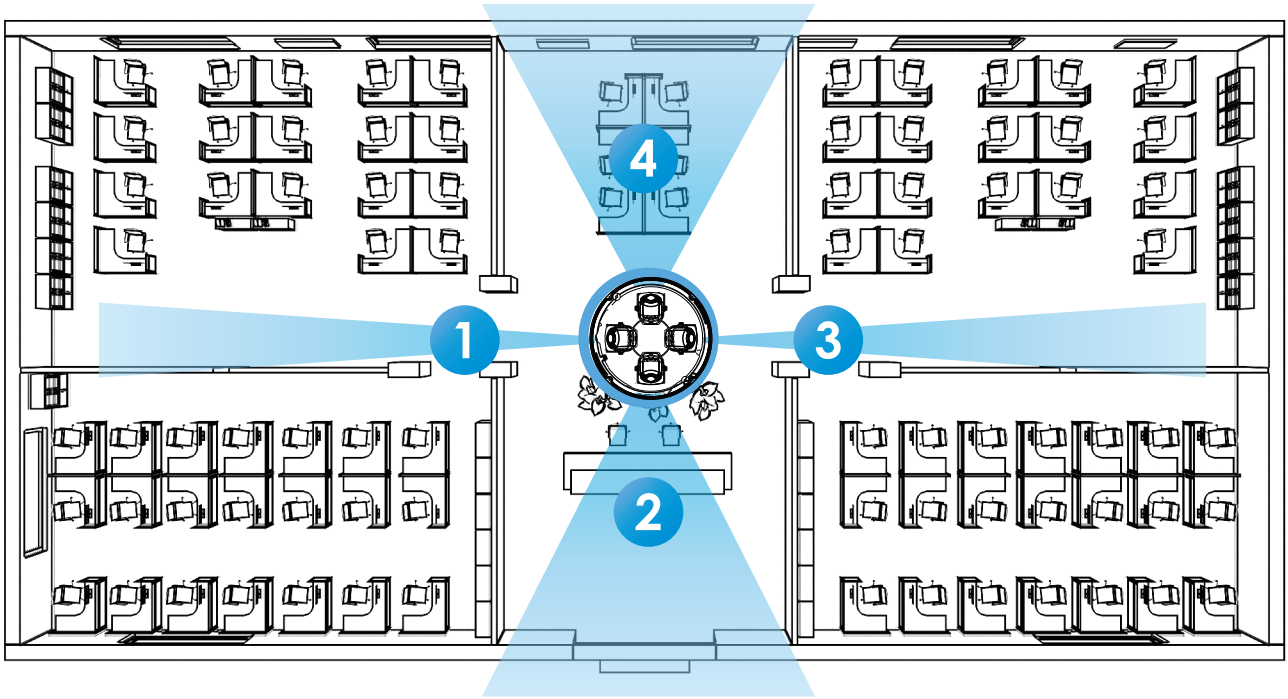
This network camera is compliant with **SD/SDHC/SDXC 16GB / 8GB / 32GB / 64GB / , and up to 512 / 1024GB** and other preceding standard SD cards.

Mounting Options

1

With its remote focus lenses, the lens modules can be aiming at different areas at different distances.

Below are some sample scenarios with lenses' shooting directions adapted to them. The Zoom function is found in Configuration > Media > Image > Focus window.



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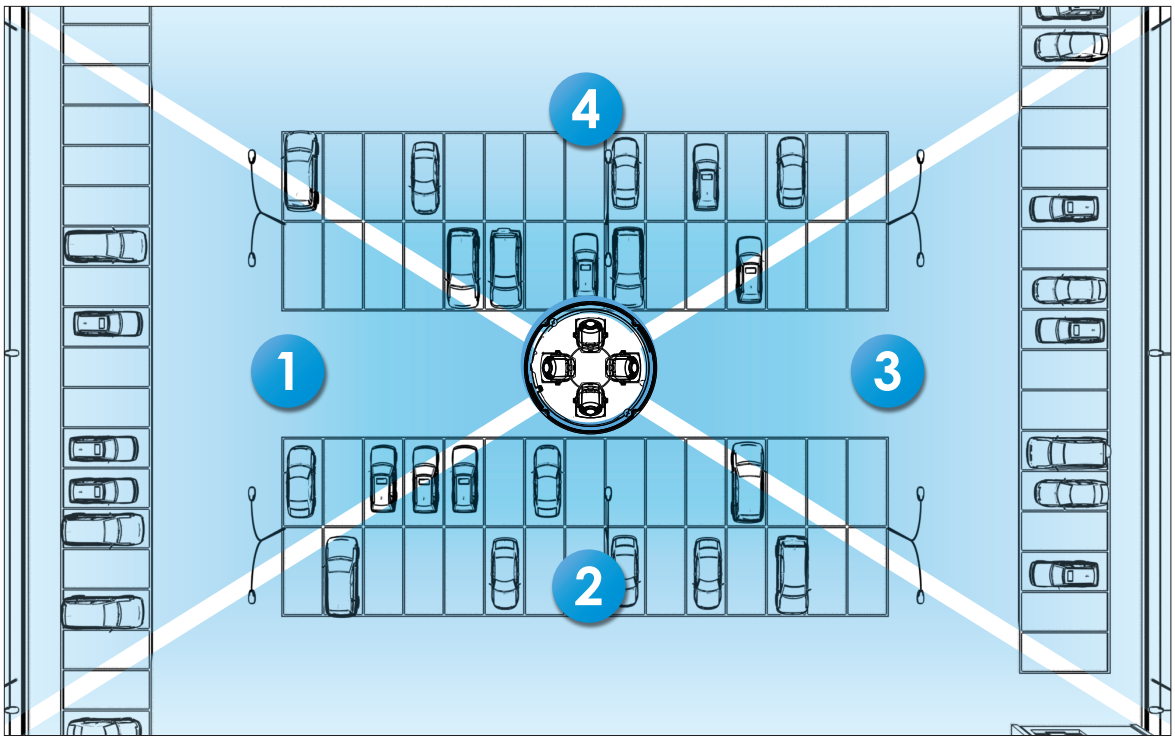
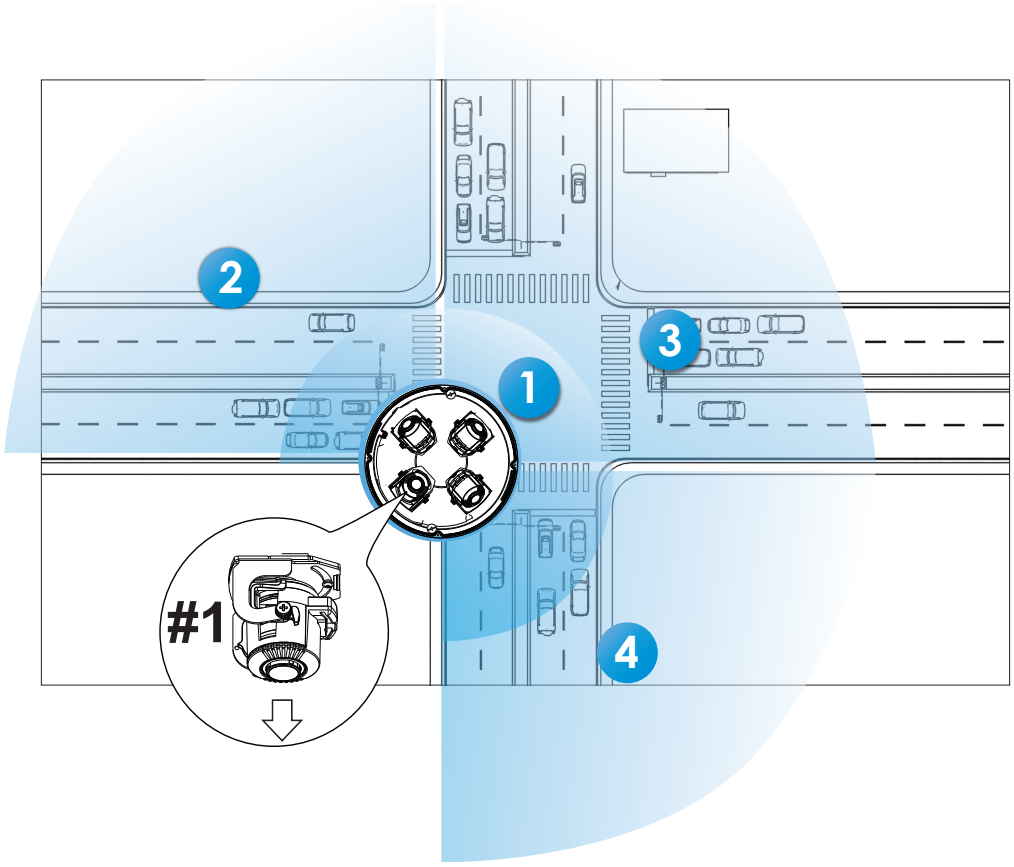


3 When installed at a corner, one of its lens can be turned facing downward to cover the area directly underneath the camera.

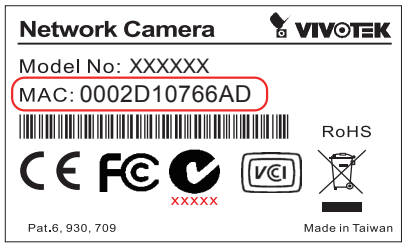


Ceiling Mount

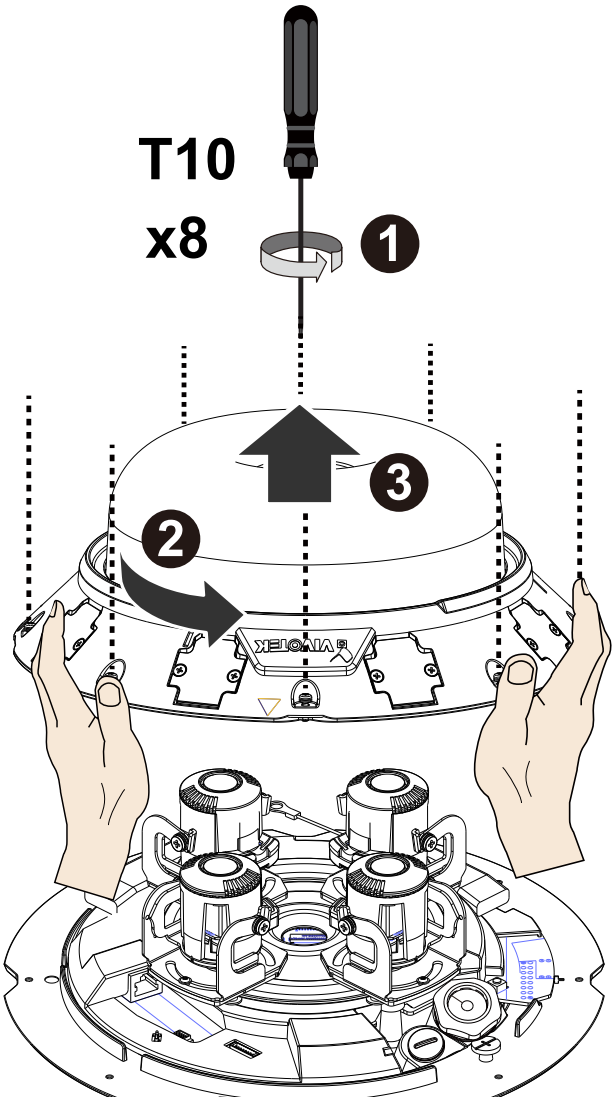
For other mounting options, please refer to the Installation Guide for Optional Accessories. The camera can be directly installed to a wall or ceiling. Refer to the following discussion for more on pendant mount, pole mount, and corner mount options.

See the installation details below for how to install the camera to a ceiling.

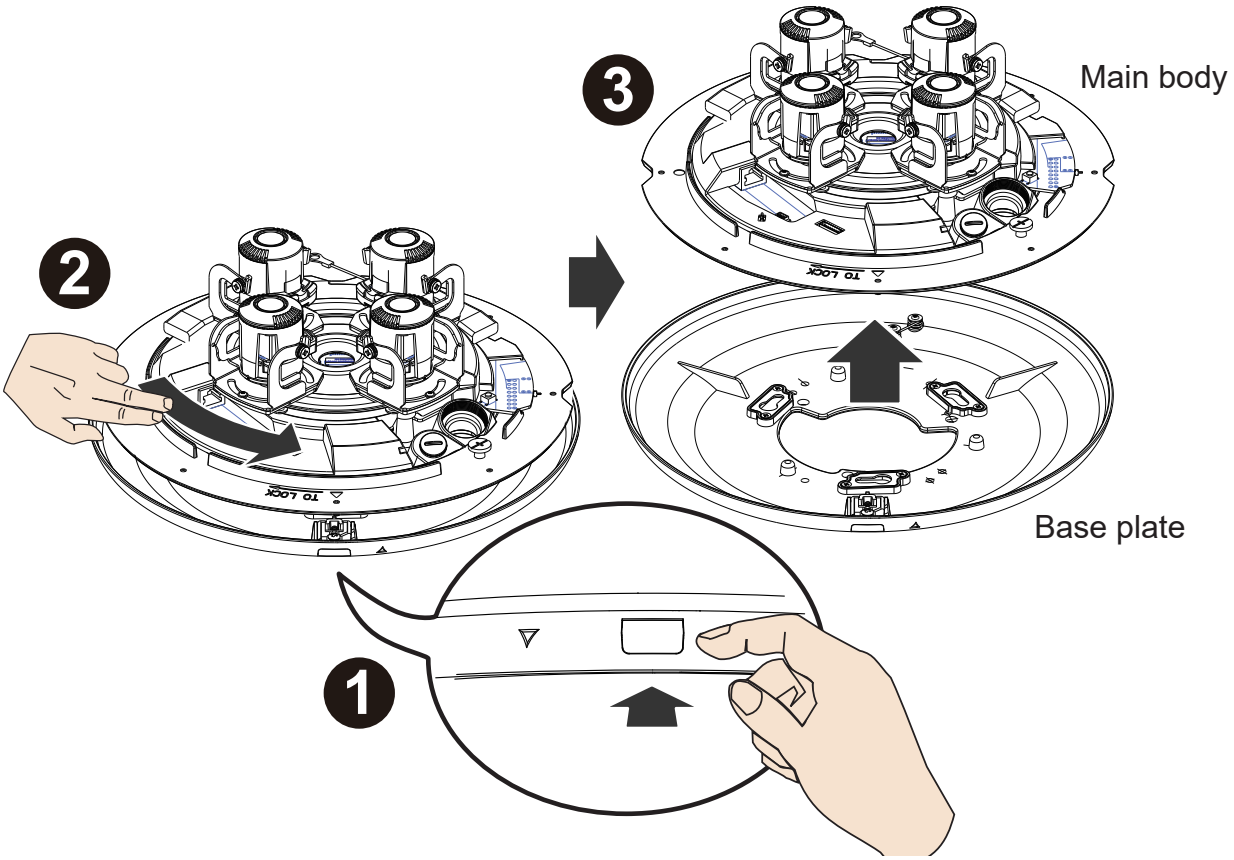
1. Jot down the camera's MAC address for later reference.



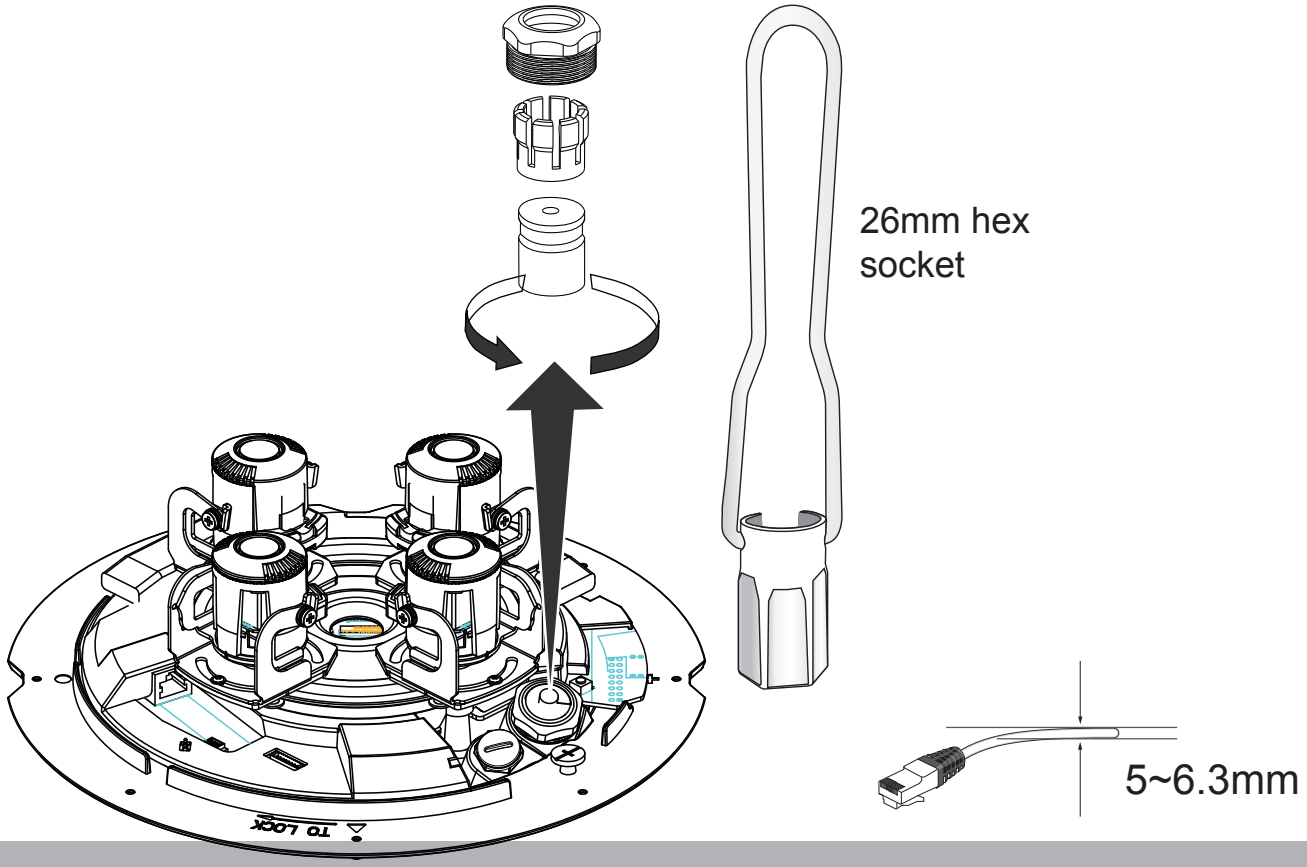
2. Open the dome cover by loosening 8 T10 anti-tamper screws. Turn slightly counter-clockwise to remove the dome cover.



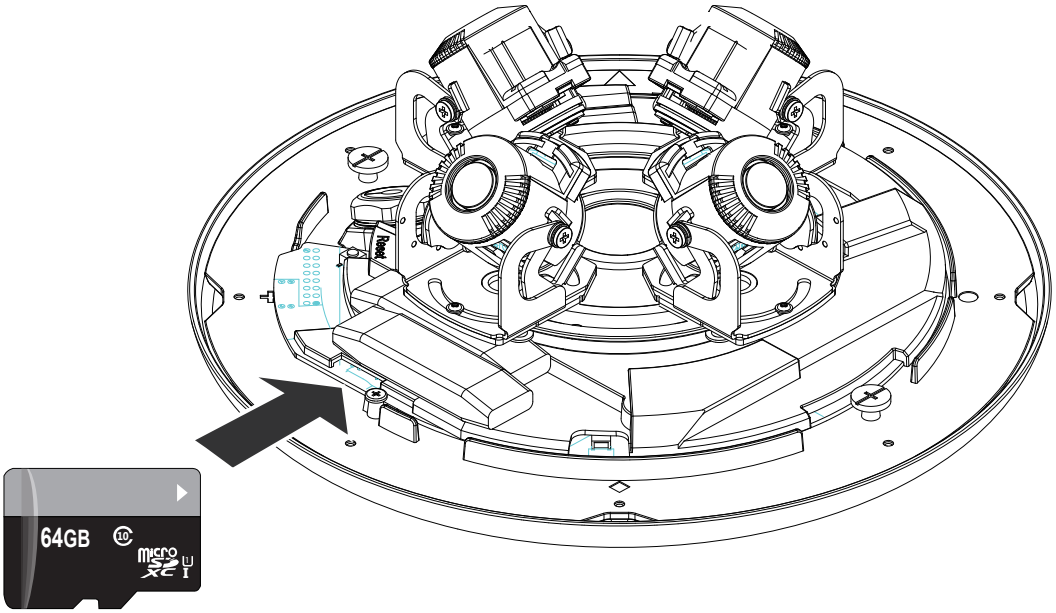
3. Remove the camera from the top mounting plate by pressing the release button. Turn the camera counter-clockwise, and then lift it off the mounting plate.



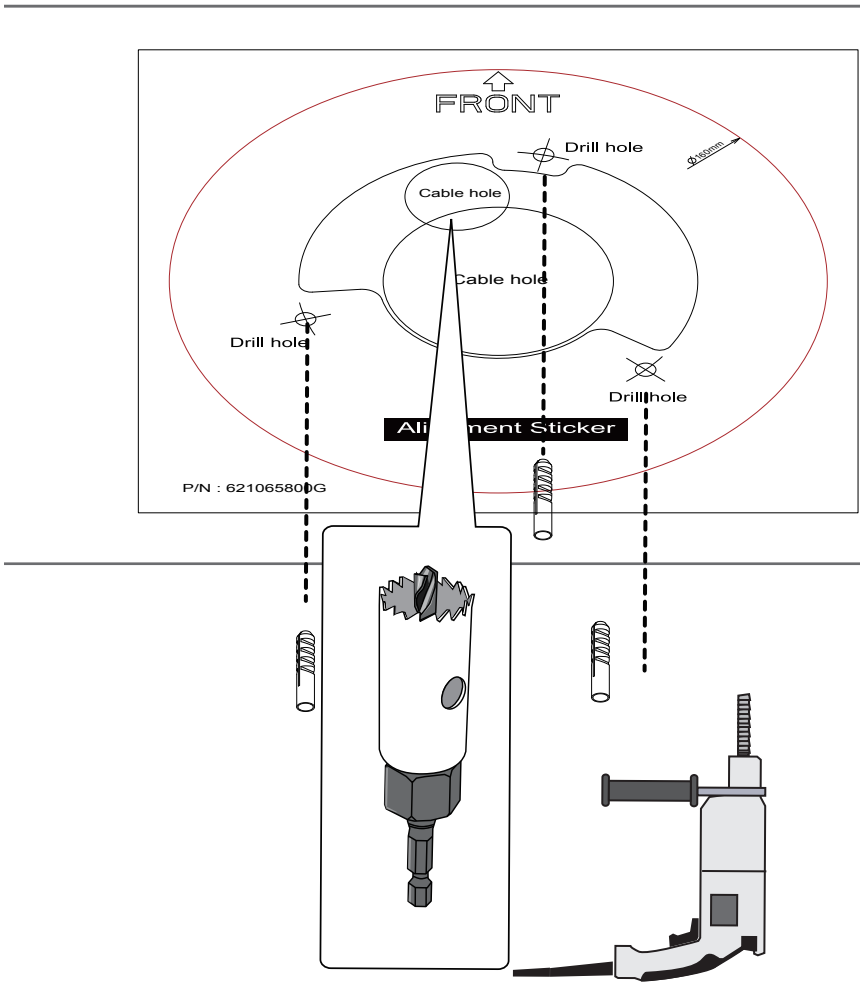
4. Remove the waterproof connectors. If you do not need to route I/O wires, leave the plastic cap in place. If you need to connect I/O wires, keep the stainless nut.



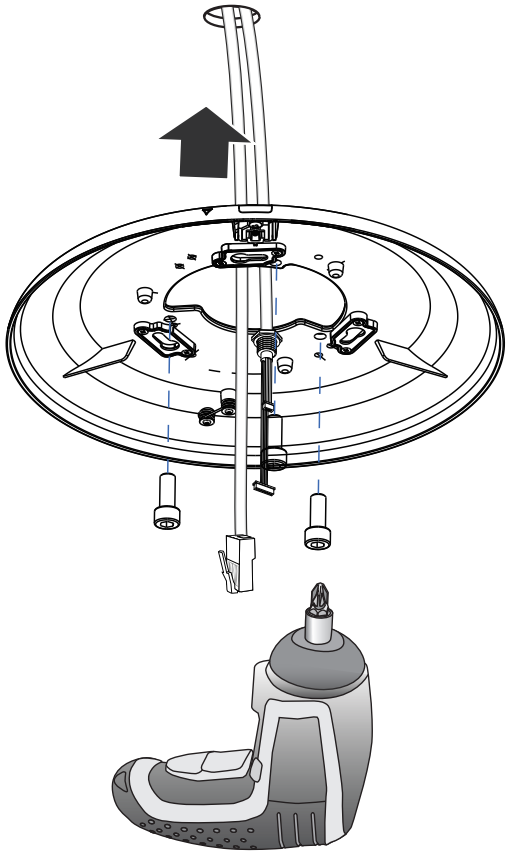
5. Install a MicroSD card if onboard storage is preferred.



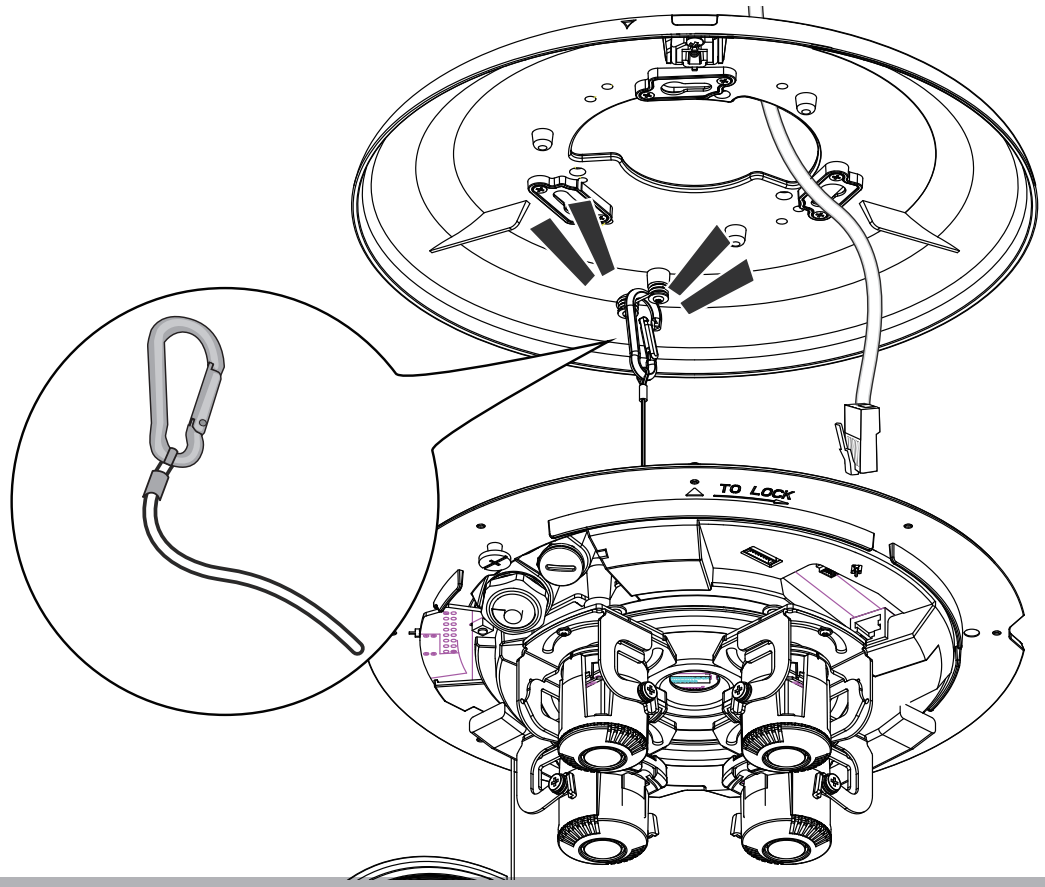
6. Attach the alignment sticker to a position you prefer. Drill screw holes and a routing hole.



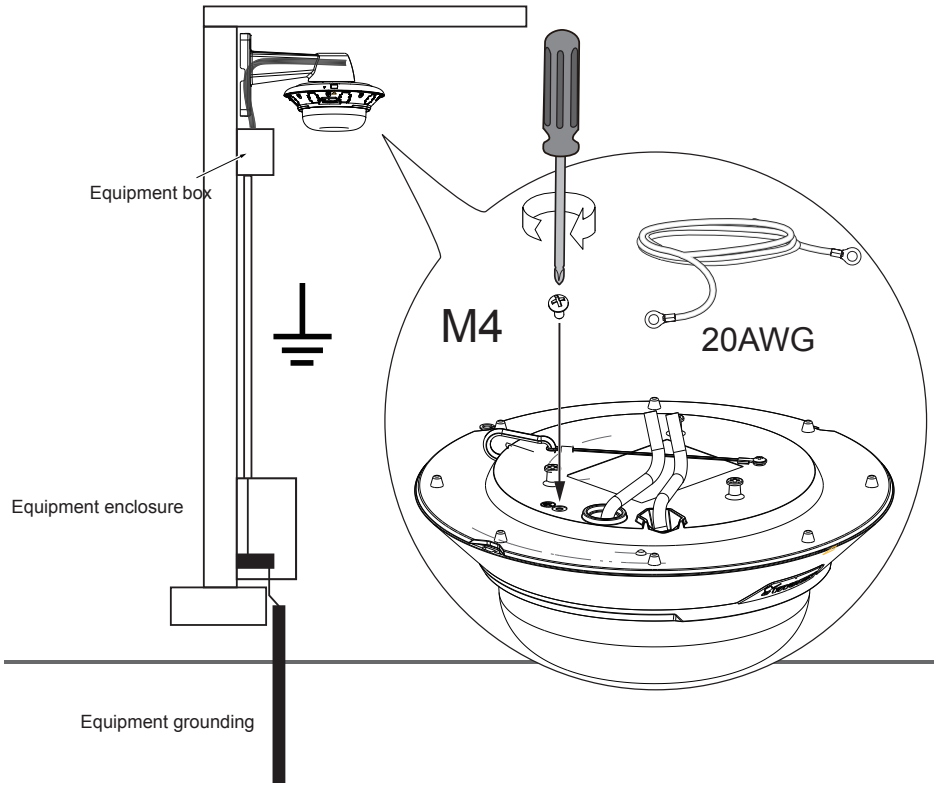
7. Route cables through the routing hole, and secure the top mounting plate to ceiling by driving the included screws.



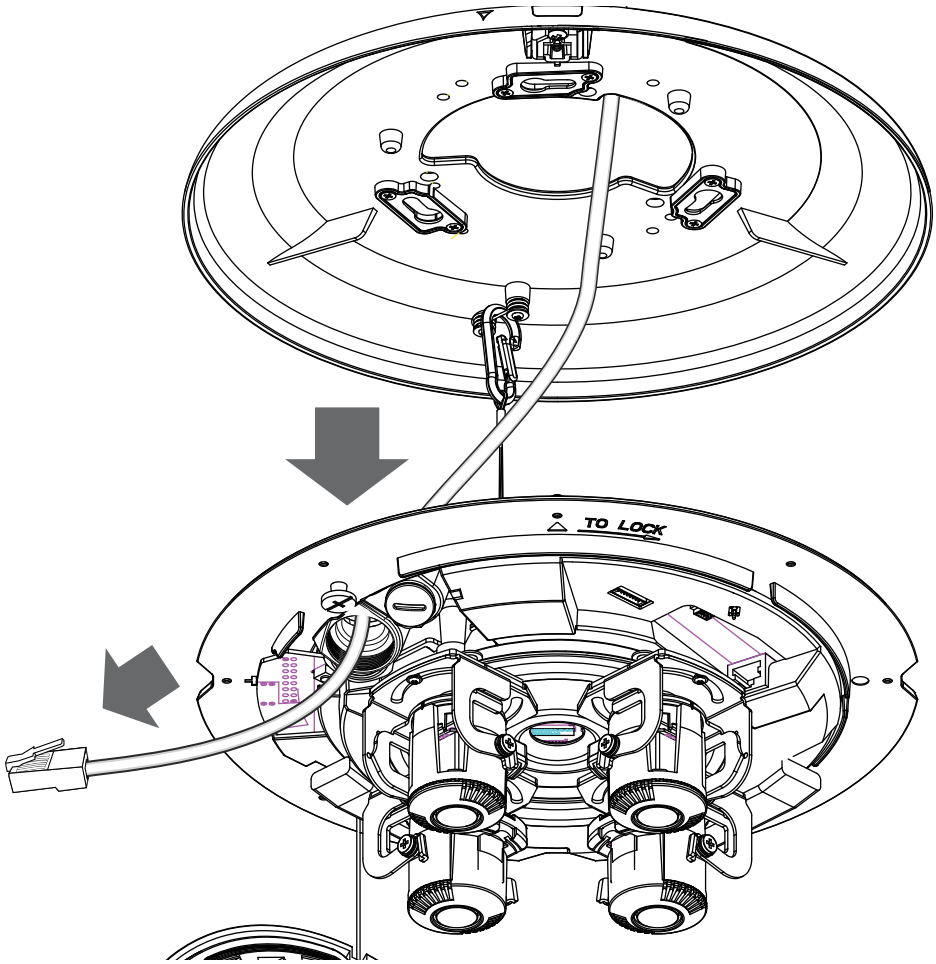
8. Connect the safety tether wire to the latch anchor on the mounting plate.



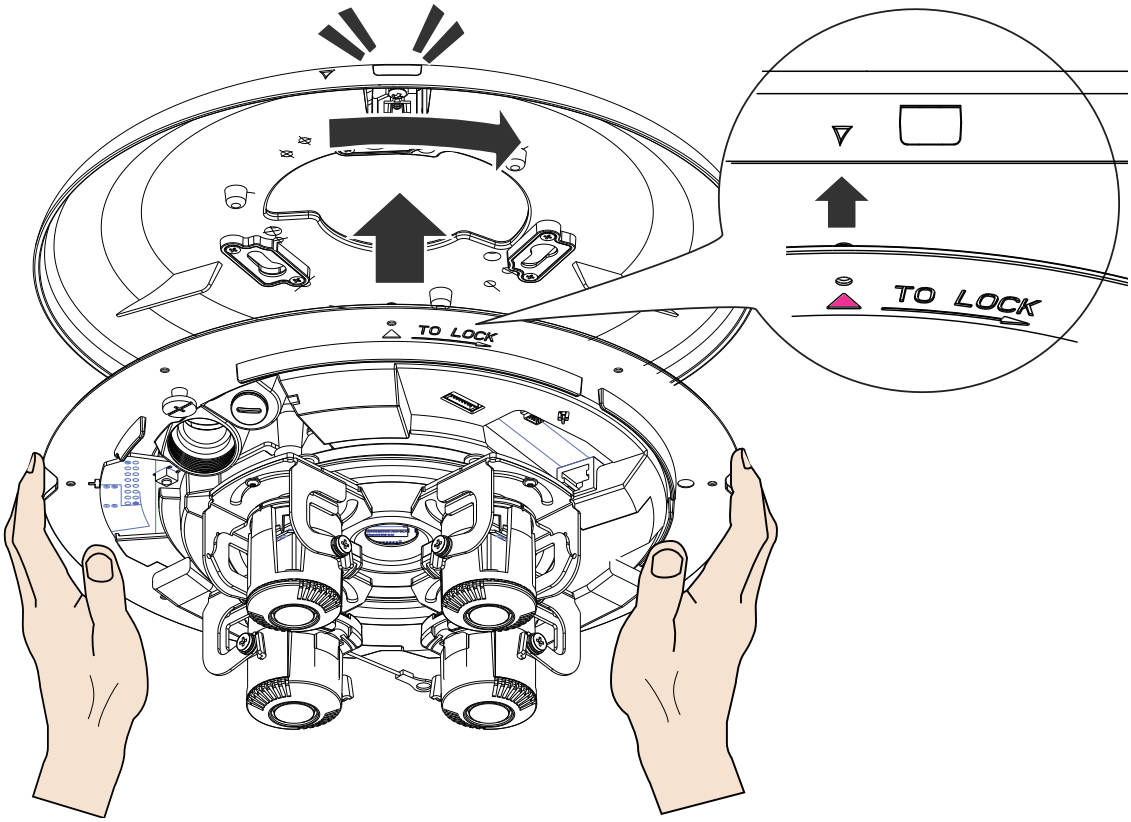
9. Connect a ground wire to the grounding screw on top of the mounting plate.



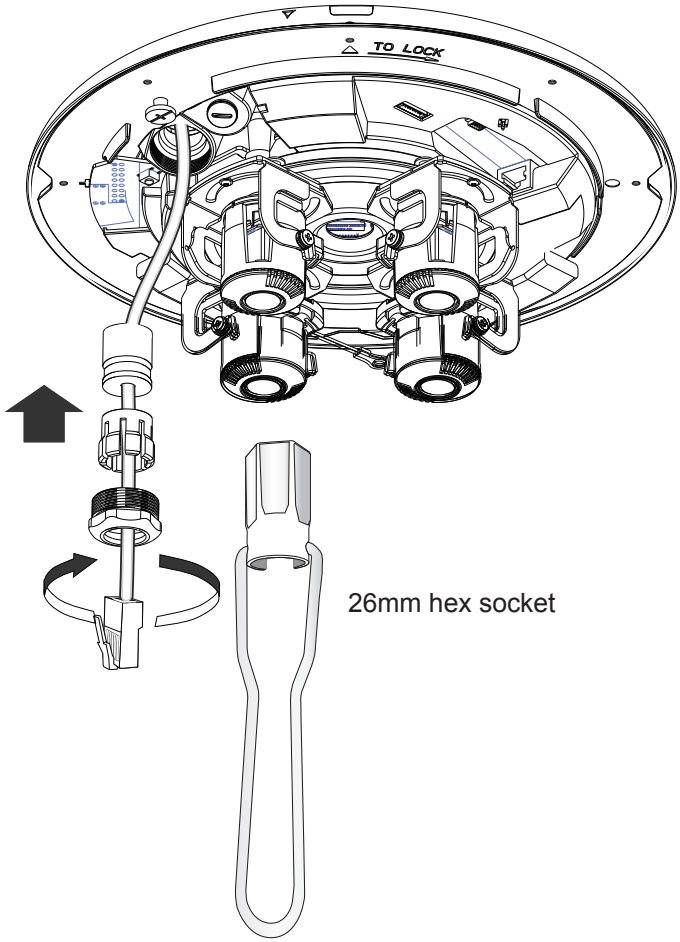
10. Pass an Ethernet cable through the cable gland through hole.



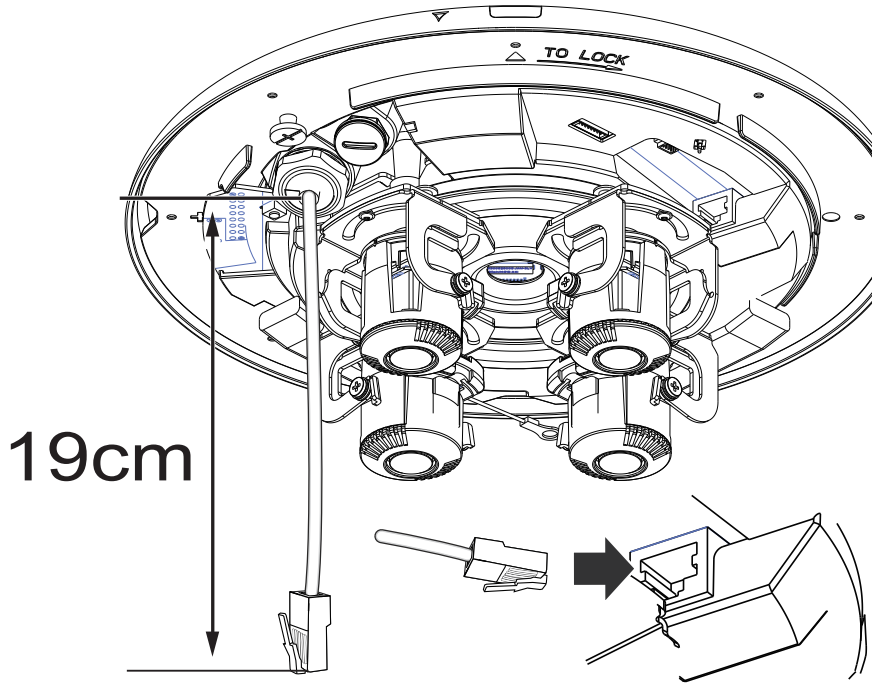
11. Secure the camera to the mounting plate by aligning and turning clock-wise. The camera will snap into place.



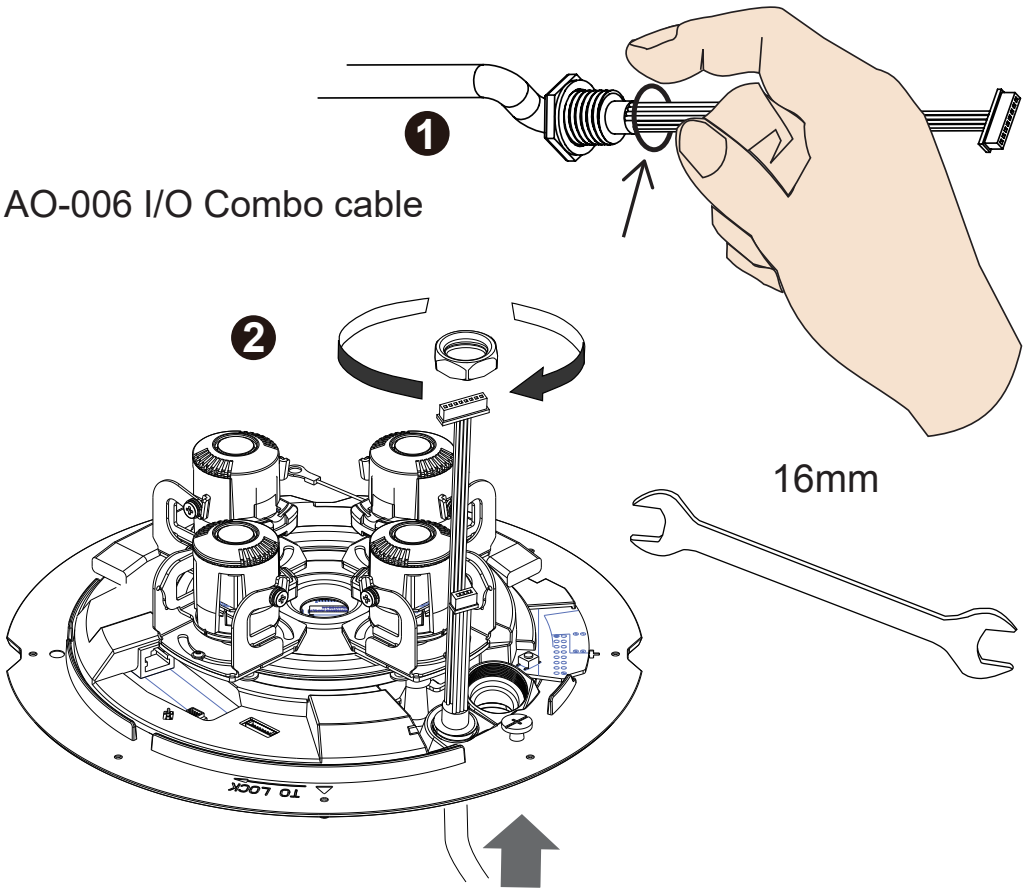
12. Install and tighten the components of the waterproof connector.



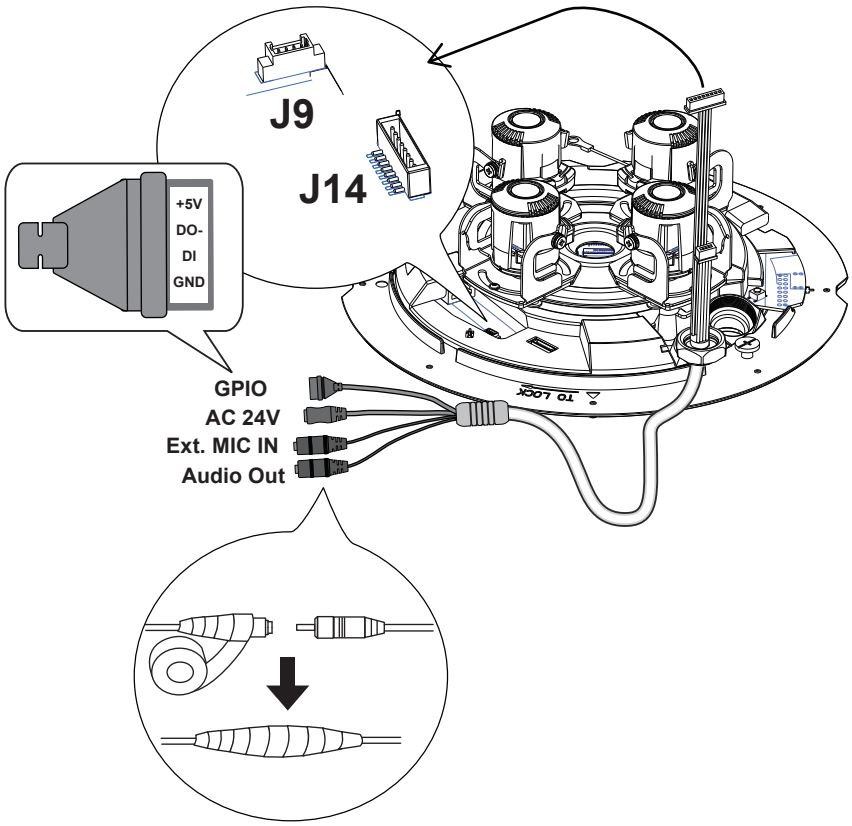
13. Leave 19 centimeters of cable length inside the camera, and connect the Ethernet cable to the RJ45 connector.



Pass the I/O combo cable (if applied) through the routing hole, and attach a rubber seal ring. Install the combo cable with the white headers inside the camera, and tighten the stainless hex nut from the inside of the camera.

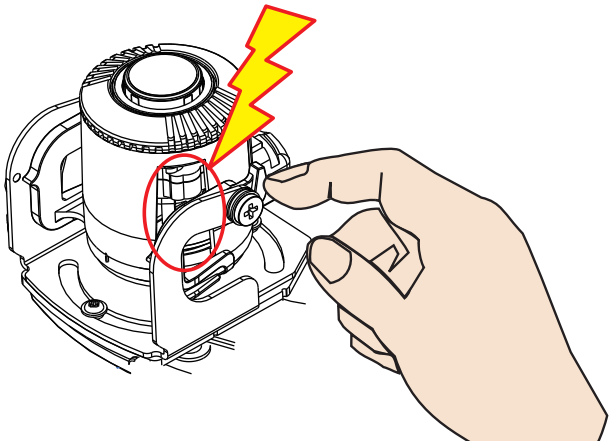


Connect the white headers to J9 and J14 heades on camera PCB board. Carefully route the cables along the the camera base.



On the outside of the cameras, the I/O wires connection should be protected against moisture by using putties.

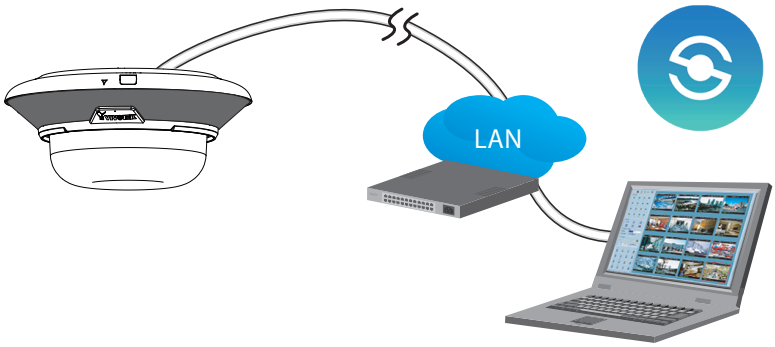
Mind the electrostatic damage by avoiding contact with exposed circuitry.



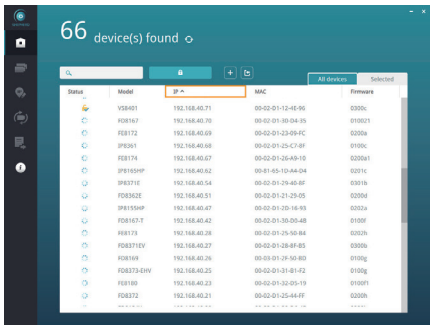
14. When the Ethernet and I/O wires connection is done and the camera is powered up, try find the camera using VIVOTEK's Shepherd utility.

    Double-click on the camera's entry on Shepherd to open a web console to the camera. A browser session will open.

    The program will search for VIVOTEK Video Receivers, Video Servers or Network Cameras on the same LAN.



Shepherd



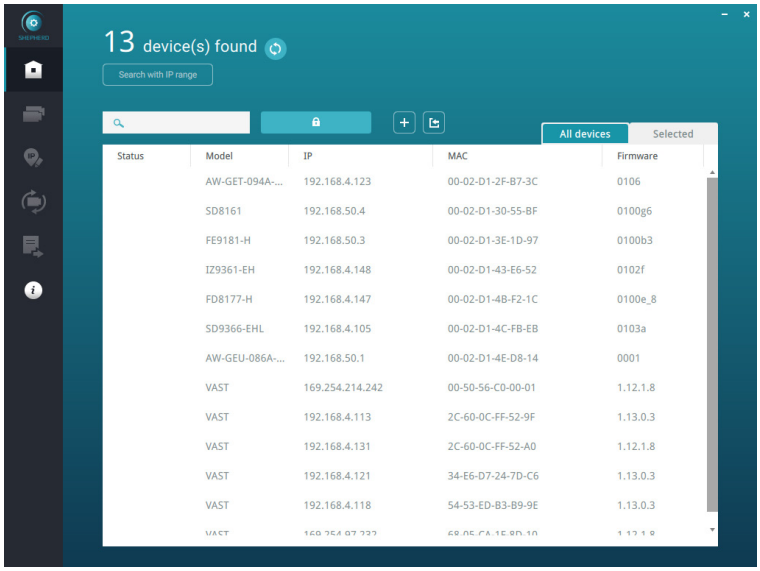
Browser

Software Installation

15. Install the **Shepherd** utility, which helps you locate and configure your Network Camera in the local network. If your camera comes without the CD, go to VIVOTEK's website, and locate the utility in the Downloads > Software page.

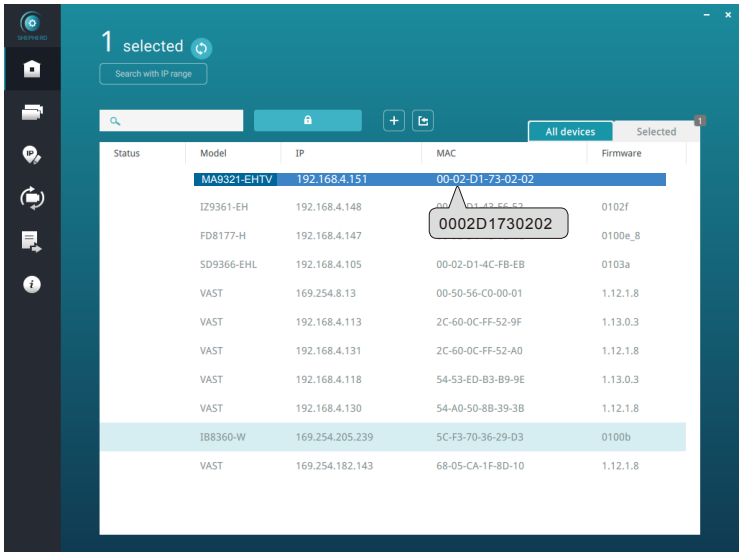
15-1. Run the Shepherd utility.

15-2. The program will conduct an analysis of your network environment.



15-3. The program will search for all VIVOTEK network devices on the same LAN.

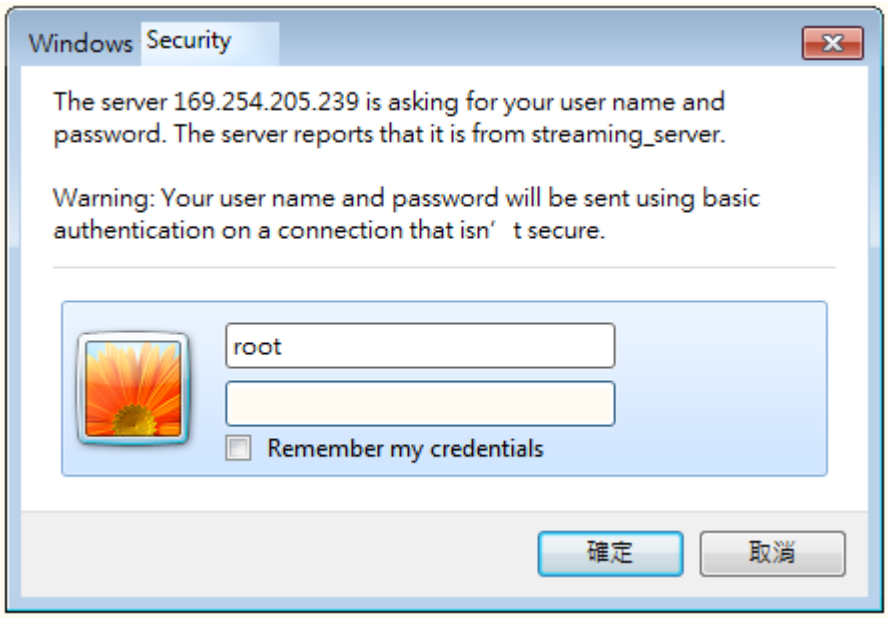
15-4. After a brief search, the installer window will prompt. Click on the MAC and model name that matches the one printed on the product label. You can then double-click on the address to open a management session with the Network Camera.



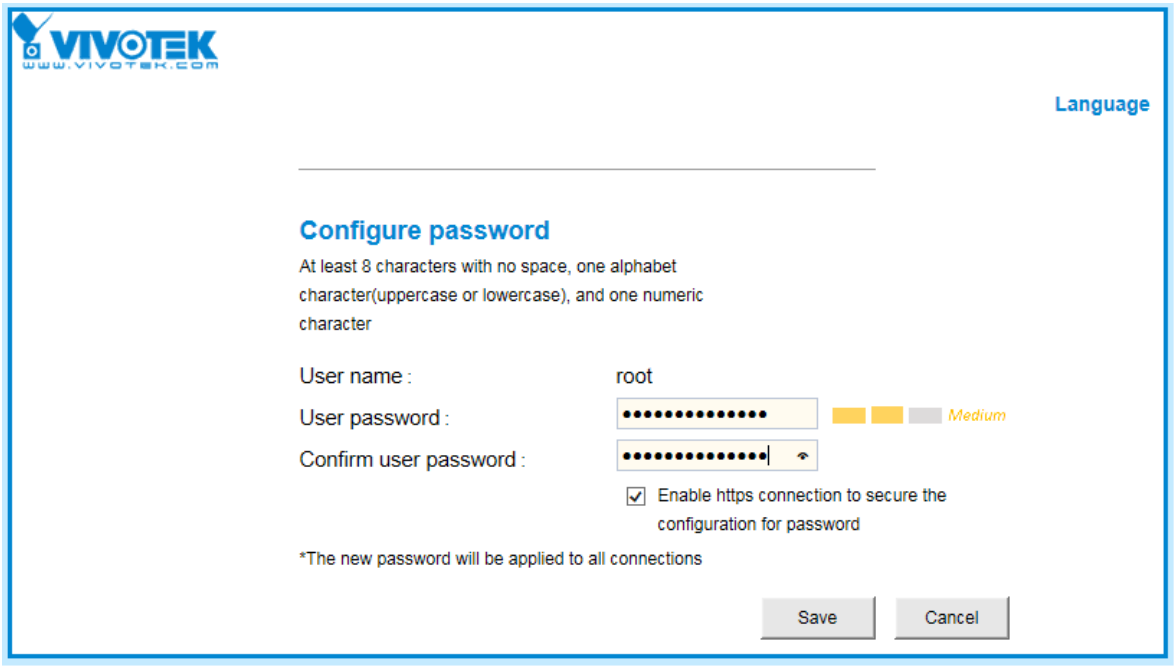
Forceful Password Configuration

16. The first time you log in to the camera, the firmware will prompt for a password configuration for security concerns.

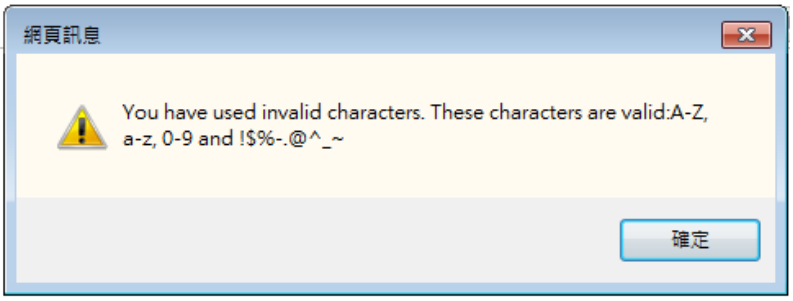
16-1. Since your camera is used for the first time, there is no password. Enter "**root**" as the user name, and nothing for the password.



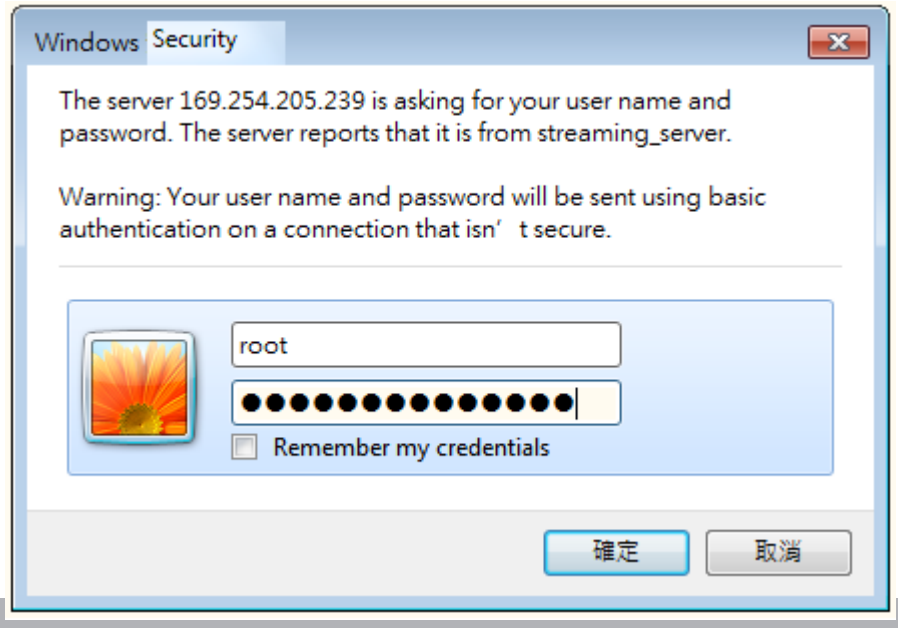
16-2. Enter the combination of alphabetic and numeric characters to fulfill the password strength requirement. The default name for the camera administrator is "**root**", and can not be changed.



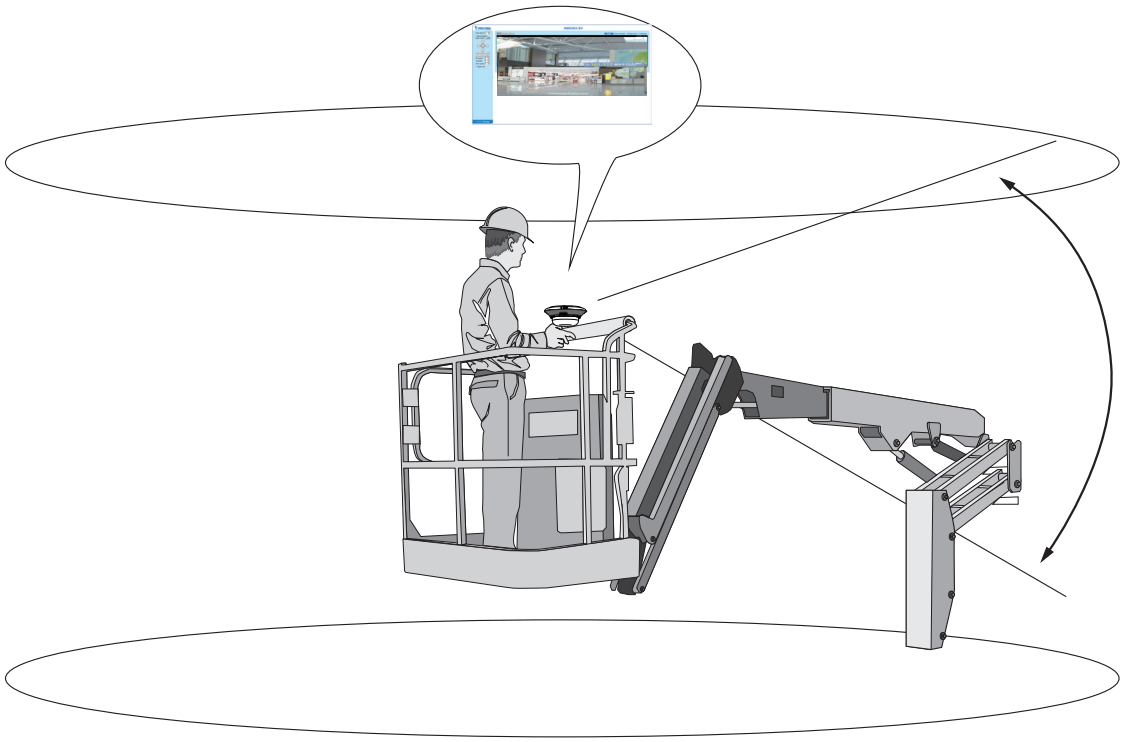
Some, but not all special ASCII characters are supported: !, $, %, -, ., @, ^, _, and ~. You can use them in the password combination.



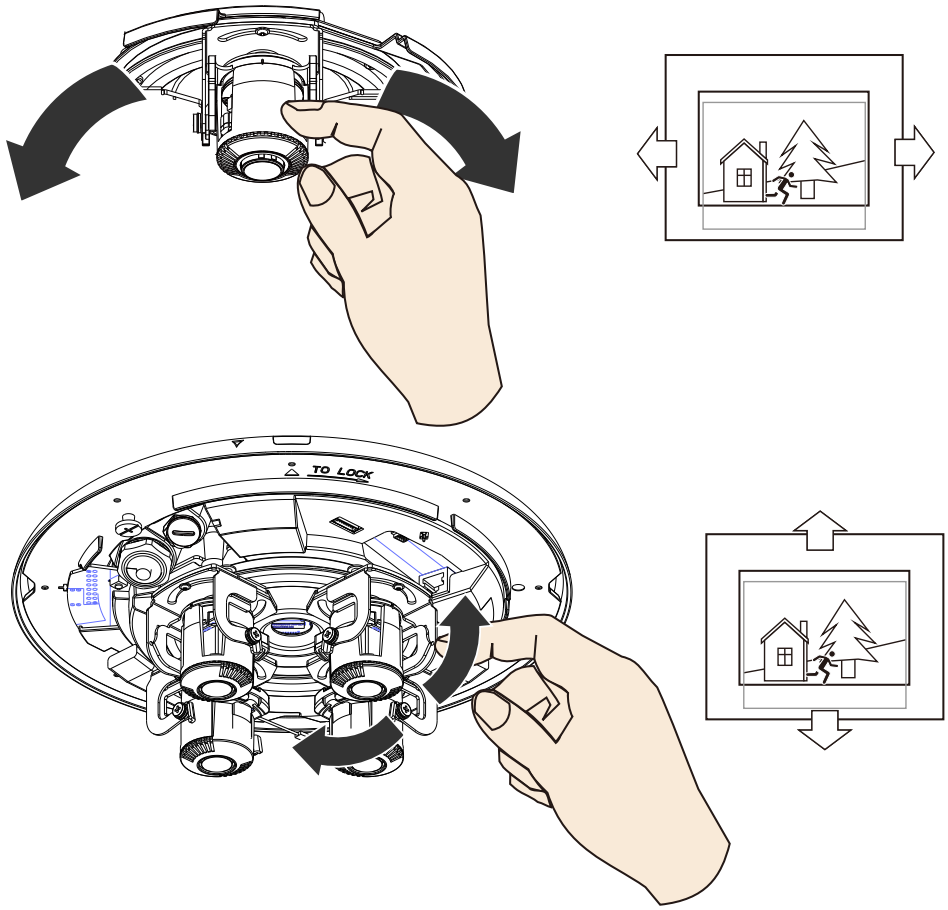
16-3. Another prompt will request for the password you just configured. Enter the password and then you can start configure your camera and see the live view.

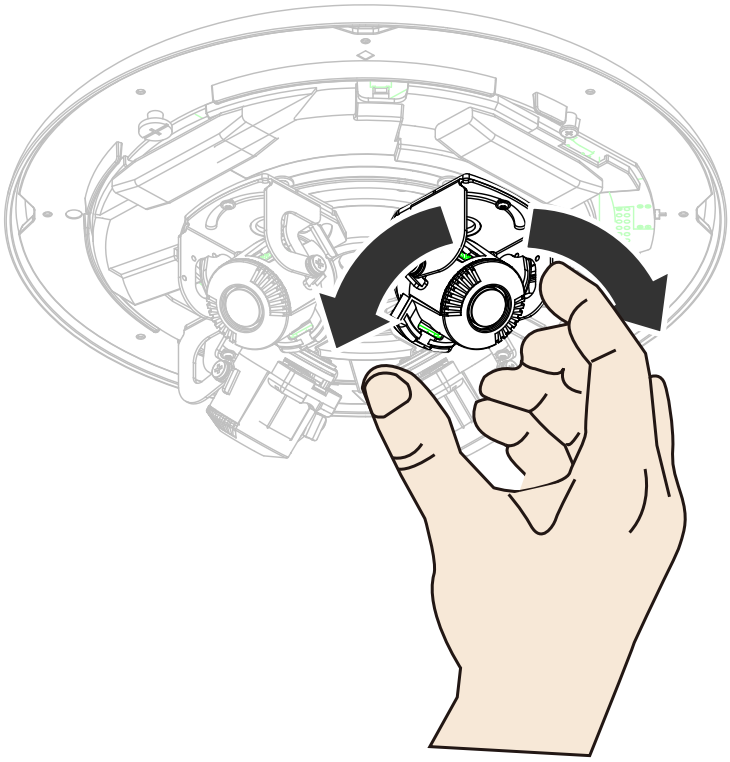


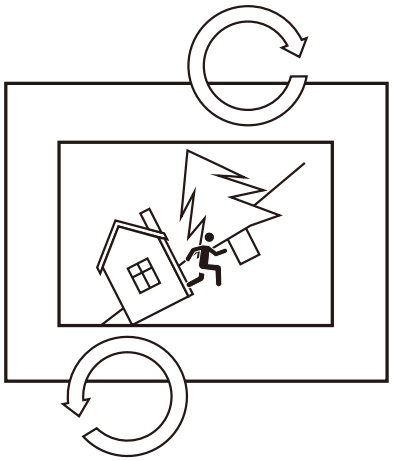
If you are not sure whether the field of view can properly cover the area of your interest, you can check the live view at the installation site, at a position of your estimation.



17. With a live view displayed on your laptop, you can adjust the lens shooting direction to obtain an optimal fied of view. Check the live view to ensure the image is in focus.





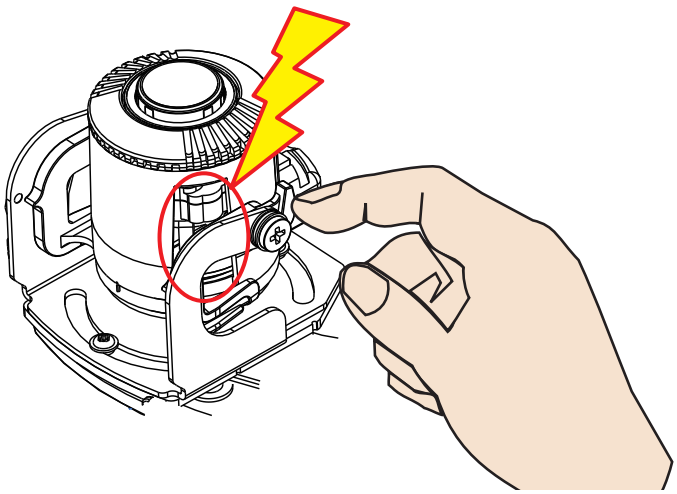


Note that you do not need any tools when changing the lens shooting direction.

You can move a lens module from side to side, turn the lens shooting direction up or down, or rotate the module to cover the area of your interest.

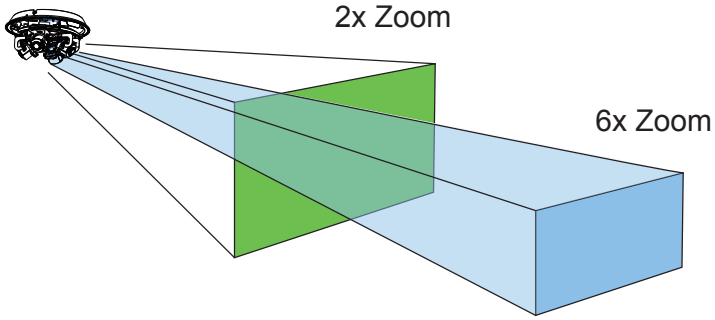
IMPORTANT:

When adjusting the shooting angle, please avoid touching the exposed circuit board or ribbon cable. Static discharge can cause damages.

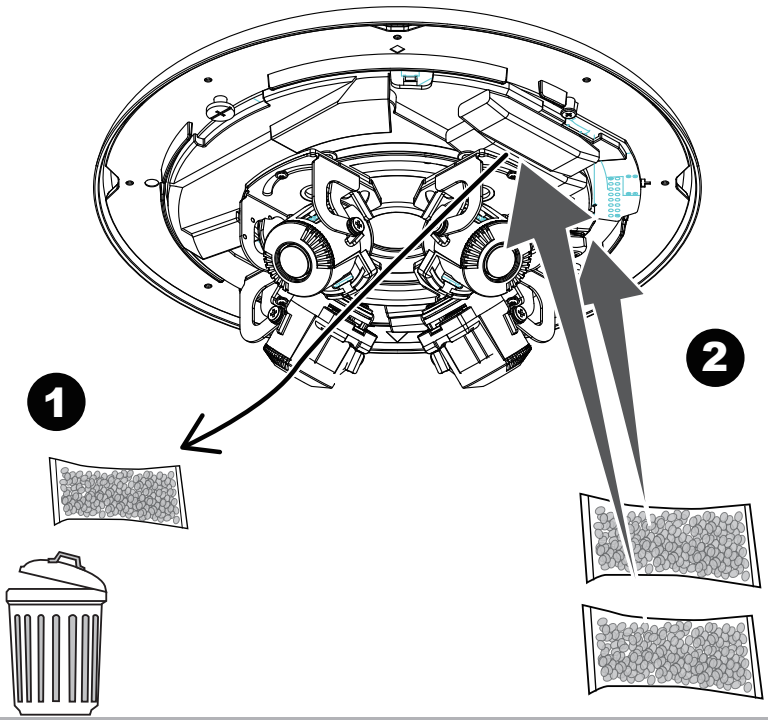


18. Perform necessary adjustments such as the image alignments on the panoramic view from the 4 sensors. Go to **Configuration** > **Media** > **Image** > **Focus**. Zoom in on the individual lens if necessary. The automated focus function can help you acquire the best image.

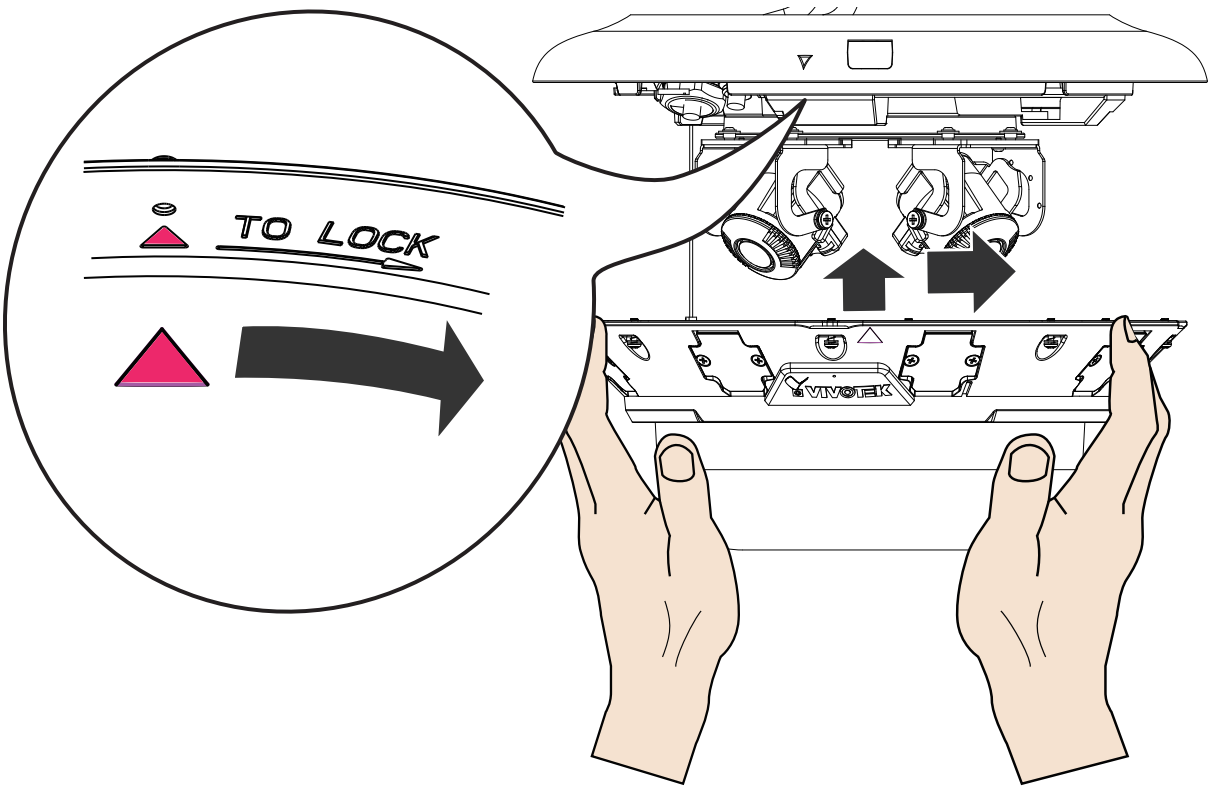
The zoom in/ zoom out function is performed in the Focus window.



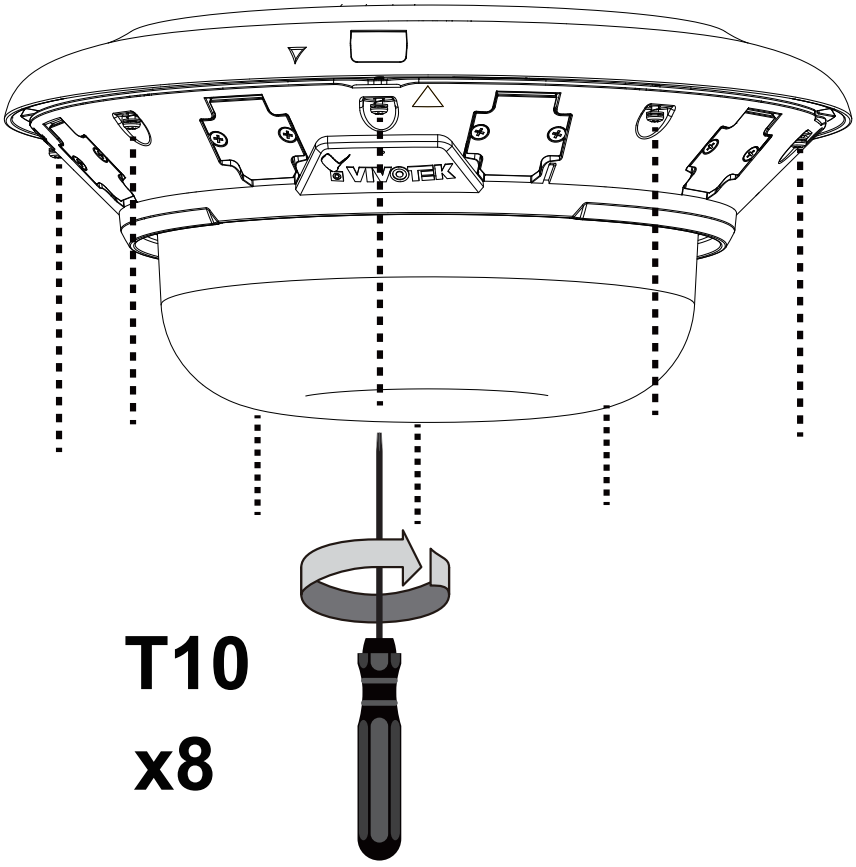
19. Replace the 2 desiccant bags on the sides of the camera. This ensures the components are free from the moisture. Replace the desiccant every time you open the dome cover.



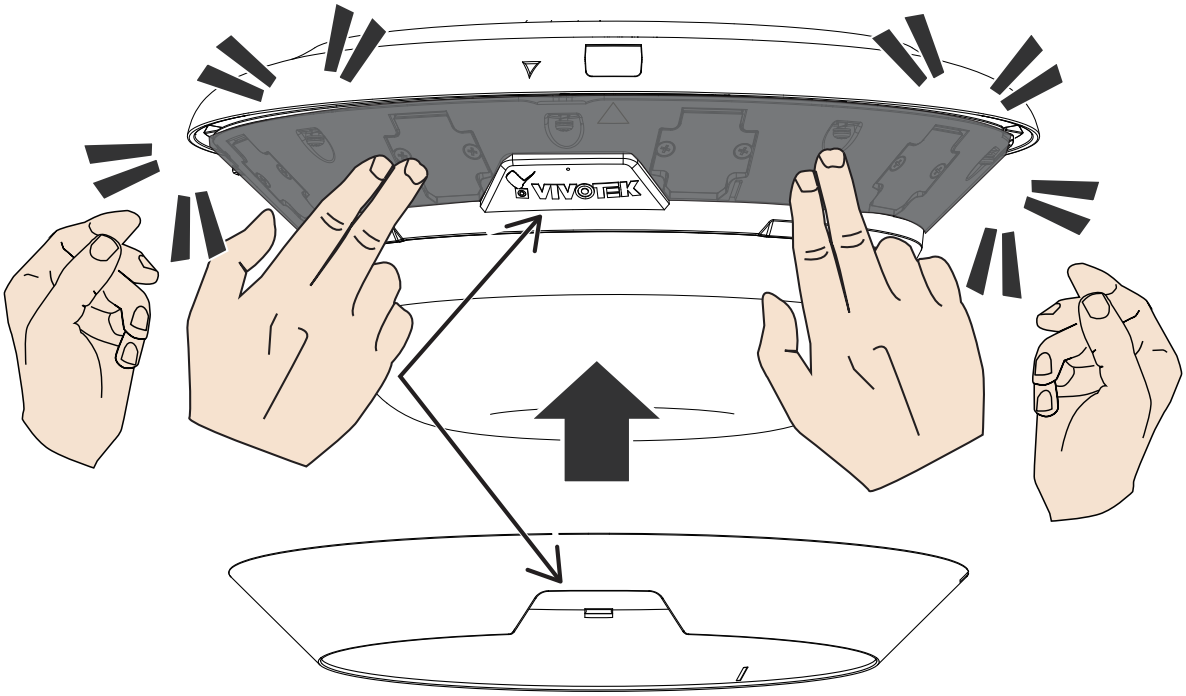
20. Aim the center of the dome cover (the center of the VIVOTEK logo) and align with the alignment mark on the camera body. Aim and then turn clockwise.



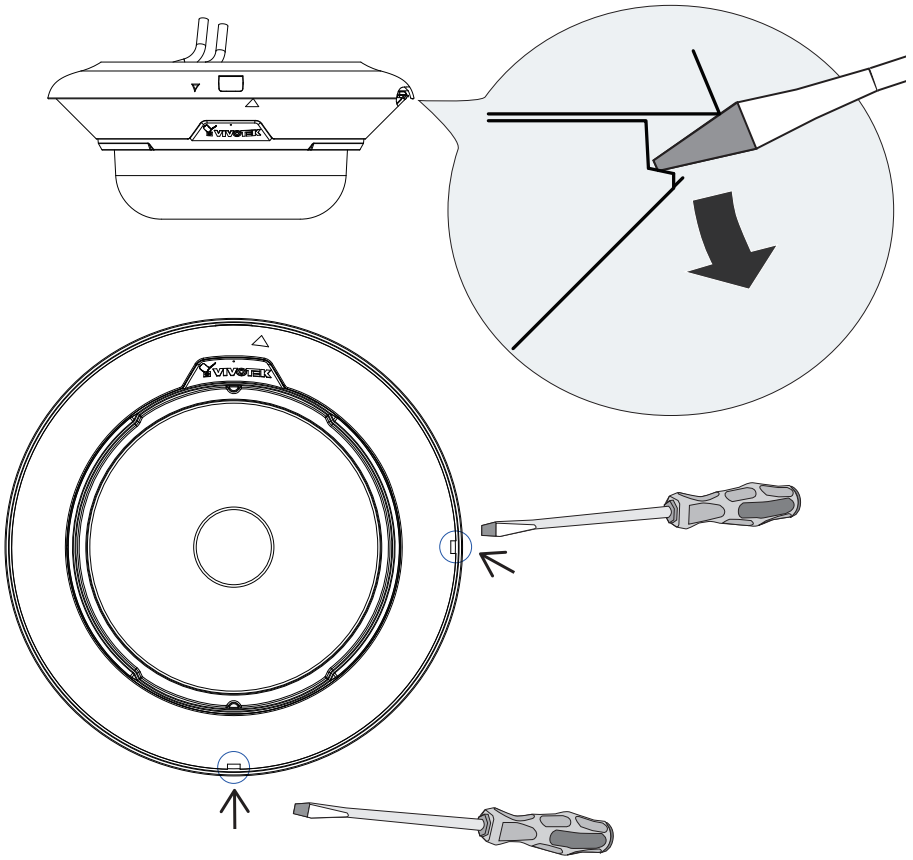
21. Secure the dome cover by fastening the T10 anti-tamper screws. You may need to carefully route the safety tether wire aside.



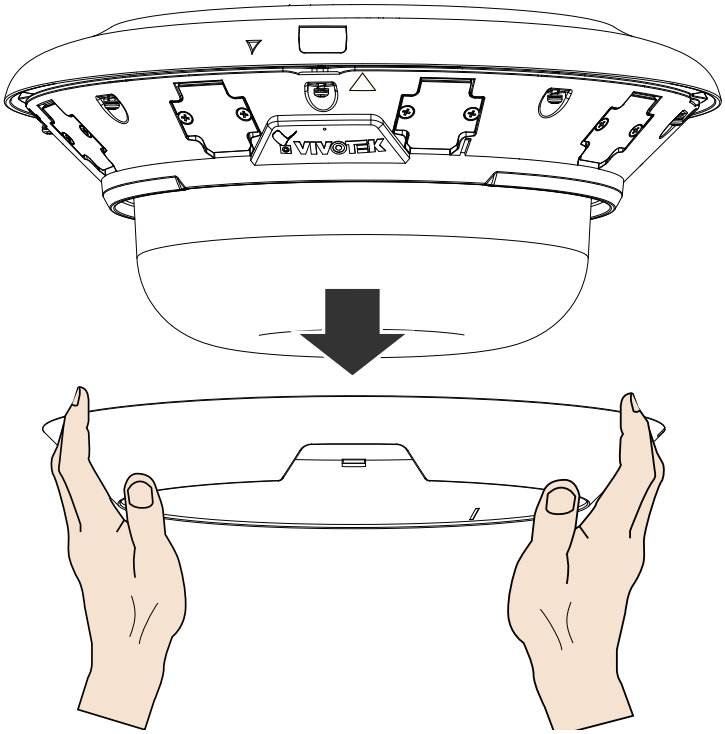
22. Install the black cover for the IR lights by pressing up firmly to the groove. Press on all sides until the cover is snapped into place. Match the indent with VIVOTEK logo.



If you need to open the dome cover, you need to remove the IR cover first. Use a medium size flat-blade screwdriver as a lever. Find the small access holes on the side and the rear of the IR cover. Use the screwdriver to slowly yet firmly lever down on the edge of the cover. You need to perform this action on both of the access points

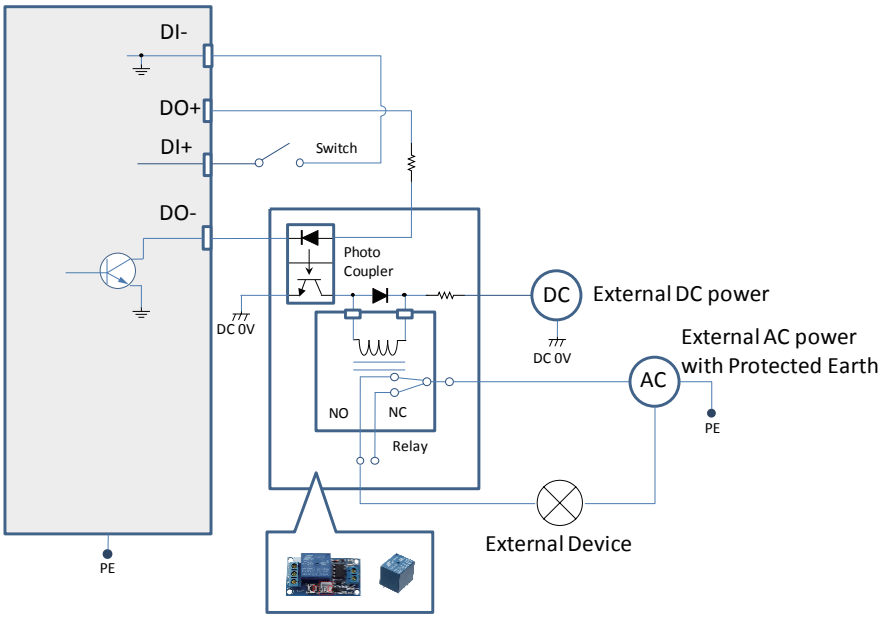


The IR cover should then be removed.

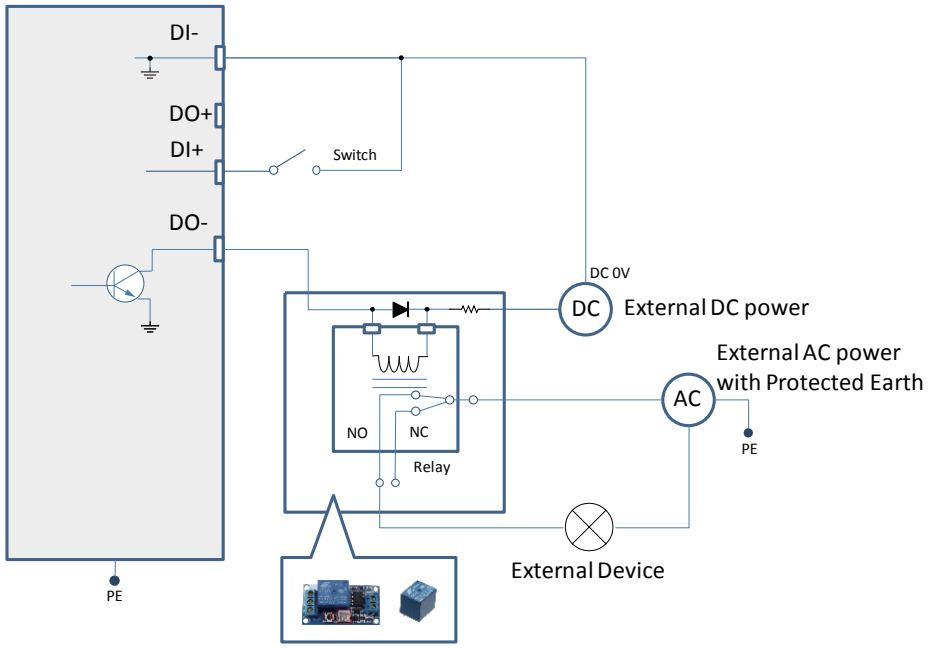


DI/DO Diagram

Dry contact with external DC power source to supply a relay. Dry contact is the safest connection to protect devices.

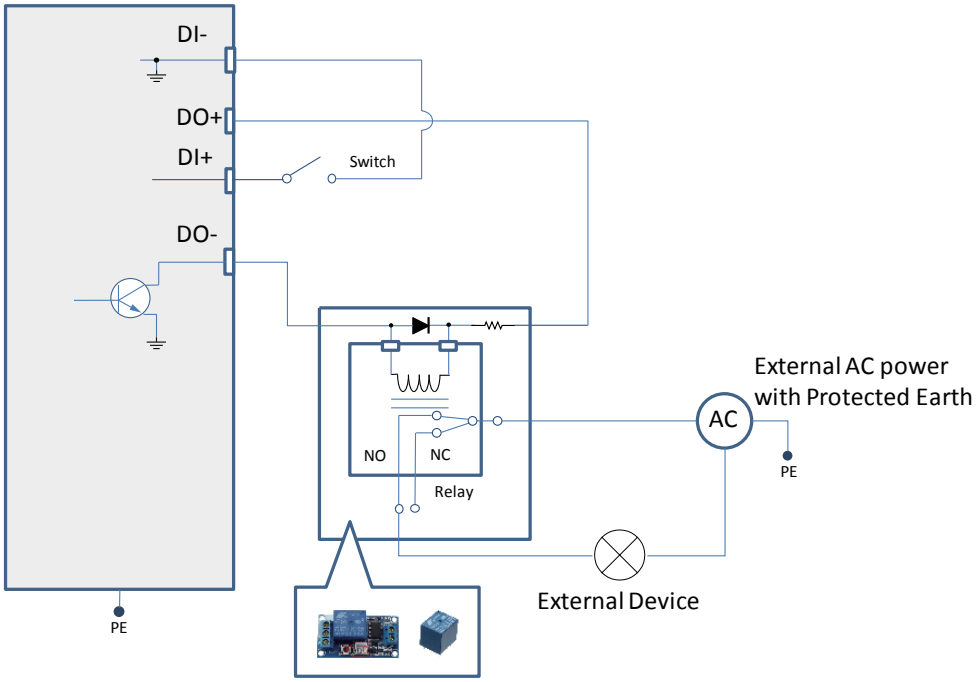


Wet contact with external DC power source to supply a relay.



1. The DO+ pin provides a 5V output voltage, and the max. load is 50mA.
2. The max. voltage for DO- pins is 30VDC (External power).
   In order to control AC devices, the above diagram can be taken in consideration. The diagram uses a relay to control the ON/OFF condition of the AC device.
3. An external relay can be triggered by using DO+ or by an external power source, depending on the type of relay you use.
4. In case of using an individual relay (instead of using a relay module), for protection against voltage or current spikes, a transient voltage suppression diode must be connected in parallel with the inductive load.

Dry contact and using camera's DO+ to supply a relay.

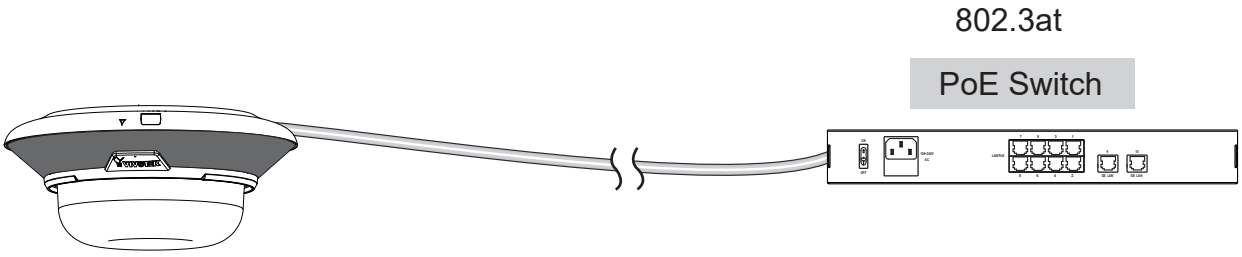


Network Deployment

General Connection (PoE)

When using a PoE-enabled switch

The Network Camera is PoE-compliant, allowing transmission of power and data via a single Ethernet cable. Follow the below illustration to connect the Network Camera to a PoE-enabled switch via Ethernet cable.

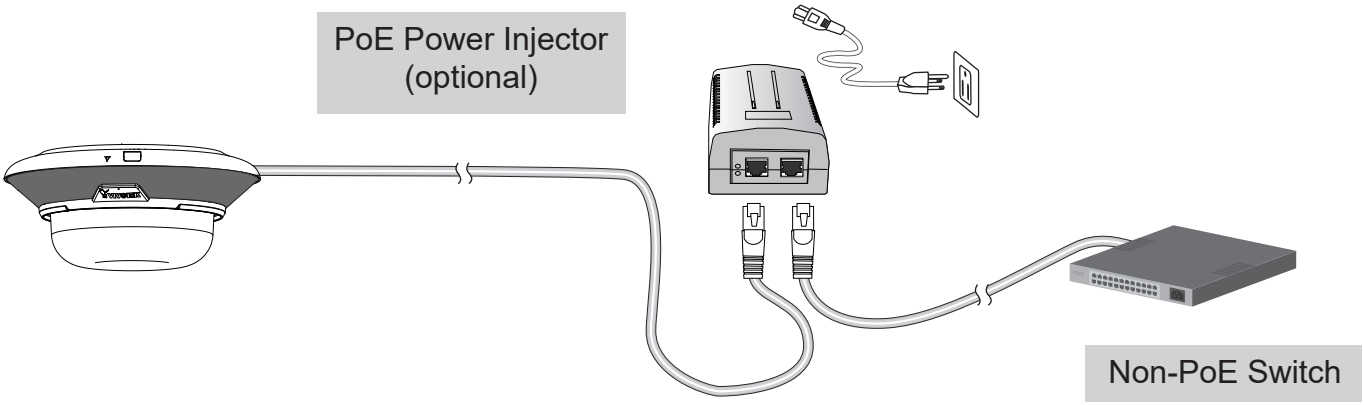


Depending on the requirements of your installation site, select an appropriate power source, such as an 802.3at PoE (30W) for operating temperature higher than -10ºC. For extremely low temperature, you will need a power source higher than 21W, such as 24V AC.

If using an 802.3at PoE as the power source, the lowest operating temperature is -20ºC.

When using a non-PoE switch

Use a 802.3at PoE power injector (optional) to connect between the Network Camera and a non-PoE switch.



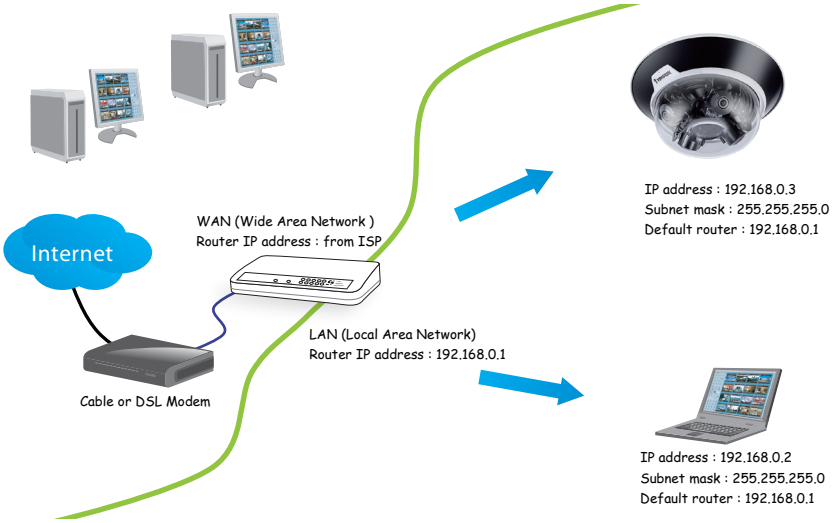
NOTE:

1. The camera is only to be connected to PoE networks without routing to outside plants.
2. For PoE connection, use only UL listed I.T.E. with PoE output.

Internet connection via a router

Before setting up the Network Camera over the Internet, make sure you have a router and follow the steps below.

1. Connect your Network Camera behind a router, the Internet environment is illustrated below. Regarding how to obtain your IP address, please refer to Software Installation on page 23 for details.



2. In this case, if the Local Area Network (LAN) IP address of your Network Camera is 192.168.0.3, please forward the following ports for the Network Camera on the router.

   - HTTP port: default is 80
   - RTSP port: default is 554
   - RTP port for video: default is 5556
   - RTCP port for video: default is 5557

   If you have changed the port numbers on the Network page, please open the ports accordingly on your router. For information on how to forward ports on the router, please refer to your router's user's manual.

3. Find out the public IP address of your router provided by your ISP (Internet Service Provider). Use the public IP and the secondary HTTP port to access the Network Camera from the Internet. Please refer to Network Type on page 96 for details.

Internet connection with static IP

Choose this connection type if you are required to use a static IP for the Network Camera. Please refer to LAN setting on page 95 for details.

Internet connection via PPPoE (Point-to-Point over Ethernet)

Choose this connection type if you are connected to the Internet via a DSL Line. Please refer to PPPoE on page 96 for details.

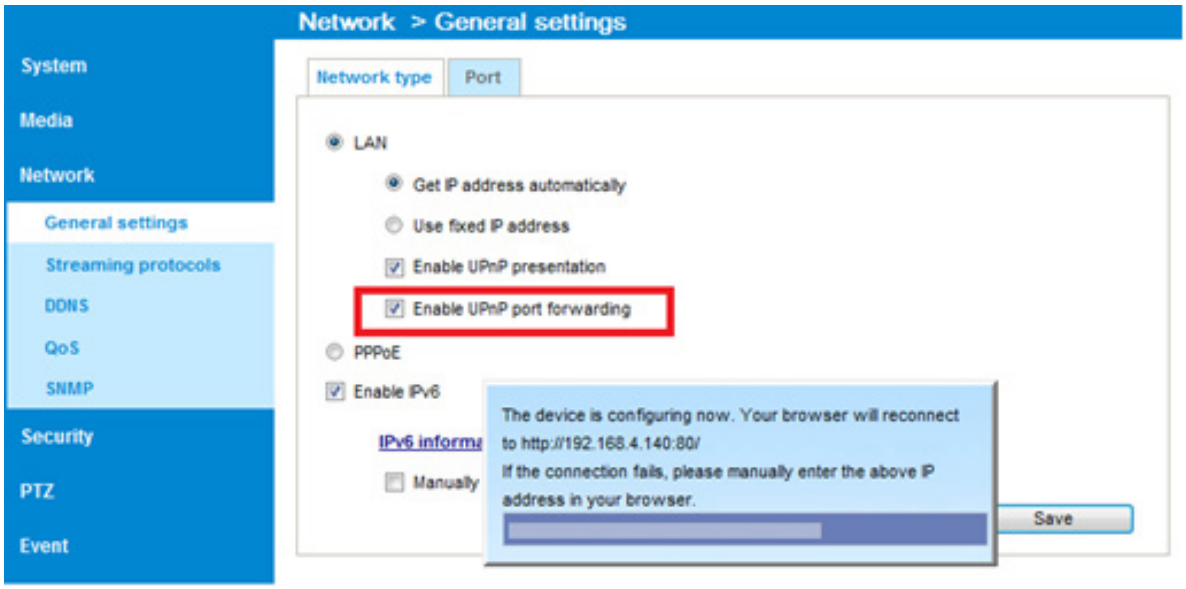
Configure the router, virtual server or firewall, so that the router can forward any data coming into a preconfigured port number to a network camera on the private network, and allow data from the camera to be transmitted to the outside of the network over the same path.

From	Forward to
122.146.57.120:8000	192.168.2.10:80
122.146.57.120:8001	192.168.2.11:80
...	...

When properly configured, you can access a camera behind the router using the HTTP request such as follows: http://122.146.57.120:8000

If you change the port numbers on the Network configuration page, please open the ports accordingly on your router. For example, you can open a management session with your router to configure access through the router to the camera within your local network. Please consult your network administrator for router configuration if you have troubles with the configuration.

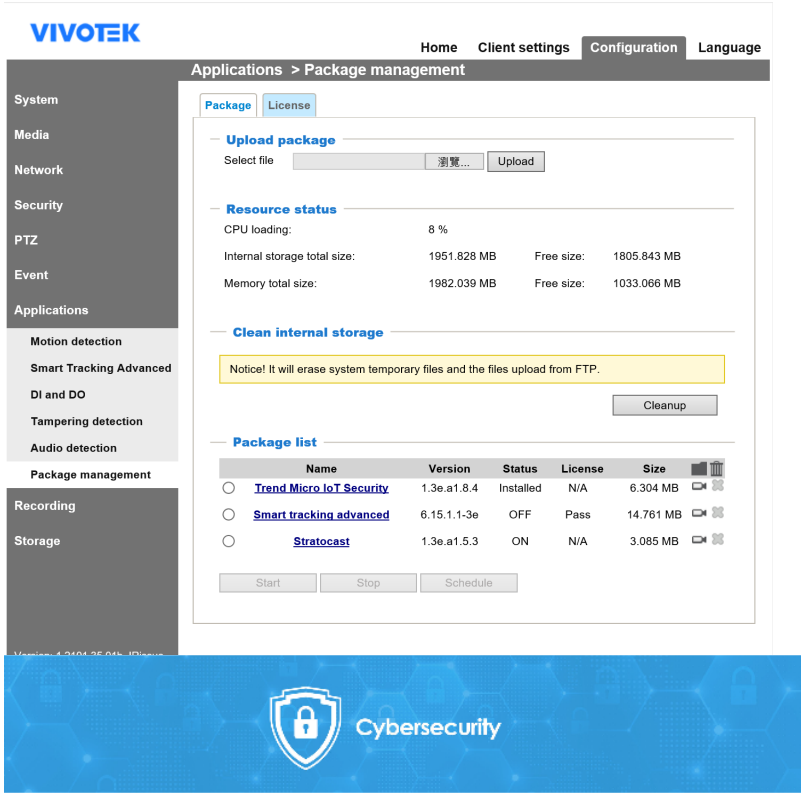
For more information with network configuration options (such as that of streaming ports), please refer to Configuration > Network Settings. VIVOTEK also provides the automatic port forwarding feature as an NAT traversal function with the precondition that your router must support the UPnP port forwarding feature.

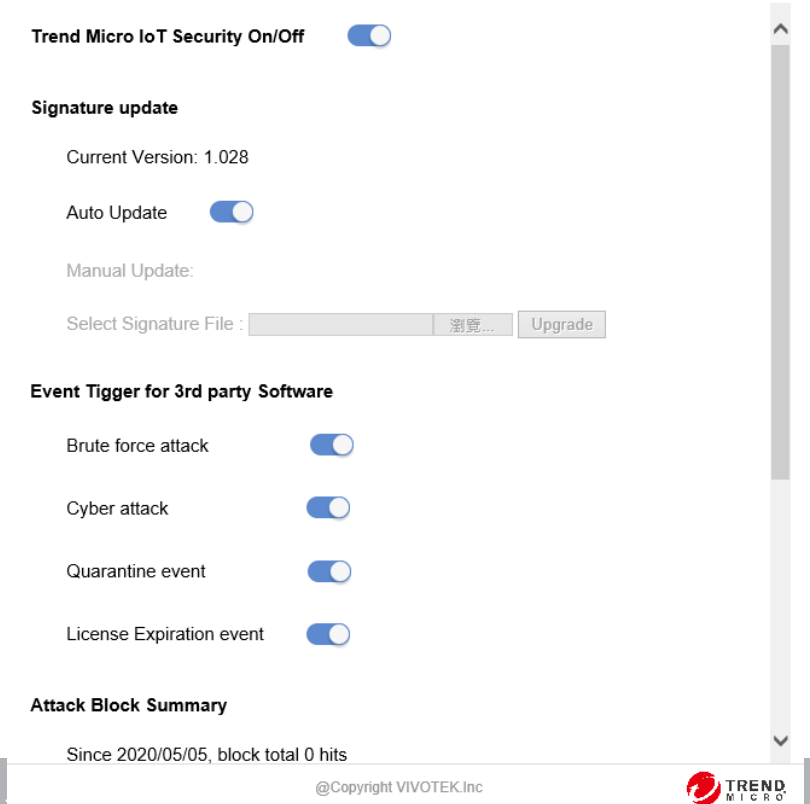


Cybersecurity

Once you open the web console, enter **Configuration** > **Applications** > **Package management**, and click on Trend Micro IoT Security. Turn on the protection to fend off cyber attacks.

In here, you can let the camera automatically update the virus codes or manually update the virus codes.





Ready to Use

1. A browser session with the Network Camera should prompt as shown below.
2. You should be able to see live video from your camera. You may also install the 32-channel recording software from the software CD in a deployment consisting of multiple cameras. For its installation details, please refer to its related documents.
3. Click to expand the Video stream menu to select to display individual sensor.

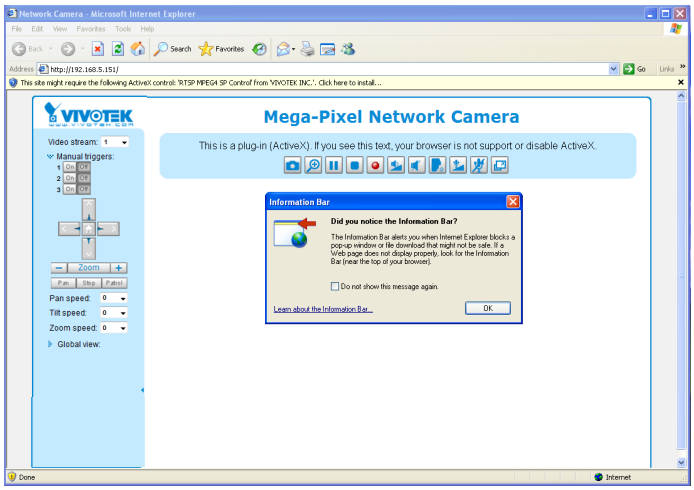
Accessing the Network Camera

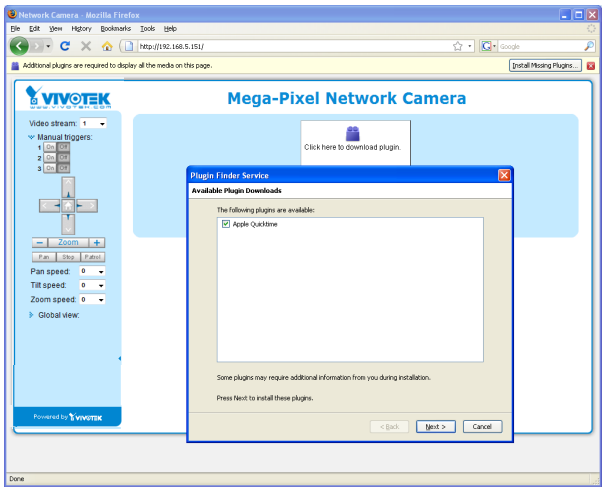
This chapter explains how to access the Network Camera through web browsers, RTSP players, 3GPP-compatible mobile devices, and VIVOTEK recording software.

Using Web Browsers

Use the Shepherd utility to access the Network Cameras on LAN.
If your network environment is not a LAN, follow these steps to access the Netwotk Camera:

1. Launch your web browser (e.g., Microsoft® Internet Explorer or Mozilla Firefox).
2. Enter the IP address of the Network Camera in the address field. Press **Enter**.
3. Live video will be displayed in your web browser.
4. If it is the first time installing the VIVOTEK network camera, an information bar will prompt as shown below. Follow the instructions to install the required plug-in on your computer.

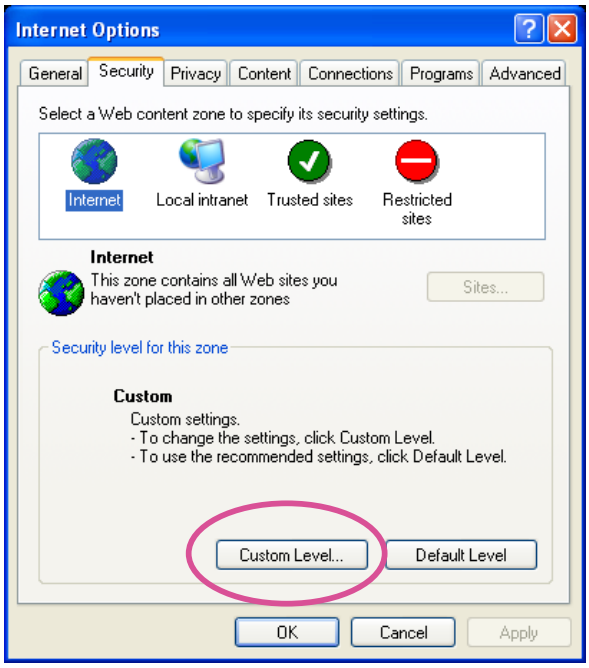




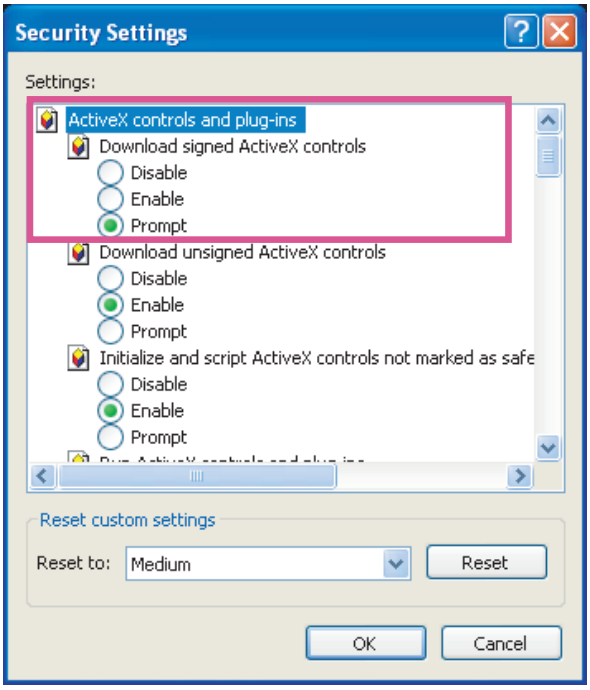
► *By default, the Network Camera is not password-protected. To prevent unauthorized access, it is highly recommended to set a password for the Network Camera.*
For more information about how to enable password protection, please refer to Security on page 116.

► *If you see a dialog box indicating that your security settings prohibit running ActiveX® Controls, please enable the ActiveX® Controls for your browser.*

1. Choose Tools > Internet Options > Security > Custom Level.



*2. Look for Download signed ActiveX® controls; select Enable or Prompt. Click **OK**.*



3. Refresh your web browser, then install the ActiveX® control. Follow the instructions to complete installation.

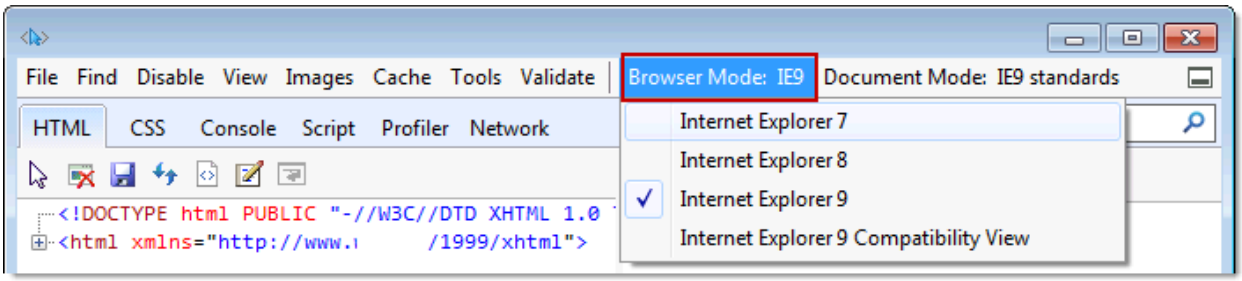
IMPORTANT:

- Currently the Network Camera utilizes a 32-bit ActiveX plugin. You CAN NOT open a management/view session with the camera using a 64-bit IE browser.
- If you encounter this problem, try execute the Iexplore.exe program from C:\Windows\SysWOW64. A 32-bit version of IE browser will be installed.
- On Windows 7, the 32-bit explorer browser can be accessed from here:
  C:\Program Files (x86)\Internet Explorer\iexplore.exe
- If you open a web session from the Shepherd utility, a 32-bit IE browser will be opened.

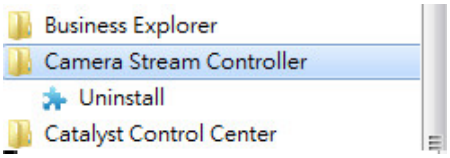
Tips:

1. The onscreen Java control can malfunction under the following situations: A PC connects to different cameras that are using the same IP address (or the same camera running different firmware versions). Removing your browser cookies will solve this problem.
2. If you encounter problems with displaying the configuration menus or UI items, try disable the Compatibility View on IE8 or IE9.

You may also press the F12 key to open the developer tools utility, and then change the Browser Mode to the genuine IE8 or IE9 mode.



- In the event of plug-in compatibility issues, you may try to uninstall the plug-in that was previously installed.



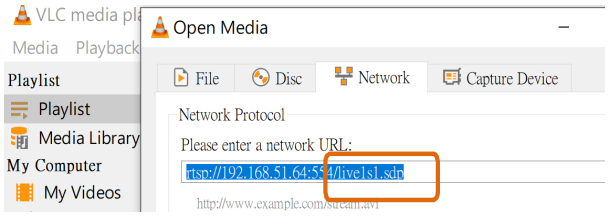
Using RTSP Players

To view the streaming media using RTSP players, you can use one of the following players that support RTSP streaming.

VLC media player

1. Launch the RTSP player.
2. Choose File > Open URL. A URL dialog box will pop up.
3. The address format is rtsp://<ip address>:<rtsp port>/<RTSP streaming access name for stream1 or stream2>

As most ISPs and players only allow RTSP streaming through port number 554, please set the RTSP port to 554. For more information, please refer to RTSP Streaming on page 104.
For example:



4. The live video will be displayed in your player.
   For more information on how to configure the RTSP access name, please refer to RTSP Streaming on page 104 for details.

Using 3GPP-compatible Mobile Devices

To view the streaming media through 3GPP-compatible mobile devices, make sure the Network Camera can be accessed over the Internet. For more information on how to set up the Network Camera over the Internet, please refer to Setup the Network Camera over the Internet on page 34.

To utilize this feature, please check the following settings on your Network Camera:

1. Because most players on 3GPP mobile phones do not support RTSP authentication, make sure the authentication mode of RTSP streaming is set to disable.
   For more information, please refer to RTSP Streaming on page 104.

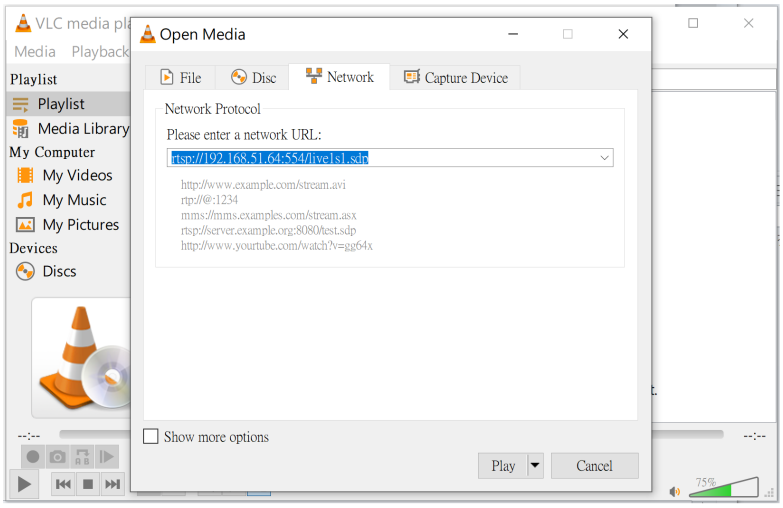
2. As the the bandwidth on 3G networks is limited, you will not be able to use a large video size. Please set the video streaming parameters as listed below.
   For more information, please refer to Stream settings on page 84.

Video Mode	H.264
Frame size	176 x 144
Maximum frame rate	5 fps
Intra frame period	1S
Video quality (Constant bit rate)	40kbps

3. As most ISPs and players only allow RTSP streaming through port number 554, please set the RTSP port to 554. For more information, please refer to RTSP Streaming on page 104.

4. Launch the player on the 3GPP-compatible mobile devices (e.g., VLC player).

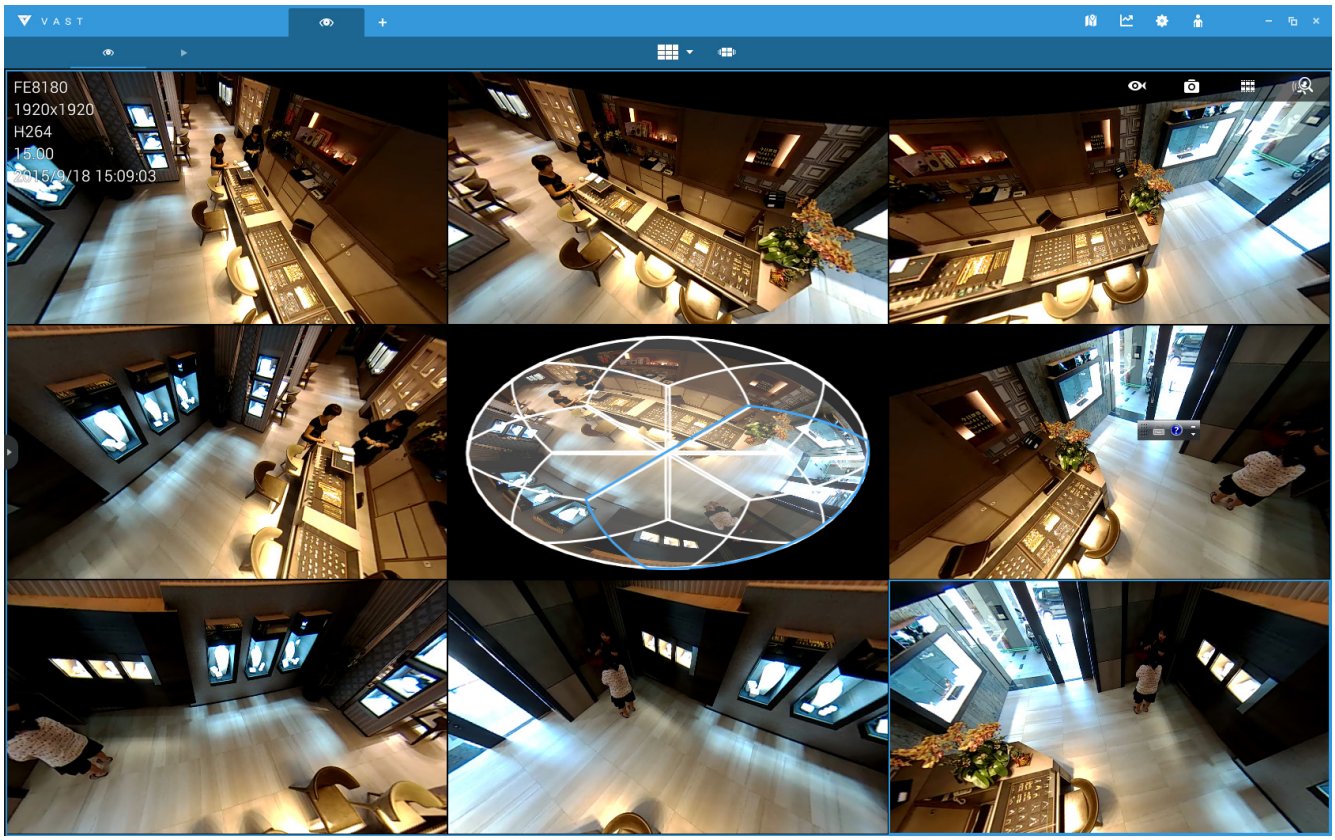
5. Type the following URL commands into the player.
   The address format is rtsp://<public ip address of your camera>:<rtsp port>/<RTSP streaming access name for stream # with small frame size and frame rate>.
   For example:



You can configure Stream #2 into the suggested stream settings as listed above for live viewing on a mobile device.

Using VIVOTEK Recording Software

The product software CD also contains a VAST recording software, allowing simultaneous monitoring and video recording for multiple Network Cameras. Please install the recording software; then launch the program to add the Network Camera to the Channel list. For detailed information about how to use the recording software, please refer to the user's manual of the software or download it from http://www.vivotek.com.



Tips:

1. If you encounter problems with displaying live view or the onscreen plug-in control, you may try to remove the plug-ins that might have been installed on your computer. Remove the following folder: C:\Program Files (x86)\Camera Stream Controller\.

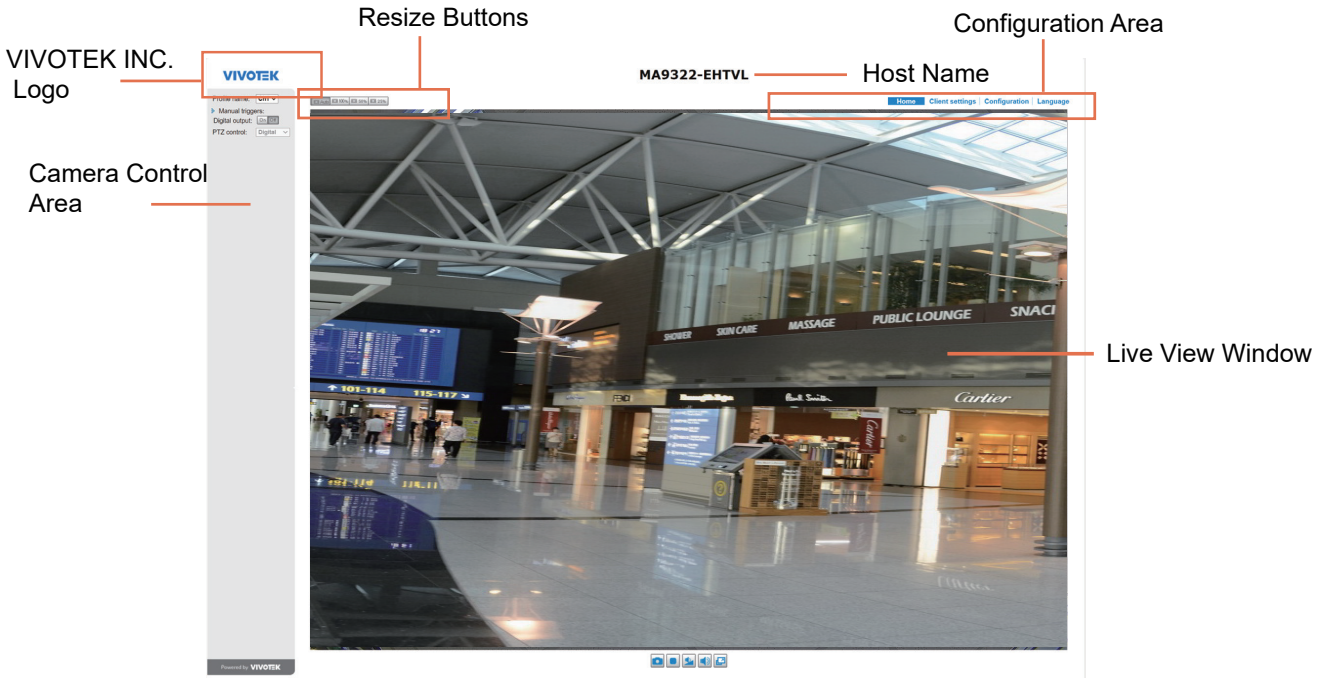
2. If you forget the root (administrator) password for the camera, you can restore the camera defaults by pressing the reset button for longer than 5 seconds.

3. If DHCP is enabled in your network, and the camera cannot be accessed, run the Shepherd utility to search the network. If the camera has been configured with fixed IP that does not comply with your local network, you may see its default IP 169.254.x.x. If you still cannot find the camera, you can restore the camera to its factory defaults.

4. If you change your network parameters, e.g., added a connection to a LAN card, re-start the Shepherd utility.

Main Page

This chapter explains the layout of the main page. It is composed of the following sections: VIVOTEK INC. Logo, Host Name, Camera Control Area, Configuration Area, Menu, and Live Video Window.



VIVOTEK INC. Logo

Click this logo to visit the VIVOTEK website.

Host Name

The host name can be customized to fit your needs. The name can be changed especially there are many cameras in your surveillance deployment. For more information, please refer to System on page 56.

Camera Control Area

Stream profile: This Network Camera supports multiple streams simultaneously. You can select any of them for live viewing. Each profile corresponds to one video stream for one sensor (CH, channel). There are 4 sensors, and each sensor (CH) supports 3 different video streams.

CH1 Max view - Stream 1 (configurable, default 2688 x 1920)
CH1 Recording - Stream 2 (configurable, default 1280 x 960)
CH2 Max view- Stream 1 (configurable, default 2688 x 1920)
CH2 Recording - Stream 2 (configurable, default 1280 x 960)
CH3 Max view- Stream 1 (configurable, default 2688 x 1920)
CH3 Recording - Stream 2 (configurable, default 1280 x 960)
CH4 Max view - Stream 1 (configurable, default 2688 x 1920)
CH4 Recording - Stream 2 (configurable, default 1280 x 960)

For more information about multiple streams, please refer to page 71 for detailed information.

Manual Trigger: Click to enable/disable an event trigger manually. Please configure an event setting on the Application page before you enable this function. A total of 3 event configuration can be configured. For more information about event setting, please refer to page 133. If you want to hide this item on the homepage, please go to **Configuration> System > Homepage Layout > General settings > Customized button** to deselect the "show manual trigger button" checkbox.

Digital Output: Click to turn the digital output device on or off.

Configuration Area

Client Settings: Click this button to access the client setting page. For more information, please refer to Client Settings on page 50.

Configuration: Click this button to access the configuration page of the Network Camera. It is suggested that a password be applied to the Network Camera so that only the administrator can configure the Network Camera. For more information, please refer to Configuration on page 55.

Language: Click this button to choose a language for the user interface. Language options are available in: English, Deutsch, Español, Français, Italiano, 日本語, Português, 簡体中文, 繁體中文, and Русский. Please note that you can also change a language on the Configuration page; please refer to page 55.

Hide Button

You can click the hide button to hide or display the control panel.

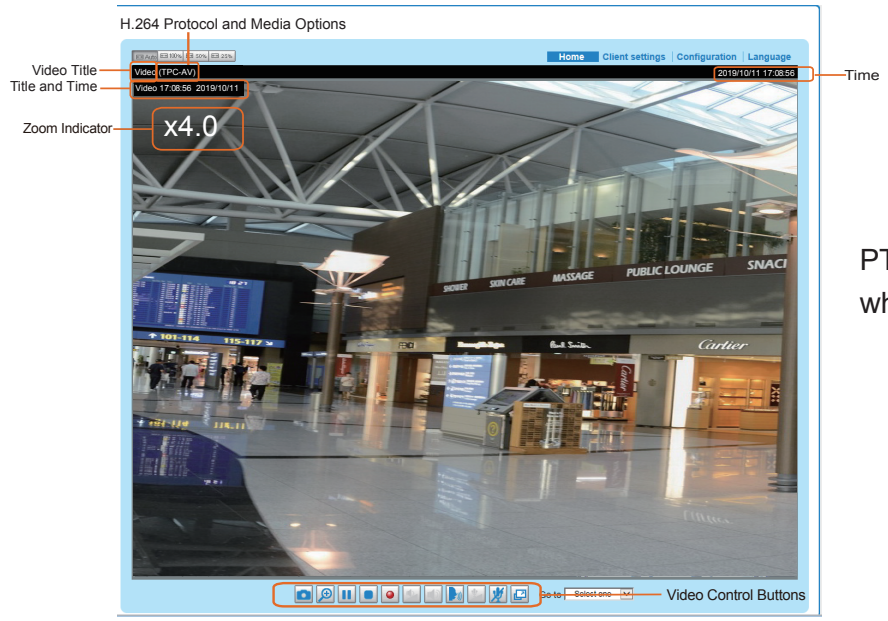
Resize Buttons

:

Click the Auto button, the video cell will resize automatically to fit the monitor.
Click 100% is to display the original homepage size.
Click 50% is to resize the homepage to 50% of its original size.
Click 25% is to resize the homepage to 25% of its original size.

Live Video Window

■ The following window is displayed when the video mode is set to H.265 or H.264:



PTZ panel and Global view are available when displaying the Recording profile.

Video Title: The video title can be configured. For more information, please refer to Video Settings on page 70.

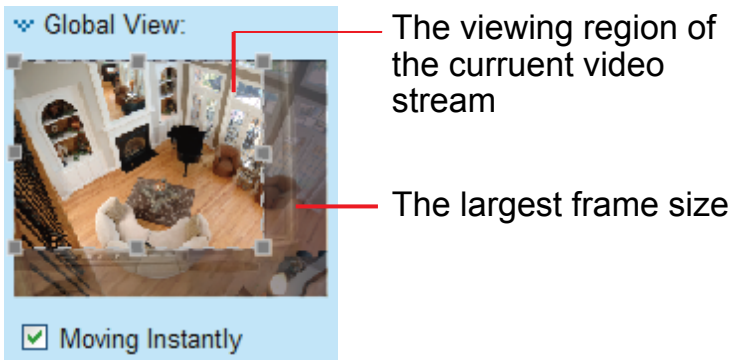
H.264 or H. 265 Protocol and Media Options: The transmission protocol and media options for H.264 video streaming. For further configuration, please refer to Client Settings on page 50.

Time: Display the current time. For further configuration, please refer to Media > Image > Genral settings on page 70.

Title and Time: The video title and time can be stamped on the streaming video. For further configuration, please refer to Media > Image > General settings on page 75.

PTZ Panel: This Network Camera supports “digital“ (e-PTZ) pan/tilt/zoom control, which allows roaming a smaller view frame within a large view frame. Please refer to PTZ settiings on page 130 for detailed information.

Global View: Click on this item to display the Global View window. The Global View window contains a full view image (the largest frame size of the captured video) and a floating frame (the viewing region of the current video stream). The floating frame allows users to control the e-PTZ function (Electronic Pan/Tilt/Zoom). For more information about e-PTZ operation, please refer to E-PTZ Operation on page 130. For more information about how to set up the viewing region of the current video stream, please refer to page 130.



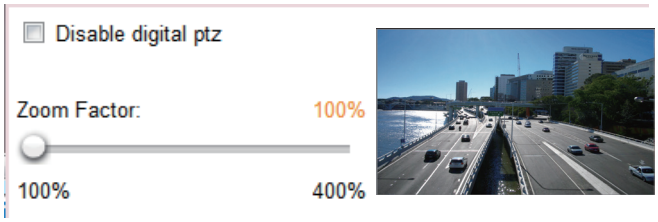
Note that the PTZ buttons on the panel are not operational unless you are showing only a portion of the full image. If the live view window is displaying the full view, the PTZ buttons are not functional.

Move Instantly: If you choose to display only a portion of the total field of view, say, zoomed in on the current field of view using the Global View setting, you can select or deselect the "Move Instantly" option. Move Instantly means the process of moving from one portion to another is not shown on screen.

Video Control Buttons: Depending on the Network Camera model and Network Camera configuration, some buttons may not be available.

Snapshot: Click this button to capture and save still images. The captured images will be displayed in a pop-up window. Right-click the image and choose **Save Picture As** to save it in JPEG (*.jpg) or BMP (*.bmp) format.

Digital Zoom: Click and uncheck "Disable digital zoom" to enable the zoom operation. The navigation screen indicates the part of the image being magnified. To control the zoom level, drag the slider bar. To move to a different area you want to magnify, drag the navigation screen.



Pause: Pause the transmission of the streaming media. The button becomes the Resume button after clicking the Pause button.

Stop: Stop the transmission of the streaming media. Click the Resume button to continue transmission.

Start MP4 Recording: Click this button to record video clips in MP4 file format to your computer. Press the Stop MP4 Recording button to end recording. When you exit the web browser, video recording stops accordingly. To specify the storage destination and file name, please refer to MP4 Saving Options on page 51 for details.

Volume: When the Mute function is not activated, move the slider bar to adjust the volume on the local computer.

Mute: Turn off the volume on the local computer. The button becomes the Audio On button after clicking the Mute button.

Talk: Click this button to talk to people around the Network Camera. Audio will project from the external speaker connected to the Network Camera. Click this button again to end talking transmission.

Mic Volume: When the Mute function is not activated, move the slider bar to adjust the microphone volume on the local computer.

NOTE:

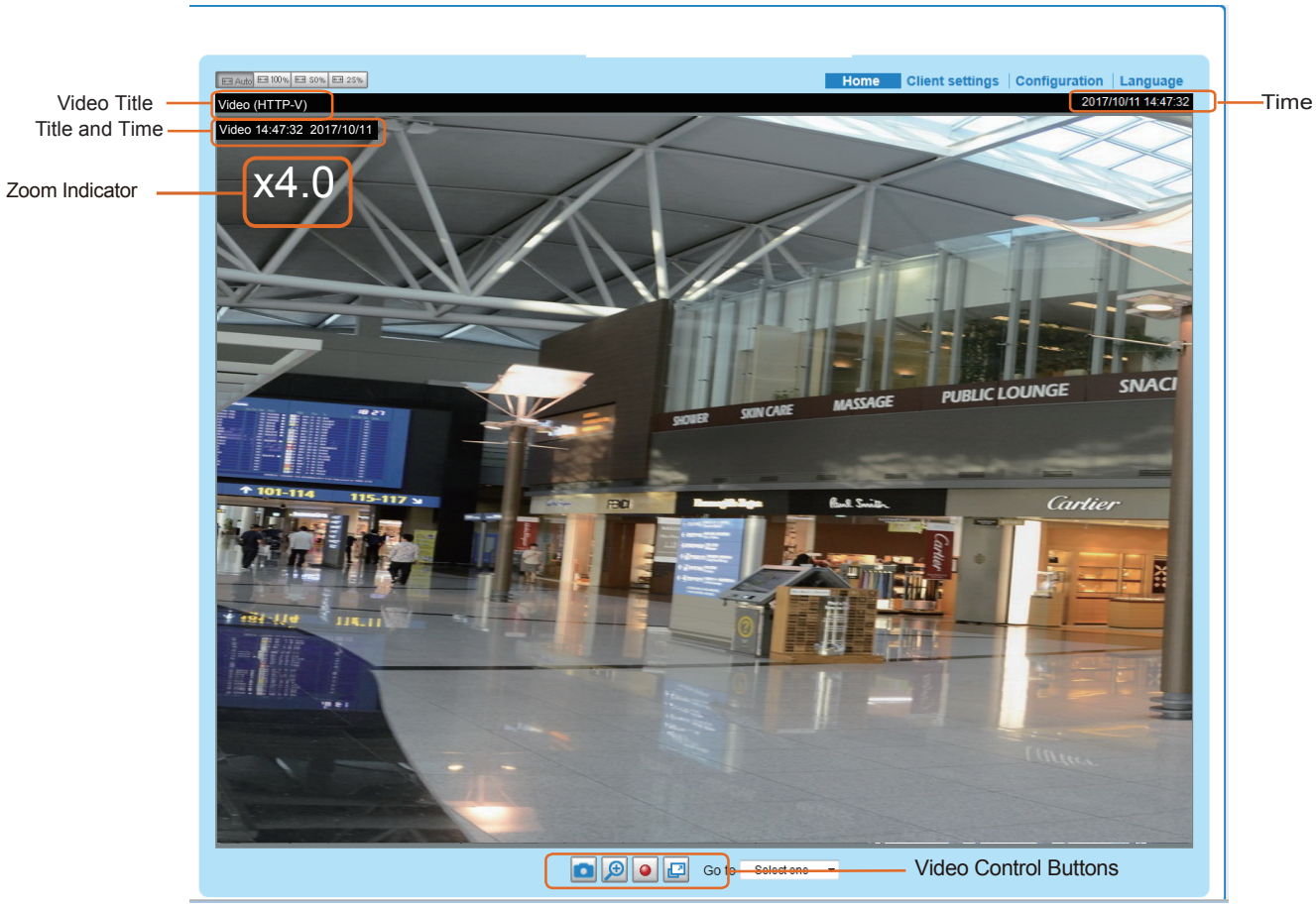
1. For a megapixel camera, it is recommended to use monitors of the 24" size or larger, which are capable of 1600x1200 or better resolutions.
2. Below are the defaults for **Audio** settings:
   For cameras with built-in microphone: **Not Muted.**
   For cameras without built-in microphone: **Muted.**

   To receive audio input from an external microphone, you may need to enable the audio input from Media > Audio. Refer to page 92 for more information.

Mute: Turn off the Mic volume on the local computer. The button becomes the Mic On button after clicking the Mute button.

Full Screen: Click this button to switch to full screen mode. Press the “Esc” key to switch back to normal mode.

■ The following window is displayed when the video mode is set to MJPEG:



Video Title: The video title can be configured. For more information, please refer to Media > Image on page 75.

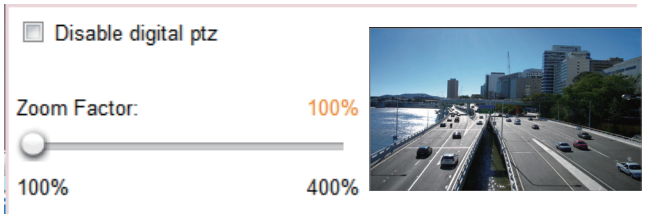
Time: Display the current time. For more information, please refer to Media > Image on page 75.

Title and Time: Video title and time can be stamped on the streaming video. For more information, please refer to Media > Image on page 75.

Video Control Buttons: Depending on the Network Camera model and Network Camera configuration, some buttons may not be available.

Snapshot: Click this button to capture and save still images. The captured images will be displayed in a pop-up window. Right-click the image and choose **Save Picture As** to save it in JPEG (*.jpg) or BMP (*.bmp) format.

Digital Zoom: Click and uncheck “Disable digital zoom” to enable the zoom operation. The navigation screen indicates the part of the image being magnified. To control the zoom level, drag the slider bar. To move to a different area you want to magnify, drag the navigation screen.



Start MP4 Recording: Click this button to record video clips in MP4 file format to your computer. Press the Stop MP4 Recording button to end recording. When you exit the web browser, video recording stops accordingly. To specify the storage destination and file name, please refer to MP4 Saving Options on page 51 for details.

Full Screen: Click this button to switch to full screen mode. Press the “Esc” key to switch back to normal mode.

Client Settings

This chapter explains how to select the stream transmission mode and saving options on the local computer. When completed with the settings on this page, click **Save** on the page bottom to enable the settings.

H.265 / H.264 Media Options

Select to stream video or audio data or both. This is enabled only when the video mode is set to H.264.

H.265 / H.264 Protocol Options

Depending on your network environment, there are four transmission modes of H.264 streaming:

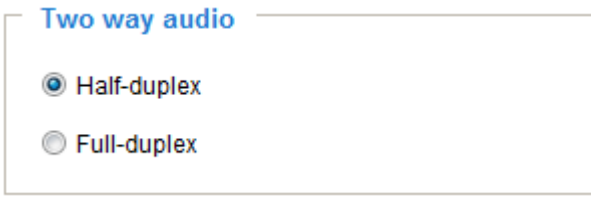
UDP unicast: This protocol allows for more real-time audio and video streams. However, network packets may be lost due to network burst traffic and images may be broken. Activate UDP connection when occasions require time-sensitive responses and the video quality is less important. Note that each unicast client connecting to the server takes up additional bandwidth and the Network Camera allows up to ten simultaneous accesses.

UDP multicast: This protocol allows multicast-enabled routers to forward network packets to all clients requesting streaming media. This helps to reduce the network transmission load of the Network Camera while serving multiple clients at the same time. Note that to utilize this feature, the Network Camera must be configured to enable multicast streaming at the same time. For more information, please refer to RTSP Streaming on page 103.

TCP: This protocol guarantees the complete delivery of streaming data and thus provides better video quality. The downside of this protocol is that its real-time effect is not as good as that of the UDP protocol.

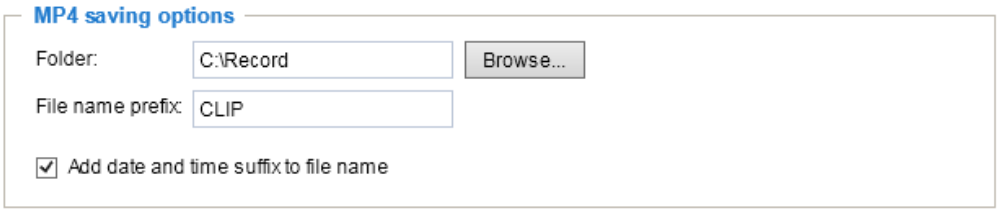
HTTP: This protocol allows the same quality as TCP protocol without needing to open specific ports for streaming under some network environments. Users inside a firewall can utilize this protocol to allow streaming data through.

Two way audio



Half duplex: Audio is transmitted from one direction at a time, e.g., from a PC holding a web console with the camera.
Full duplex: Audio is transmitted in both directions simultaneously.

MP4 Saving Options



Users can record live video as they are watching it by clicking  Start MP4 Recording on the main page. Here, you can specify the storage destination and file name.

Folder: Specify a storage destination on your PC for the recorded video files. The location can be changed.

File name prefix: Enter the text that will be appended to the front of the video file name. A specified folder will be automatically created on your local hard disk.

Add date and time suffix to the file name: Select this option to append the date and time to the end of the file name.

Local Streaming Buffer Time

In the case of encountering unsteady bandwidth, live streaming may lag and video streaming may not be very smoothly. If you enable this option, the live streaming will be stored temporarily on your PC's cache memory for a few milli seconds before being played on the live viewing window. This will help you see the streaming more smoothly. If you enter 3,000 Millisecond, the streaming will delay for 3 seconds.

Joystick settings

Enable Joystick

Connect a joystick to a USB port on your management computer. Supported by the plug-in (Microsoft's DirectX), once the plug-in for the web console is loaded, it will automatically detect if there is any joystick on the computer. The joystick should work properly without installing any other driver or software.

Then you can begin to configure the joystick settings of connected devices. Please follow the instructions below to enable joystick settings.

1. Select a detected joystick, if there are multiple, from the Selected joystick menu. If your joystick is not detected, if may be defective.
2. Click Calibrate or Configure buttons to configure the joystick-related settings.

NOTE:

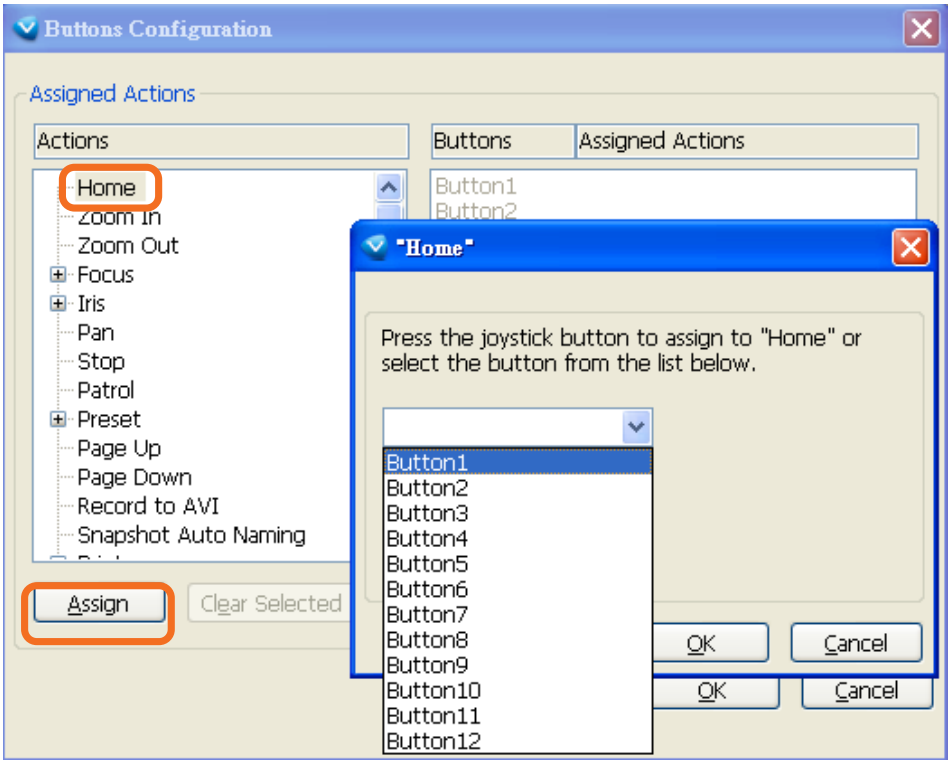
- If you want to assign Preset actions to your joystick, the preset locations should be configured in advance in the **Configuration** > **PTZ** page. In Windows, use the search function on the Start menu to search for Game Controller.
- If your joystick is not working properly, it may need to be calibrated. Click the **Calibrate** button to open the Game Controllers window located in Microsoft Windows control panel and follow the instructions for trouble shooting.
- The joystick will appear in the **Game Controllers** list in the Windows Control panel. If you want to check out for your devices, go to the following page: Start -> Control Panel -> Game Controllers.

Buttons Configuration

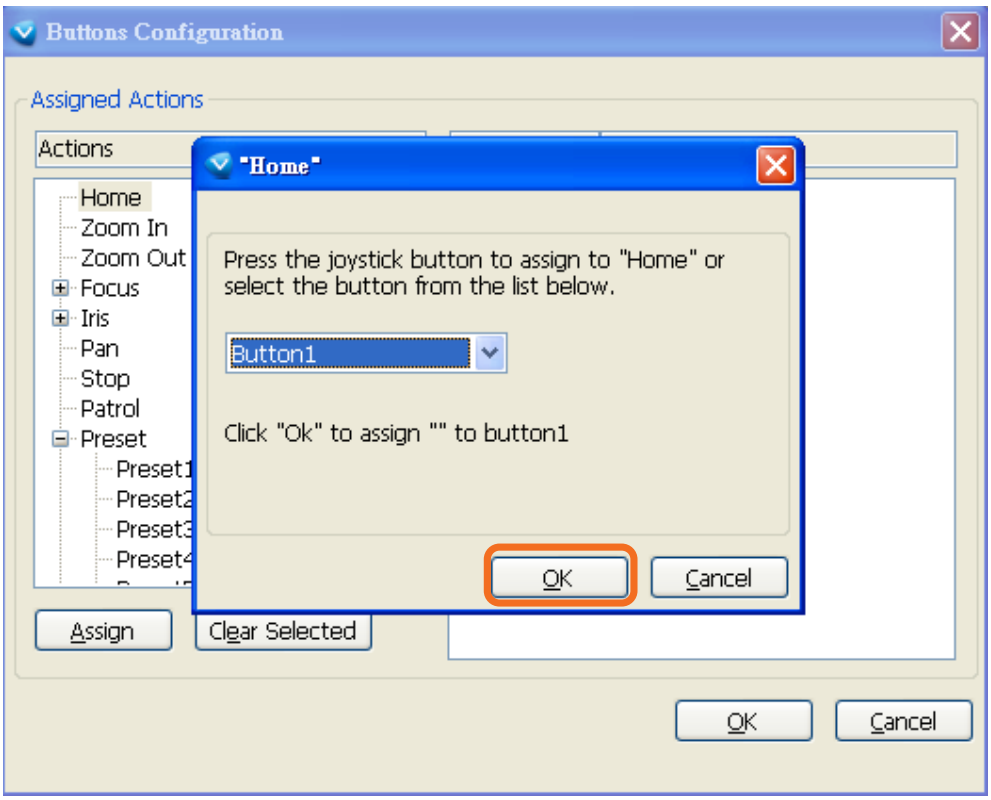
In the Button Configuration window, the left column shows the actions you can assign, and the right column shows the functional buttons and assigned actions. The number of buttons may differ from different joysticks.

Please follow the steps below to configure your joystick buttons:

1. Choosing one of the actions and click **Assign** will pop up a dialog. Then you can assign this action to a button by pressing the joystick button or select it from the drop-down list.
   For example: Assign **Home** (move to home position) to Button 1.



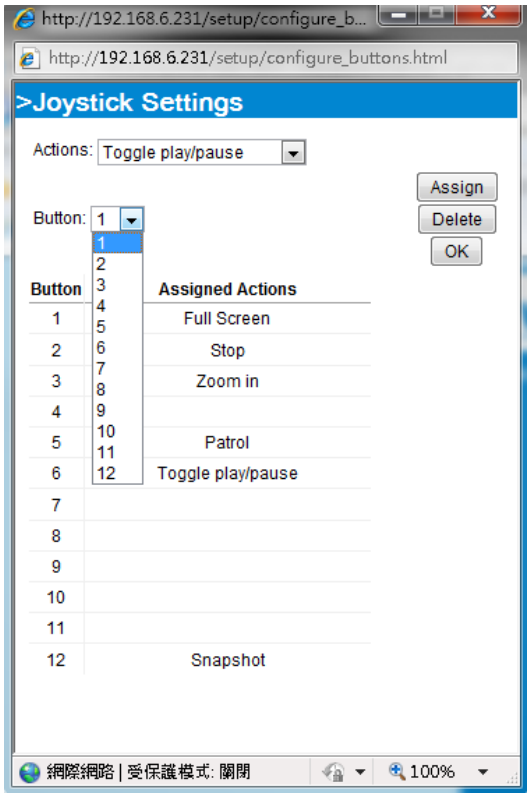
2. Click **OK** to confirm the configuration.



Buttons Configuration

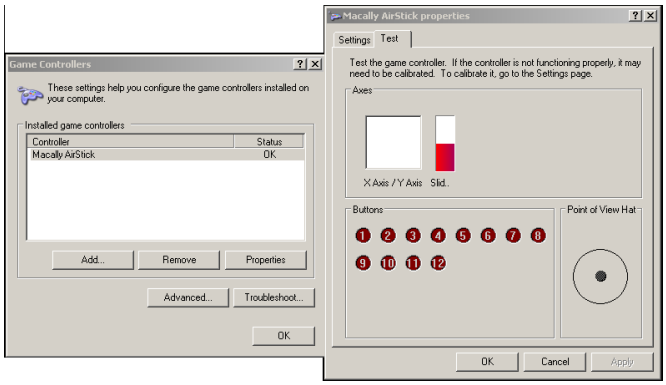
Click the **Configure Buttons** button, a window will prompt as shown below. Please follow the steps below to configure your joystick buttons:

1. Select a button number from the Button # pull-down menu.



Tips:

If you are not sure of the locations of each button, use the **Properties** window in the **Game Controllers** utility.



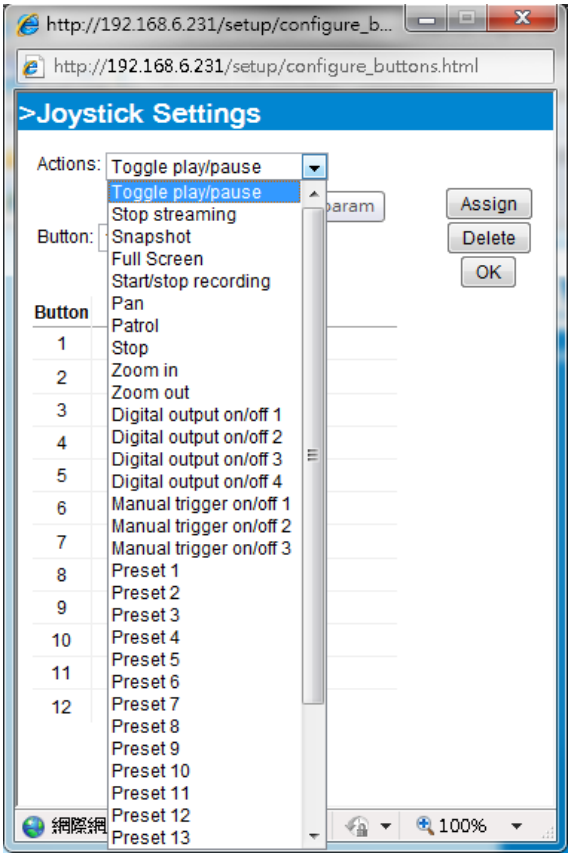
2. Select a corresponding action, such as Patrol or Preset#.

3. Click the **Assign** button to assign an action to the button. You can delete an association by selecting a button number, and then click the **Delete** button.

   Repeat the process until you are done with the configuration of all preferred actions.

   The buttons you define should appear on the button list accordingly.

4. Please remember to click the **Save** button on the Client settings page to preserver your settings.

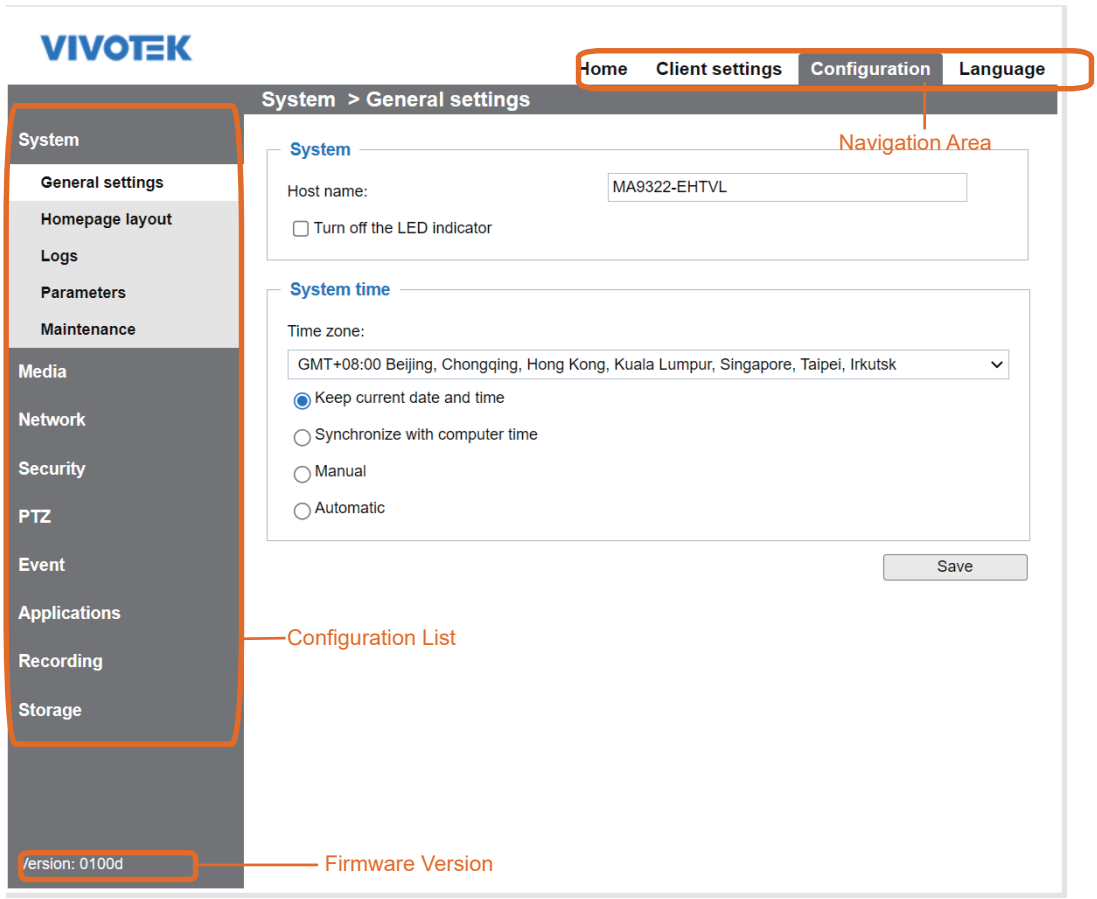


Configuration

Click **Configuration** on the main page to enter the camera setting pages. Note that only Administrators can access the configuration page.

VIVOTEK provides an easy-to-use user interface that helps you set up your network camera with minimal effort. In order to simplify the user interface, detailed information will be hidden unless you click on the function item. When you click on the first sub-item, the detailed information for the first sub-item will be displayed; when you click on the second sub-item, the detailed information for the second sub-item will be displayed and that of the first sub-item will be hidden.

The following is the interface of the main page:



Each function on the configuration list will be explained in the following sections.

The Navigation Area provides access to all different views from the **Home** page (for live viewing), **Configuration** page, and multi-language selection.

System > General settings

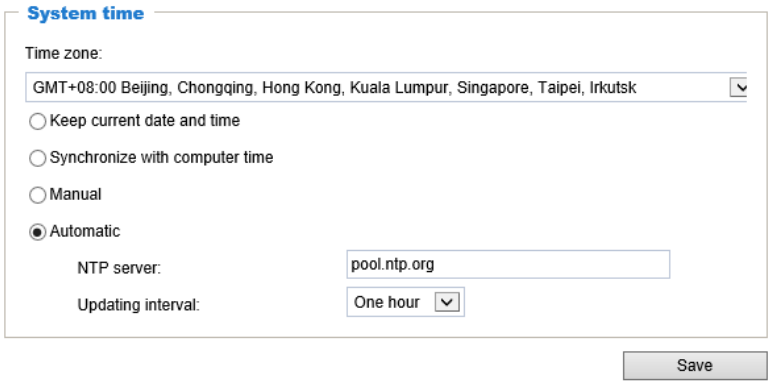
This section explains how to configure the basic settings for the Network Camera, such as the host name and system time. It is composed of the following two columns: System, and System Time. When finished with the settings on this page, click **Save** at the bottom of the page to enable the settings.

System

Host name: Enter a desired name for the Network Camera. The text will be displayed at the top of the main page, and also on the view cells of the ST7501 and VAST management software.

Turn off the LED indicators: If you do not want others to notice the network camera is in operation, you can select this option to turn off the LED indicators.

System time



Keep current date and time: Select this option to preserve the current date and time of the Network Camera. The Network Camera's internal real-time clock maintains the date and time even when the power of the system is turned off.

Synchronize with computer time: Select this option to synchronize the date and time of the Network Camera with the local computer. The read-only date and time of the PC is displayed as updated.

Manual: The administrator can enter the date and time manually. Note that the date and time format are [yyyy/mm/dd] and [hh:mm:ss].

Automatic: The Network Time Protocol is a protocol which synchronizes computer clocks by periodically querying an NTP Server.

NTP server: Assign the IP address or domain name of the time-server. Leaving the text box blank connects the Network Camera to the default time servers. The precondition is that the camera must have the access to the Internet.

Update interval: Select to update the time using the NTP server on an hourly, daily, weekly, or monthly basis.

Time zone : Select the appropriate time zone from the list. You can scroll down on the Time zone menu to find the Customize option and use the POSIX TZ variables. For example, http://www.gnu.org/software/libc/manual/html_node/TZ-Variable.html.

Here are some examples for TZ values, including the appropriate Daylight Saving Time and its dates of applicability. In North American Eastern Standard Time (EST) and Eastern Daylight Time (EDT), the normal offset from UTC is 5 hours; since this is west of the prime meridian, the sign is positive. Summer time begins on March's second Sunday at 2:00am, and ends on November's first Sunday at 2:00am. EST+5EDT,M3.2.0/2,M11.1.0/2

Israel Standard Time (IST) and Israel Daylight Time (IDT) are 2 hours ahead of the prime meridian in winter, springing forward an hour on March's fourth Thursday (i.e., on the first Friday on or after March 23), and falling back on October's last Sunday.
IST-2IDT,M3.4.4,M10.5.0

Western Argentina Summer Time (WARST) is 3 hours behind the prime meridian all year. There is a dummy fall-back transition on December 31 at 25:00 daylight saving time (i.e., 24:00 standard time, equivalent to January 1 at 00:00 standard time), and a simultaneous spring-forward transition on January 1 at 00:00 standard time, so daylight saving time is in effect all year and the initial WART is a placeholder.

The format is TZ = local_timezone,date/time,date/time.

Here, date is in the Mm.n.d format, where:

Mm (1-12) for 12 months
n (1-5) 1 for the first week and 5 for the last week in the month
d (0-6) 0 for Sunday and 6 for Saturday

CST6CDT is the name of the time zone
CST is the abbreviation used when DST is off
6 hours is the time difference from GMT
CDT is the abbreviation used when DST is on
,M3 is the third month
.2 is the second occurrence of the day in the month
.0 is Sunday
/2 is the time
,M11 is the eleventh month
.1 is the first occurrence of the day in the month
.0 is Sunday
/2 is the time

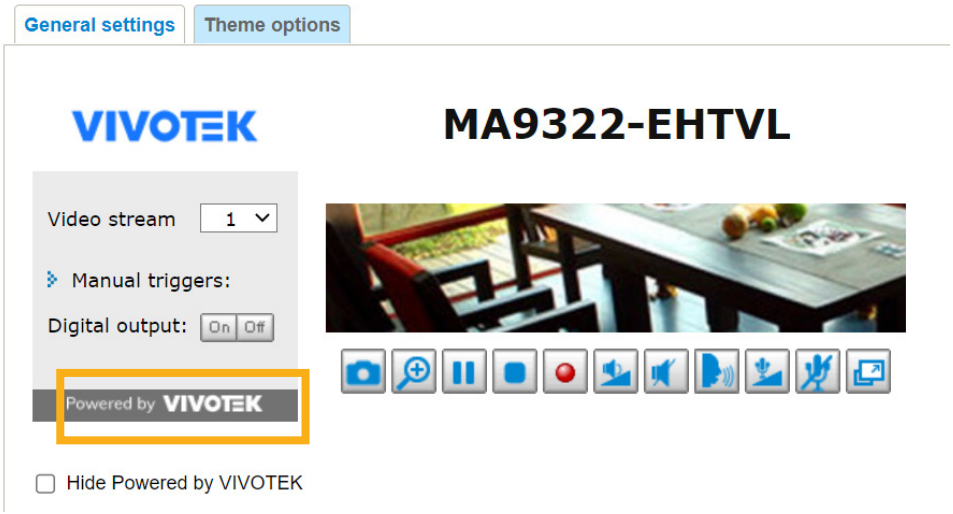
The minimum specifier is down to the hour.

System > Homepage layout

This section explains how to set up your own customized homepage layout.

General settings

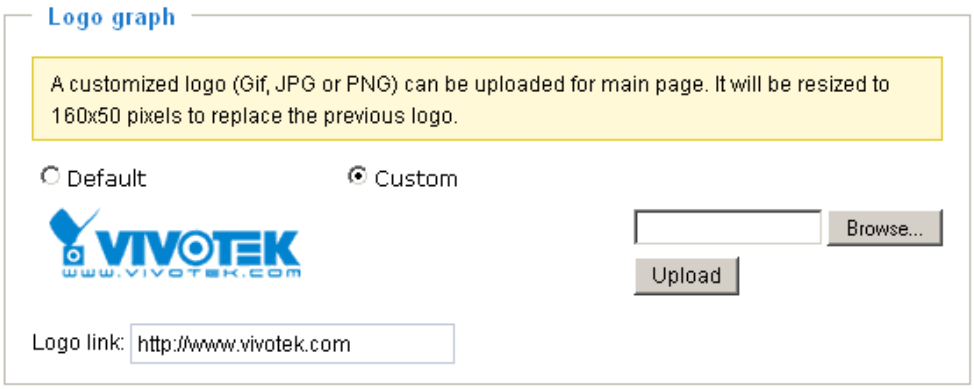
This column shows the settings of your hompage layout. You can manually select the background and font colors in Theme Options (the second tab on this page). The settings will be displayed automatically in this Preview field. The following shows the homepage using the default settings:



■ Hide Powered by VIVOTEK: If you check this item, it will be removed from the homepage.

Logo graph

Here you can change the logo that is placed at the top of your homepage.



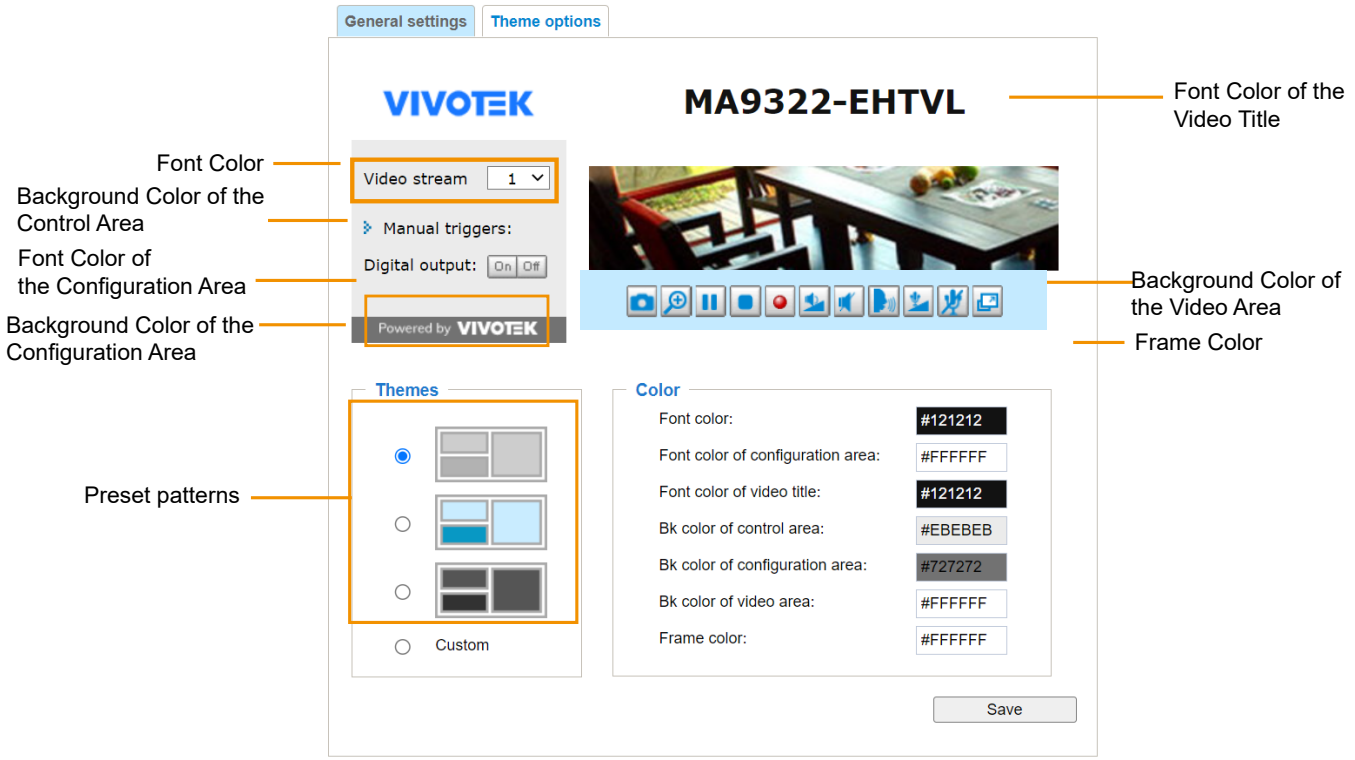
Follow the steps below to upload a new logo:
1. Click **Custom** and the Browse field will appear.
2. Select a logo from your files.
3. Click **Upload** to replace the existing logo with a new one.
4. Enter a website link if necessary.
5. Click **Save** to enable the settings.

Customized button

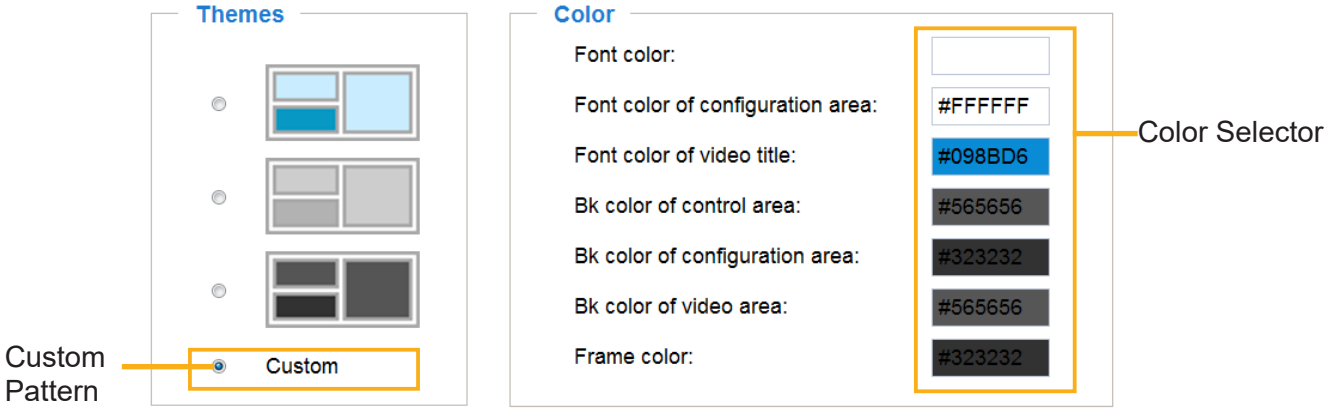
If you want to hide manual trigger buttons on the homepage, please uncheck this item. This item is checked by default.

Theme Options

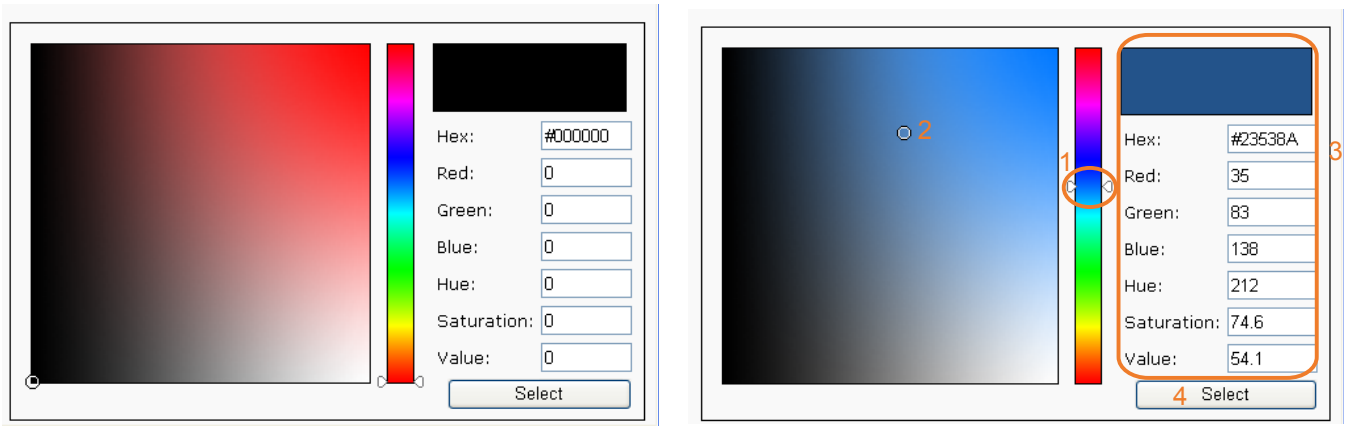
Here you can change the color of your homepage layout. There are three types of preset patterns for you to choose from. The new layout will simultaneously appear in the **Preview** filed. Click **Save** to enable the settings.



■ Follow the steps below to set up the customed homepage:
1. Click **Custom** on the left column.
2. Click the field where you want to change the color on the right column.



3. The palette window will pop up as shown below.

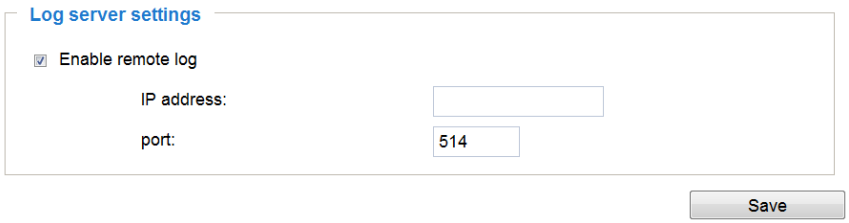


4. Drag the slider bar and click on the left square to select a desired color.
5. The selected color will be displayed in the corresponding fields and in the **Preview** column.
6. Click **Save** to enable the settings.

System > Logs

This section explains how to configure the Network Camera to send the system log to a remote server as backup.

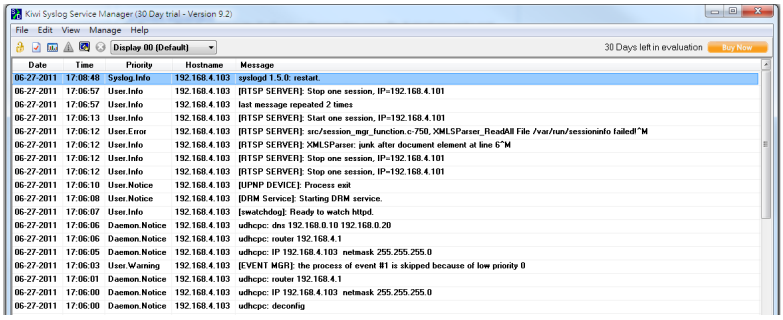
Log server settings



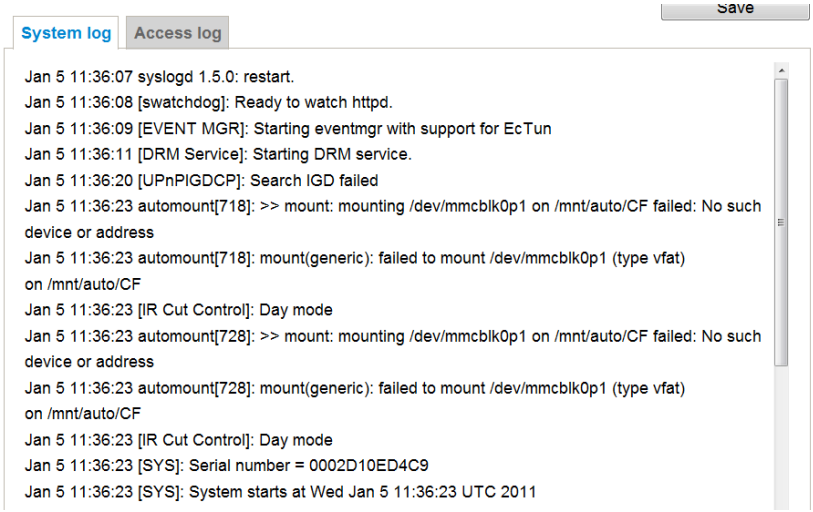
Follow the steps below to set up the remote log:

1. Select **Enable remote log**.
2. In the IP address text box, enter the IP address of the remote server.
2. In the port text box, enter the port number of the remote server.
3. When completed, click **Save** to enable the setting.

You can configure the Network Camera to send the system log file to a remote server as a log backup. Before utilizing this feature, it is suggested that the user install a log-recording tool to receive system log messages from the Network Camera. An example is Kiwi Syslog Daemon. Visit http://www.kiwisyslog.com/kiwi-syslog-daemon-overview/.

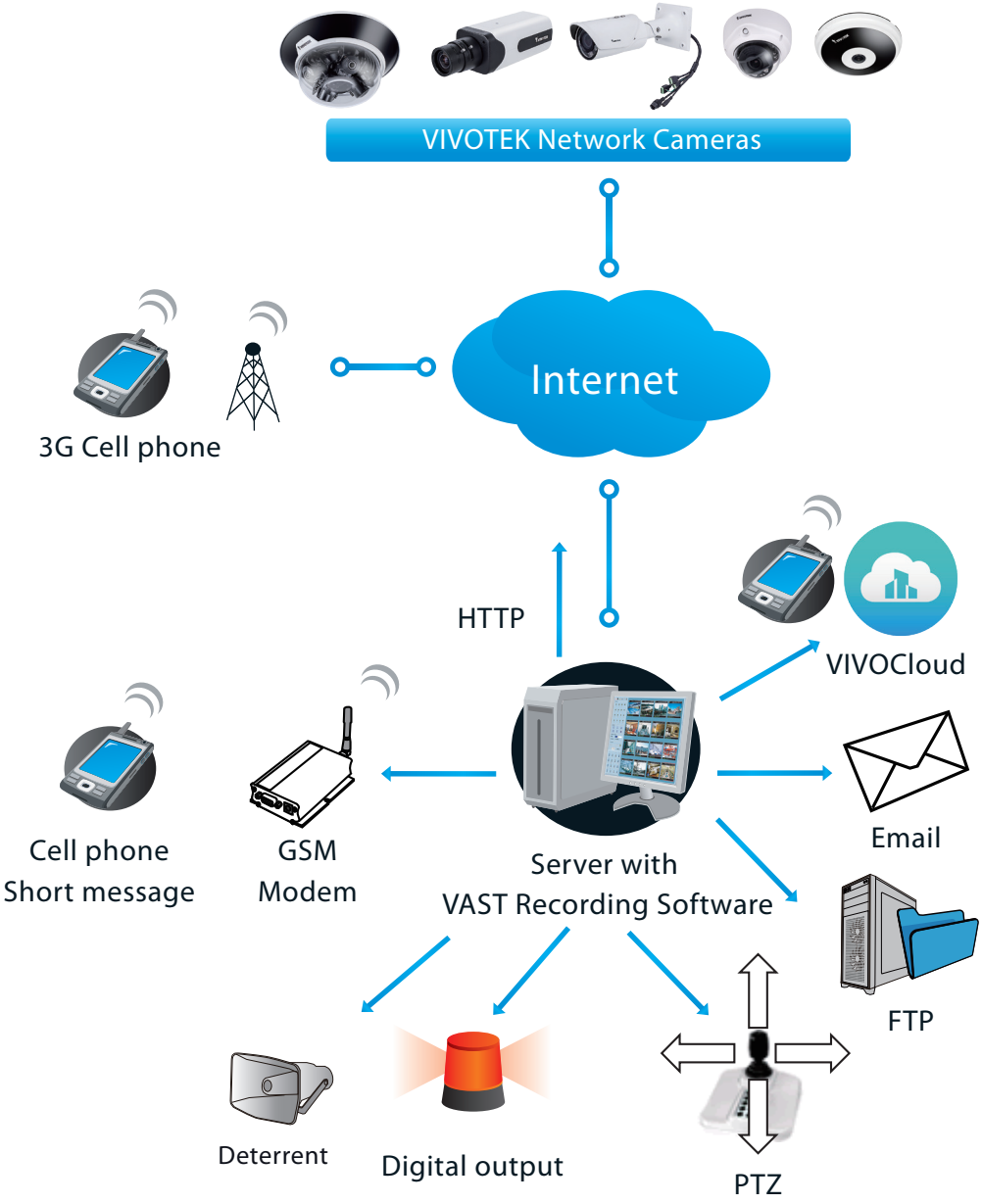


System log

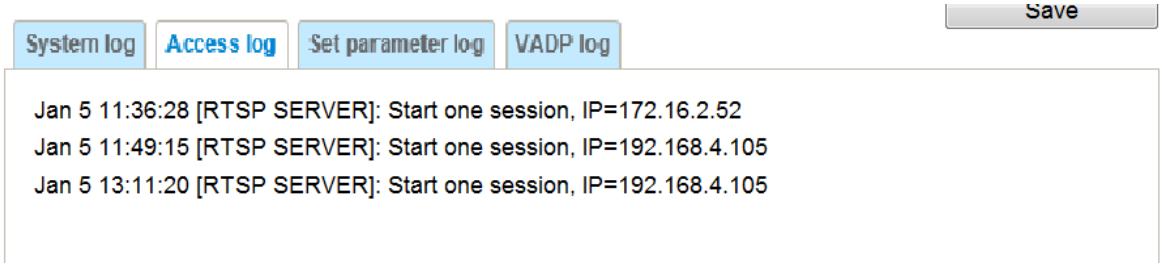


This column displays the system log in a chronological order. The system log is stored in the Network Camera's buffer area and will be overwritten when reaching a certain limit.

You can install the included VAST recording software, which provides an Event Management function group for delivering event messages via emails, GSM short messages, onscreen event panel, or to trigger an alarm, etc. For more information, refer to the VAST User Manual.



Access log



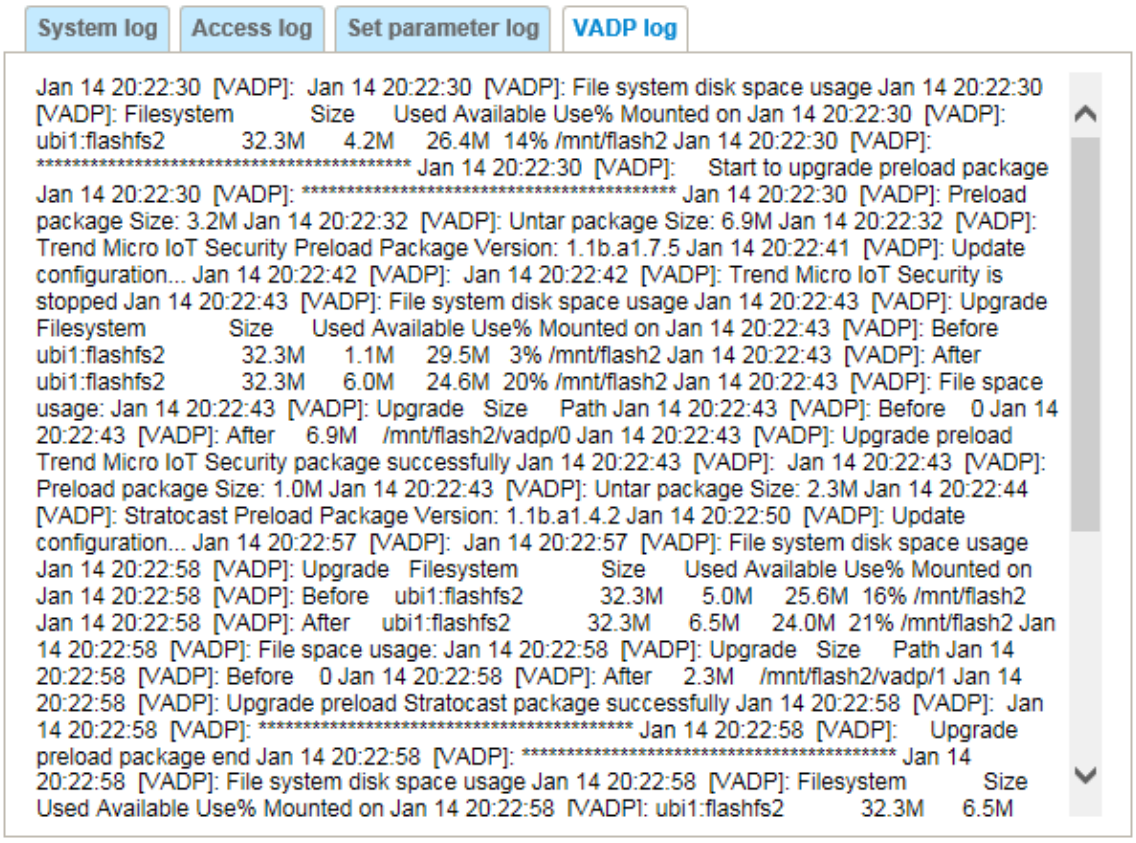
Access log displays the access time and IP address of all viewers (including operators and administrators) in a chronological order. The access log is stored in the Network Camera's buffer area and will be overwritten when reaching a certain limit.

Set Parameter log

VADP log contains the history of changes made to system parameters such as recording, imaging parameters, and all other parameters.

VADP log

VADP log contains the information for the onboard VADP packages, including memory usage, module load and unload information.



System > Parameters

The View Parameters page lists the entire system's parameters. If you need technical assistance, please provide the information listed on this page.

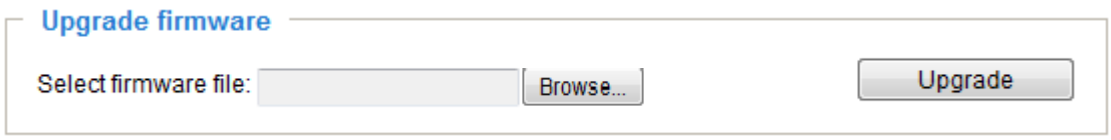
Parameters

```
system_hostname='MA9322-EHTVL'
system_ledoff='0'
system_lowlight='1'
system_date='2022/07/11'
system_time='23:37:23'
system_datetime=''
system_ntp=''
system_daylight_enable='0'
system_daylight_auto_begintime='Not Support'
system_daylight_auto_endtime='Not Support'
system_daylight_timezones=',-360,-320,-280,-240,-241,-200,-140,-121,-40,
0,40,41,80,82,83,140,380,480'
system_updateinterval='0'
system_info_modelname='MA9322-EHTVL'
system_info_extendedmodelname='MA9322-EHTVL'
system_info_serialnumber='0002D1A16901'
system_info_firmwareversion='MA9322-VVTK-0100d'
system_info_language_count='10'
system_info_language_i0='English'
system_info_language_i1='Deutsch'
system_info_language_i2='Español'
system_info_language_i3='Français'
system_info_language_i4='Italiano'
system_info_language_i5='日本語'
system_info_language_i6='Português'
system_info_language_i7='简体中文'
system_info_language_i8='繁體中文'
system_info_language_i9='Русский'
system_info_language_i10=''
system_info_language_i11=''
```

System > Maintenance

This chapter explains how to restore the Network Camera to factory default, upgrade firmware version, etc.

General settings > Upgrade firmware

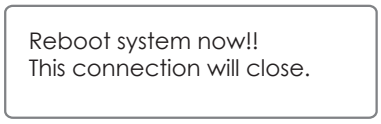


This feature allows you to upgrade the firmware of your Network Camera. It takes a few minutes to complete the process.
Note: Do not power off the Network Camera during the upgrade!

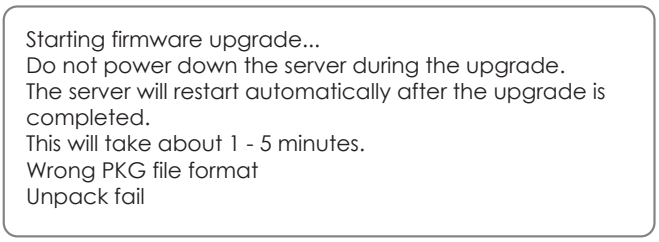
Follow the steps below to upgrade the firmware:
1. Download the latest firmware file from the VIVOTEK website. The file is in .pkg file format.
2. Click **Browse…** and locate the firmware file.
3. Click **Upgrade**. The Network Camera starts to upgrade and will reboot automatically when the upgrade completes.

If the upgrade is successful, you will see “Reboot system now!! This connection will close”. After that, re-access the Network Camera.

The following message is displayed when the upgrade has succeeded.

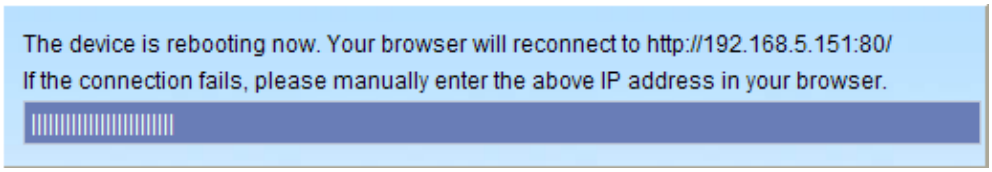


The following message is displayed when you have selected an incorrect firmware file.



General settings > Reboot

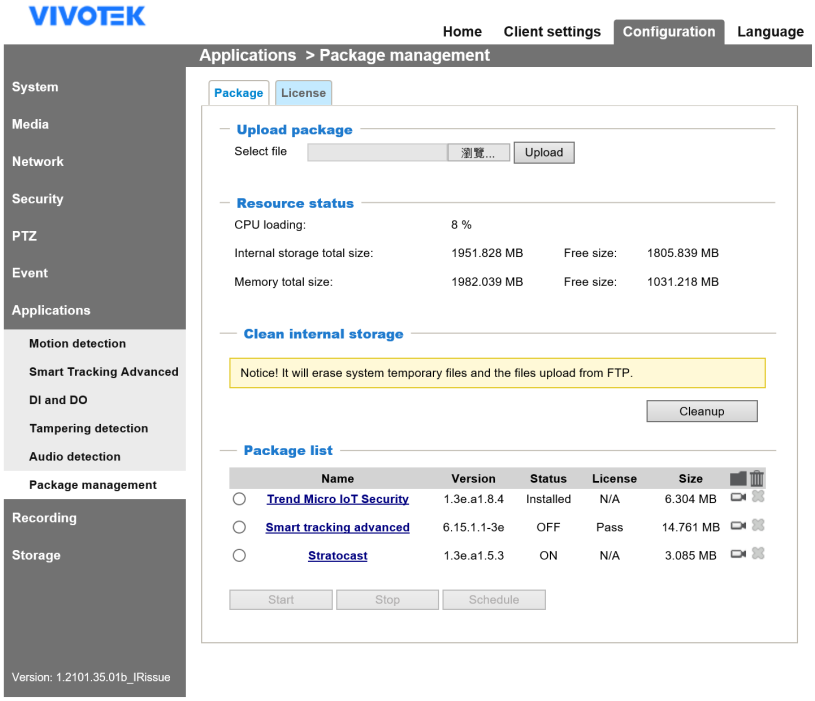
This feature allows you to reboot the Network Camera, which takes about one minute to complete. When completed, the live video page will be displayed in your browser. The following message will be displayed during the reboot process.



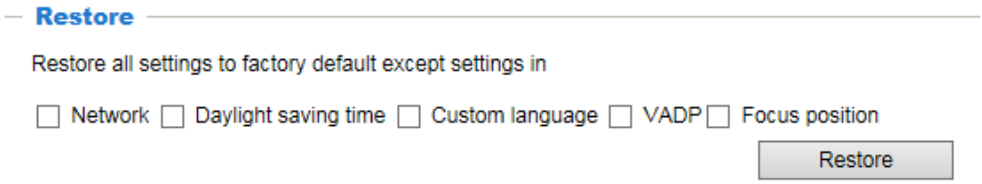
If the connection fails after rebooting, manually enter the IP address of the Network Camera in the address field to resume the connection.

IMPORTANT:

Through extensive use, temporary files may accumulate that disable a firmware upgrade. You can use the Clean up function in the Application > Package management window to solve this problem.



General settings > Restore



This feature allows you to restore the Network Camera to factory default settings.

Network: Select this option to retain the Network Type settings (please refer to Network Type on page 96).

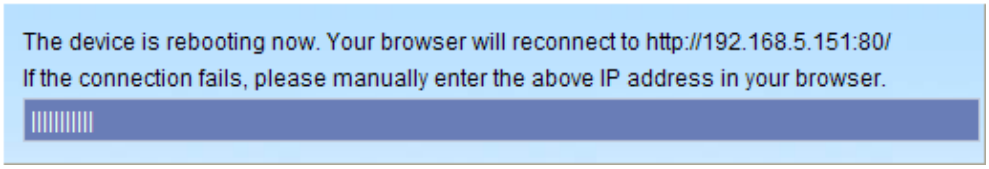
Daylight Saving Time: Select this option to retain the Daylight Saving Time settings (please refer to Import/Export files below on this page).

Custom Language: Select this option to retain the Custom Language settings.

VADP: Retain the VADP modules (3rd-party software stored on the SD card) and related settings.

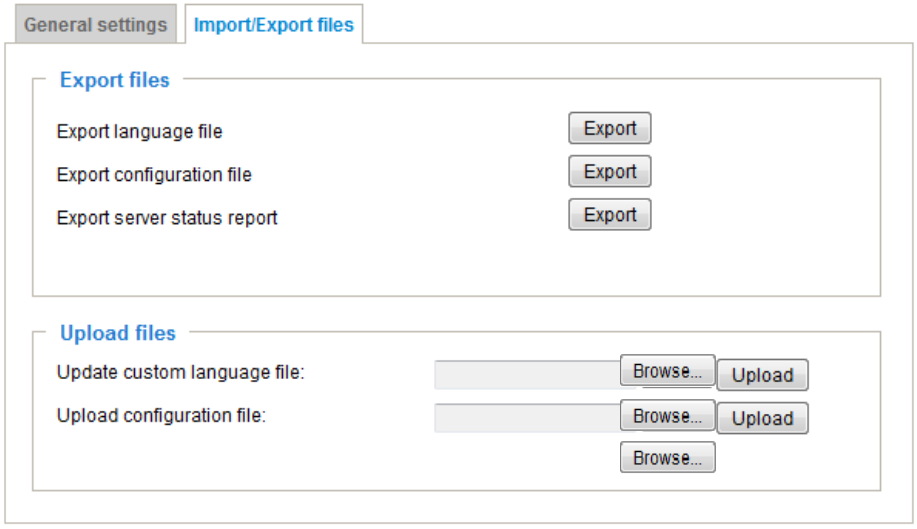
Focus position: Retain the lens focus position using the previously saved position parameters.

If none of the options is selected, all settings will be restored to factory default. The following message is displayed during the restoring process.



Import/Export files

This feature allows you to Export / Update daylight saving time rules, custom language file, configuration file, and server status report.

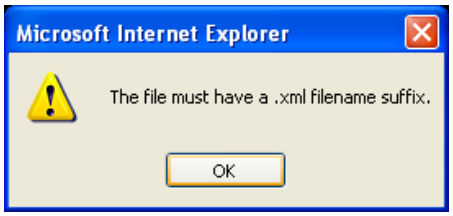


Export daylight saving time configuration file: Click to set the start and end time of DST (Daylight Saving).

Follow the steps below to export:

1. In the Export files column, click **Export** to export the daylight saving time configuration file from the Network Camera.
2. A file download dialog will pop up as shown below. Click **Open** to review the XML file or click **Save** to store the file for editing.

The following message is displayed when attempting to upload an incorrect file format.



Export language file: Click to export language strings. VIVOTEK provides nine languages: English, Deutsch, Español, Français, Italiano, 日本語, Português, 簡体中文, 繁體中文, and Русский..

Update custom language file: Click **Browse…** and specify your own custom language file to upload.

Export configuration file: Click to export all parameters for the device and user-defined scripts.

Update configuration file: Click **Browse…** to update a configuration file. Please note that the model and firmware version of the device should be the same as the configuration file. If you have set up a fixed IP or other special settings for your device, it is not suggested to update a configuration file.

Export server staus report: Click to export the current server status report, such as time, logs, parameters, process status, memory status, file system status, network status, kernel message ... and so on.

Tips:

If a firmware upgrade is accidentally disrupted, say, by a power outage, you still have a last resort method to restore normal operation. See the following for how to bring the camera back to work:

Applicable scenario:

(a) Power disconnected during firmware upgrade.
(b) Unknown reason causing abnormal LED status, and a Restore cannot recover normal working condition.

You can use the following methods to activate the camera with its backup firmware:

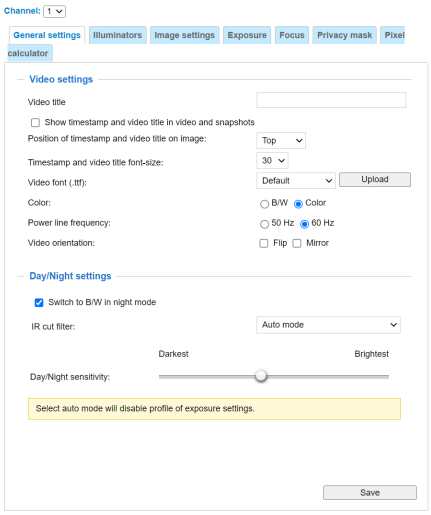
(a) Press and hold down the reset button for at least one minute.
(b) Power on the camera until the Red LED blinks rapidly.
(c) After boot up, the firmware should return to the previous version before the camera hanged. (The procedure should take 5 to 10 minutes, longer than the normal boot-up process). When tthis process is completed, the LED status should return to normal.

Media > Image

Channel: Select a Channel (one of the 4 sensors) before making configurations. These 4 sensors can be individually configured.

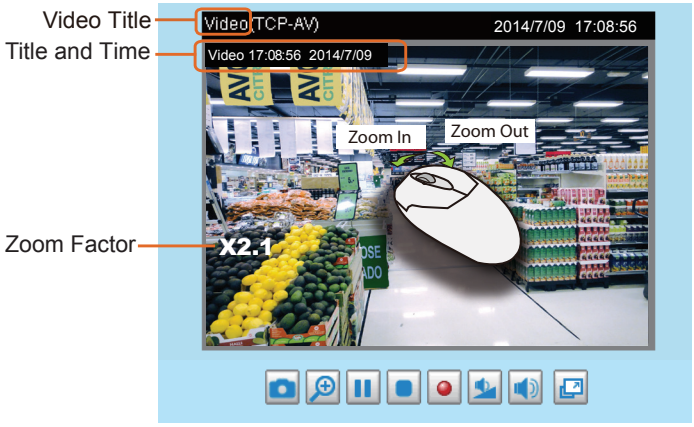
This section explains how to configure the image settings of the Network Camera. It is composed of the following function groups: General settings, Image settings, Exposure, Focus, and Privacy mask.

General settings



Video title

Show_timestamp_and_video_title_in_video_and_snapshots: Enter a name that will be displayed on the title bar of the live video as the picture shown below. A zoom indicator will be displayed on the Home page when you zoom in/out on the live viewing window as shown below. You may zoom in/out on the image by scrolling the mouse wheel inside the live viewing window, and the maximum zoom in will be up to 4 times.



Position of timestamp and video title on image: Select to display time stamp and video title on the top or at the bottom of the video stream.

Timestamp and video title font size: Select the font size for the time stamp and title.

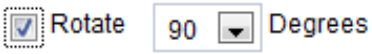
Video font (.ttf): You can select a True Type font file for the display of textual messages on video.

Color: Select to display color or black/white video streams.

Power line frequency: Set the power line frequency consistent with local utility settings to eliminate image flickering associated with fluorescent lights. Note that after the power line frequency is changed, you must disconnect and reconnect the power cord of the Network Camera in order for the new setting to take effect.

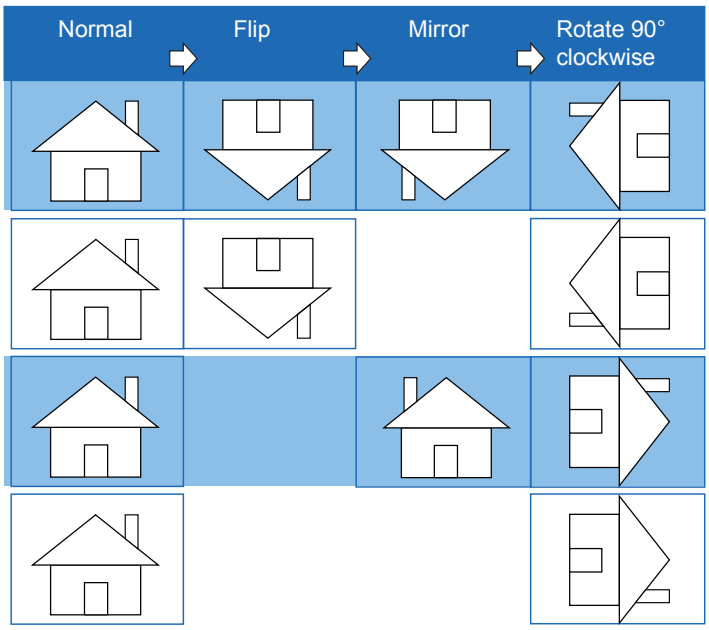
Video orientation: Flip - vertically reflect the display of the live video; Mirror - horizontally reflect the display of the live video. Select both options if the Network Camera is installed upside-down (e.g., on the ceiling) to correct the image orientation. Please note that if you have preset locations, those locations will be cleared after flip/mirror setting.

Rotate -



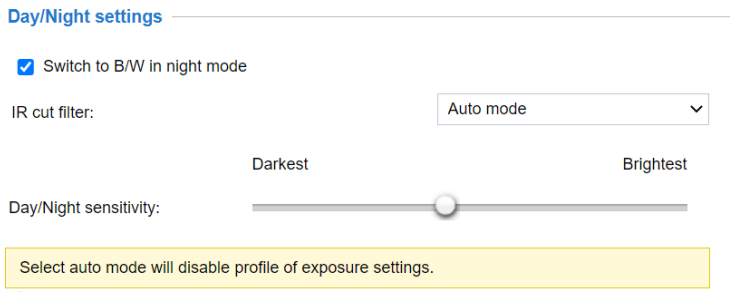
The rotation here indicates clockwise rotation. Rotation can be applied with flip, mirror, and physical lens rotation (see below) settings to adapt to different mounting locations.

The figures in the illustration are shown in a consecutive order.



The camera may be installed on a vertical, side-facing, or tilted surface in order to accommodate the interior or exterior design of a building. The interior of a building can be shaped as a narrow rectangular space, such as a corridor. The conventional HD image, such as that of a 16:9 aspect ratio, will be incongruous with its wide horizontal view. With video rotation, the camera can more readily cover the field of view on a tall and narrow scene.

Day/Night Settings



Switch to B/W in night mode

Select this to enable the Network Camera to automatically switch to Black/White during night mode.

IR cut filter

With a removable IR-cut filter, this Network Camera can automatically remove the filter to let IR light enter the light sensor during low light conditions.

■ Auto mode
The Network Camera automatically removes the filter by judging the level of ambient light.

■ Day mode
In day mode, the Network Camera switches on the IR cut filter at all times to block infrared light from reaching the sensor so that the colors will not be distorted.

■ Night mode
In night mode, the Network Camera switches off the IR cut filter at all times for the sensor to accept infrared light, thus helping to improve low light sensitivity.

■ Synchronize with digital input
The Network Camera automatically removes the IR cut filter when a Digital Input is triggerred. For example, an external IR light may come with its own detection circuits.

■ Schedule mode
The Network Camera switches between day mode and night mode based on a specified schedule. Enter the start and end time for the day mode. Note that the time format is [hh:mm] and is expressed in 24-hour clock time. By default, the start and end time of day mode are set to 07:00 and 18:00.

Sensitivity of IR cut filter

Tune the responsiveness of the IR cut filter to lighting conditions as Low, Normal, or High.

When completed with the settings on this page, click **Save** to enable the settings.

Illuminators

Turn on built-in IR illuminator in night mode
Select this to turn on the camera's onboard IR illuminator when the camera detects low light condition and enters the night mode.

Anti-overexposure
When enabled, the camera automatically adjusts the IR projection to adjacent objects in order to avoid over-exposure in the night mode.

The Smart IR function is more beneficial when the spot of intrusions or an object of your interest is close to the lens and the IR lights. For example, if an intruder has a chance of getting near the range of 3 meters, Smart IR can effectively reduce the over-exposure. For a surveillance area at a greater distance, e.g., 5 meters or farther away, the Smart IR function may not bring as significant benefits as in close range.

Smart IR disabled; distance: 5M

Smart IR enabled; distance: 5M

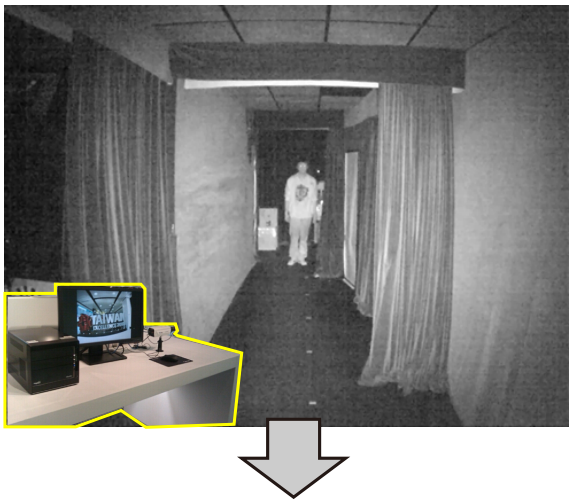
Smart IR disabled; distance: 3M

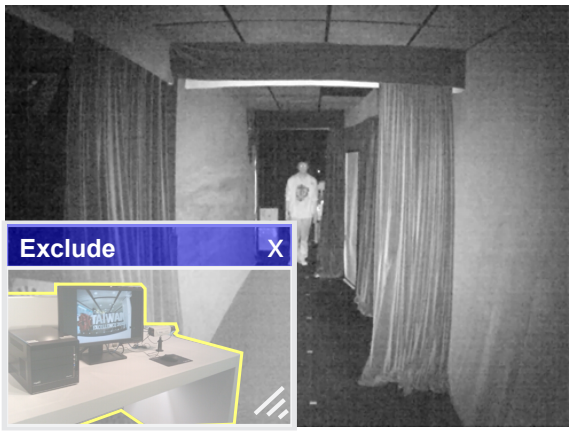
Smart IR enabled; distance: 3M

Tips:

If there is an object in close proximity, the IR lights reflected back from it can mislead the Smart IR's calculation of light level. To solve this problem, you can place an "Exposure Exclude" window on an unavoidable object in the Exposure setting window. See page 77 for how to do it.

You can also configure the "Exposure Exclude" window in a night mode "Profile" setting so that your day time setting is not affected.





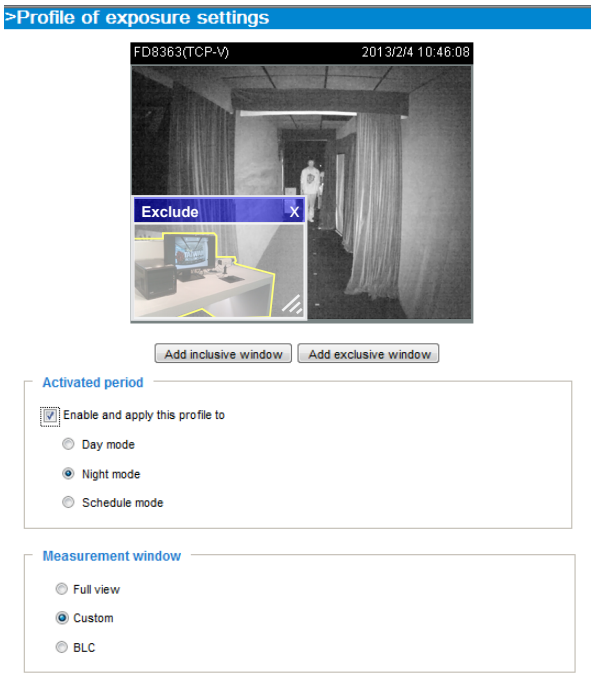
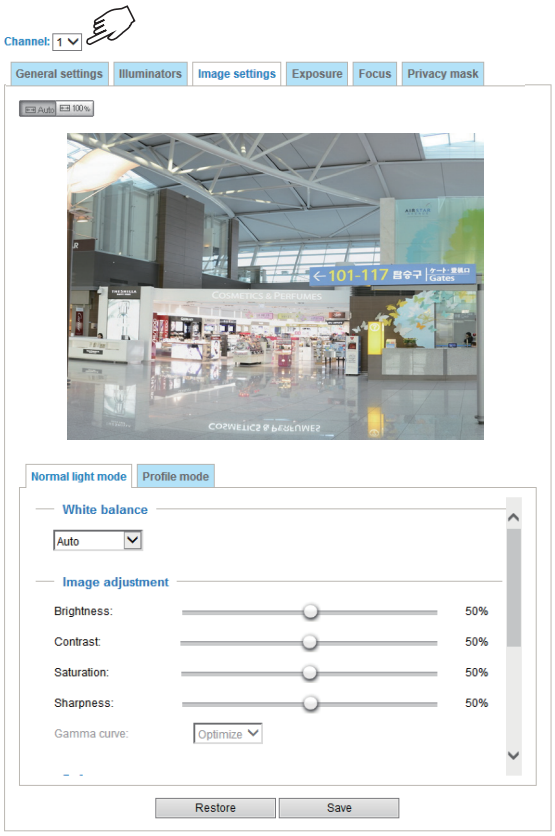


Image settings

On this page, you can tune the White balance and Image adjustment.



Channel: Select one of the 4 Channels (sensors).

White balance: Adjust the value for the best color temperature.
■ You may follow the steps below to adjust the white balance to the best color temperature.

1. Place a sheet of paper of white or cooler-color temperature color, such as blue, in front of the lens, then allow the Network Camera to automatically adjust the color temperature.
2. Click the **On** button to **Fix current value** and confirm the setting while the white balance is being measured.

■ You may also manually tune the color temperature by pulling the RGain and BGain slide bars.

Image Adjustment
■ Brightness: Adjust the image brightness level, which ranges from 0% to 100%.

■ Contrast: Adjust the image contrast level, which ranges from 0% to 100%.

■ Saturation: Adjust the image saturation level, which ranges from 0% to 100%.

■ Sharpness: Adjust the image sharpness level, which ranges from 0% to 100%.

■ Gamma curve: Adjust the image sharpness level, which ranges from 0 to 0.45.
You may let firmware Optimize your display or select a value to change the preferred level of Gamma correction towards higher contrast or towards the higher luminance for detailed expression for both the dark and lighted areas of an image.

This option is disabled when the WDR feature is enabled.

Defog: Defog helps improve the visibility quality of captured image in poor weather conditions such as smog, fog, or smoke.

Highlight mask

- Strong light sources will be masked from the scene, and the image contrast will be strengthened. This function is useful to prevent the spot-light effects in a high dynamic scene.

  False color may be observed around the edges of strong light sources.

Noise reduction

- Enable noise reduction: Check to enable noise reduction in order to reduce noises and flickers in image. This applies to the onboard 3D Noise Reduction feature. Use the pull-down menu to adjust the reduction strength. Note that applying this function to the video channel will consume system computing power.

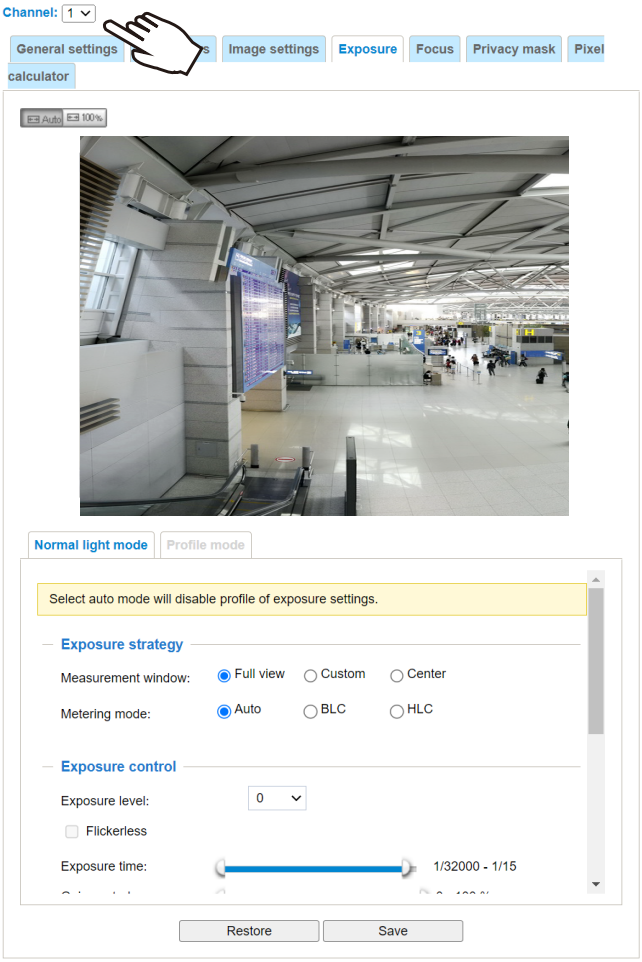
  3D Noise Reduction is mostly applied in low-light conditions. When enabled in a low-light condition with fast moving objects, trails of after-images may occur. You may then select a lower strength level or disable the function.

Note that the **Preview** button has been cancelled, all changes made to image settings is directly shown on screen. You can click **Restore** to recall the original settings without incorporating the changes. When completed with the settings on this page, click **Save** to enable the setting. You can also click on **Profile mode** to adjust all settings above in a tabbed window for special lighting conditions.

Enable and apply these settings at: Select the mode this profile to apply to: Day mode, Night mode, or Schedule mode. Please manually enter a range of time if you choose Schedule mode. Then check **Save** to take effect.

Exposure

On this page, you can configure the Exposure measurement window, Exposure level, Exposure mode, Exposure time, Gain control settings. You can configure two sets of Exposure settings: one for normal situations, the other for special situations, such as the day/night/schedule mode.

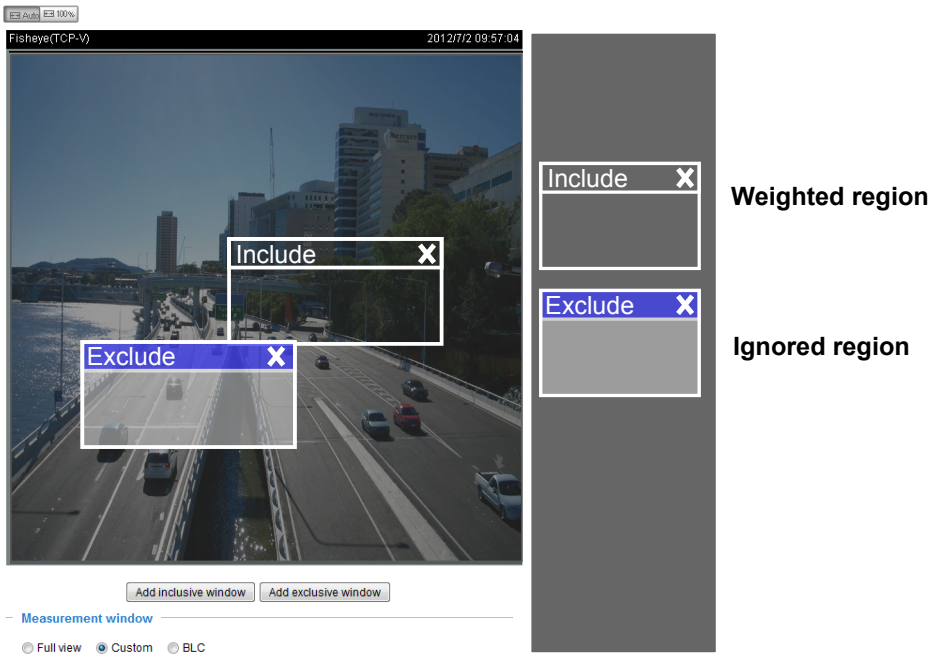


Measurement Window: This function allows users to configure measurement window(s) for low light compensation. For example, where low-light objects are posed against an extremely bright background. You may want to exclude the bright sunlight shining through a building's corridor.

■ Full view: System calculates the full range of view and provides appropriate light compensation.

■ Custom: This option allows you to manually add customized windows as inclusive or exclusive regions. A total of 10 windows can be configured. Please refer to the next page for detailed illustration.

The inclusive window refers to the “weighted window“; the exclusive window refers to “ignored window“. It adopts the weighed averages method to calculate the value. The inclusive windows have a higher priority. You can overlap these windows, and, if you place an exclusive window within a larger inclusive window, the exclusive part of the overlapped windows will be deducted from the inclusive window. An exposure value will then be calculated out of the remaining of the inclusive window.



- **BLC** (Back Light Compensation): This option will automatically add a “weighted region“ in the middle of the window and give the necessary light compensation.
- **HLC**: (Highlight Compensation). Firmware detects strong light sources and compensates on affected spots to enhance the overall image quality. For example, the HLC helps reduce the glares produced by spotlights or headlights.

Exposure control:

- **Exposure level**: You can manually configure the Exposure level, which ranges from -2.0 to +2.0 (dark to bright). You can click and drag the semi-circular pointers on the **Exposure time** and **Gain control** slide bars to specify a range of shutter time and Gain control values within which the camera can automatically tune to an optimal imaging result. You may prefer a shorter shutter time to better capture moving objects, while a faster shutter reduces light and needs to be compensated by electrical brightness gains.

- **Flickerless**:
  Fixed iris models can encounter image rolling band issues when operating under incongrous power line frequency with fluorescent lights. To solve the problem, the Flickerless mode can limit the exposure time to 1/120 ~ 1/5 second. For the Auto iris models, when the exposure time is limited to 1/120 ~1/5 second, iris size is automatically adjusted, and that the image brightness is appropriately adjusted. Although the chance is rare, for Fixed iris models, when the exposure time is limited to 1/120 ~ 1/5 second, they may encounter image over-exposure. If the Flickerless option is selected, and users discover over-exposure from the live view, they can disable the Flickerless option.

■ **AE Speed Adjustment**:

This function applies when you need to monitor fast changing lighting conditions. For example, the camera may need to monitor a highway lane or entrance of a parking area at night where cars passing by with their lights on can bring fast changes in light levels. The same applies if the camera is installed on a vehicle, and when it needs to adapt to fast changes of light when entering and leaving a tunnel.

■ **WDR Pro:**

This refers to the Wide Dynamic Range function that enables the camera to capture details in a high contrast environment. Use the checkbox to enable the function, and use the slide bar to select the strength of the WDR Pro functionality, depending on the lighting condition at the installation site. You can select a higher effect when the contrast is high (between the shaded area and the light behind the objects).

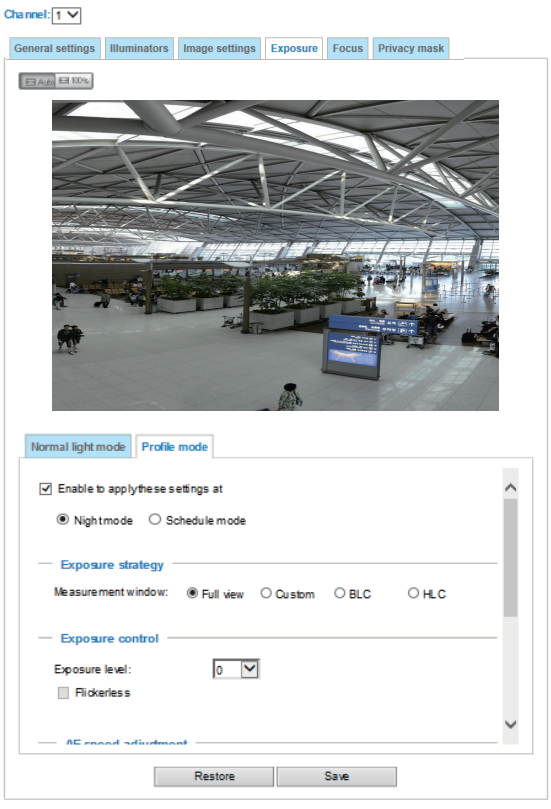
Enable WDR enhanced: This function allows users to identify more image details with an extreme contrast from an object of interest with one shadowed side against a bright background, e.g., an entrance. You may select the **Enable WDR enhanced** checkbox, and then adjust the strength (low, medium, high) to reach the best image quality.

You can click **Restore** to recall the original settings without incorporating the changes. When completed with the settings on this page, click **Save** to enable the settings.

If you want to configure another sensor setting for day/night/schedule mode, please click **Profile** to open the Profile of exposure settings page as shown below.

Activated period: Select the mode this profile to apply to: Night mode or Schedule mode. Please manually enter a range of time if you choose Schedule mode. Then check **Save** for the configuration to take effect.

Note that the Profile mode configuration is not available when the IR cut filer is configured in the Auto mode.



Please follow the steps below to configure a profile:

1. Select the **Profile mode** tab.
2. Select the applicable mode: Night mode or Schedule mode. Please manually enter a range of time if you choose the Schedule mode.
3. Configure Exposure control settings in the folowing columns. Please refer to previous dicussions for detailed information.
4. Click **Save** to enable the setting and click **Close** to exit the page.

Focus

Focus here refers to the **Remote Focus**, is applicable to Network Cameras that are equipped with stepping motor lens. The automated focus adjustment function eliminates the needs to physically adjust camera focus. In an outdoor deployment consisting of a large number of cameras, the auto focus function can be very helpful when these cameras become out of focus after days or weeks of operation. And that can easily result from the effects of natural forces, e.g., shrink and expand due to a wide range of operating temperatures and the vibration caused by wind.

Below is the procedure to perform the automated Focus function:

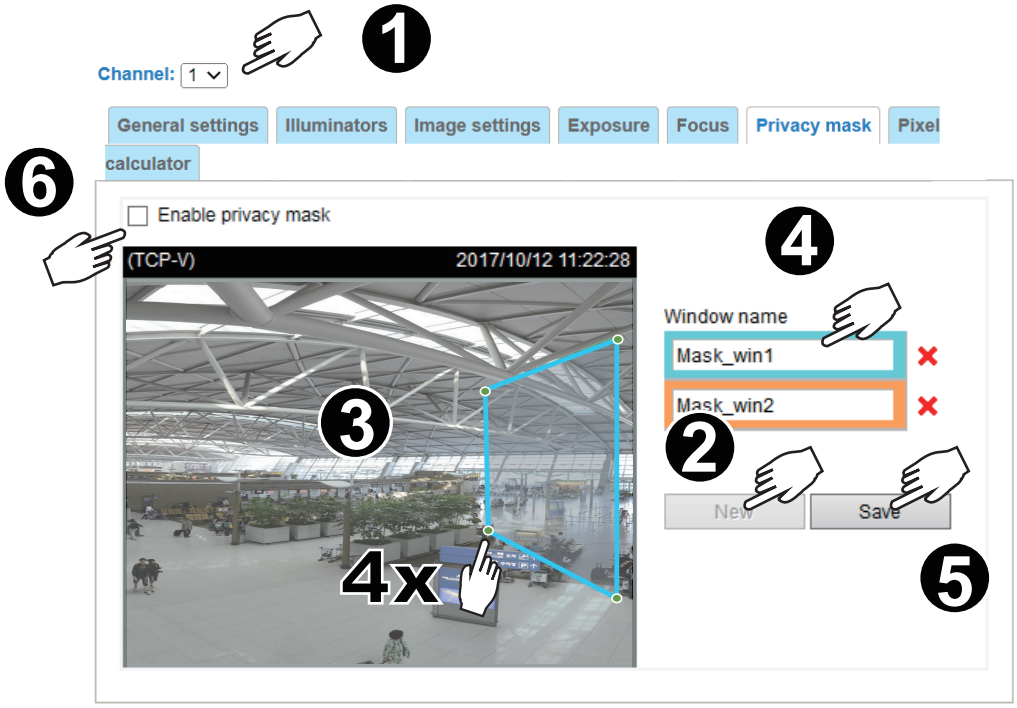
1. Select a Channel (one of the 4 sensors).
2. Select from the bottom of the screen whether you want to perform focus adjustment on the **Full view** or within a **Custom** focus window. You can create a custom window and click and drag the window to a desired position on screen.

3. You can use the **Fully-opened iris** checkbox (default) to increase the iris size for a better focus adjustment result.

4. Click on the **Perform auto focus** button. When the **Full-range scan** checkbox is selected, a full-range scan through the camera's entire focal length can take about 30 to 80 seconds. If not, the auto focus scan will only go through the length where optimal focus may occur, and that takes about 15 to 20 seconds. In theory, best results of the auto scan can be acquired when the camera's iris is fully open.

Privacy mask

Click **Privacy Mask** to open the settings page. On this page, you can block out sensitive zones to address privacy concerns.



■ To configure privacy mask windows,
1. Select a Channel (one of the 4 sensors).
2. Click **New** to add a new window.
3. You can use 4 mouse clicks to create a new masking window. You can pull the corner marks to adjust the coverage.
4. Enter a Window Name, such as Neighbor's window.
5. Click **Save** to preserve the setting.
6. Click on the **Enable privacy mask** checkbox to enable this function.

NOTE:

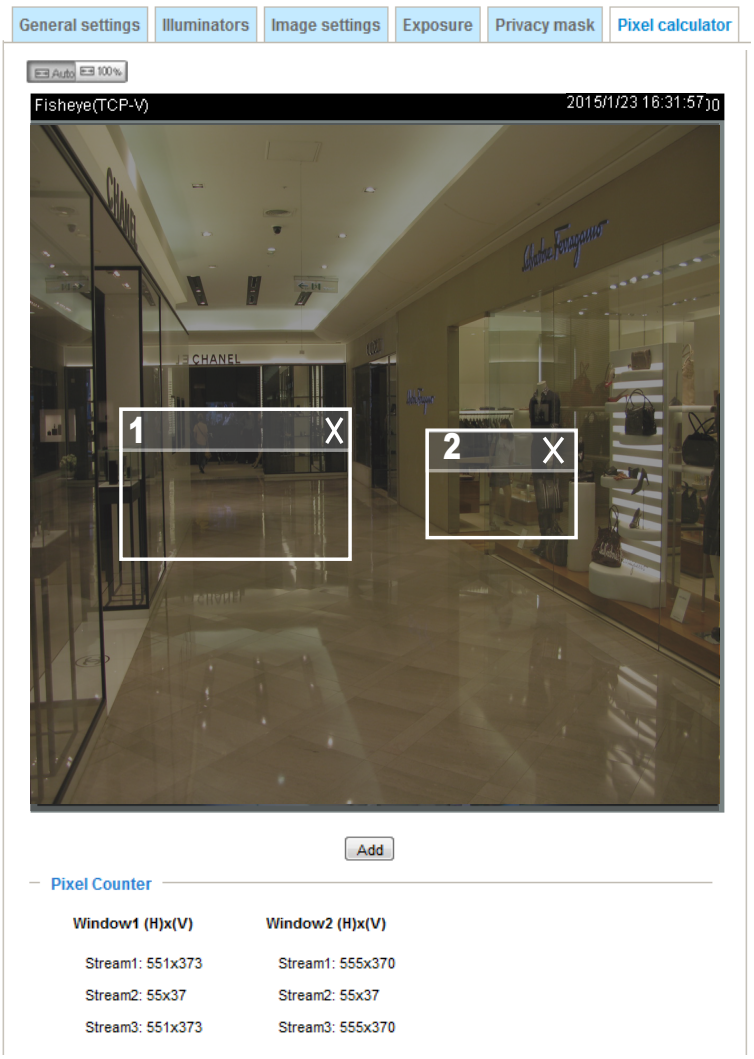
► *Up to 5 privacy mask windows can be configured on the same screen.*

► *If you want to delete the privacy mask window, please click the 'x' mark on the side of window name.*

Pixel Calculator

Click the **Add** button at the lower screen to create a pixel calculator window. Place your cursor on the window to move it to an area of your interest, and change the size of window to fit the area of interest.

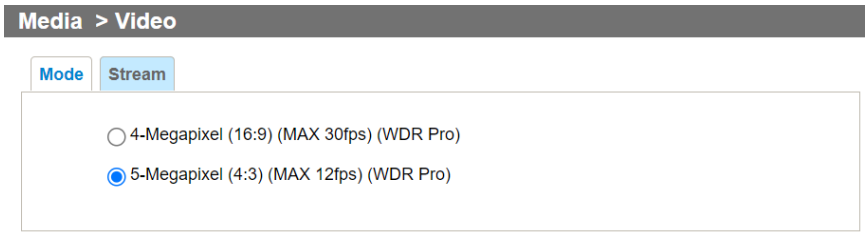
Once they are drawn, the numbers of pixels on the sides of windows will appear. This allows you to calculate if your current configuration fulfills a requirement, for instance, for recognizing the faces of persons passing through a location. A facial recognition usually requires around 130 pixels per meter or higher.



The pixels thus calculated are listed at the lower screen on a per-stream basis depending on the frame size you configured for each video stream.

Media > Video

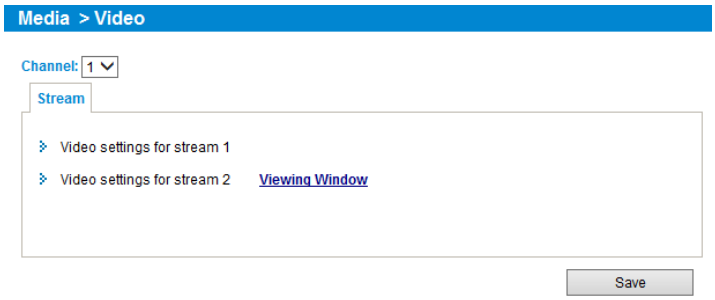
Mode



The applicable video modes include:

- 5-Megapixel (4:3)(MAX 12fps) (WDR Pro): This is the full resolution at 5 megapixels in a 4:3 screen aspect ratio, with the WDR function enabled.
- 4-Megapixel (16:9)(MAX 30fps) (WDR Pro): This is the full resolution at 4 megapixels in a 16:9 screen aspect ratio, with the WDR function enabled.

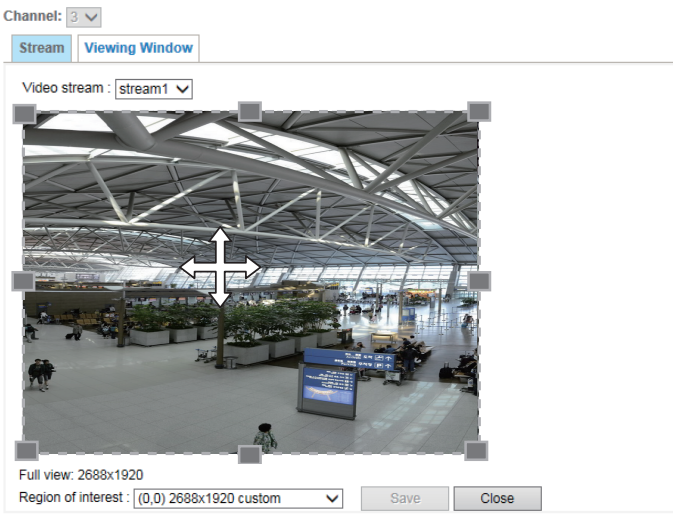
Stream settings



This Network Camera supports multiple streams with frame sizes ranging from 448 x 320 to 2688 x 1920 pixels.

- Stream 1: Users can define the "Region of Interest" (viewing region) and the "Output Frame Size" (size of the live view window).
- Stream 2: The default frame size for Stream 2 is set to the 1280 x 960.

Click **Viewing Window** to open the viewing region settings page. On this page, you can configure the **Region of Interest** and the **Output Frame Size** for a video stream. For example, you can crop only a portion of the image that is of your interest, and thus save the bandwidth needed to transmit the video stream. As the picture shown below, the area of your interest in a parking lot should be the vehicles. The blue sky is of little value for the surveillance purpose.



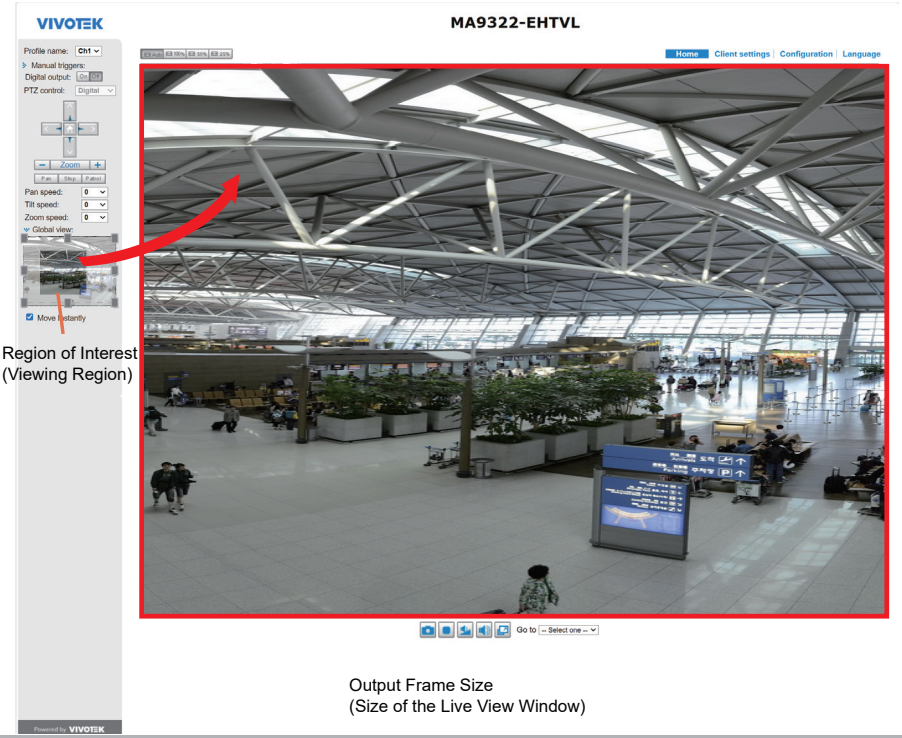
Please follow the steps below to configure the settings for a stream:

1. Select a stream for which you want to set up the viewing region.
2. Select a **Region of Interest** from the drop-down list. The floating frame, the same as the one in the Gloabl View window on the home page, will resize accordingly. If you want to set up a customized viewing region, you can also resize and drag the floating frame to a desired position using your mouse.
3. Choose a proper **Output Frame Size** from the drop-down list according to the size of your monitoring device.

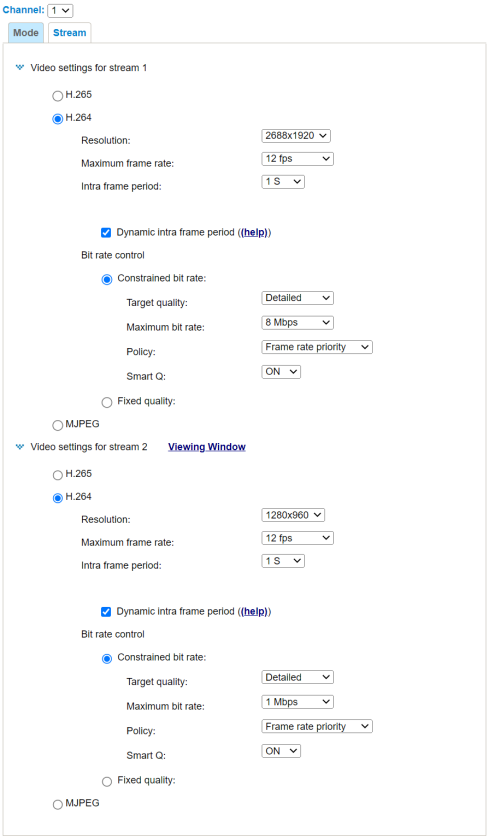
NOTE:

► *All the items in the "Region of Interest" should not be larger than the "Output Frame Size" (current maximum resolution).*

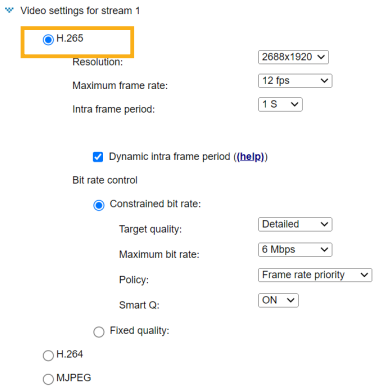
When completed with the settings in the Viewing Window, click **Save** to enable the settings and click **Close** to exit the window. The selected **Output Frame Size** will immediately be applied to the **Frame size** of each video stream. Then you can go back to the home page to test the e-PTZ function. For more information about the e-PTZ function, please refer to page 130.



Click the stream item to display the detailed information. The maximum frame size will follow your settings in the above Viewing Window sections.



This Network Camera offers real-time H.265, H.264, and MJPEG compression standards (Triple Codec) for real-time viewing. If the **H.265 or H.264** mode is selected, the video is streamed via RTSP protocol. There are several parameters through which you can adjust the video performance:



■ Frame size

You can set up different video resolutions for different viewing devices. For example, set a smaller frame size and lower bit rate for remote viewing on mobile phones and a larger video size and a higher bit rate for live viewing on web browsers, or recording the stream to an NVR. Note that a larger frame size takes up more bandwidth.

■ Maximum frame rate

This limits the maximum refresh frame rate per second. Set the frame rate higher for smoother video quality and for recognizing moving objects in the field of view.

If the power line frequency is set to 50Hz , the frame rates are selectable at 1fps to 25fps. If the power line frequency is set to 60Hz, the frame rates are selectable at 1fps to 30fps. You can also select **Customize** and manually enter a value.

■ Intra frame period

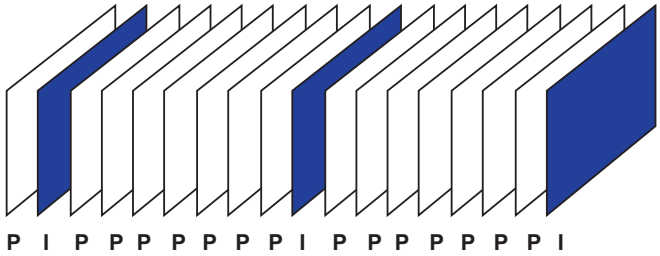
Determine how often for firmware to plant an I frame. The shorter the duration, the more likely you will get better video quality, but at the cost of higher network bandwidth consumption. Select the intra frame period from the following durations: 1/4 second, 1/2 second, 1 second, 2 seconds, 3 seconds, and 4 seconds.

Smart stream III

■ Dynamic Intra frame period

High quality motion codecs, such as H.264, utilize the redundancies between video frames to deliver video streams at a balance of quality and bit rate.

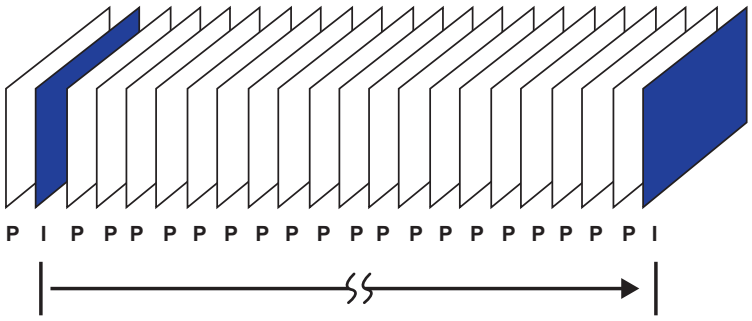
The encoding parameters are summarized and illustrated below. The **I-frames** are completely self-referential and they are largest in size. The **P-frames** are predicted frames. The encoder refers to the previous I- or P-frames for redundant image information.



H.264/265 Frame Types

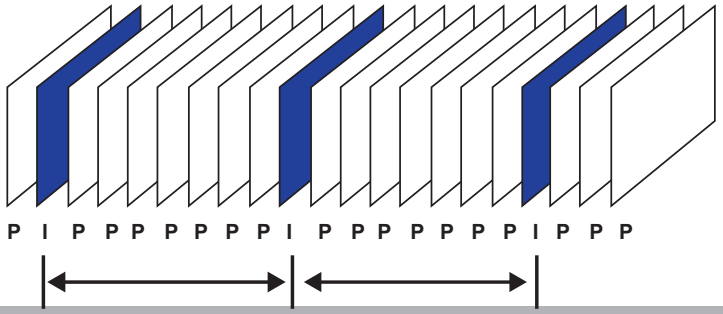
By dynamically prolonging the intervals for I-frames insertion to up to 10 seconds, the bit rates required for streaming a video can be tremendously reduced. When streaming a video of a static scene, the Dynamic Intra frame feature can save up to 53% of bandwidth. The amount of bandwidth thus saved is also determined by the activities in the field of view. If activities occur in the scene, firmware automatically shortens the I-frame insertion intervals in order to maintain image quality. In the low light or night conditions, the P-frames can have a larger size due to the noises, and hence the bandwidth saving effect is also reduced.

Streaming a typical 2MP scene normally requires 3~4Mb/s of bandwidth. With the Dynamic Intra frame function, the bandwidth for streaming a medium-traffic scene can be reduced to 2~3Mb/s, and during the no-traffic period of time, down to 500kb/s.



Static scene

Dynamic Intra Frame w/ static scenes



Activities

Dynamic Intra Frame w/ activities in scenes

With the H.265 codec in an optimal scenario and when Dynamic Intra frame is combined with the Smart Stream function, an 80% of bandwidth saving can be achieved compared with using H.264 without enabling these bandwidth-saving features.

■ Bit rate control

Constrained bit rate:

A complex scene generally produces a larger file size, meaning that higher bandwidth will be needed for data transmission. The bandwidth utilization is configurable to match a selected level, resulting in mutable video quality performance. The bit rates are selectable at the following rates: 20Kbps, 30Kbps, 40Kbps, 50Kbps, 64Kbps, 128Kbps, 256Kbps, 512Kbps, 768Kbps, 1Mbps, 2Mbps, 3Mbps, 4Mbps, 6Mbps, 8Mbps, 10Mbps, 12Mbps, 14Mbps, ~ to 80Mbps. You can also select **Customize** and manually enter a value up to 40Mbps.

- - Target quality: Select a desired quality ranging from Medium to Excellent

  - Maximum bit rate: select a bit rate from the pull-down menu. The bit rate ranges from 20kbps to a maximum of 40Mbps. The bit rate then becomes the Average or Upper bound bit rate number. The Network Camera will strive to deliver video streams around or within the bit rate limitation you impose.

  - Policy: If Frame Rate Priority is selected, the Network Camera will try to maintain the frame rate per second performance, while the image quality will be compromised. If Image quality priority is selected, the Network Camera may drop some video frames in order to maintain image quality.

Smart Q: Select ON or OFF to enable or disable the feature. Smart Q is scene-aware. The Smart Q reduces frame size and bit rate consumption through the following:

- ■ Dynamically adjusting the image quality for scenes in different luminosities while keeping the same imaging quality in low light.
- ■ Endorsing different qualities for the I frames and P frames.
- ■ Dividing a single frame into different sections, and giving these sections different quality values. For a highly complex image section (high frequency area), such as an area with dense vegetation, screen windows, or repeated patterns (wall paper), having a lower quality actually poses little effects on human eyes.

Fixed quality:

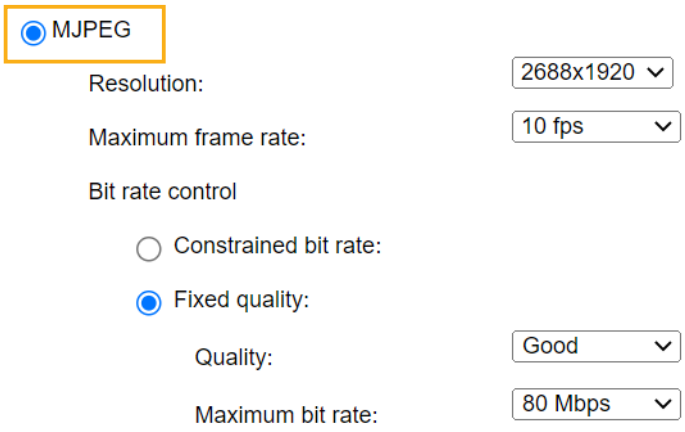
On the other hand, if **Fixed quality** is selected, all frames are transmitted with the same quality; bandwidth utilization is therefore unpredictable. The video quality can be adjusted to the following settings: Medium, Standard, Good, Detailed, and Excellent. You can also select **Customize** and manually enter a value.

Maximum bit rate: With the guaranteed image quality, you might still want to place a bit rate limitation to control the size of video streams for bandwidth and storage concerns. The configurable bit rate starts from 1Mbps to 40Mbps.

The Maximum bit rate setting in the Fixed quality configuration can ensure a reasonable and limited use of network bandwidth. For example, in low light conditions where a Fixed quality setting is applied, video packet sizes can tremendously increase when noises are produced with electrical gains.

You may also manually enter a bit rate number by selecting the **Customized** option.

If the **JPEG** mode is selected, the Network Camera sends consecutive JPEG images to the client, producing a moving effect similar to a filmstrip. Every single JPEG image transmitted guarantees the same image quality, which in turn comes at the expense of variable bandwidth usage. Because the media contents are a combination of JPEG images, no audio data is transmitted to the client. There are three parameters provided in MJPEG mode to control the video performance:



■ Frame size

You can set up different video resolution for different viewing devices. For example, set a smaller frame size and lower bit rate for remote viewing on mobile phones and a larger video size and a higher bit rate for live viewing on web browsers. Note that a larger frame size takes up more bandwidth.

■ Maximum frame rate

This limits the maximum refresh frame rate per second. Set the frame rate higher for smoother video quality.

If the power line frequency is set to 50Hz, the frame rates are selectable at 1fps, 2fps, 3fps, 5fps, 7fps, 10fps, and up to 25fps. If the power line frequency is set to 60Hz, the frame rates are selectable at 1fps, 2fps, 3fps, 5fps, 7fps, 10fps, and up to 30fps. You can also select **Customize** and manually enter a value. The frame rate will decrease if you select a higher resolution.

■ Video quality

Refer to the previous page setting an average or upper bound threshold for controlling the bandwidth consumed for transmitting motion jpegs. The configuration method is identical to that for H.264.

For Constant Bit Rate and other settings, refer to the previous page for details.

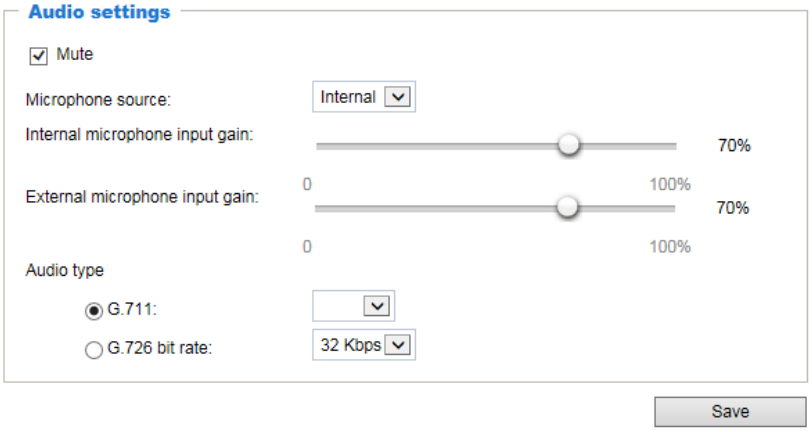
NOTE:

► *Video quality and fixed quality refers to the **compression rate**, so a lower value will produce higher quality.*

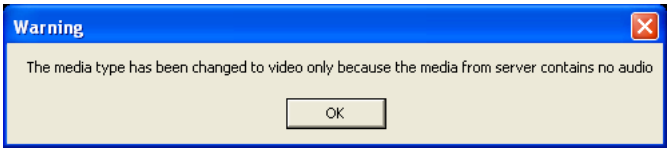
► *Converting high-quality video may significantly increase the CPU loading, and you may encounter streaming disconnection or video loss while capturing a complicated scene. In the event of occurance, we suggest you customize a lower video resolution or reduce the frame rate to obtain smooth video.*

Media > Audio

Audio Settings



Mute: Select this option to disable audio transmission from the Network Camera to all clients. Note that if muted, no audio data will be transmitted even if audio transmission is enabled on the Client Settings page. In that case, the following message is displayed:



Microphone source: Select the source of audio input as the onboard microphone (on the dome cover), or the external microphone you connected via the I/O combo cable.

Internal microphone input gain: Select the gain of the external audio input according to ambient conditions. Adjust the gain from 0% to 100%.

External microphone input gain: Select the gain of the external audio input according to ambient conditions. Adjust the gain from 0% to 100%.

Audio type: Select audio codec and the sampling bit rate .

- G.711 also provides good sound quality and requires about 64Kbps. Select pcmu (μ-Law) or pcma (A-Law) mode.
- G.726 is a speech codec standard covering voice transmission at rates of 16, 24, 32, and 40kbit/s.

When completed with the settings on this page, click **Save** to enable the settings.

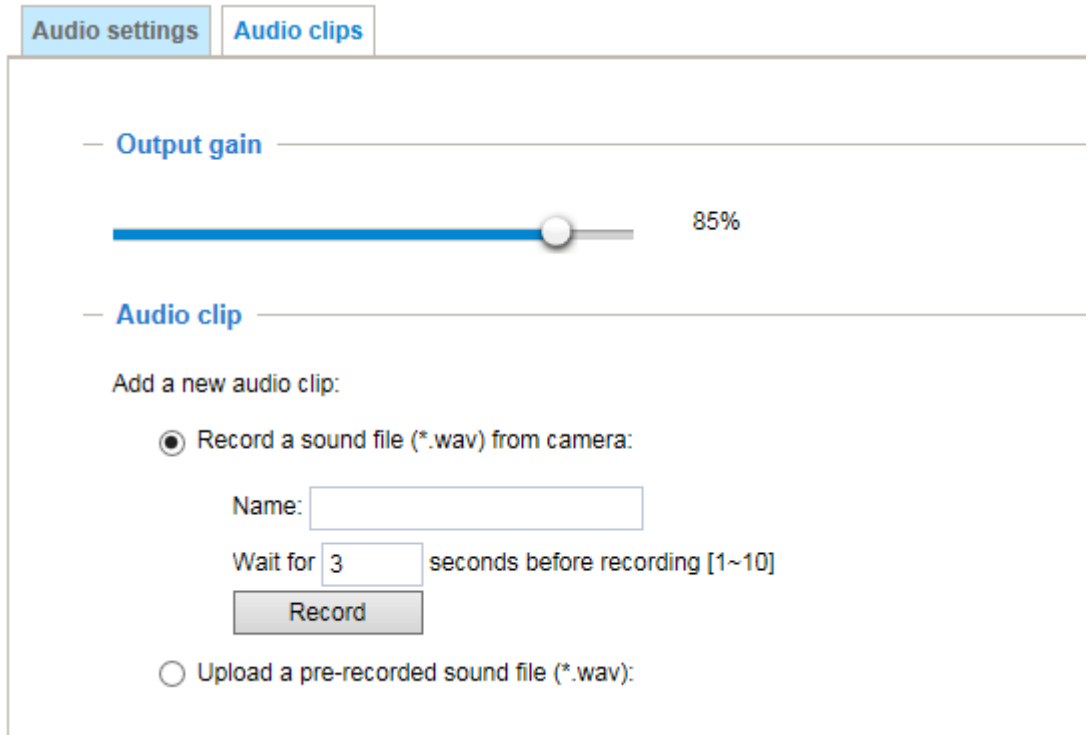
Audio clips

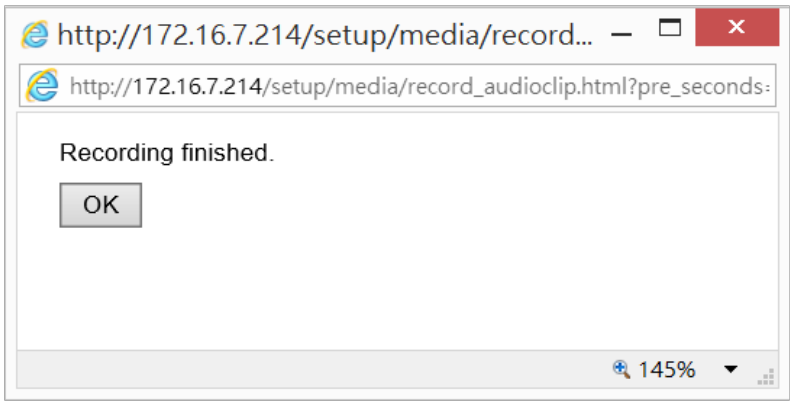
■ Output gain: Use the slide bar to change the audio output gains value.

■ Audio clip: When the camera's audio input is connected to a microphone, you can record a short period of audio recordings (1 to 10 seconds). You can also use the camera's embedded microphone to record an audio clip, if available. Because the memory space is limited, a recording count down will be available on screen.

You can also upload an audio file to the camera's flash memory. With amplified speakers, you can playback the audio, e.g., to deter an intruder. A maximum of 2 audio clips in wav format are supported. The maximum size of the audio file to be uploaded is 2,000Kbytes.

The voice alert is enabled in the **Event settings** > **action** > **Play Audio Clip**. The action can be associated with triggering conditions.

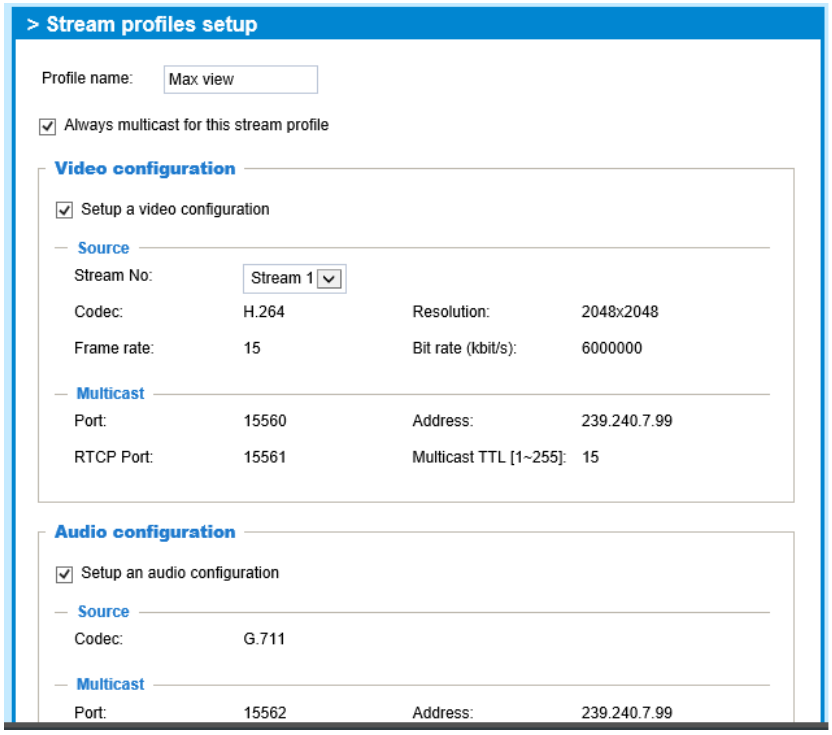




Media profiles

You can configure a different video stream for each of the 3 default profiles, Max. view, Recording, Live view, and App.

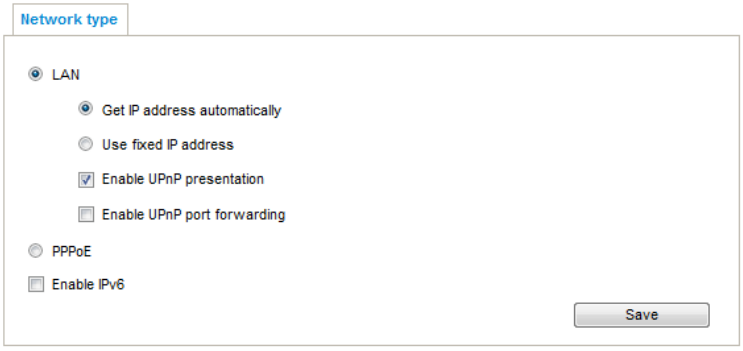
The related video stream information will display, including stream number, resolution, codec used, frame rate, etc. The Multicast port number, and address for video, audio, and Metadata configuration will also be listed.



Network > General settings

This section explains how to configure a wired network connection for the Network Camera.

Network Type

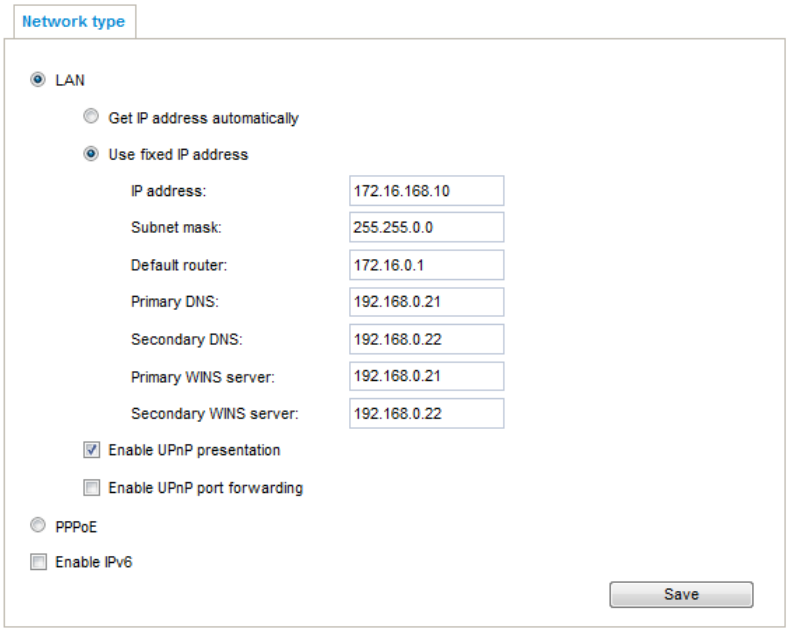


LAN

Select this option when the Network Camera is deployed on a local area network (LAN) and is intended to be accessed by local computers. The default setting for the Network Type is LAN. Please rememer to click on the **Save** button when you complete the Network setting.

Get IP address automatically: Select this option to obtain an available dynamic IP address assigned by the DHCP server each time the camera is connected to the LAN.

Use fixed IP address: Select this option to manually assign a static IP address to the Network Camera.



1. You can make use of VIVOTEK Installation Wizard 2 on the software CD to easily set up the Network Camera on LAN. Please refer to Software Installation on page 23 for details.
2. Enter the Static IP, Subnet mask, Default router, and Primary DNS provided by your ISP or network administrator.

Subnet mask: This is used to determine if the destination is in the same subnet. The default value is “255.255.255.0”.

Default router: This is the gateway used to forward frames to destinations in a different subnet. Invalid router setting will disable the transmission to destinations across different subnets.

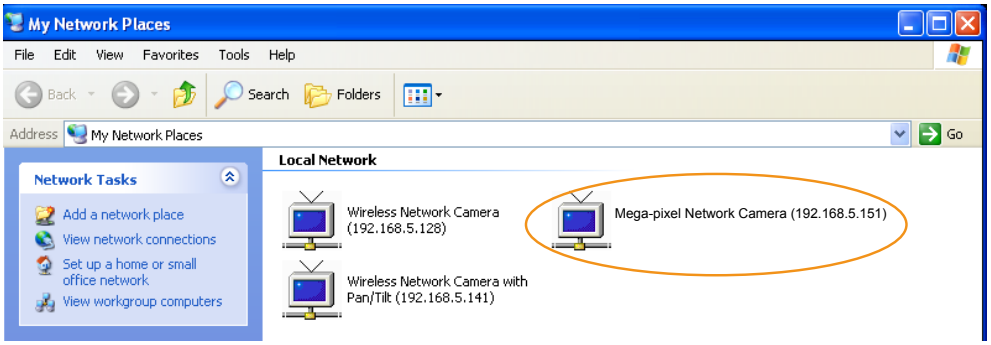
Primary DNS: The primary domain name server that translates hostnames into IP addresses.

Secondary DNS: Secondary domain name server that backups the Primary DNS.

Primary WINS server: The primary WINS server that maintains the database of computer names and IP addresses.

Secondary WINS server: The secondary WINS server that maintains the database of computer names and IP addresses.

Enable UPnP presentation: Select this option to enable UPnP™ presentation for your Network Camera so that whenever a Network Camera is presented to the LAN, the shortcuts to connected Network Cameras will be listed in My Network Places. You can click the shortcut to link to the web browser. Currently, UPnP™ is supported by Windows XP or later. Note that to utilize this feature, please make sure the UPnP™ component is installed on your computer.



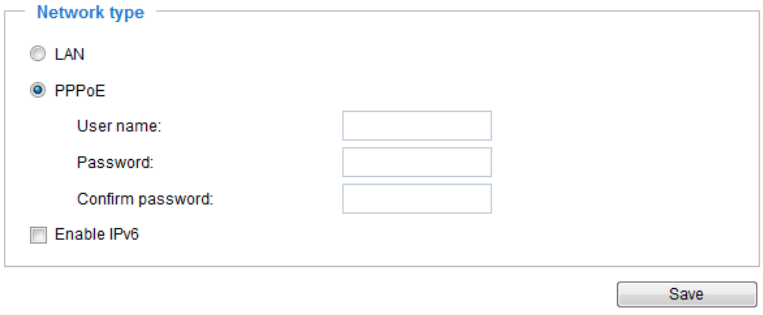
Enable UPnP port forwarding: To access the Network Camera from the Internet, select this option to allow the Network Camera to open ports automatically on the router so that video streams can be sent out from a LAN. To utilize of this feature, make sure that your router supports UPnP™ and it is activated.

PPPoE (Point-to-point over Ethernet)

Select this option to configure your Network Camera to make it accessible from anywhere as long as there is an Internet connection. Note that to utilize this feature, it requires an account provided by your ISP.

Follow the steps below to acquire your Network Camera's public IP address.

1. Set up the Network Camera on the LAN.
2. Go to Configuration > Event > Event settings > Add server (please refer to Add server on page 139) to add a new email or FTP server.
3. Go to Configuration > Event > Event settings > Add media (please refer to Add media on page 147).
   Select System log so that you will receive the system log in TXT file format which contains the Network Camera's public IP address in your email or on the FTP server.
4. Go to Configuration > Network > General settings > Network type. Select PPPoE and enter the user name and password provided by your ISP. Click **Save** to enable the setting.



5. The Network Camera will reboot.
6. Disconnect the power to the Network Camera; remove it from the LAN environment.

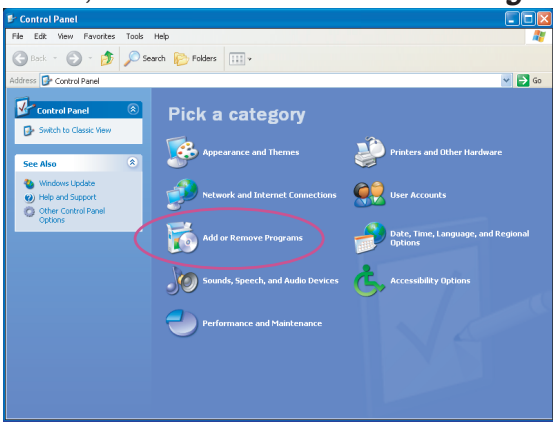
NOTE:

► *If the default ports are already used by other devices connected to the same router, the Network Camera will select other ports for the Network Camera.*

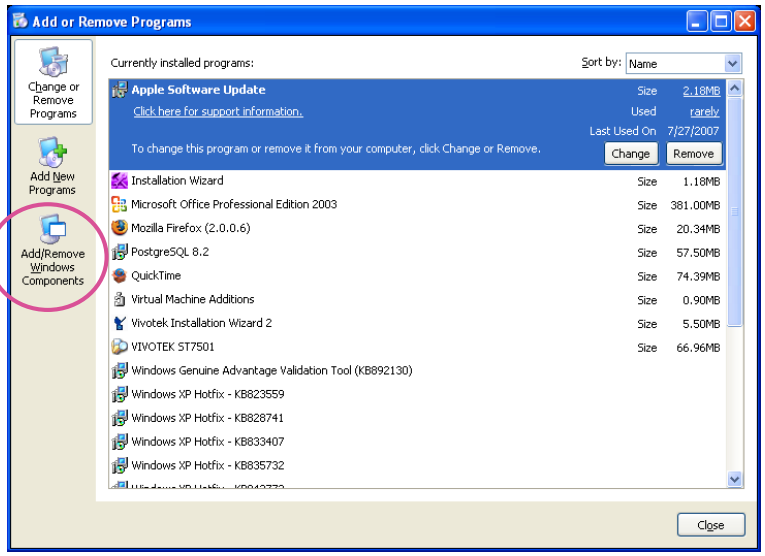
► *If UPnP™ is not supported by your router, you will see the following message:*
Error: Router does not support UPnP port forwarding.

► *Steps to enable the UPnP™ user interface on your computer:*
Note that you must log on to the computer as a system administrator to install the UPnP™ components.

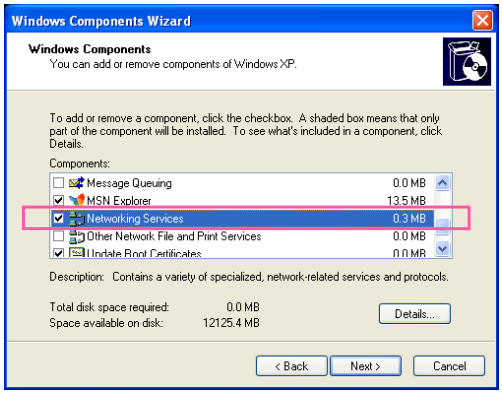
1. *Go to Start, click **Control Panel**, then click **Add or Remove Programs**.*



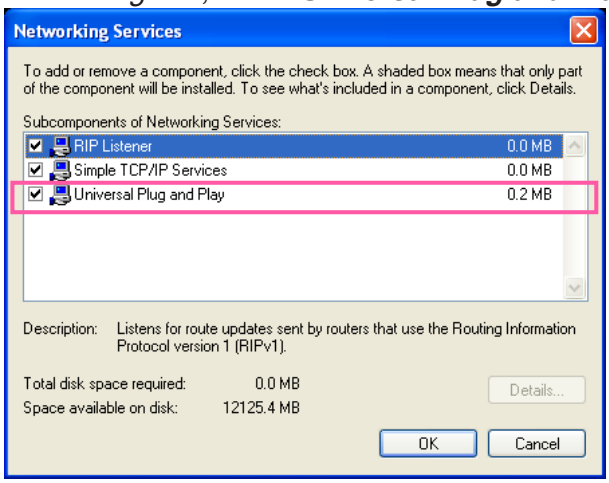
2. *In the Add or Remove Programs dialog box, click **Add/Remove Windows Components**.*



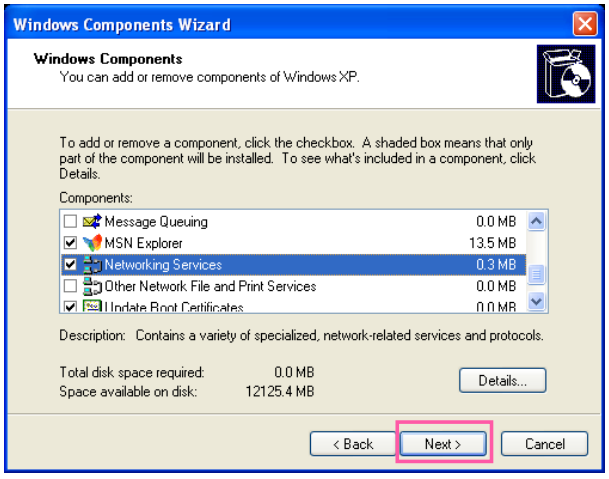
3. *In the Windows Components Wizard dialog box, select **Networking Services** and click **Details**.*



4. In the Networking Services dialog box, select **Universal Plug and Play** and click **OK**.



5. Click **Next** in the following window.



6. Click **Finish**. UPnP™ is enabled.

► *How does UPnP™ work?*
UPnP™ networking technology provides automatic IP configuration and dynamic discovery of devices added to a network. Services and capabilities offered by networked devices, such as printing and file sharing, are available among each other without the need for cumbersome network configuration. In the case of Network Cameras, you will see Network Camera shortcuts under My Network Places.

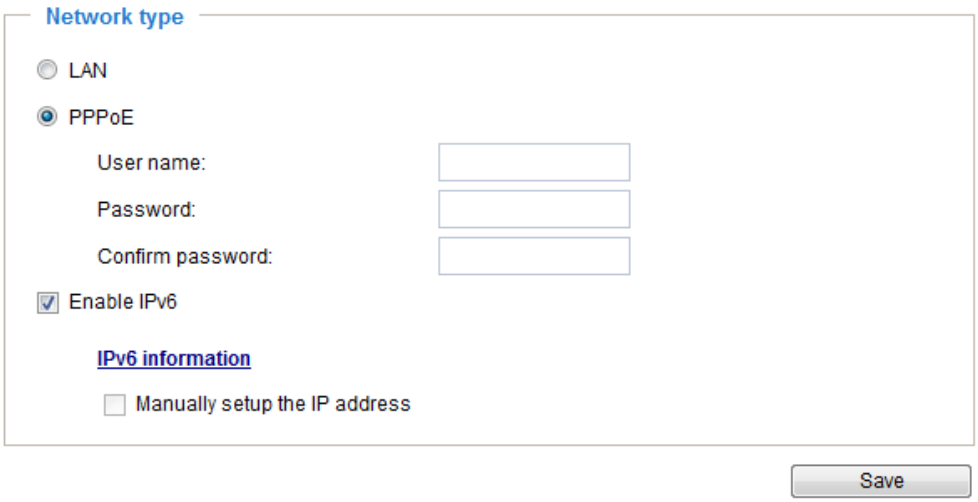
► *Enabling UPnP port forwarding allows the Network Camera to open a secondary HTTP port on the router-not HTTP port-meaning that you have to add the secondary HTTP port number to the Network Camera's public address in order to access the Network Camera from the Internet. For example, when the HTTP port is set to 80 and the secondary HTTP port is set to 8080, refer to the list below for the Network Camera's IP address.*

From the Internet	In LAN
http://203.67.124.123:8080	http://192.168.4.160 or http://192.168.4.160:8080

► *If the PPPoE settings are incorrectly configured or the Internet access is not working, restore the Network Camera to factory default; please refer to Restore on page 68 for details. After the Network Camera is reset to factory default, it will be accessible on the LAN.*

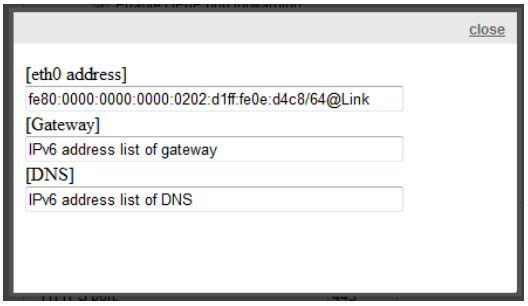
Enable IPv6

Select this option and click **Save** to enable IPv6 settings.
Please note that this only works if your network environment and hardware equipment support IPv6. The browser should be Microsoft® Internet Explorer 6.5, Mozilla Firefox 3.0 or above.



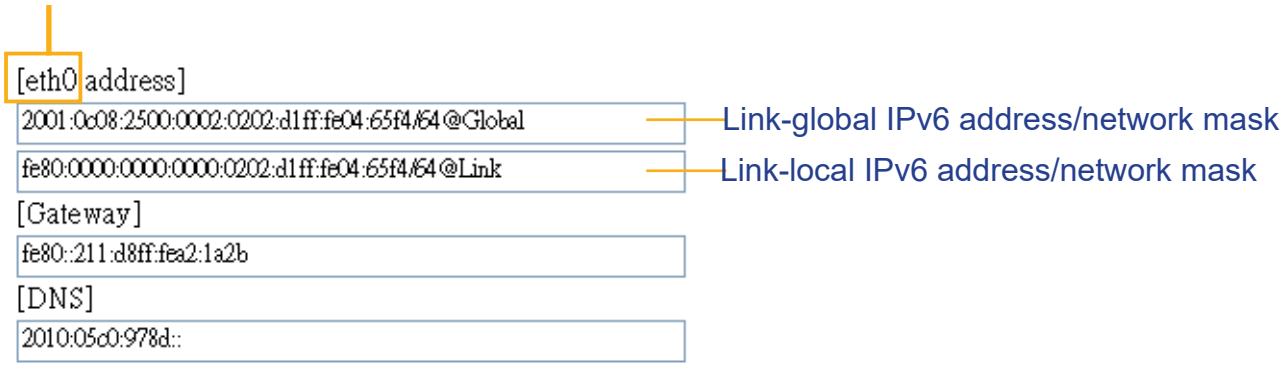
When IPv6 is enabled, by default, the network camera will listen to router advertisements and be assigned with a link-local IPv6 address accordingly.

IPv6 Information: Click this button to obtain the IPv6 information as shown below.



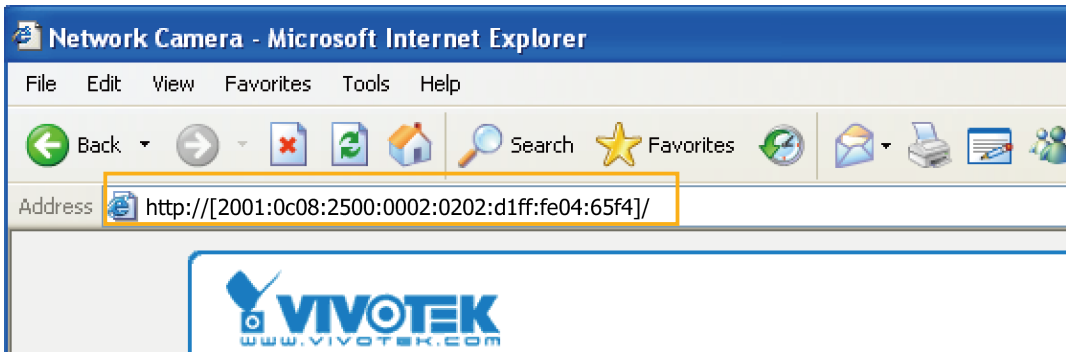
If your IPv6 settings are successful, the IPv6 address list will be listed in the pop-up window. The IPv6 address will be displayed as follows:

Refers to Ethernet



Please follow the steps below to link to an IPv6 address:
1. Open your web browser.
2. Enter the link-global or link-local IPv6 address in the address bar of your web browser.
3. The format should be:

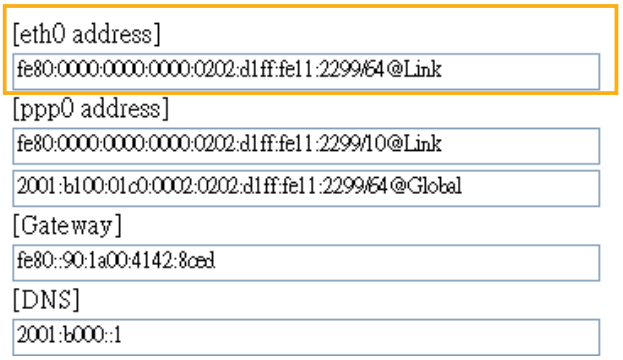
4. Press **Enter** on the keyboard or click **Refresh** button to refresh the webpage.
For example:



NOTE:

► *If you have a Secondary HTTP port (the default value is 8080), you can also link to the webpage using the following address format: (Please refer to **HTTP** streaming on page 102 for detailed information.)*

► *If you choose PPPoE as the Network Type, the [PPP0 address] will be displayed in the IPv6 information column as shown below.*



Manually setup the IP address: Select this option to manually set up IPv6 settings if your network environment does not have DHCPv6 server and router advertisements-enabled routers. If you check this item, the following blanks will be displayed for you to enter the corresponding information:


Enable IPv6
IPv6 information
Manually setup the IP address
Optional IP address / Prefix length
/ 64
Optional default router
Optional primary DNS

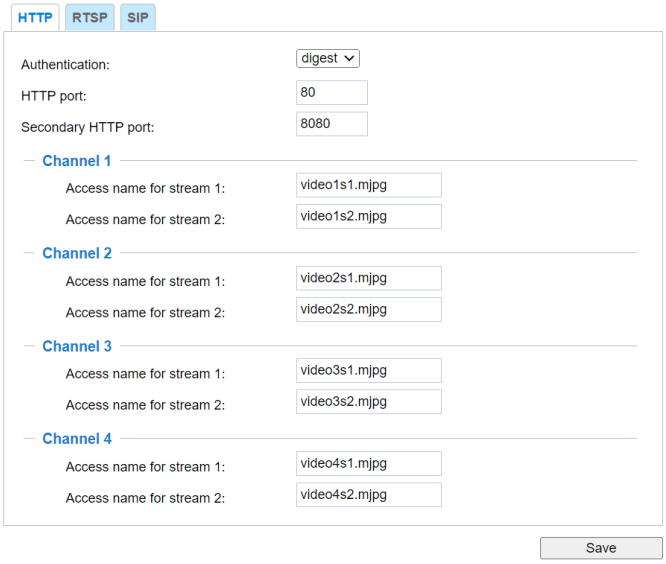
Network > Streaming protocols

NOTE:

The metadata information can only be transmitted through the HTTP main port. Metadata is not available through the secondary HTTP port.

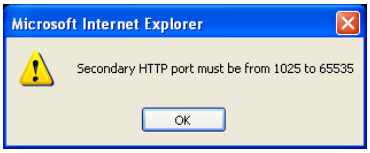
HTTP streaming

To utilize HTTP authentication, make sure that your have set a password for the Network Camera first; please refer to Security > User account on page 116 for details.



Authentication: Depending on your network security requirements, the Network Camera provides two types of security settings for an HTTP transaction: basic and digest.
If **basic** authentication is selected, the password is sent in plain text format and there can be potential risks of being intercepted. If **digest** authentication is selected, user credentials are encrypted using MD5 algorithm and thus provide better protection against unauthorized accesses.

HTTP port / Secondary HTTP port: By default, the HTTP port is set to 80 and the secondary HTTP port is set to 8080. They can also be assigned to another port number between 1025 and 65535. If the ports are incorrectly assigned, the following warning messages will be displayed:



To access the Network Camera on the LAN, both the HTTP port and secondary HTTP port can be used to access the Network Camera. For example, when the HTTP port is set to 80 and the secondary HTTP port is set to 8080, refer to the list below for the Network Camera's IP address.

On the LAN
http://192.168.4.160 or http://192.168.4.160:8080

Access name for stream 1 or 2: This Network camera supports multiple streams simultaneously. The access name is used to identify different video streams. Users can click **Media > Video > Stream settings** to configure the video quality of linked streams. For more information about how to configure the video quality, please refer to Stream settings on page 83.

When using **Mozilla Firefox** to access the Network Camera and the video mode is set to JPEG, users will receive video comprised of continuous JPEG images. This technology, known as "server push", allows the Network Camera to feed live pictures to Mozilla Firefox.

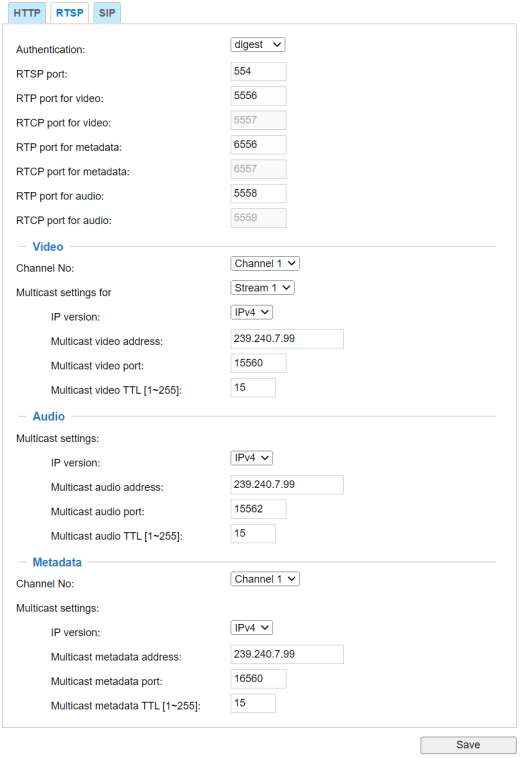
URL command -- http://<ip address>:<http port>/<access name for stream 1 or 2>
For example, when the Access name for Channel 1 stream 2 is set to video1s2.mjpg:
1. Launch Mozilla Firefox or Netscape.
2. Type the above URL command in the address bar. Press **Enter**.
3. The JPEG images will be displayed in your web browser.

NOTE:

► *Microsoft® Internet Explorer does not support server push technology; therefore, you will not be able to access a video stream using http://<ip address>:<http port>/<access name for stream 1, or 2> .*

RTSP Streaming

To utilize RTSP streaming authentication, make sure that you have set a password for controlling the access to video stream first. Please refer to Security > User account on page 116 for details.

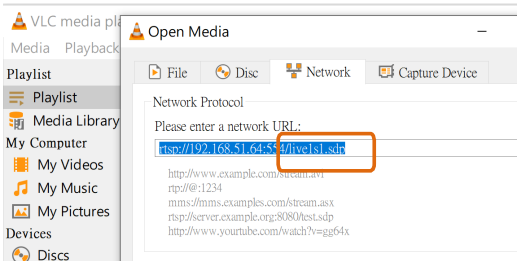


Authentication: Depending on your network security requirements, the Network Camera provides three types of security settings for streaming via RTSP protocol: disable, basic, and digest.

If **basic** authentication is selected, the password is sent in plain text format, but there can be potential risks of it being intercepted. If **digest** authentication is selected, user credentials are encrypted using MD5 algorithm, thus providing better protection against unauthorized access.
The availability of the RTSP streaming for the three authentication modes is listed in the following table:

	VLC
Disable	O
Basic	O
Digest	X

Access name for Channel # and stream #: This Network camera supports multiple streams simultaneously. The access name is used to differentiate the streaming source.
If you want to use an RTSP player to access the Network Camera, you **HAVE TO** set the video mode to H.265 or 264 and use the following RTSP URL command to request transmission of the streaming data.
rtsp://<ip address>:<rtsp port>/<access name for stream1 ~ 4>
For example, when the access name for stream 1 is set to live1s1.sdp:
1. Launch an RTSP player.
2. Choose File > Open URL. A URL dialog box will pop up.
3. Type the above URL command in the address field.
4. The live video will be displayed in your player as shown below.



IMPORTANT:

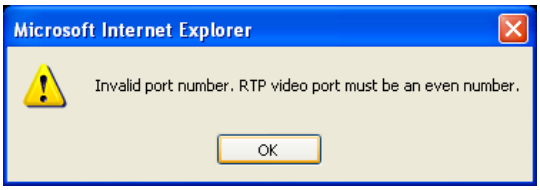
The Multicast metadata port is utilized by VIVOTEK VADP modules to transfer video analytics results, PTZ stream, textual data, and event messages between the camera and the client side running and observing the video analysis. If your client side computer is located outside the local network, you may need to open the associated TCP port on routers and firewall.

RTSP port /RTP port for video, audio/ RTCP port for video, audio

- RTSP (Real-Time Streaming Protocol) controls the delivery of streaming media. By default, the port number is set to 554.
- The RTP (Real-time Transport Protocol) is used to deliver video and audio data to the clients. By default, the RTP port for video is set to 5556 and the RTP port for audio is set to 5558.
- The RTCP (Real-time Transport Control Protocol) allows the Network Camera to transmit the data by monitoring the Internet traffic volume. By default, the RTCP port for video is set to 5557 and the RTCP port for audio is set to 5559.

The ports can be changed to values between 1025 and 65535. The RTP port must be an even number and the RTCP port is the RTP port number plus one, and thus is always an odd number. When the RTP port changes, the RTCP port will change accordingly.

If the RTP ports are incorrectly assigned, the following warning message will be displayed:

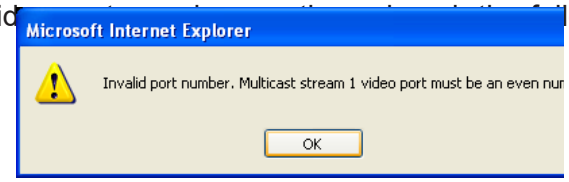


Multicast settings for stream #1 ~ #3: Click the items to display the detailed configuration information. Select the Always multicast option to enable multicast for streams #1 ~ #3.

Unicast video transmission delivers a stream through point-to-point transmission; multicast, on the other hand, sends a stream to the multicast group address and allows multiple clients to acquire the stream at the same time by requesting a copy from the multicast group address. Therefore, enabling multicast can effectively save Internet bandwith.

The ports can be changed to values between 1025 and 65535. The multicast RTP port must be an even number and the multicast RTCP port number is the multicast RTP port number plus one, and thus is always odd. When the multicast RTP port changes, the multicast RTCP port will change accordingly.

If the multicast RTP vid lowing warning message will be displayed:



Multicast TTL [1~255]: The multicast TTL (Time To Live) is the value that tells the router the range a packet can be forwarded. Each hop decreases TTL by one.

Initial TTL	Scope
0	Restricted to the same host
1	Restricted to the same subnetwork
15	Restricted to the same site
64	Restricted to the same region
128	Restricted to the same continent
255	Unrestricted in scope

IMPORTANT:

The Multicast metadata port is utilized by VIVOTEK VADP modules to transfer video analytics results, PTZ stream, textual data, and event messages between the camera and the client side running and observing the video analysis. If your client side computer is located outside the local network, you may need to open the associated TCP port on routers and firewall.

SIP

SIP is short for Session Initiation Protocol. If necessary, you can change the default port number, 5060, to one between 1025 and 65535.

Two way audio port: By default, the two way audio port is set to 5060. Also, it can also be assigned to another port number between 1025 and 65535.

The Network Camera supports two way audio communication so that operators can transmit and receive audio simultaneously. By using the Network Camera's built-in or external microphone and an external speaker, you can communicate with people around the Network Camera.

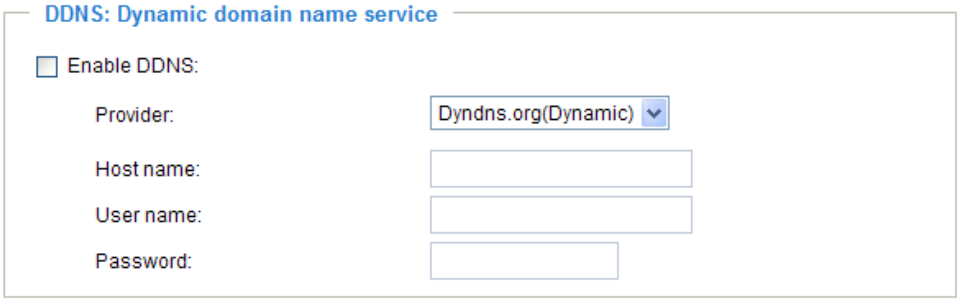
Note that as JPEG only transmits a series of JPEG images to the client, to enable the two-way audio function, make sure the video mode is set to "H.264" on the Media > Video > Stream settings page and the media option is set to "Media > Video > Stream settings" on the Client Settings page. Please refer to Client Settings on page 50 and Stream settings on page 86.

Network > DDNS

This section explains how to configure the dynamic domain name service for the Network Camera. DDNS is a service that allows your Network Camera, especially when assigned with a dynamic IP address, to have a fixed host and domain name.

Manual setup

DDNS: Dynamic domain name service

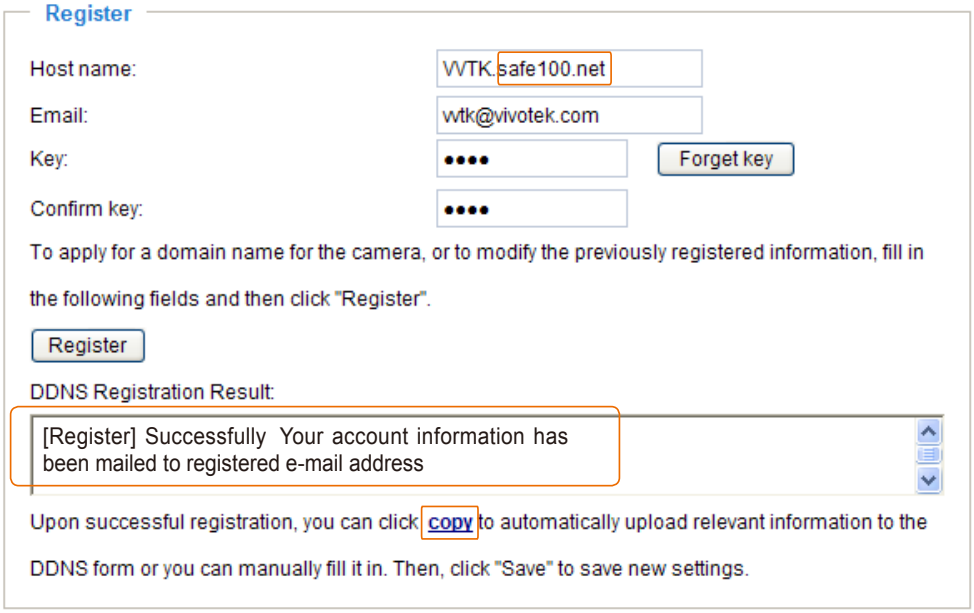


Enable DDNS: Select this option to enable the DDNS setting.

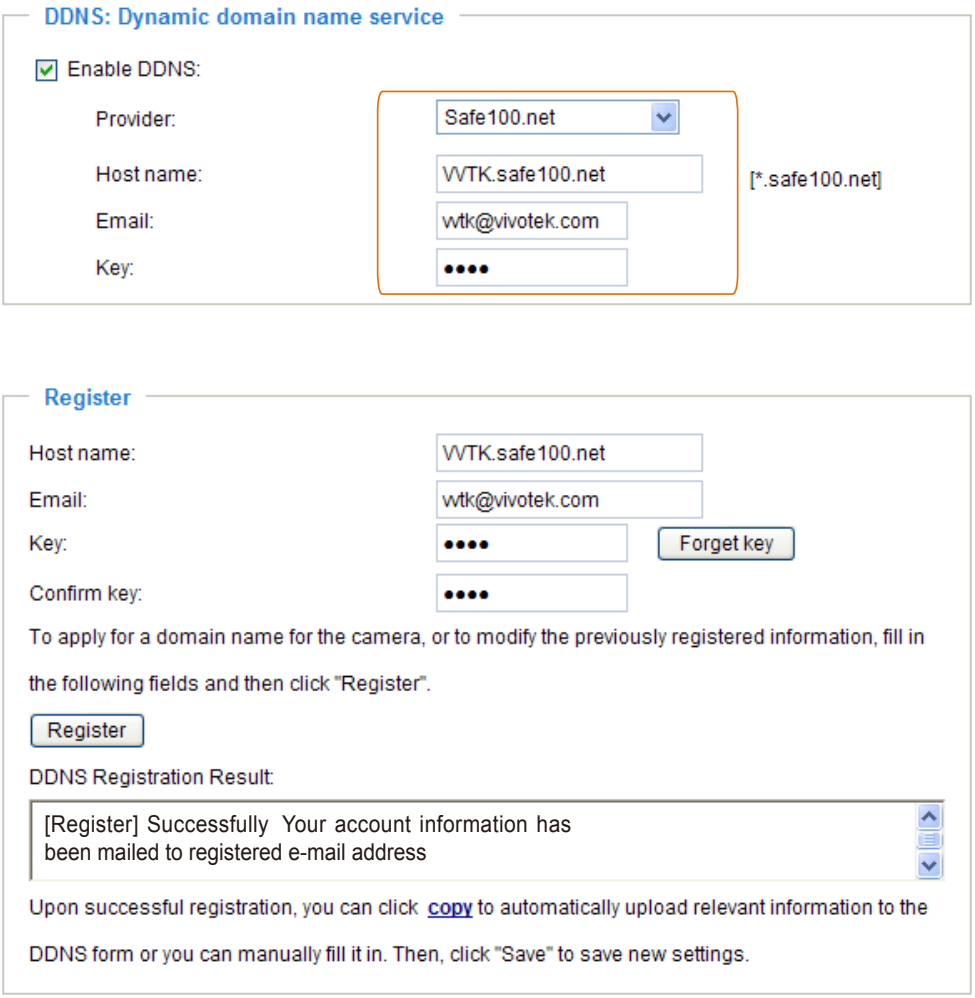
Provider: Select a DDNS provider from the provider drop-down list.
VIVOTEK offers **Safe100.net**, a free dynamic domain name service, to VIVOTEK customers. It is recommended that you register **Safe100.net** to access VIVOTEK's Network Cameras from the Internet. Additionally, we offer other DDNS providers, such as Dyndns.org(Dynamic), Dyndns.org(Custom), TZO.com, DHS.org, CustomSafe100, dyn-interfree.it.
Note that before utilizing this function, please apply for a dynamic domain account first.

■ Safe100.net

1. In the DDNS column, select **Safe100.net** from the drop-down list. Click **I accept** after reviewing the terms of the Service Agreement.
2. In the Register column, fill in the Host name (xxxx.safe100.net), Email, Key, and Confirm Key, and click **Register**. After a host name has been successfully created, a success message will be displayed in the DDNS Registration Result column.



3. Click **Copy** and all the registered information will automatically be uploaded to the corresponding fields in the DDNS column at the top of the page as seen in the picture.



4. Select Enable DDNS and click **Save** to enable the setting.

■ CustomSafe100

VIVOTEK offers documents to establish a CustomSafe100 DDNS server for distributors and system integrators. You can use CustomSafe100 to register a dynamic domain name if your distributor or system integrators offer such services.

1. In the DDNS column, select CustomSafe100 from the drop-down list.
2. In the Register column, fill in the Host name, Email, Key, and Confirm Key; then click **Register**. After a host name has been successfully created, you will see a success message in the DDNS Registration Result column.
3. Click **Copy** and all for the registered information will be uploaded to the corresponding fields in the DDNS column.
4. Select Enable DDNS and click **Save** to enable the setting.

Forget key: Click this button if you have forgotten the key to Safe100.net or CustomSafe100. Your account information will be sent to your email address.

Refer to the following links to apply for a dynamic domain account when selecting other DDNS providers:

■ Dyndns.org(Dynamic) / Dyndns.org(Custom): visit http://www.dyndns.com/

Network > QoS (Quality of Service)

Quality of Service refers to a resource reservation control mechanism, which guarantees a certain quality to different services on the network. Quality of service guarantees are important if the network capacity is insufficient, especially for real-time streaming multimedia applications. Quality can be defined as, for instance, a maintained level of bit rate, low latency, no packet dropping, etc.

The following are the main benefits of a QoS-aware network:
- The ability to prioritize traffic and guarantee a certain level of performance to the data flow.
- The ability to control the amount of bandwidth each application may use, and thus provide higher reliability and stability on the network.

Requirements for QoS

To utilize QoS in a network environment, the following requirements must be met:
- All network switches and routers in the network must include support for QoS.
- The network video devices used in the network must be QoS-enabled.

QoS models

CoS (the VLAN 802.1p model)

IEEE802.1p defines a QoS model at OSI Layer 2 (Data Link Layer), which is called CoS, Class of Service. It adds a 3-bit value to the VLAN MAC header, which indicates the frame priority level from 0 (lowest) to 7 (highest). The priority is set up on the network switches, which then use different queuing disciplines to forward the packets.

Below is the setting column for CoS. Enter the **VLAN ID** of your switch (0~4095) and choose the priority for each application (0~7).

If you assign Video the highest level, the switch will handle video packets first.

NOTE:

► *A VLAN Switch (802.1p) is required. Web browsing may fail if the CoS setting is incorrect.*

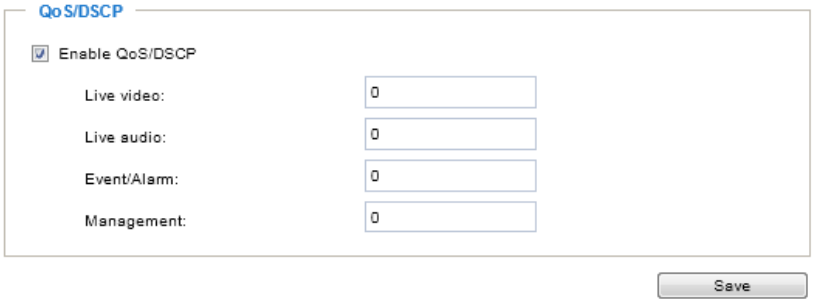
► *The Class of Service technologies do not guarantee a level of service in terms of bandwidth and delivery time; they offer a "best-effort." Users can think of CoS as "coarsely-grained" traffic control and QoS as "finely-grained" traffic control.*

► *Although CoS is simple to manage, it lacks scalability and does not offer end-to-end guarantees since it is based on L2 protocol.*

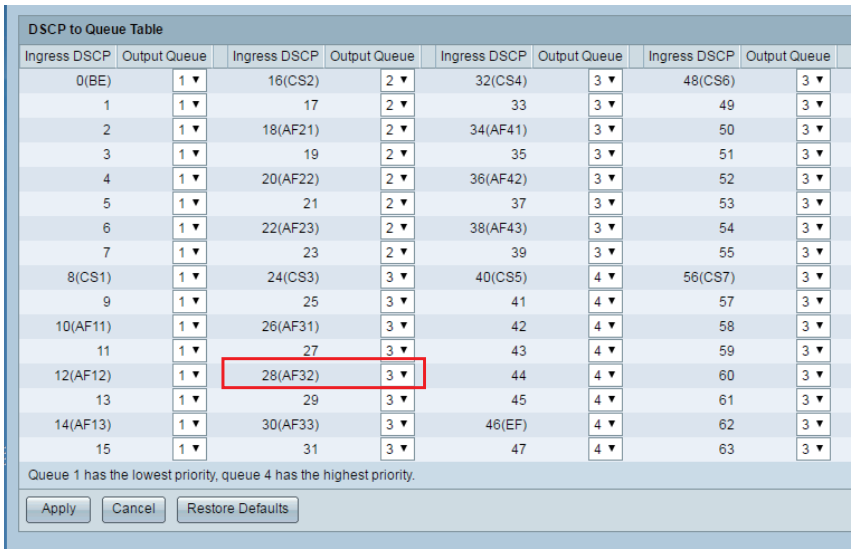
QoS/DSCP (the DiffServ model)

DSCP-ECN defines QoS at Layer 3 (Network Layer). The Differentiated Services (DiffServ) model is based on packet marking and router queuing disciplines. The marking is done by adding a field to the IP header, called the DSCP (Differentiated Services Codepoint). This is a 6-bit field that provides 64 different class IDs. It gives an indication of how a given packet is to be forwarded, known as the Per Hop Behavior (PHB). The PHB describes a particular service level in terms of bandwidth, queueing theory, and dropping (discarding the packet) decisions. Routers at each network node classify packets according to their DSCP value and give them a particular forwarding treatment; for example, how much bandwidth to reserve for it.

Below are the setting options of DSCP (DiffServ Codepoint). Specify the DSCP value for each application (0~63).



Note that different vendors of network devices might have different methodologies and unique implementations. Shown below is a sample corresponding information from a Cisco switch. You should enter a DSCP tag value according to the information provided by the network devices.

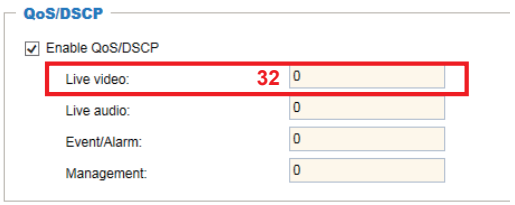


DSCP to Queue Table

Ingress DSCP	Output Queue	Ingress DSCP	Output Queue	Ingress DSCP	Output Queue	Ingress DSCP	Output Queue
0(BE)	1	16(CS2)	2	32(CS4)	3	48(CS6)	3
1	1	17	2	33	3	49	3
2	1	18(AF21)	2	34(AF41)	3	50	3
3	1	19	2	35	3	51	3
4	1	20(AF22)	2	36(AF42)	3	52	3
5	1	21	2	37	3	53	3
6	1	22(AF23)	2	38(AF43)	3	54	3
7	1	23	2	39	3	55	3
8(CS1)	1	24(CS3)	3	40(CS5)	4	56(CS7)	3
9	1	25	3	41	4	57	3
10(AF11)	1	26(AF31)	3	42	4	58	3
11	1	27	3	43	4	59	3
12(AF12)	1	28(AF32)	3	44	4	60	3
13	1	29	3	45	4	61	3
14(AF13)	1	30(AF33)	3	46(EF)	4	62	3
15	1	31	3	47	4	63	3

Queue 1 has the lowest priority, queue 4 has the highest priority.

Apply Cancel Restore Defaults



QoS Baseline/Technical Marketing Classification and Marking Recommendations					
Application	Layer3 Classification			Layer 2 CoS/MPLS EXP	
	IPP	PHB	DSCP		
IP Routing	6	CS6	48	6	
Voice	5	EF	46	5	
Interactive Video	4	AF41	34	4	QoS B
Streaming-Video	4	CS4	32	4	
Locally-defined Mission-Critical Data	3	-	25	3	
Call-signaling	3	AF31/CS3	26/24	3	
Transactional Data	2	AF21	18	2	
Network Management	2	CS2	16	2	
Bulk Data	1	AF11	10	1	

Network > SNMP (Simple Network Management Protocol)

This section explains how to use the SNMP on the network camera. The Simple Network Management Protocol is an application layer protocol that facilitates the exchange of management information between network devices. It helps network administrators to remotely manage network devices and find, solve network problems with ease.

■ The SNMP consists of the following three key components:
1. Manager: Network-management station (NMS), a server which executes applications that monitor and control managed devices.
2. Agent: A network-management software module on a managed device which transfers the status of managed devices to the NMS.
3. Managed device: A network node on a managed network. For example: routers, switches, bridges, hubs, computer hosts, printers, IP telephones, network cameras, web server, and database.

Before configuring SNMP settings on the this page, please enable your NMS first.

SNMP Configuration

Enable SNMPv1, SNMPv2c
Select this option and enter the names of Read/Write community and Read Only community according to your NMS settings.

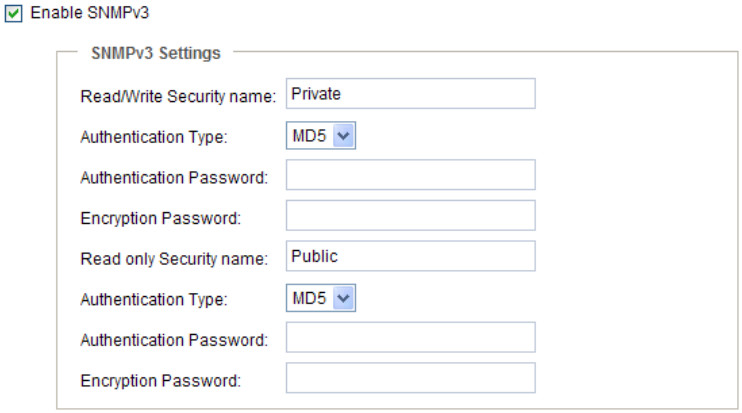
Enable SNMPv3
This option contains cryptographic security, a higher security level, which allows you to set the Authentication password and the Encryption password.

■ Security name: According to your NMS settings, choose Read/Write or Read Only and enter the community name.

■ Authentication type: Select MD5 or SHA as the authentication method.

■ Authentication password: Enter the password for authentication (at least 8 characters).

■ Encryption password: Enter a password for encryption (at least 8 characters).



Network > FTP

The newer firmware disabled the FTP port for security concerns. You can manually enable the FTP server service to enable the FTP function. You can disable the FTP server function when it is not in use.

FTP port: The FTP server allows the user to save recorded video clips. You can utilize VIVOTEK's Shepherd utility to upgrade the firmware via FTP server. By default, the FTP port is set to 21. It can also be assigned to another port number between 1025 and 65535.

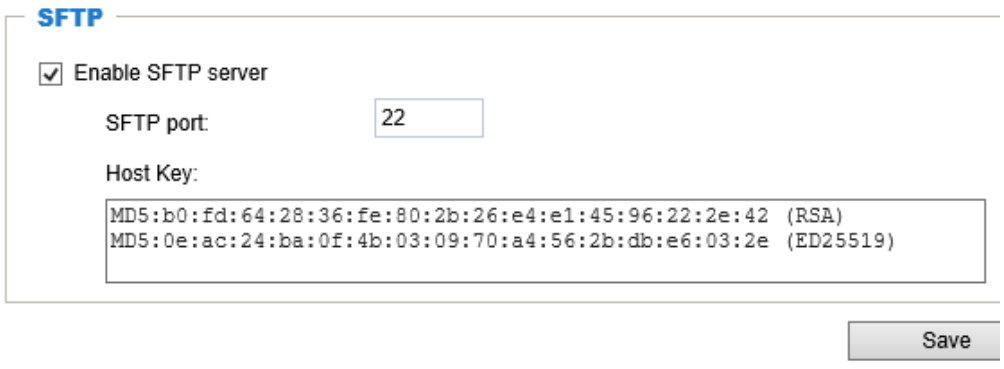
Tips:

You can FTP the camera's IP address to download videos recorded in the SD card, or use the "http://ip/cgi-bin/admin/lsctrl.cgi?cmd=search" command to examine the recorded files on your SD card.

SFTP:

This is the embedded SFTP client. Host Key: A host key is the SFTP server's public key. Ensuring the SFTP server is validated is an important aspect of the SFTP protocol. It is designed to protect against man-in-the-middle attacks where the hacker intercepts and relays an impersonated message to the other party.

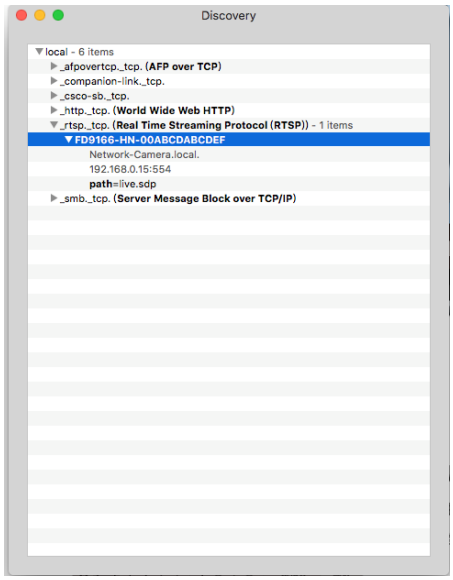
Click the **Save** button and the camera SFTP server MD5 key will display. The default format is ED25519 and RSA.



Bonjour

To access the camera from a Mac computer, go to Safari, click on Bonjour and select the camera from a drop-down list.

You can go to Safari > Preferences to enter your user name and password, and provide the root password the first time you access the camera. The camera main page will open in your browser.



Some later iOSes may come without the Bonjour option. Install the Discovery utility instead.

Find the Discovery (formerly Bonjour Browser) from the Mac App Store.

Discovery is a utility that displays all the Bonjour services on your local network or on Wide-Area Bonjour domains. The utility is previously called Bonjour Browser, it is now distributed on the Mac App Store.

Discovery requires macOS 10.12 or higher. For older versions of Mac OS you can download the old version of Bonjour Browser.

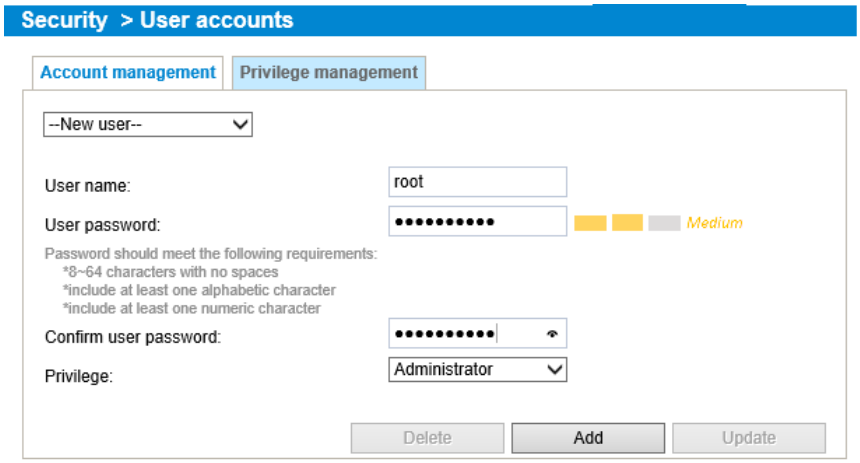
Bonjour Browser (obsolete)
http://www.tildesoft.com/files/BonjourBrowser.dmg - Version 1.5.6

Discovery for iOS
https://itunes.apple.com/us/app/discovery-dns-sd-browser/id305441017?mt=8

Security > User accounts

This section explains how to enable password protection and create multiple accounts.

Account management



The administrator account name is “root”, which is permanent and can not be deleted. If you want to add more accounts in the Account management window, please apply the password for the “root” account first.

The administrator can create up to 20 user accounts.

To create a new user,

1. Click to unfold the pull-down menu. Select **New user**.
2. Enter the new user’s name and password. Type the password identically in both text boxes.

   Some, but not all special ASCII characters are supported: !, $, %, -, ., @, ^, _, and ~. You can use them in the password combination.

   The strength of your password combination is shown on the right, use the combination of alphabetic, numeric, upper case, and lower case characters until the password strength is good enough.

3. Select the privilege level for the new user account. Click **Add** to enable the setting.
   The privilege levels are listed below:

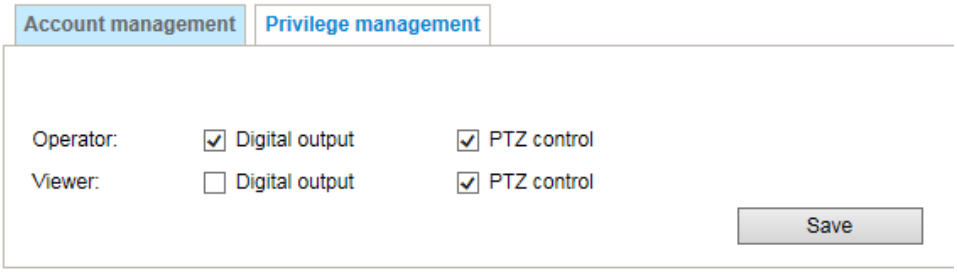
Administrator	Full control
Operator	Control DO, white-light illuminator, snapshot, and PTZ; the operator is unable to enter the camera Configuration page.
Viewer	Control DO, white-light illuminator, view, listen, PTZ, and talk through the camera interface.

Access rights are sorted by user privilege (Administrator, Operator, and Viewer). Only administrators can access the Configuration page. Although operators cannot access the Configuration page, they can use the URL Commands to get and set the value of parameters. Viewers can only access the main page for live viewing.

Here you can also change a user’s access rights or delete user accounts.

1. Select an existing account to modify.
2. Make necessary changes and click **Update** or **Delete** to enable the setting.

Privilege management



Digital Output & PTZ control: You can modify the management privilege as operators or viewers. Select or de-select the checkboxes, and then click **Save** to enable the settings. If you give Viewers the privilege, Operators will also have the ability to control the Network Camera through the main page.

Security > HTTPS (Hypertext Transfer Protocol over SSL)

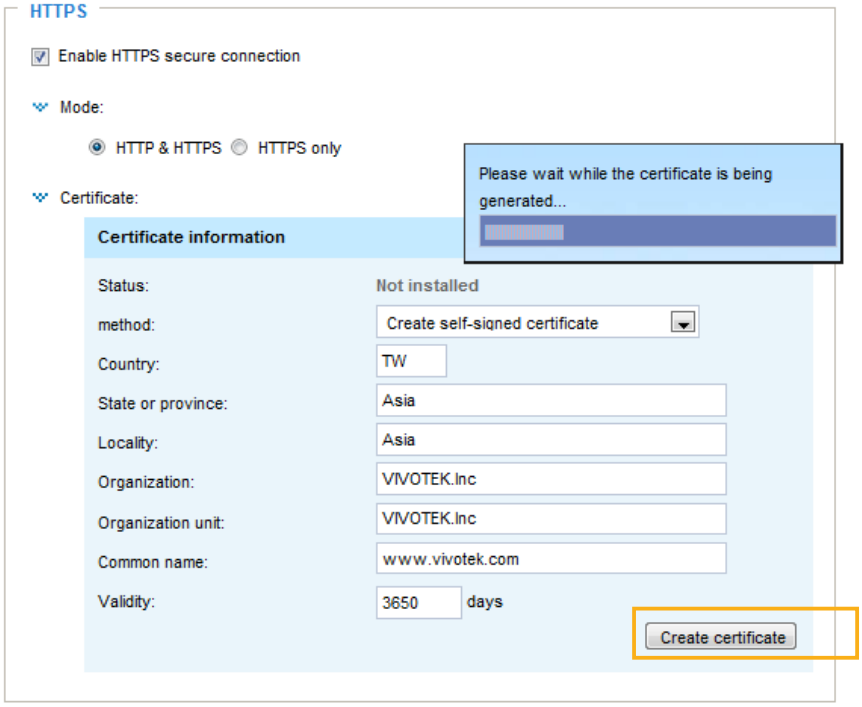
This section explains how to enable authentication and encrypted communication over SSL (Secure Socket Layer). It helps protect streaming data transmission over the Internet on higher security level.

Create and Install Certificate Method

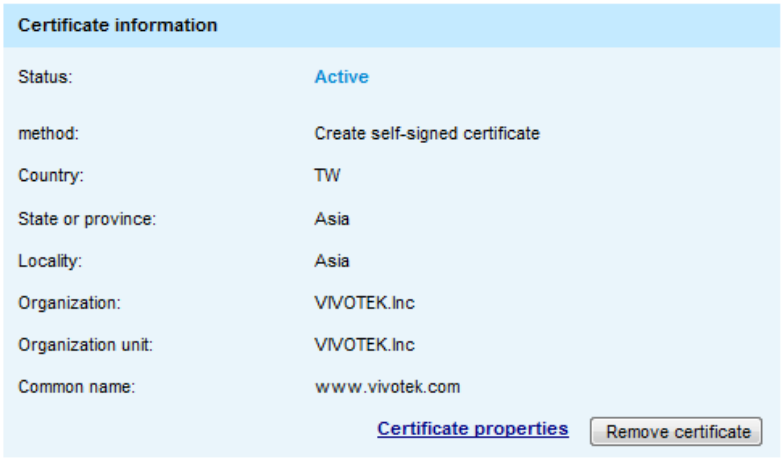
Before using HTTPS for communication with the Network Camera, a **Certificate** must be created first. There are three ways to create and install a certificate:

Create self-signed certificate

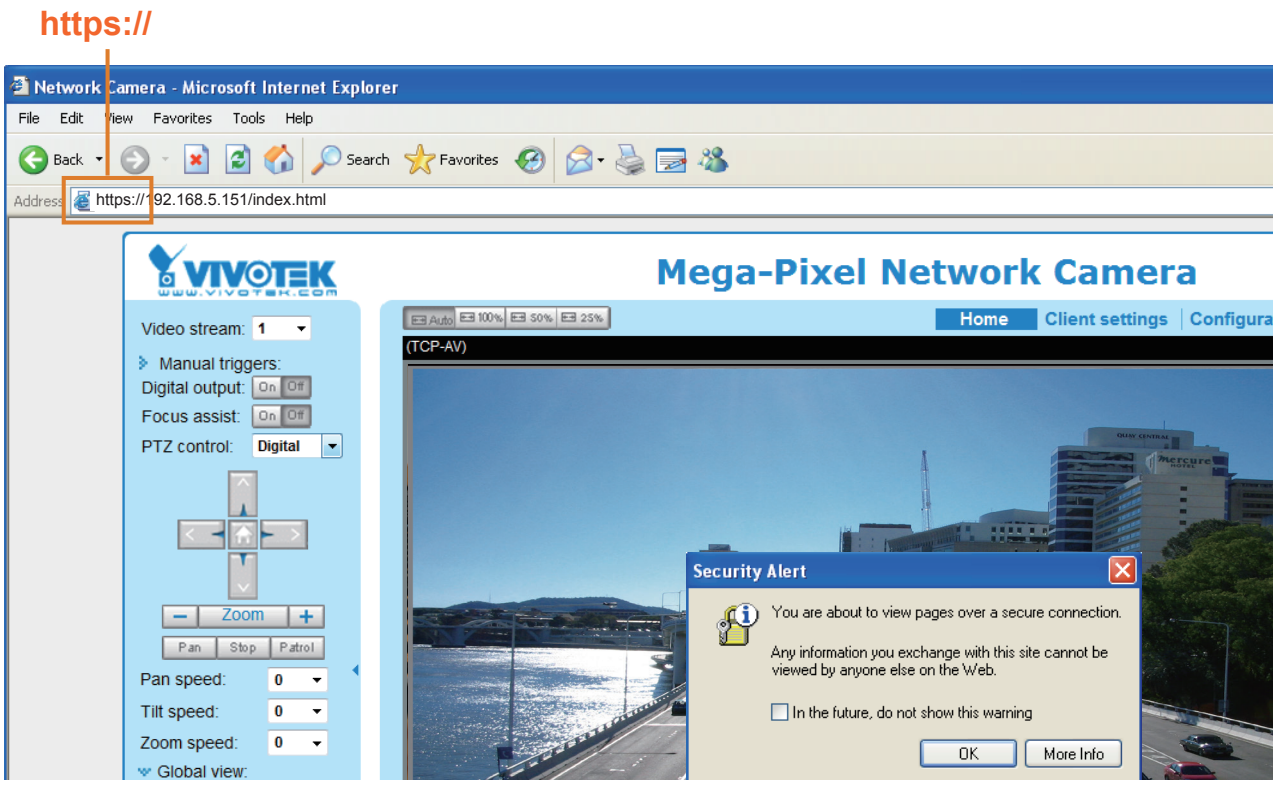
1. Select this option from a pull-down menu.
2. In the first column, select **Enable HTTPS secure connection**, then select a connection option: "HTTP & HTTPS" or "HTTPS only".
3. Click **Create certificate** to generate a certificate.

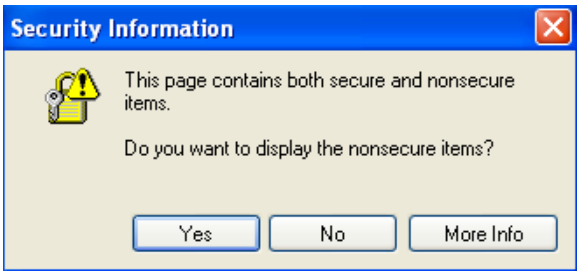


4. The Certificate Information will automatically be displayed as shown below. You can click **Certificate properties** to view detailed information about the certificate.



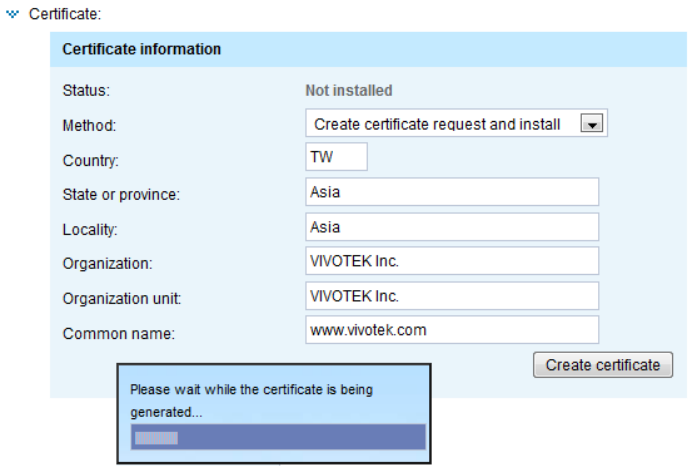
5. Click **Save** to preserve your configuration, and your current session with the camera will change to the encrypted connection.
6. If your web session does not automatically change to an encrypted HTTPS session, click **Home** to return to the main page. Change the URL address from "http://" to "https://" in the address bar and press **Enter** on your keyboard. Some Security Alert dialogs will pop up. Click **OK** or **Yes** to enable HTTPS.



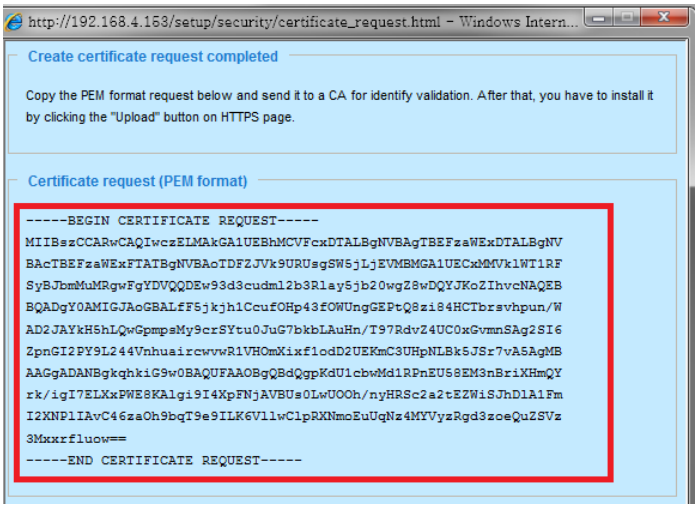


Create certificate request and install

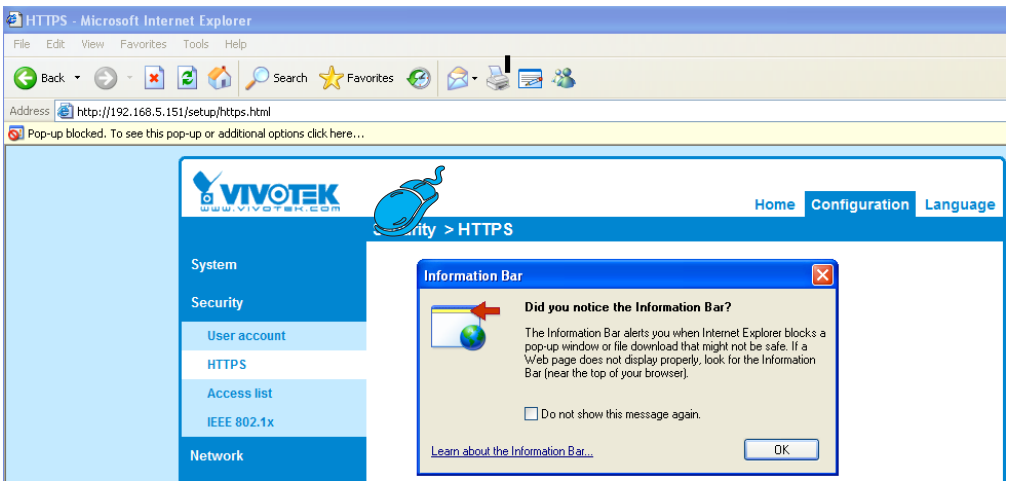
1. Select the option from the **Method** pull-down menu.
2. Click **Create certificate** to proceed.
3. The following information will show up in a pop-up window after clicking **Create**. Then click **Save** to generate the certificate request.



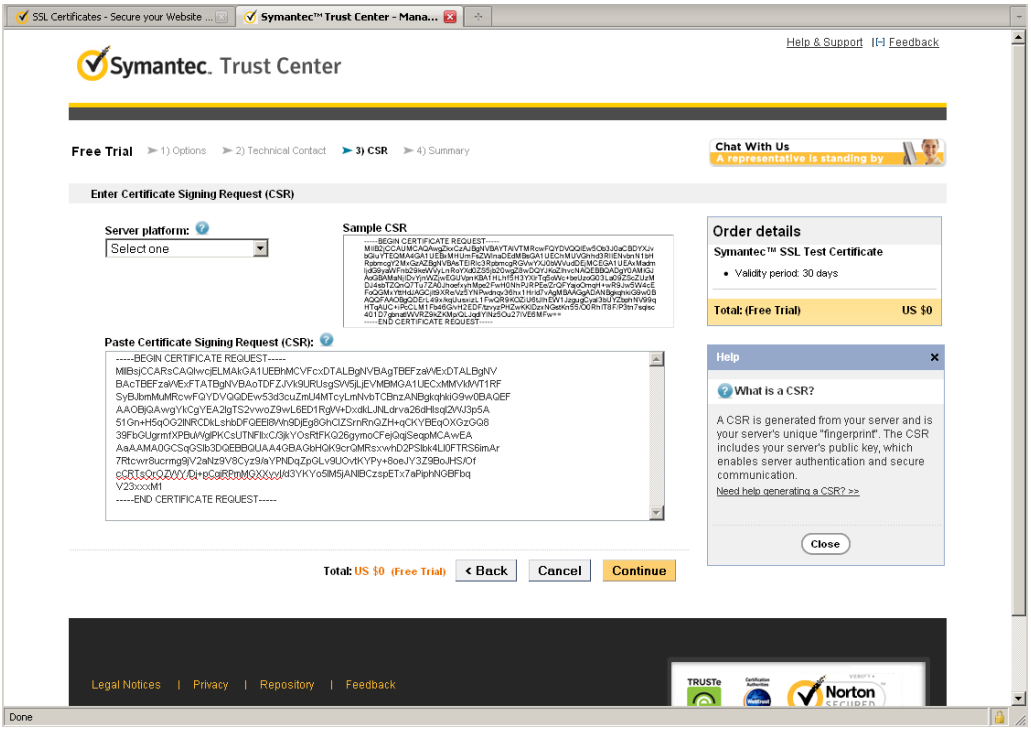
4. The Certificate request window will prompt.



If you see the following Information bar, click **OK** and click on the Information bar at the top of the page to allow pop-ups.



5. Look for a trusted certificate authority, such as Symantec's VeriSign Authentication Services, that issues digital certificates. Sign in and purchase the SSL certification service. Copy the certificate request from your request prompt and paste it in the CA's signing request window. Proceed with the rest of the process as CA's instructions on their webpage.



6. Once completed, your SSL certificate should be delivered to you via an email or other means. Copy the contents of the certificate in the email and paste it in a text/HTML/hex editor/converter, such as IDM Computer Solutions' UltraEdit.

```
immediately, please dial 866.893.6565 or 650.426.5112 option 3 or send an email to internet-sales@verisign.com

Thank you for your interest in Symantec!

-----BEGIN CERTIFICATE-----
MIIFBDCCA+ygAwIBAgIQFx1Cahn/SeBSit0WQDOBIzANBgkqhkiG9w0BAQUFADCB
yzELMAkGA1UEBhMCVVMxFzAVBgNVBAoTDlZlcmlTaWduLCBJbmMuMTAwLgYDVQQL
EydGb3IgVGVzdCBQdXJwb3NlcyBPbmx5LiAgTm8gYXNzdXJhbmNlcy4xQjBABgNV
BAsTOVRlcm1zIG9mIHVzZSBhdCBodHRwczovL3d3dy52ZXJpc2lnbi5jb20vY3Bz
L3Rlc3RjYSAoYykwOTEtMCsGA1UEAxMkVmVyaVNpZ24gVHJpYWwgU2VjdXJlIFNl
cnZlciBDQSAtIEcyMB4XDTEyMDcwMzAwMDAwMFoXDTEyMDgwMjIzNTk1OVowga4x
CzAJBgNVBAYTAlRXMQ0wCwYDVQQIEwRBc2lhMQ0wCwYDVQQHFARBc2lhMRUwEwYD
VQQKFAxWSVZPVEVLIEluYy4xFTATBgNVBAsUDFZJVk9URUsgSW5jLjE6MDgGA1UE
CxQxVGVybXMgb2YgdXNlIGF0IHd3dy52ZXJpc2lnbi5jb20vY3BzL3Rlc3RjYSAo
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A1UdDwEB/wQEAwIFoDBDBgNVHR8EPDA6MDigNgA0hjJodHRwOi8vU1ZSVHJpYWwt
RzItY3JsLnZlcmlzaWduLmNvbS9TVlJUcmlhbEcyLmNybDBKBgNVHSAEQzBBMD8G
CmCGSAGG+EUBBxUwMTAvBggrBgEFBQcCARYjaHR0cHM6Ly93d3cudmVyaXNpZ24u
Y29tL2Nwcy90ZXN0Y2EwHQYDVR0lBBYwFAYIKwYBBQUHAwEGCCsGAQUFBwMCMB8G
A1UdIwQYMBaAFCgXE4q91qK13AYst7aO2hBmYG7lMHQGCCsGAQUFBwEBBGgwZjAk
BggrBgEFBQcwAYYYaHR0cDovL29jc3AudmVyaXNpZ24uY29tMD4GCCsGAQUFBzAC
hjJodHRwOi8vU1ZSVHJpYWwtRzItYWlhLnZlcmlzaWduLmNvbS9TVlJUcmlhbEcy
LmNlcjANBgkqhkiG9w0BAQUFAAOCAQEATxuH7FnIae/X7T6z/zzr9zEKhLKSEQSp
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m6CoYpntb1gmFtyj9EvgIUdc6YZImn2B0qSc5q3iZARPH/gi//XeGg==
-----END CERTIFICATE-----
```
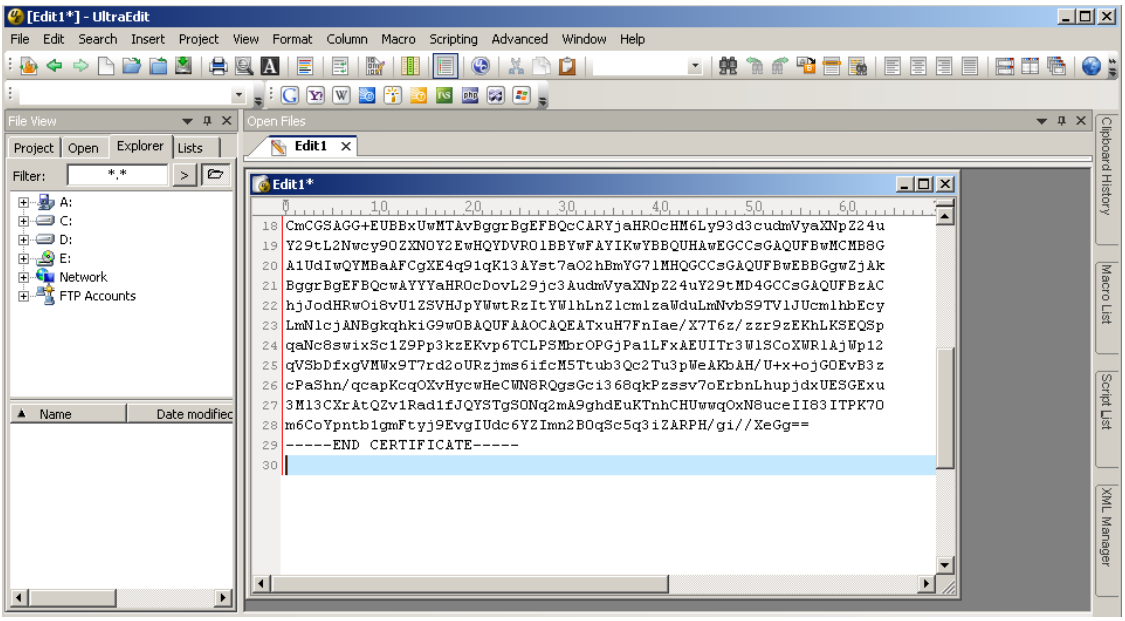
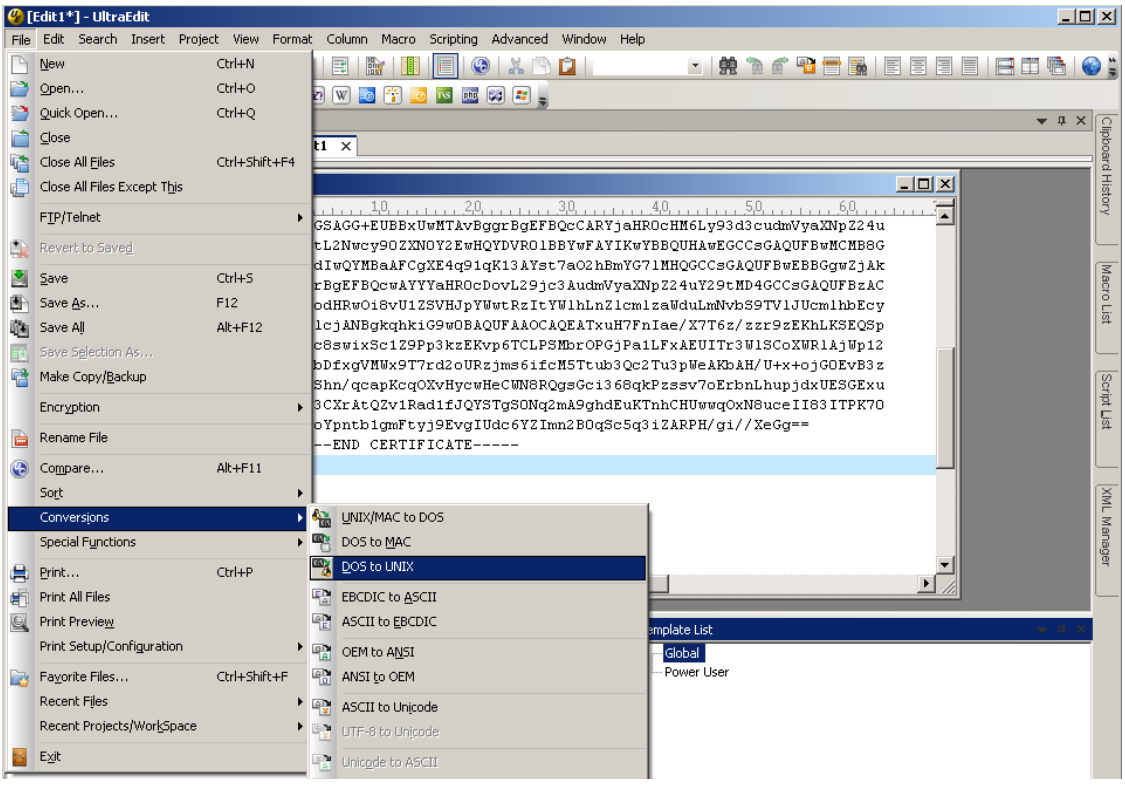
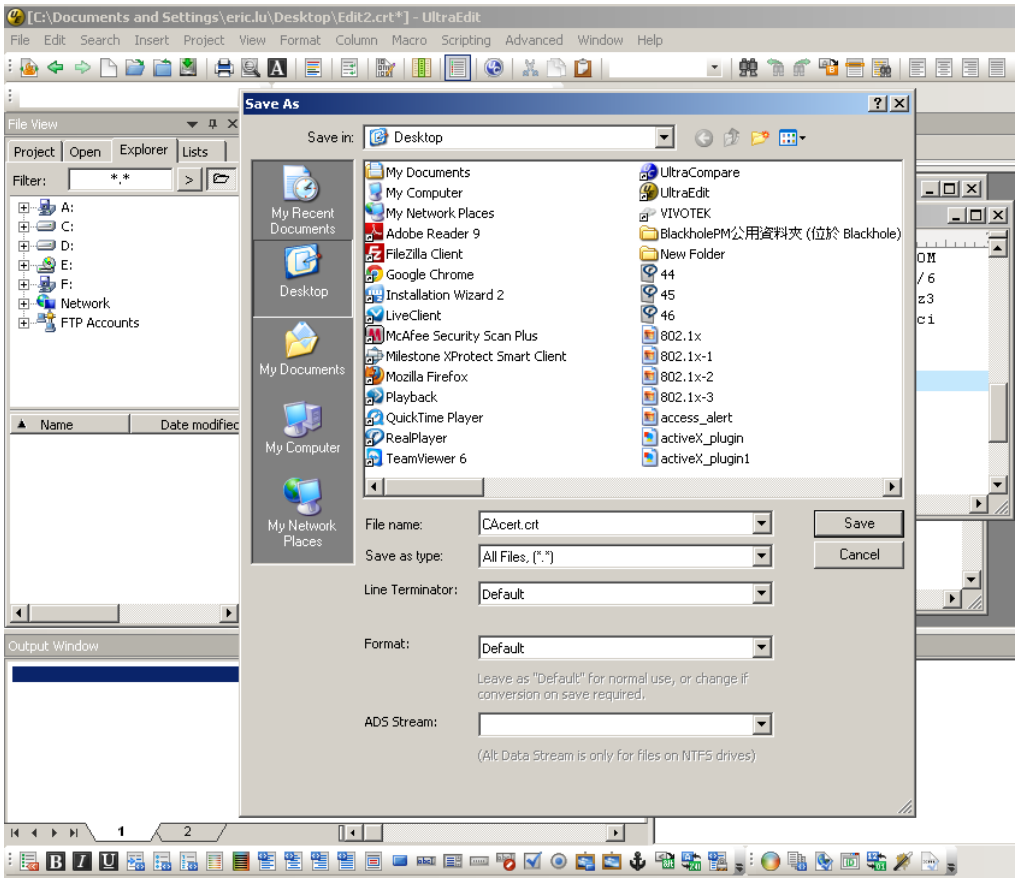

7. Open a new edit, paste the certificate contents, and press ENTER at the end of the contents to add an empty line.



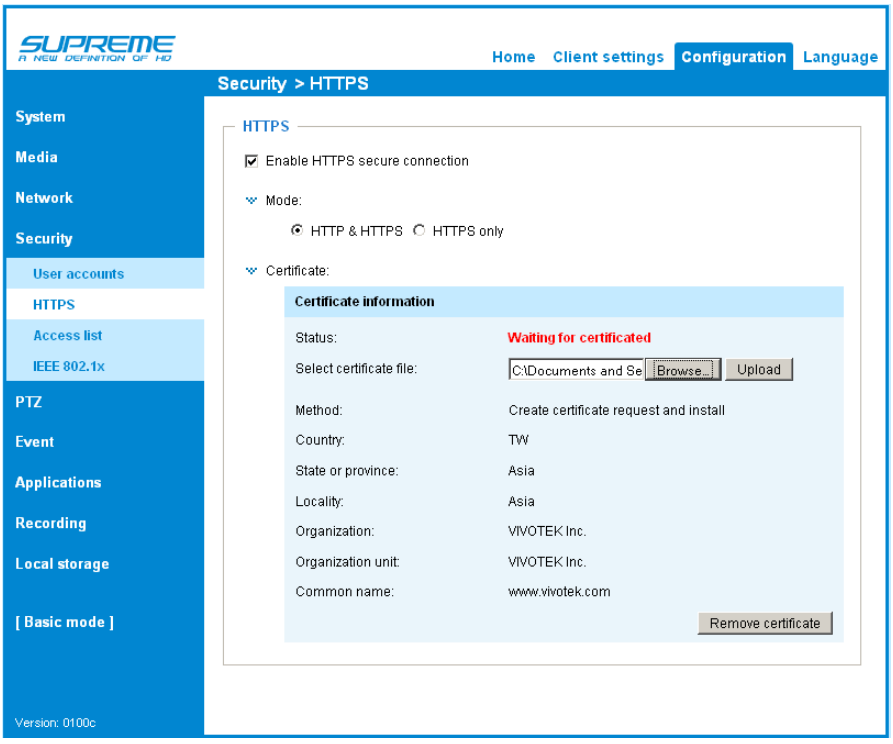
8. Convert file format from DOS to UNIX. Open **File** menu > **Conversions** > **DOS to Unix**.



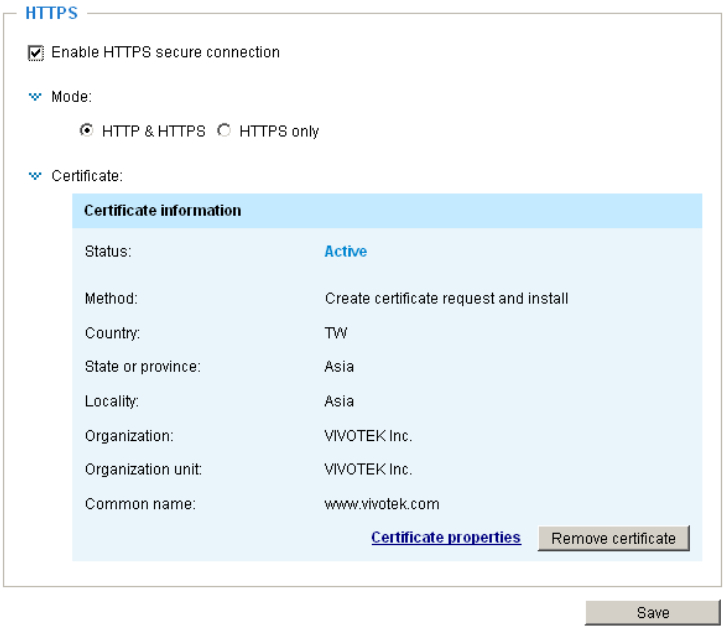
9. Save the edit using the ".crt" extension, using a file name like "CAcert.crt."



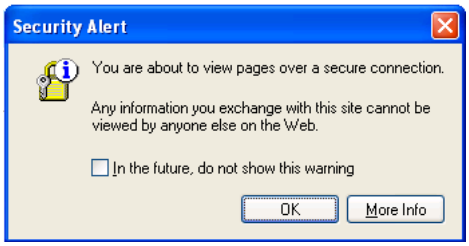
10. Return to the original firmware session, use the **Browse** button to locate the crt certificate file, and click **Upload** to enable the certification.

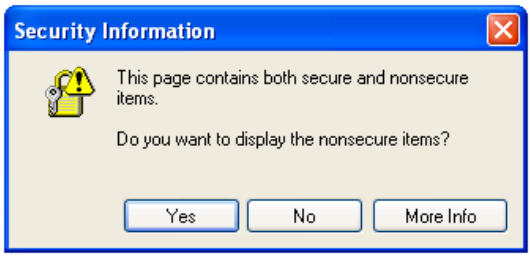


11. When the certifice file is successfully loaded, its status will be stated as **Active**. Note that a certificate must have been created and installed before you can click on the "**Save**" button for the configuration to take effect.



12. To begin an encrypted HTTPS session, click **Home** to return to the main page. Change the URL address from "http://" to "https://" in the address bar and press **Enter** on your keyboard. Some Security Alert dialogs will pop up. Click **OK** or **Yes** to enable HTTPS.





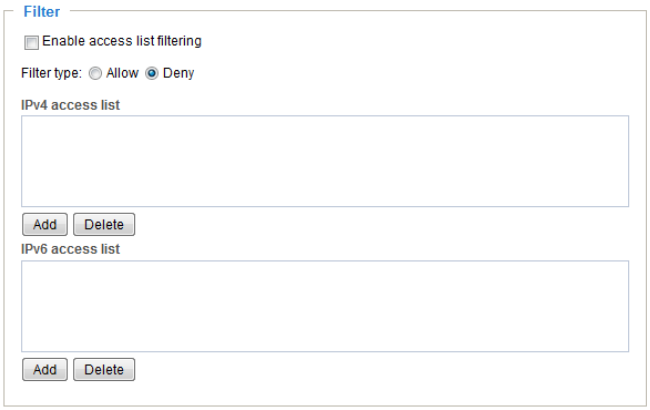
Security > Access List

This section explains how to control access permission by verifying the client PC's IP address.

Filter

Enable access list filtering: Check this item and click **Save** if you want to enable the access list filtering function.

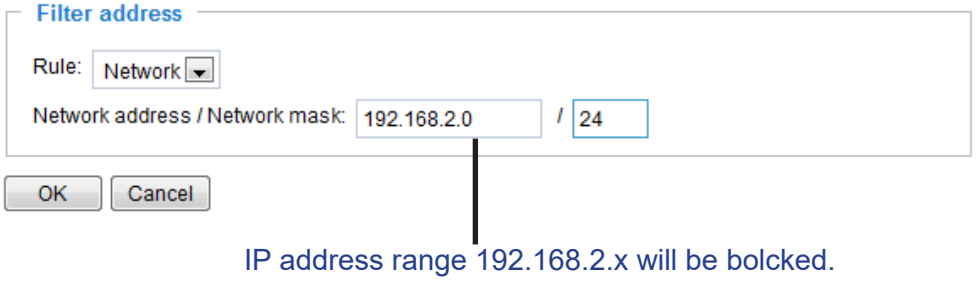
Filter type: Select **Allow** or **Deny** as the filter type. If you choose **Allow Type**, only those clients whose IP addresses are on the Access List below can access the Network Camera, and the others cannot. On the contrary, if you choose **Deny Type**, those clients whose IP addresses are on the Access List below will not be allowed to access the Network Camera, and the others can.



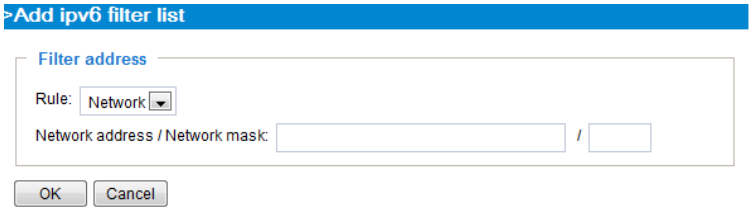
Then you can **Add** a rule to the following Access List. Please note that the IPv6 access list column will not be displayed unless you enable IPv6 on the Network page. For more information about **IPv6 Settings**, please refer to Network > General settings on page 95 for detailed information.

There are three types of rules:
Single: This rule allows the user to add an IP address to the Allowed/Denied list.
For example:

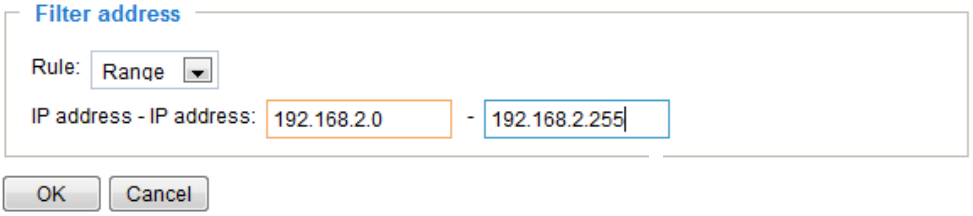
Network: This rule allows the user to assign a network address and corresponding subnet mask to the Allow/Deny List. The address and network mask are written in CIDR format.
For example:



If IPv6 filter is preferred, you will be prompted by the following window. Enter the IPv6 address and the two-digit prefix length to specify the range of IP addresses in your configuration.

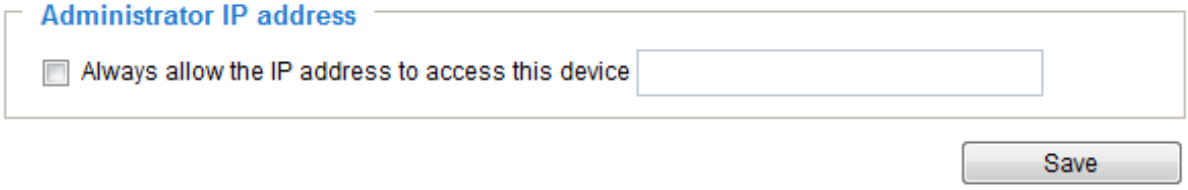


Range: This rule allows the user to assign a range of IP addresses to the Allow/Deny List.
Note: This rule only applies to IPv4 addresses.
For example:



Administrator IP address

Always allow the IP address to access this device: You can check this item and add the Administrator's IP address in this field to make sure the Administrator can always connect to the device.



Security > IEEE 802.1X

Enable this function if your network environment uses IEEE 802.1x, which is a port-based network access control. The network devices, intermediary switch/access point/hub, and RADIUS server must support and enable 802.1x settings.

The 802.1x standard is designed to enhance the security of local area networks, which provides authentication to network devices (clients) attached to a network port (wired or wireless). If all certificates between client and server are verified, a point-to-point connection will be enabled; if authentication fails, access on that port will be prohibited. 802.1x utilizes an existing protocol, the Extensible Authentication Protocol (EAP), to facilitate communication.

■ The components of a protected network with 802.1x authentication:

Supplicant
(Network Camera)

Authenticator
(Network Switch)

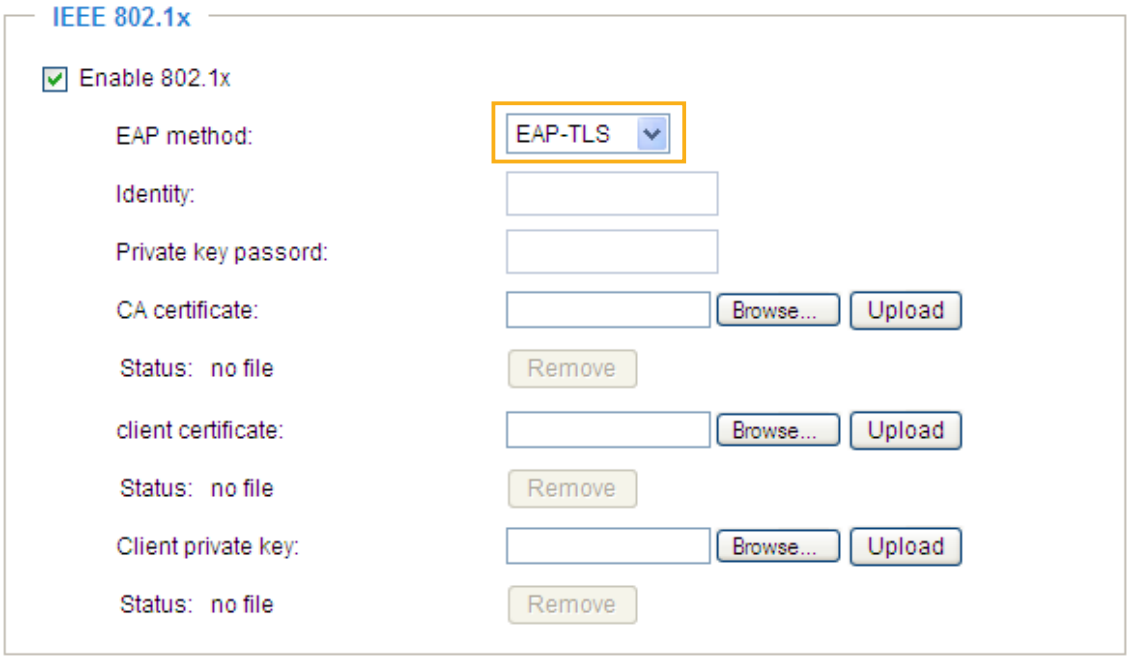
Authentication Server
(RADIUS Server)

1. Supplicant: A client end user (camera), which requests authentication.
2. Authenticator (an access point or a switch): A “go between” which restricts unauthorized end users from communicating with the authentication server.
3. Authentication server (usually a RADIUS server): Checks the client certificate and decides whether to accept the end user’s access request.

■ VIVOTEK Network Cameras support two types of EAP methods to perform authentication: **EAP-PEAP** and **EAP-TLS**.

Please follow the steps below to enable 802.1x settings:

1. Before connecting the Network Camera to the protected network with 802.1x, please apply a digital certificate from a Certificate Authority (i.e., your network administrator) which can be validated by a RADIUS server.
2. Connect the Network Camera to a PC or notebook outside of the protected LAN. Open the configuration page of the Network Camera as shown below. Select **EAP-PEAP** or **EAP-TLS** as the EAP method. In the following blanks, enter your ID and password issued by the CA, then upload related certificate(s).

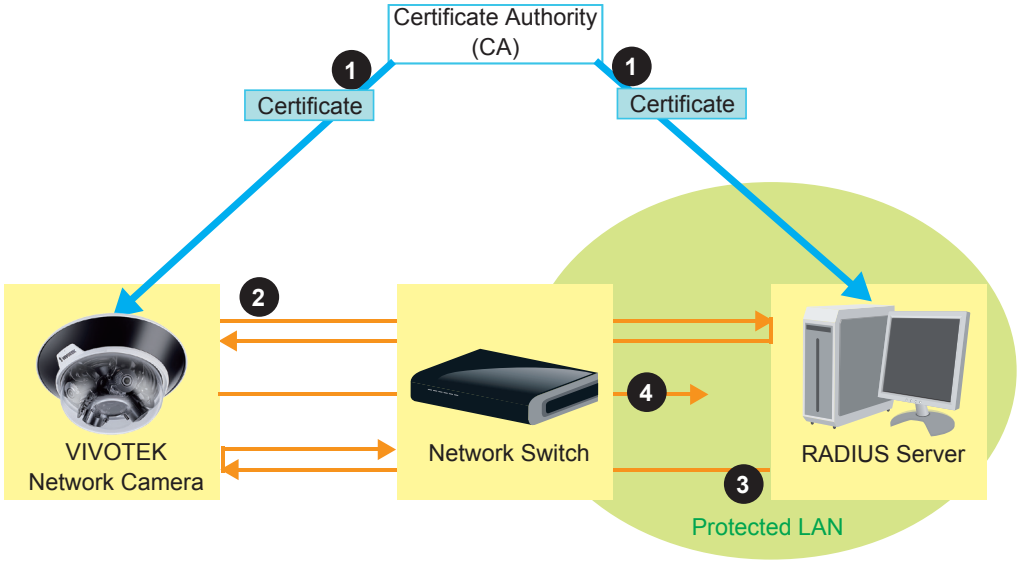


3. When all settings are complete, move the Network Camera to the protected LAN by connecting it to an 802.1x enabled switch. The devices will then start the authentication automatically.

NOTE:

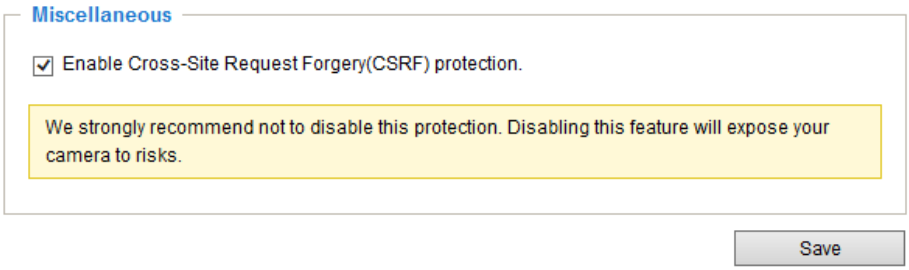
► *The authentication process for 802.1x:*

1. *The Certificate Authority (CA) provides the required signed certificates to the Network Camera (the supplicant) and the RADIUS Server (the authentication server).*
2. *A Network Camera requests access to the protected LAN using 802.1X via a switch (the authenticator). The client offers its identity and client certificate, which is then forwarded by the switch to the RADIUS Server, which uses an algorithm to authenticate the Network Camera and returns an acceptance or rejection back to the switch.*
3. *The switch also forwards the RADIUS Server's certificate to the Network Camera.*
4. *Assuming all certificates are validated, the switch then changes the Network Camera's state to authorized and is allowed access to the protected network via a pre-configured port.*



Security > Miscellaneous

The embedded TrendMicro utitlity provides the protection against Cross-Site Request Forgery. Cross-site request forgery is also known as one-click attack or session riding and is abbreviated as CSRF. CSRF is a type of malicious exploit of a website, in this case, the camera. Unauthorized commands are transmitted from a user that the web application trusts, using the mechanism of forging a trusted user's own request with a request containing his own cookies, etc. Different ways can be used for a malicious website to transmit such commands. They can be specially-crafted image tags, hidden forms, and JavaScript XMLHttpRequests. The malicious attack can occur without users' interaction or even knowing it.



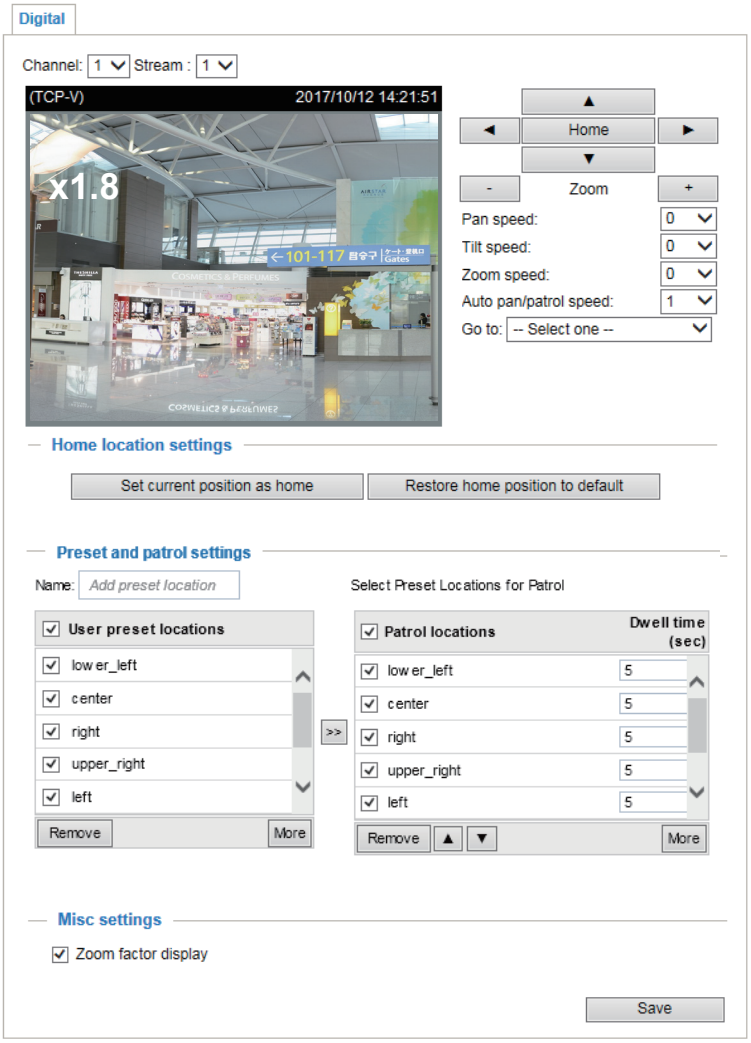
PTZ > PTZ settings

This section explains how to control the Network Camera's Pan/Tilt/Zoom operation.

Digital: Control the e-PTZ operation. Within a field of view, it allows users to quickly move the focus to a target area for close-up viewing without physically moving the camera.

Digital PTZ Operation (E-PTZ Operation)

The e-PTZ control settings section will be displayed as shown below:



For e-PTZ related details, please refer to page 132.

Auto pan/patrol speed: Select the speed from 1~5 (slow/fast) to set up the Auto pan/patrol speed control.

Zoom factor display
If you check this item, the zoom indicator will be displayed on the home page when you zoom in/out the live viewing window as the picture shown on the next page.
When completed with the e-PTZ settings, click **Save** to enable the settings on this page.

Home page in the E-PTZ Mode

■ The e-Preset Positions will also be displayed on the home page. Select one from the drop-down list, and the Network Camera will move to the selected position.

■ If you have set up different preset positions for different streams, you can select one of the video streams to display its separate preset positions.

Global View

In addition to using the e-PTZ control panel, you can also use the mouse to drag or resize the floating frame to pan/tilt/zoom the viewing region. The live view window will also move to the viewing region accordingly.

Moving Instantly

If you check this item, the live view window will switch to the new viewing region instantly after you move the floating frame. If not selected, the process of moving from one position to another will be shown.

Click on Image

The e-PTZ function also supports “Click on Image“. When you click on any point of the Global View Window or Live View Window, the viewing region will also move to that point.

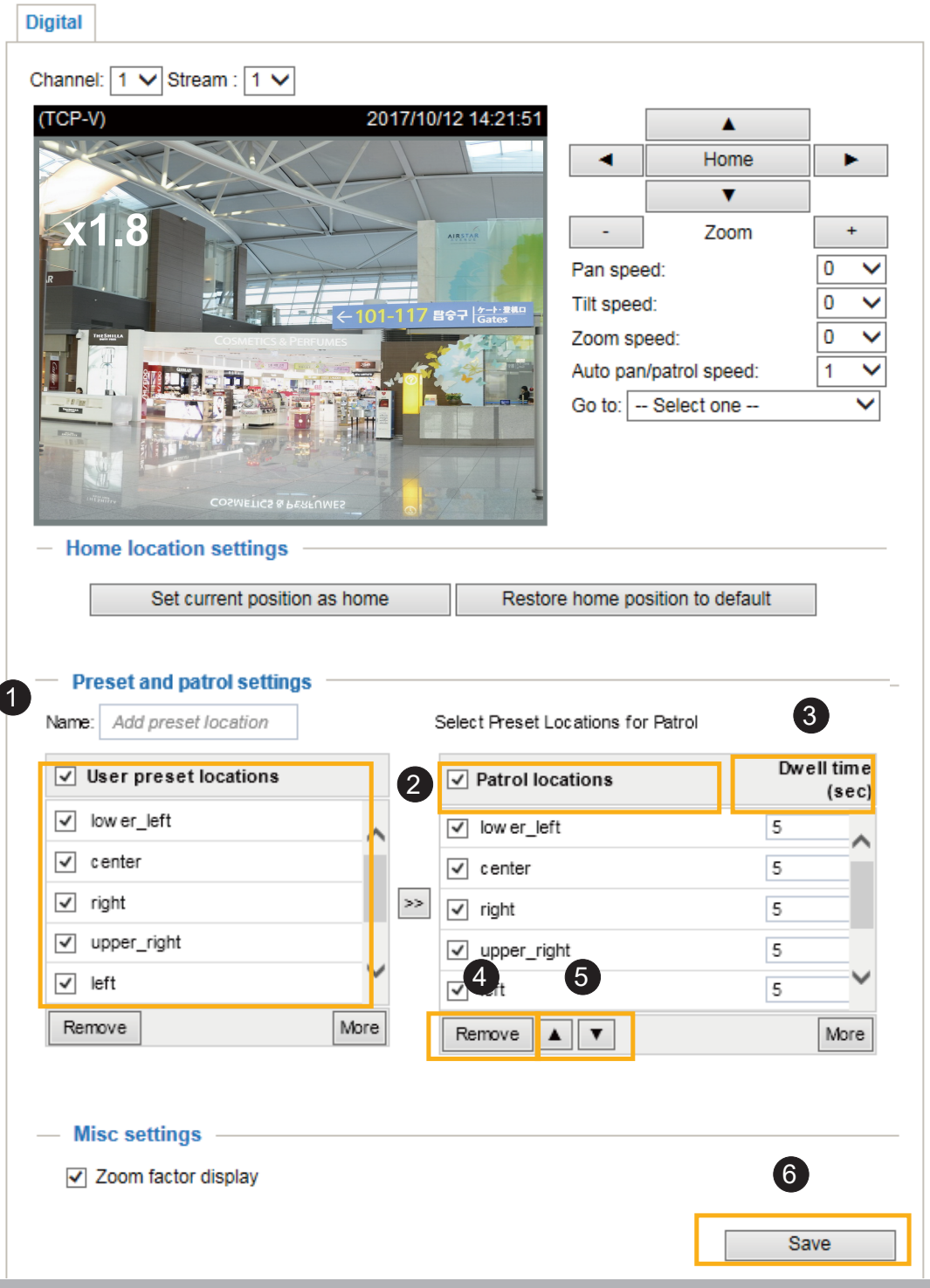
Note that the”Click on Image” function only applies when you have configured a smaller “Region of Interest” out of the maximum output frame! e.g., an 800 x 600 region from out of the camera’s maximum frame size.

Patrol button: Click this button, then the Network Camera will patrol among the selected preset positions continuously.

Patrol settings

You can select some preset positions for the Network Camera to patrol.
Please follow the steps below to set up a patrol schedule:

1. Select the preset locations on the list, and click >>.
2. The selected preset locations will be displayed on the **Patrol locations** list.
3. Set the **Dwelling time** for the preset location during an auto patrol.
4. If you want to delete a preset location from the Patrol locations list, select it and click **Remove**.
5. Select a location and click ▲ ▼ to rearrange the patrol order.
6. Select patrol locations you want to save in the list and click **Save** to enable the patrol settings.
7. To implement the patrol schedule, please go to homepage and click on the **Patrol** button.

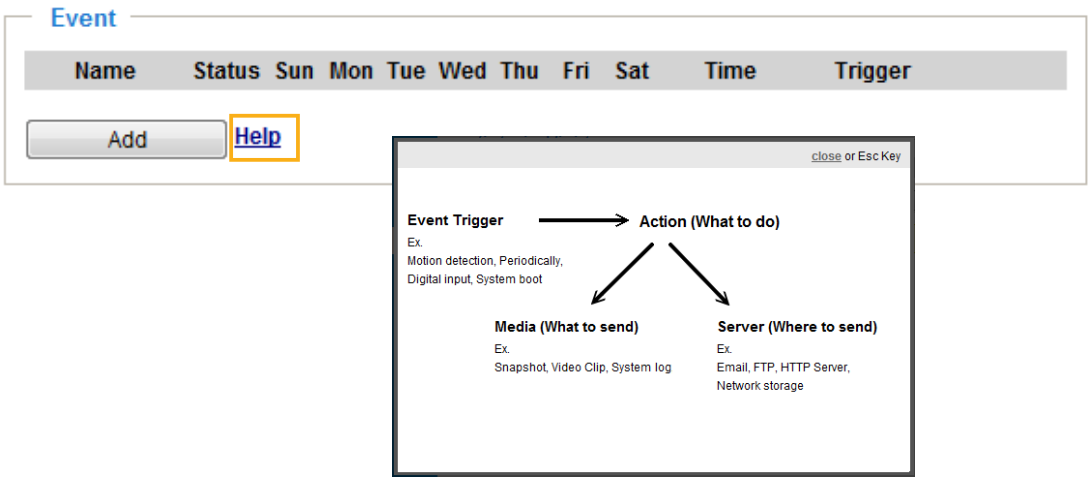


NOTE:

- The Preset Positions will also be displayed on the Home page. Select one from the **Go to** menu, and the Network Camera will move to the selected preset position.
- Click Patrol: The Network Camera will patrol along the selected positions repeatedly.

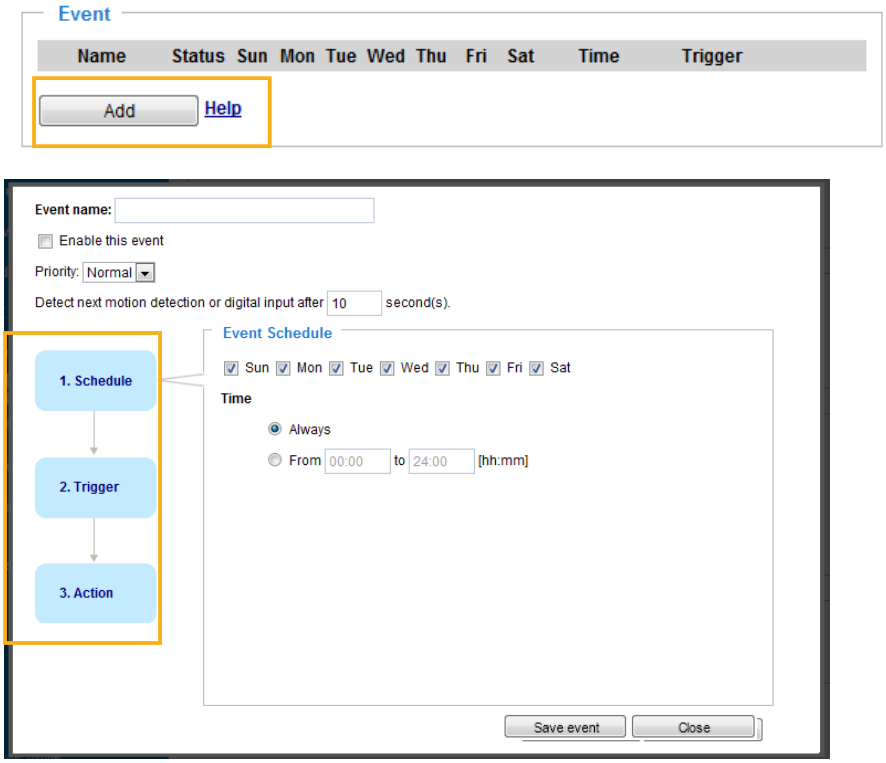
Event > Event settings

This section explains how to configure the Network Camera to respond to particular situations (event). A typical application is that when a motion is detected, the Network Camera sends buffered images to an FTP server or e-mail address as notifications. Click on **Help**, there is an illustration shown in the pop-up window explaining that an event can be triggered by many sources, such as motion detection or external digital input devices. When an event is triggered, you can specify what type of action that will be performed. You can configure the Network Camera to send snapshots or videos to your email address or FTP site.



Event

To configure an event with reactive measures such as recording video or snapshots, it is necessary to configure the server and media settings so that the Network Camera will know what action to take (such as which server to send the media files to) when a trigger is activated. An event is an action initiated by a user-defined trigger source. In the **Event** column, click **Add** to open the event settings window. Here you can arrange three elements -- Schedule, Trigger, and Action. A total of 3 event settings can be configured.



■ Event name: Enter a name for the event setting.

■ Enable this event: Select this checkbox to enable the event setting.

■ Priority: Select the relative importance of this event (High, Normal, or Low). Events with a higher priority setting will be executed first.

■ Detect next motion detection or digital input after ☐ seconds: Enter the duration in seconds to pause motion detection after a motion is detected. This can prevent event-related actions to take place too frequently.

1. Schedule

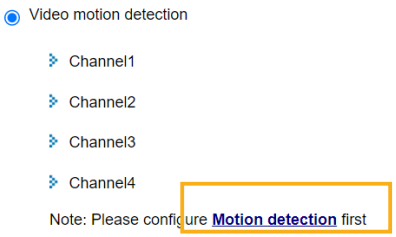
Specify the period of time during which the event trigger will take effect. Please select the days of the week and the time in a day (in 24-hr time format) for the event triggering schedule. For example, you may prefer an event to be triggered only during the off-office hours.

2. Trigger

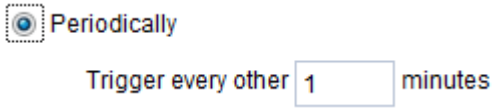
This is the cause or stimulus which defines when to trigger the Network Camera. The trigger source can be configured to use the Network Camera's built-in motion detection mechanism or external digital input devices.

There are several choices of trigger sources as shown on the next page. Select the item to display the detailed configuration options.

■ Video motion detection
This option makes use of the built-in motion detection mechanism as a trigger source. To enable this function, you need to configure a Motion Detection Window first. For more information, please refer to Motion Detection on page 151 for details.



■ Periodically
This option allows the Network Camera to trigger periodically for every other defined minute. Up to 999 minutes are allowed.



■ Digital input
This option allows the Network Camera to use an external digital input device or sensor as a trigger source. Depending on your application, there are many choices with digital input devices on the market which help detect changes in temperature, vibration, sound, light, etc.

■ System boot
This option triggers the Network Camera when the power to the Network Camera is disconnected and re-connected.

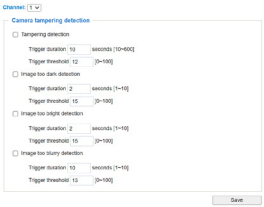
■ Recording notify
This option allows the Network Camera to trigger when the recording disk is full or when recording starts to overwrite older data.

■ Audio detection

A preset threshold can be configured with an external microphone as the trigger to system event. The triggering condition can be an input exceeding or falling below a threshold. Audio detection can take place as a complement to motion detection or as a method to detect activities not covered by the camera's view.

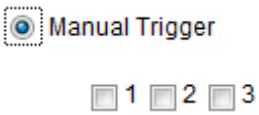
■ Camera tampering detection

This option allows the Network Camera to trigger when the camera detects that it is being tampered with. To enable this function, you need to configure the Tampering Detection option first. Please refer to page 155 for detailed information.



■ Manual Triggers

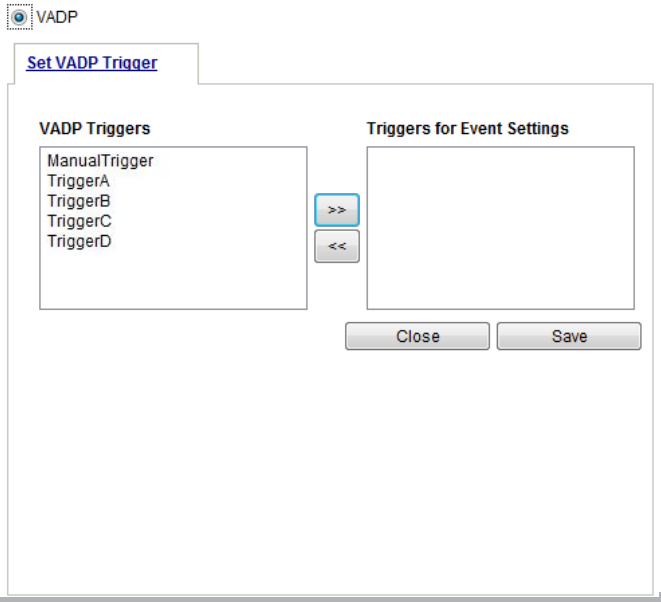
This option allows users to enable event triggers manually by clicking the on/off button on the homepage. Please configure 1 to 3 associated events before using this function.



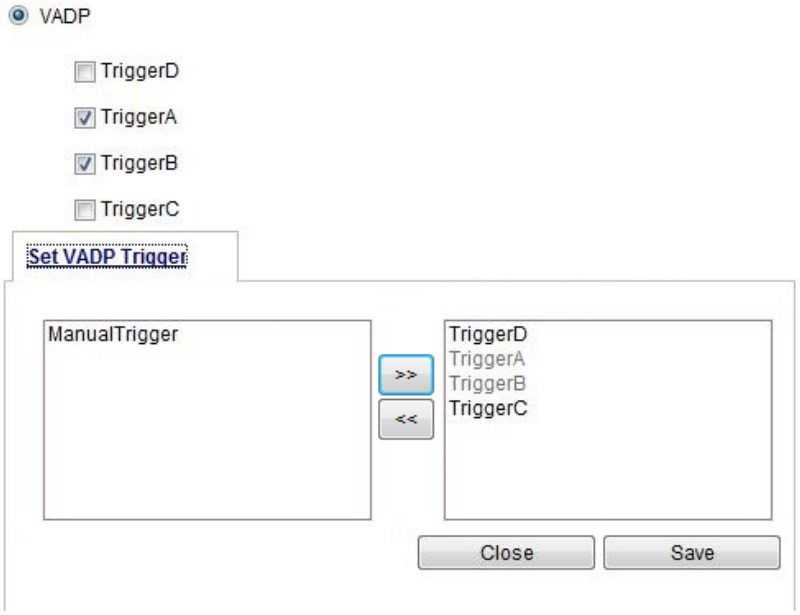
■ VADP

It is presumed that you already uploaded and enabled the VADP modules before you can associatee VADP triggers with an Event setting.

Click on the Set VADP Trigger button to open the VADP setup menu. The triggering conditions available with 3rd-party software modules known as VADP will be listed. Use the arrow buttons to select these triggers. Users may implant these modules for different purposes such as triggering motion detection, or applications related to video analysis, etc. Please refer to page 158 for the configuration options with VADP modules.

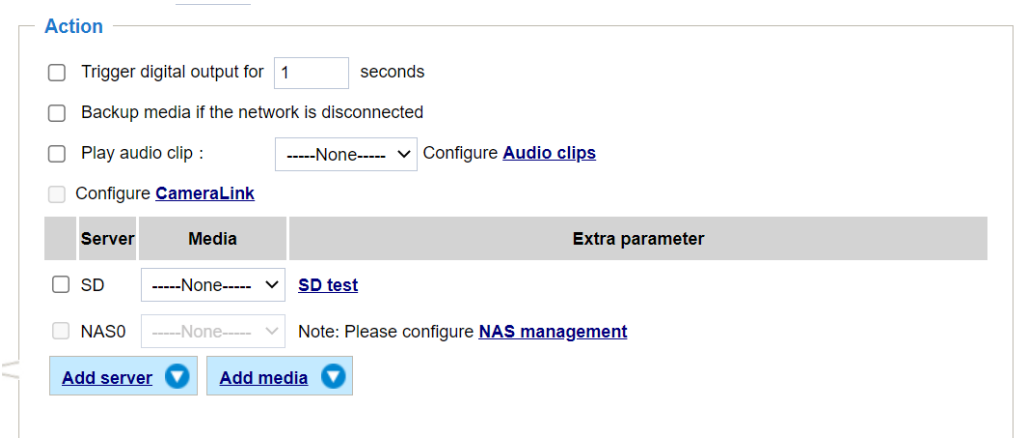


Once the triggers are configured, they will be listed under the VADP option.



3. Action

Define the actions to be performed by the Network Camera when a trigger is activated.



■ Trigger digital output for ☐ seconds

Select this option to turn on the external digital output device when a trigger is activated. Specify the length of the trigger interval in the text box.

■ Backup media if the network is disconnected

Select this option to backup media file on SD card if the network is disconnected. This function will only be displayed after you set up a network storage (NAS). The media to back up can include snapshot images, video, or system logs depending on your event settings.

■ Play audio clip:

A pre-loaded audio clip can be configured to be played when one triggering condition is met. For example, playing a warning message to deter an intruder.

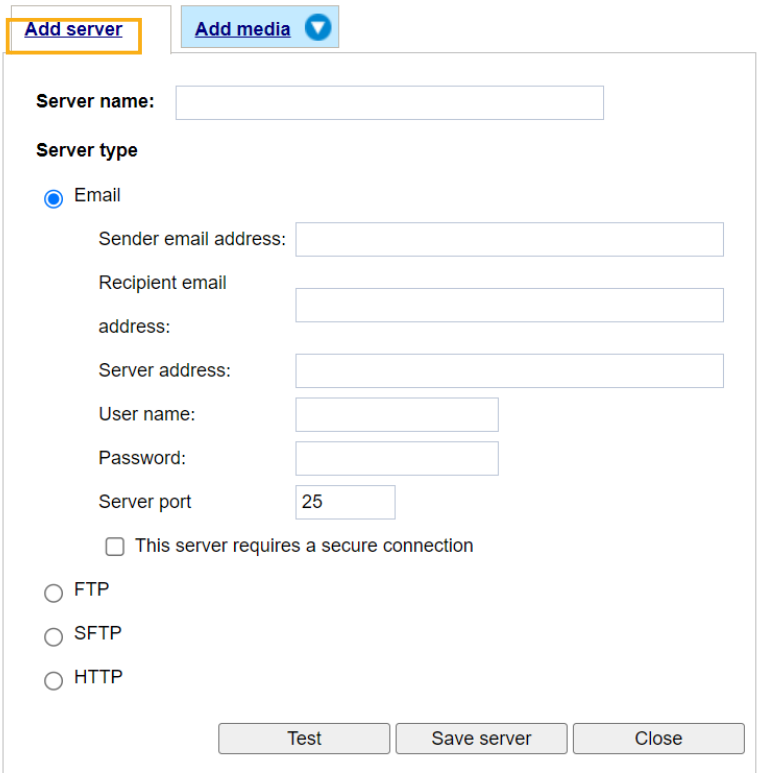
■ Configure CameraLink

The camera can be associated with another camera with responsive actions. For example, if a thermal camera detects some abnormal situations, e.g., a fire, the camera can tell another camera, say, a PTZ camera to move to a preset position to observe the current situation.

Add server

It is necessary to configure the server and media settings so that the Network Camera will know what action to take (such as which server to send the media files to) when a trigger is activated. Click **Add server** to open the server setting window. You can specify where the notification messages are sent to when a trigger is activated. A total of 5 server settings can be configured.

There are four choices of server types available: Email, FTP, HTTP, and Network storage. Select the item to display the detailed configuration options. You can configure either one or all of them.



Server type - Email
Select to send the media files via email when a trigger is activated.

■ Server name: Enter a name for the server setting.

■ Sender email address: Enter the email address of the sender.

■ Recipient email address: Enter the email address of the recipient.

■ Server address: Enter the domain name or IP address of the email server.

■ User name: Enter the user name of the email account if necessary.

■ Password: Enter the password of the email account if necessary.

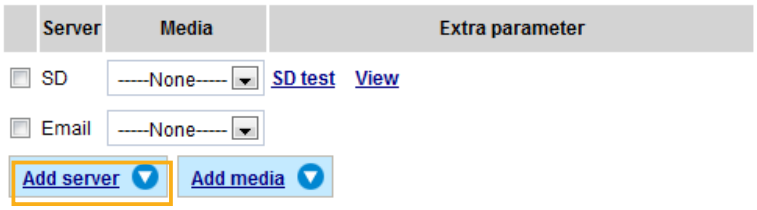
■ Server port: The default mail server port is set to 25. You can also manually set another port.

If your SMTP server requires a secure connection (SSL), select **This server requires a secure connection (SSL).**

To verify if the email settings are correctly configured, click **Test**. The result will be shown in a pop-up window. If successful, you will also receive an email indicating the result.

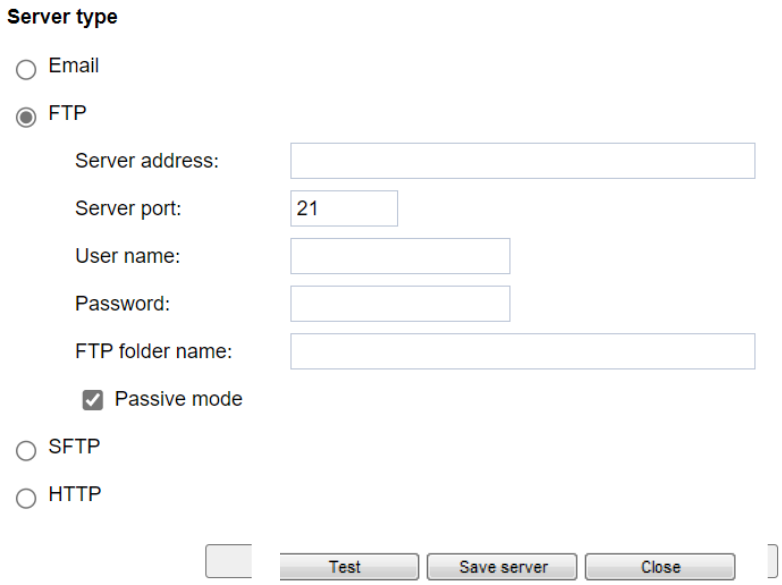
Click **Save server** to enable the settings.

Note that after you configure the first event server, the new event server will automatically display on the Server list. If you wish to add other server options, click **Add server**.



Server type - FTP

Select to send the media files to an FTP server when a trigger is activated.



■ Server name: Enter a name for the server setting.

■ Server address: Enter the domain name or IP address of the FTP server.

■ Server port: By default, the FTP server port is set to 21. It can also be assigned to another port number between 1025 and 65535.

■ User name: Enter the login name of the FTP account.

■ Password: Enter the password of the FTP account.

■ FTP folder name

Enter the folder where the media files will be placed. If the folder name does not exist, the Network Camera will automatically create one on the FTP server.

■ Passive mode

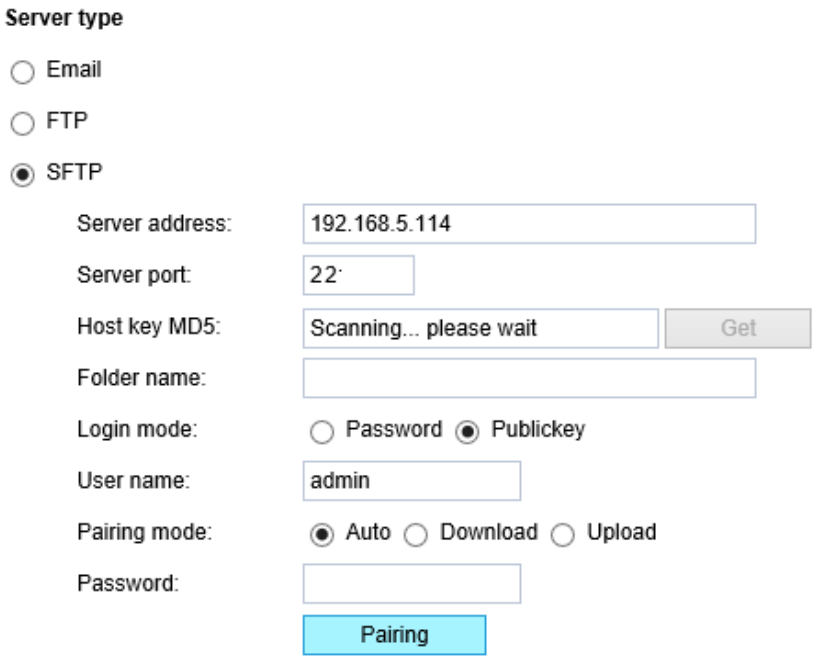
Most firewalls do not accept new connections initiated from external requests. If the FTP server supports passive mode, select this option to enable passive mode FTP and allow data transmission to pass through the firewall. The firmware default has the Passive mode checkbox selected.

To verify if the FTP settings are correctly configured, click **Test**. The result will be shown in a pop-up window as shown below. If successful, you will also receive a test.txt file on the FTP server.

Click **Save server** to enable the settings.

Server type - SFTP

Select to send the media files to an SFTP (Secure File Transfer Protocol) server when a trigger is activated. This page contains the client side settings.



■ Server address: Enter the SFTP server address in either the domain name or IP address.

■ Server port: By default, the FTP server port is set to 22. It can also be assigned to another port number between 1025 and 65535.

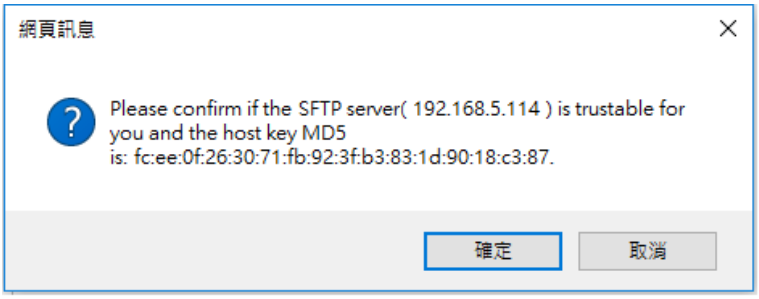
■ Host key MD5: You have the option to use public/private key authentication instead of a username and password to connect to the server. This option requires that you have a private/public SSH key pair, and that the public key is in place on your SFTP server.

If you wish to Use key authentication for this SFTP server, click the **Get** (Read Fingerprint) button to request the public key fingerprint from the server. The host key MD5 is a hash of the FTP server's public key, which the camera stores in order to verify that it is connecting to the correct SFTP server. You can copy that fingerprint and save it for later reference.

The max. length of MD5 fingerprint is 47 characters.

If key authentication is not preferred, you can specify a username and password in the section below.

An RSA key fingerprint will look like this: da:47:93:b4:3a:90:5b:50:1f:20:a8:f9:b7:a1:d0:e1. Verify if this is the SFTP server you want to connect to.



■ Folder name

Enter the folder where the media file will be placed. If the folder name does not exist, the Network Camera will create one on the SFTP server.

Use backslash "\" when you need to specify a path. Leave it blank to use the SFTP server's default root directory. The max. length of folder name is 128 characters.

■ Login mode

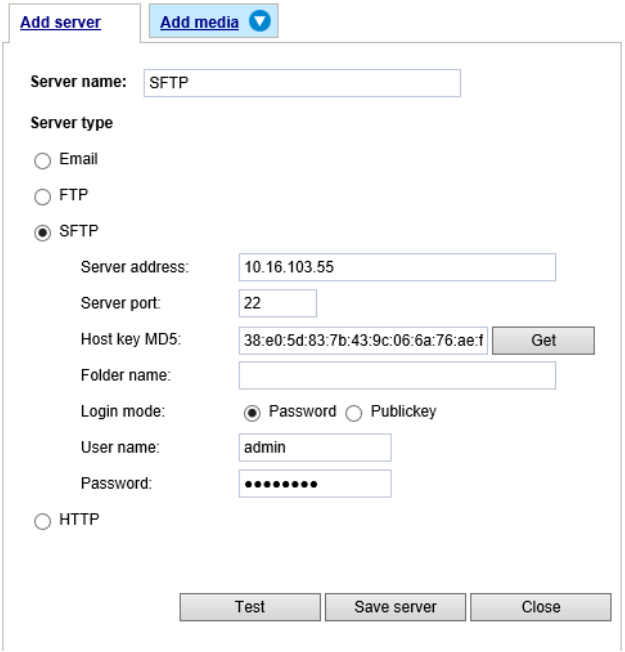
Select a Login mode as either the **Password** or the **Public key** mode.

When using SFTP, you can authenticate using a public/private SSH key pair instead of a password. If key authentication is not enabled, you need to specify a password instead. The administrator of the SFTP server will need to manually add the corresponding public key to the SFTP server.

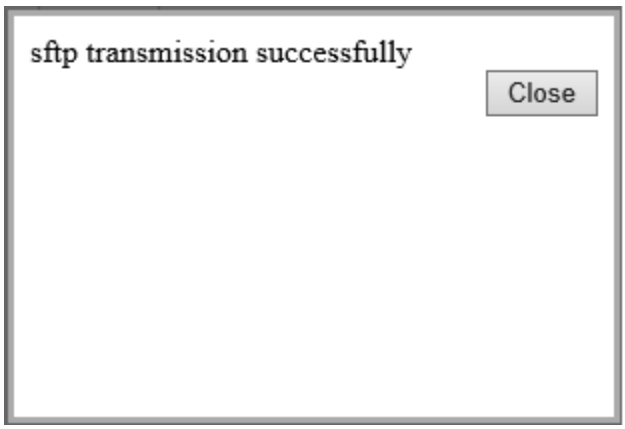
Password mode:

■ User name: Enter the login name of the SFTP account.

■ Password: Enter the password of the SFTP account.



Use the **Test** button to test the connectivity. When done, enter the server name and click the **Save server** button to preserve your settings.



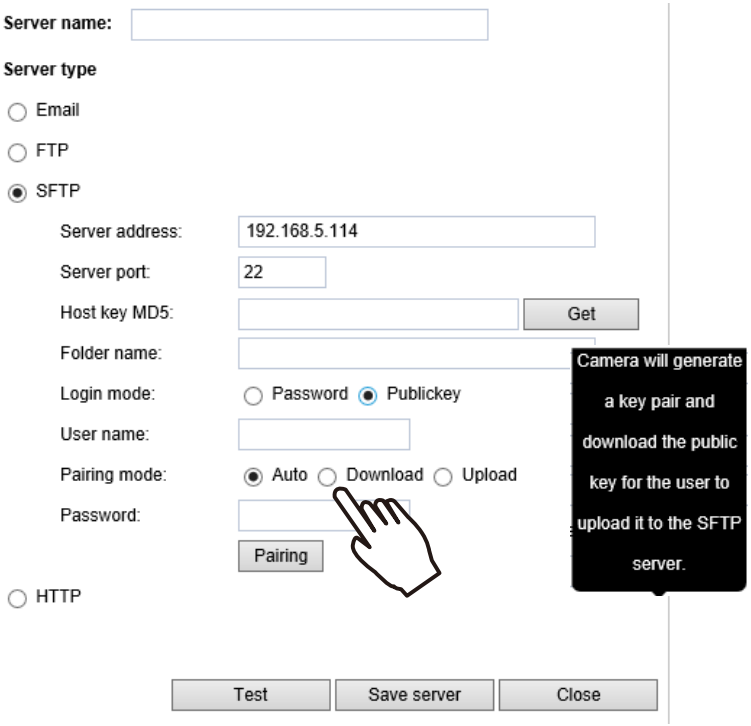
Publickey mode:

Selecting the **Public key** mode will bring up the **Pairing mode** options: Auto, Download, Upload.

Auto	Camera will generate a key pair and auto pair public key with the SFTP server.
Download	Camera will generate a key pair and download the public key for the user to upload it to the SFTP server. The supported formats are: ED25519 (default. Elliptic curve signature scheme Edwards-curve Digital Signature Algorithm; with faster key creation, encryption and decryption), RSA (Rivest–Shamir–Adleman, with greater portability), ECDSA (Elliptic Curve Digital Signature Algorithm).
Upload	Upload the private key here and upload the public key to the SFTP server. A private key is a guarded secret and it can be stored on disk in an encrypted form. A passphrase is used in order to decrypt it. It is a login password to the SSH server, the passphrase is only used to decrypt the private key on the local system. The passphrase is not transmitted over the network.

When using SFTP, you can authenticate using a public/private SSH key pair instead of a password. If key authentication is not enabled, you need to specify a password instead. The administrator of the SFTP server will need to manually add the corresponding public key to the SFTP server.

The key benefit of a key-based authentication is that instead of a using a password, you are less vulnerable to brute-force attacks and you do not expose valid credentials, if the server has been compromised.

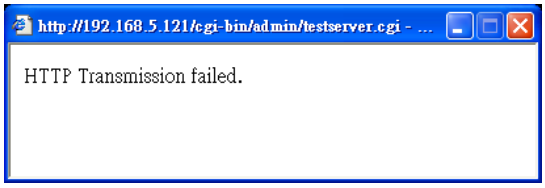


Server type - HTTP
Select to send the media files to an HTTP server when a trigger is activated.

- Server name: Enter a name for the server setting.
- URL: Enter the URL of the HTTP server.
- User name: Enter the user name if necessary.
- Password: Enter the password if necessary.

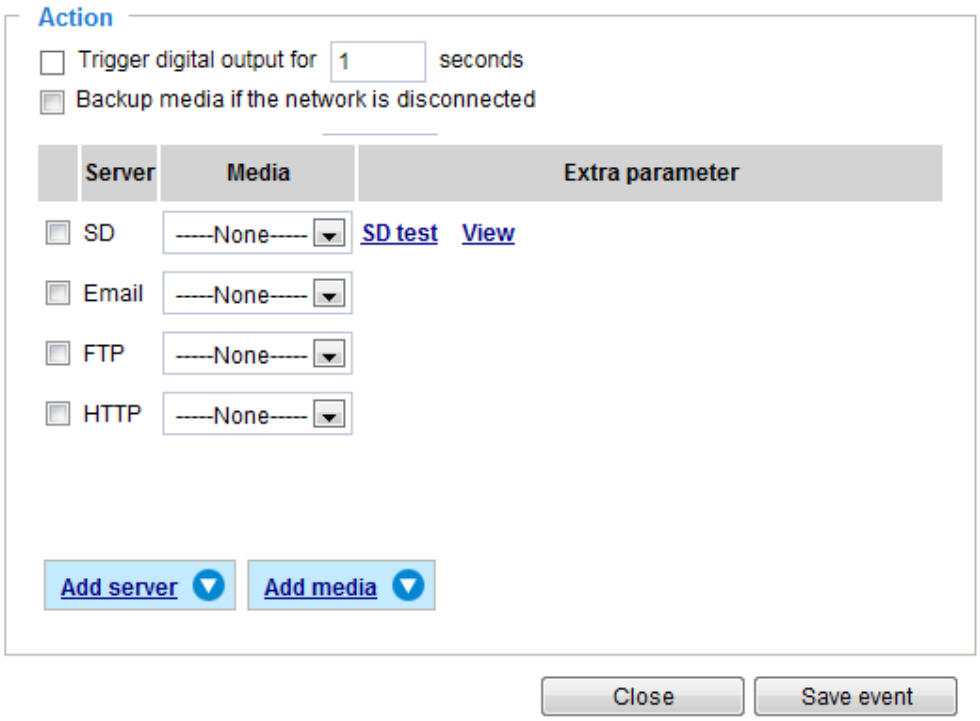
To verify if the HTTP settings are correctly configured, click **Test**. The result will be shown in a pop-up window as shown below. If successful, you will receive a test.txt file on the HTTP server.

Click **Save server** to enable the settings.



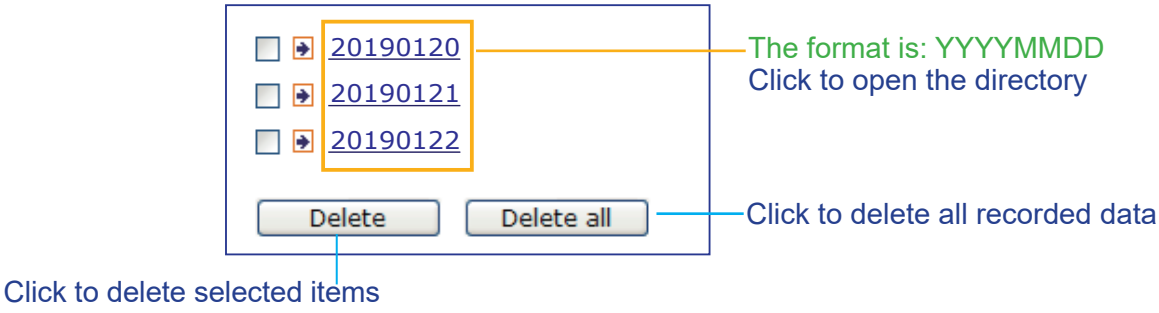
Network storage:

Click **Save server** to enable the settings.

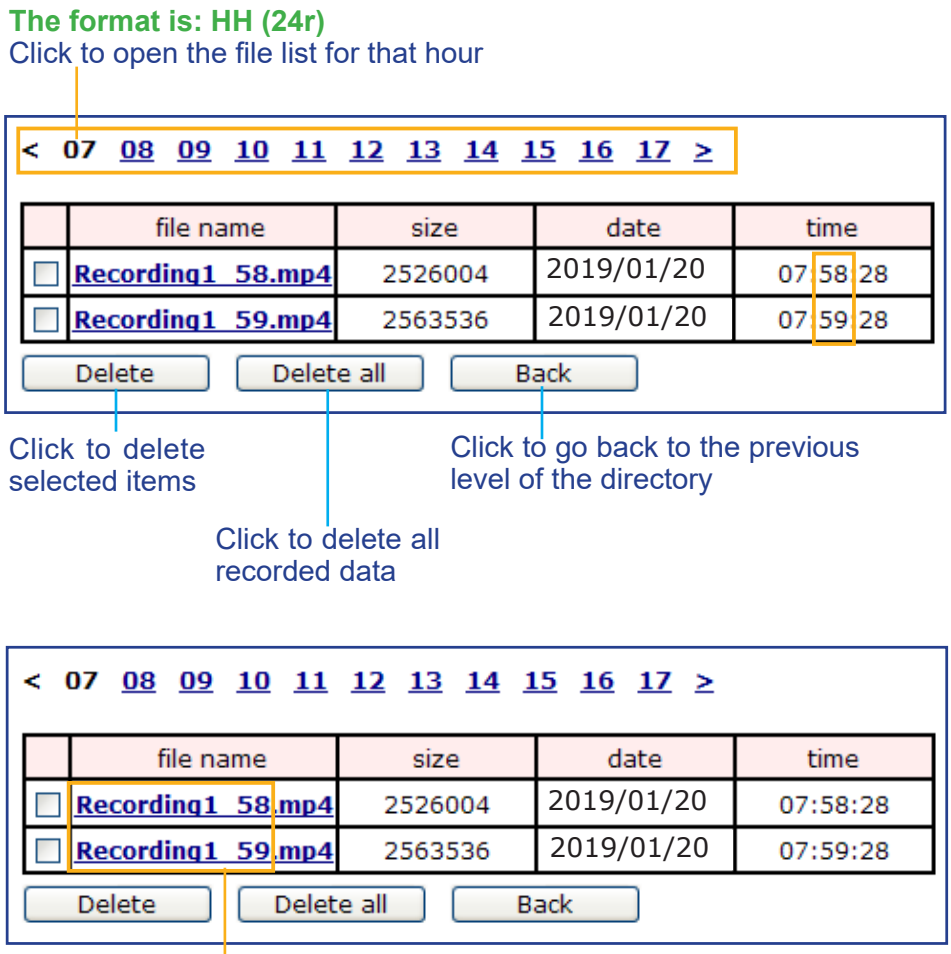


- SD Test: Click to test your SD card. The system will display a message indicating the result as a success or a failure. If you want to use your SD card for local storage, please format it before use. Please refer to page 147 for detailed information.
- View: Click this button to open a file list window. This function is only for SD card and Network Storage. If you click the View button for an SD card, a Local storage page will prompt so that you can manage the recorded files on SD card. For more information about Local storage, please refer to page 166. If you click the View button for a Network storage, a file directory window will prompt for you to view recorded data on Network storage. For detailed illustration, please refer to the next page.
- Create folders by date, time, and hour automatically: If you select this item, the system will automatically create folders by the date when video footages are stored onto the networked storage.

The following is an example of a file destination with video clips:



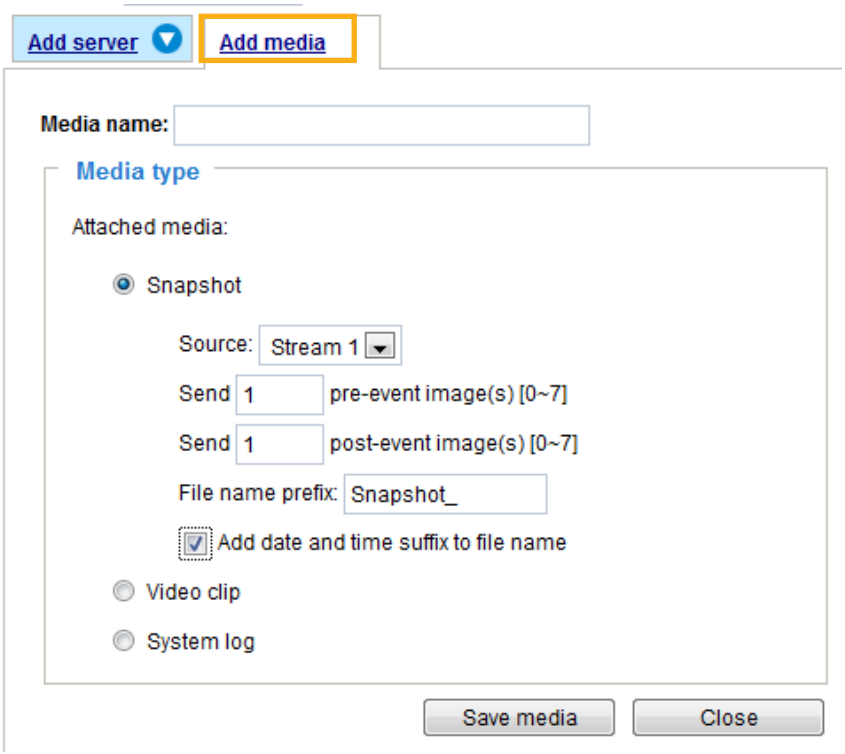
Click **20190120** to open the directory:



The format is: File name prefix + Minute (mm)
You can set up the file name prefix on Add media page. Please refer to next page for detailed information.

Add media

Click **Add media** to open the media setting window. You can specify the type of media that will be sent when a trigger is activated. A total of 5 media settings can be configured. There are three choices of media types available: Snapshot, Video Clip, and System log. Select the item to display the detailed configuration options. You can configure either one or all of them.



Media type - Snapshot
Select to send snapshots when a trigger is activated.

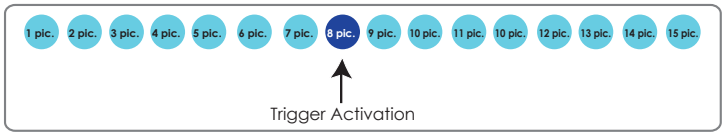
■ Media name: Enter a name for the media setting.

■ Source: Select to take snapshots from any of the video streams.

■ Send ☐ pre-event images
The Network Camera has a buffer to temporarily hold data up to a certain limit. Enter a number to decide how many images to capture before a trigger is activated. Up to 7 images can be generated.

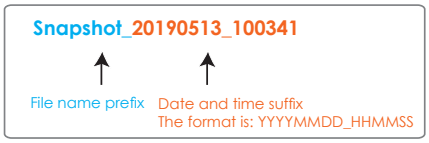
■ Send ☐ post-event images
Enter a number to decide how many images to capture after a trigger is activated. Up to 7 images can be generated.

For example, if both the Send pre-event images and Send post-event images are set to 7, a total of 15 images can be generated after a trigger is activated.



■ File name prefix
Enter the text that will be appended to the front of the file name.

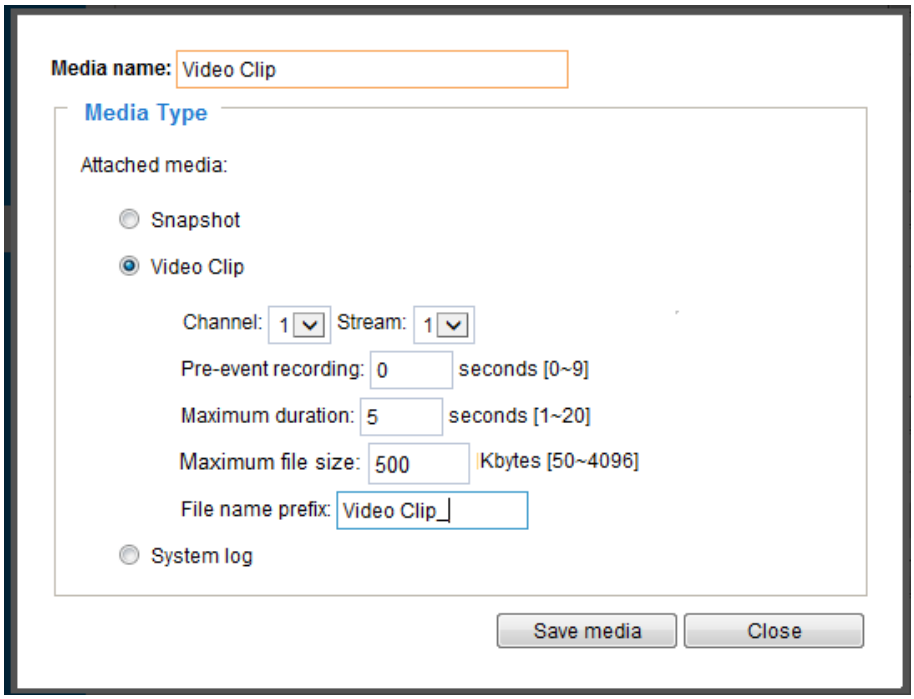
■ Add date and time suffix to the file name
Select this option to add a date/time suffix to the file name.
For example:



Click **Save media** to enable the settings.

Note that after you set up the first media server, a new column for media server will automatically display on the Media list. If you wish to add more media options, click **Add media**.

Media type - Video clip
Select to send video clips when a trigger is activated.

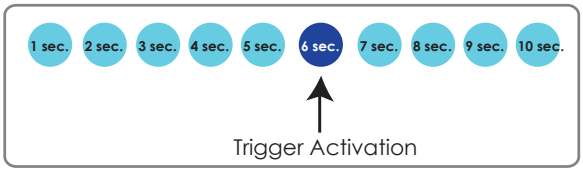


■ Media name: Enter a name for the media setting.

■ Source: Select a video stream as the source of video clip.

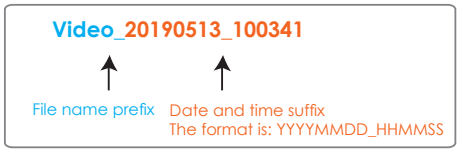
■ Pre-event recording
The Network Camera has a buffer to temporarily hold data up to a certain limit. Enter a number to decide the duration of recording before a trigger is activated. Up to 9 seconds can be set.

■ Maximum duration
Specify the maximum recording duration in seconds. The duration can be up to 10 seconds.
For example, if pre-event recording is set to five seconds and the maximum duration is set to ten seconds, the Network Camera continues to record for another 4 seconds after a trigger is activated.



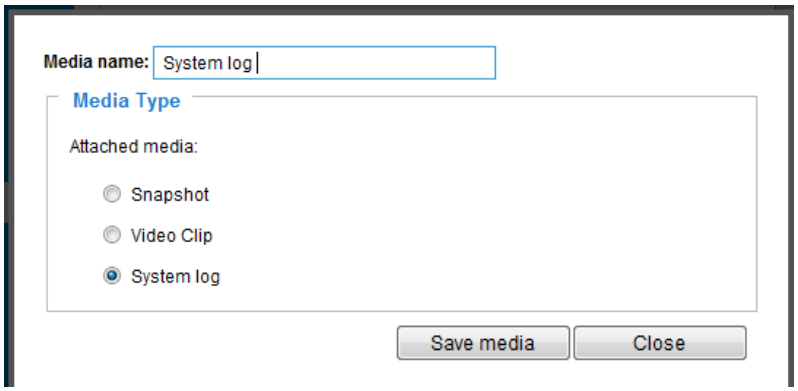
■ Maximum file size
Specify the maximum file size allowed. Some users may need to stitch the video clips together when searching and packing up forensic evidence.

■ File name prefix
Enter the text that will be appended to the front of the file name.
For example:

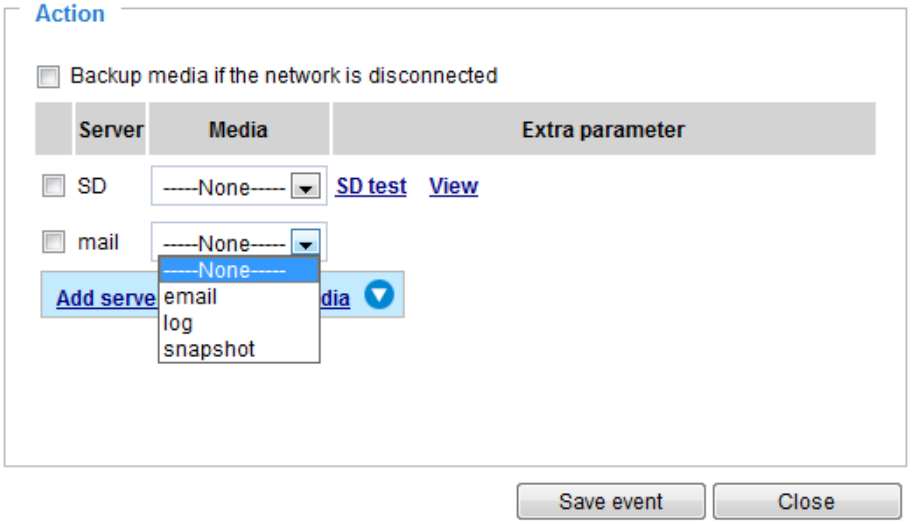


Click **Save media** to enable the settings.

Media type - System log
Select to send a system log when a trigger is activated.



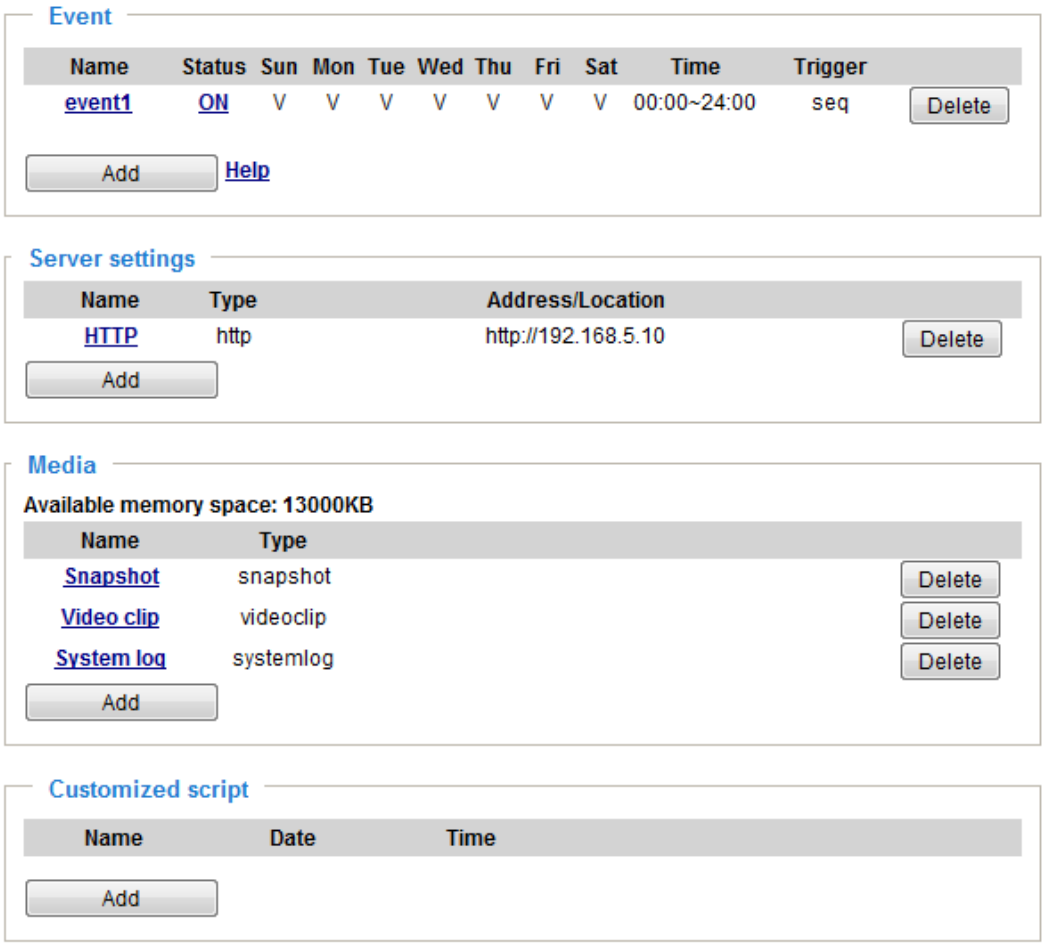
Click **Save media** to enable the settings, then click **Close** to exit the page.



In the Event settings column, the Servers and Medias you configured will be listed; please make sure the Event -> Status is indicated as **ON**, in order to enable the event triggering action.

When completed, click the **Save event** button to enable the settings and click **Close** to exit Event Settings page. The new Event / Server settings / Media will appear in the event drop-down list on the Event setting page.

Please see the example of the Event setting page below:



When the Event Status is **ON**, the event configuration above is triggered by motion detection, the Network Camera will automatically send snapshots via e-mail.

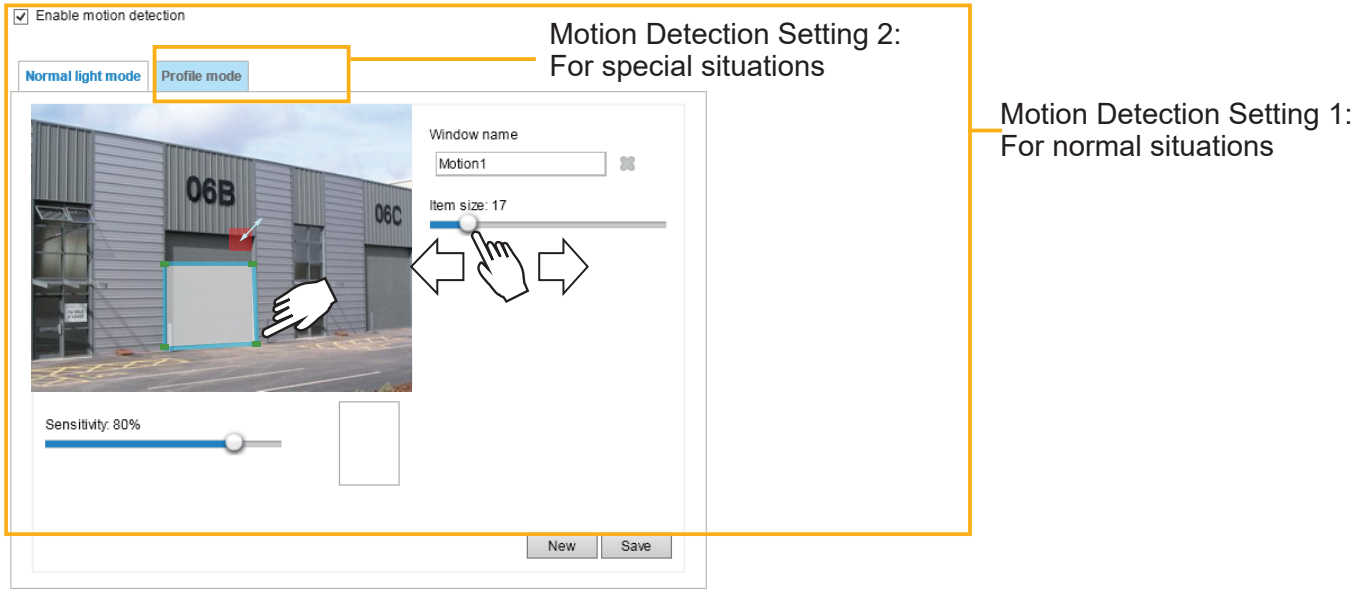
If you want to stop the event trigger, you can click on the **ON** button to turn it to **OFF** status or click the **Delete** button to remove the event setting.

To remove a server setting from the list, select a server name from the drop-down list and click **Delete**. Note that you can only delete a server setting when it is not applied in an existing event setting.

To remove a media setting from the list, select a media name from the drop-down list and click **Delete**. Note that you can only delete a media setting when it is not applied in an existing event setting.

Applications > Motion detection

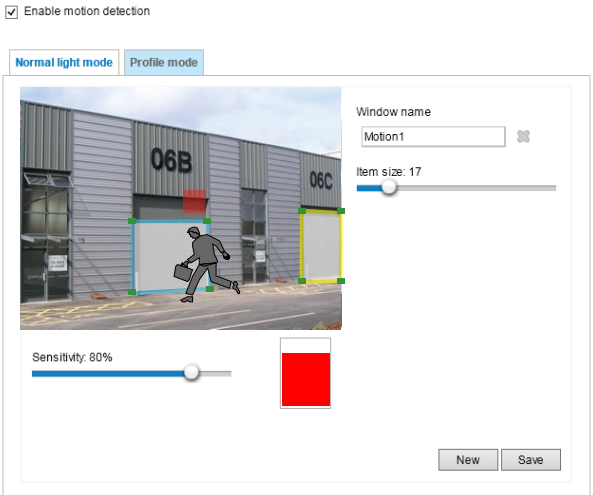
This section explains how to configure the Network Camera to enable motion detection. A total of 5 motion detection windows can be configured.



Follow the steps below to enable motion detection:

1. Click **New** to add a new motion detection window.
2. In the Window Name text box, enter a name for the motion detection window.
   - Use 4 mouse clicks to designate a detection window. You can change the window shape by dragging the corner marks to a preferred location.
   - Drag the item size tab to change the minimum size of item to trigger an alarm. An item size box will appear in the center of screen for your reference (in semi-transparent red). An intruding object must be larger than the Item size to trigger an alarm. Change the item size according to the live view.
   - To delete a window, click the X mark on the right of the window name.
3. Define the sensitivity to moving objects by moving the Sensitivity slide bar. Note that a high sensitivity is prone to produce false alarms such as the fast changes of light (such as day/night mode switch, turning lights on/off). A movement must persist longer than 0.3 second for the motion to be detected.
4. Click **Save** to enable the settings.
5. Select **Enable motion detection** to enable this function.

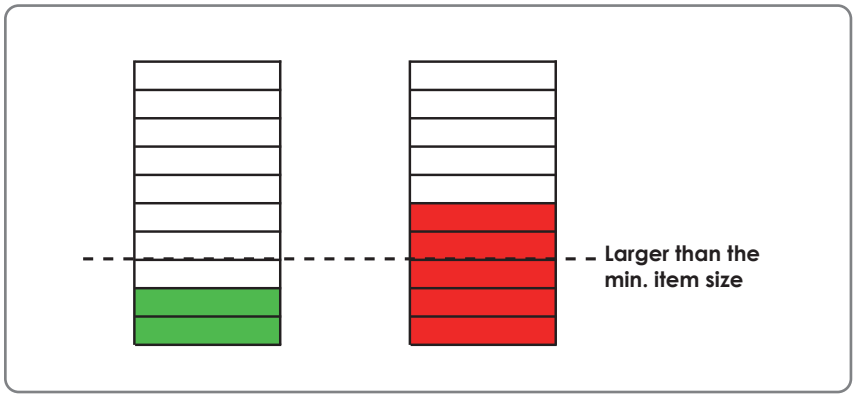
For example:



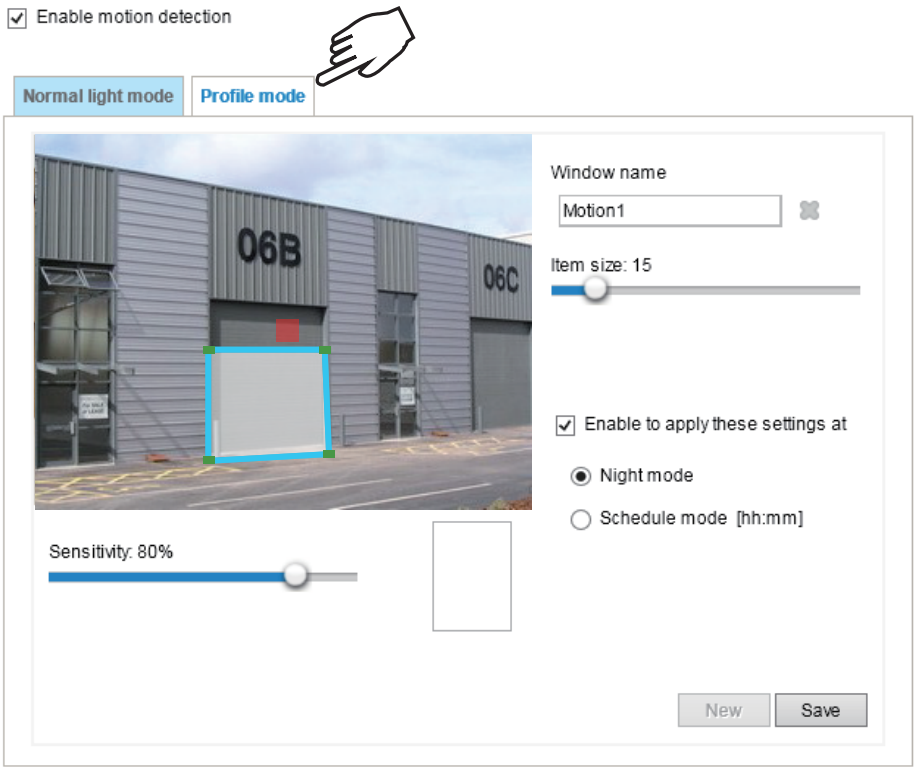
The Percentage Indicator will rise or fall depending on the variation between sequential images. When motions are detected by the Network Camera and are considered to exceed the preset threshold, the red bar rises. Meanwhile, the motion detection window will be outlined in red.

Photos or videos can be captured instantly and configured to be sent to a remote server (via an Email or FTP server). For more information on how to configure an event setting, please refer to Event settings on page 134.

A green bar indicates that even though motions have been detected, the event has not been triggered because the image variations still fall under the preset threshold.



If you want to configure other motion detection settings for day/night/schedule mode (e.g., for a different lighting condition), please click **Profile** to open the Motion Detection Profile Settings page as shown below. Another three motion detection windows can be configured on this page.



Please follow the steps beolw to set up a profile:
1. Create a new motion detection window.
2. Click the **Profile mode** tab.
3. Select the applicable Schedule mode. Please manually enter a time range.
4. Click **Save** to enable the settings and click **Close** to exit the page.

This motion detection window will also be displayed on the Event Settings page. You can go to **Event > Event settings > Trigger** to select it as a trigger source. Please refer to page 134 for detailed information.

NOTE:

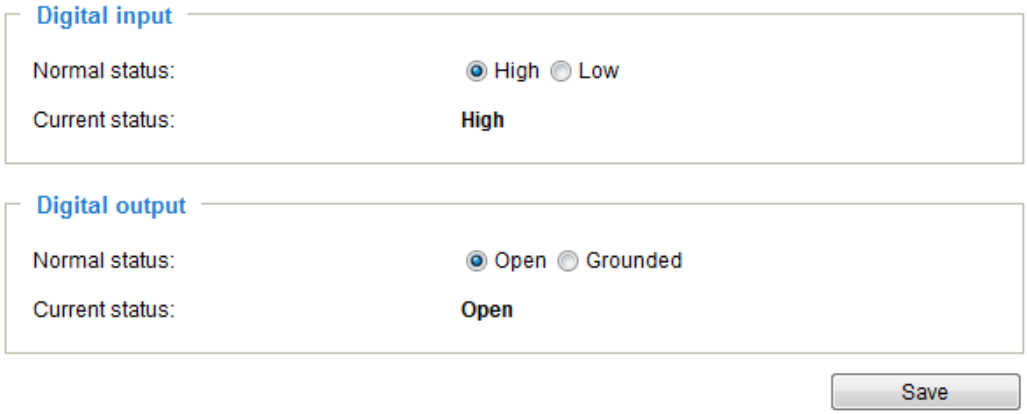
► *How does motion detection work?*

There are two motion detection parameters: Sensitivity and Min. Item Size. As illustrated above, frame A and frame B are two sequential images. Pixel differences between the two frames are detected and highlighted in gray in which the sensitivity setting will take effect. Sensitivity is a value that expresses the sensitivity to moving objects. A higher sensitivity setting allows camera to detect slight movements while a lower sensitivity setting will neglect them.

The minimum item size is a threshold value that determines how many "alerted pixels" can trigger an event. When the size of an intruding object is larger than the minimum size, and its movement persist for 0.3 second, the motion is judged to exceed the defined threshold; and the motion window will be outlined in red. With a large minimum item size, the size of moving object in frame C is considered as smaller than the minimum item size, no motion alarm is triggered. With a smaller minimum item size, the same moving object in frame D triggers the alarm.

*For applications that require a high level of security management, it is suggested to use **higher** sensitivity settings. However, a higher sensitivity level can also produce false alarms due to fast light changes when switching between the day and night modes, AE switch, turning the light on or off, etc.*

Applications > DI and DO



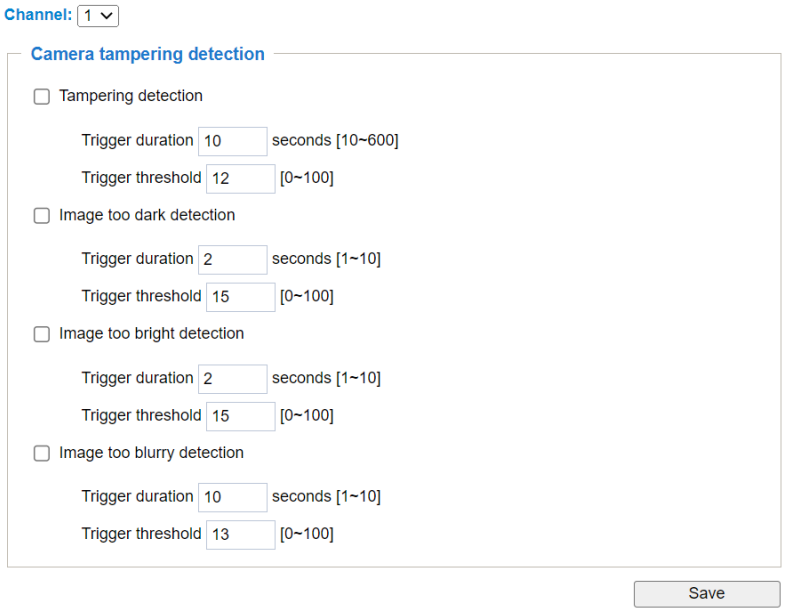
Digital input: Select High or Low as the Normal status for the digital input connection. Connect the digital input pin of the Network Camera to an external device to detect the current connection status.

Digital output: Select Grounded or Open to define the normal status for the digital output. Connect the digital output pin of the Network Camera to an external device to determine the current status.

Set up the event source as DI on **Event > Event settings > Trigger.** Please refer to page 135 for detailed information.

Applications > Tampering detection

This section explains how to set up camera tamper detection. With tamper detection, the camera is capable of detecting incidents such as **redirection**, **blocking or defocusing**, or even **spray paint**.



Please follow the steps below to set up the camera tamper detection function:

1. Click to select the checkbox before tampering conditions: Tampering detection, Image too dark, Image too bright, and Image too blurry. Enter the tamper trigger duration. (10 sec. ~ 10 min.). The duration specifies the set of time before the tampering is considered as a real alarm. This helps avoid false alarms by short-lived changes.

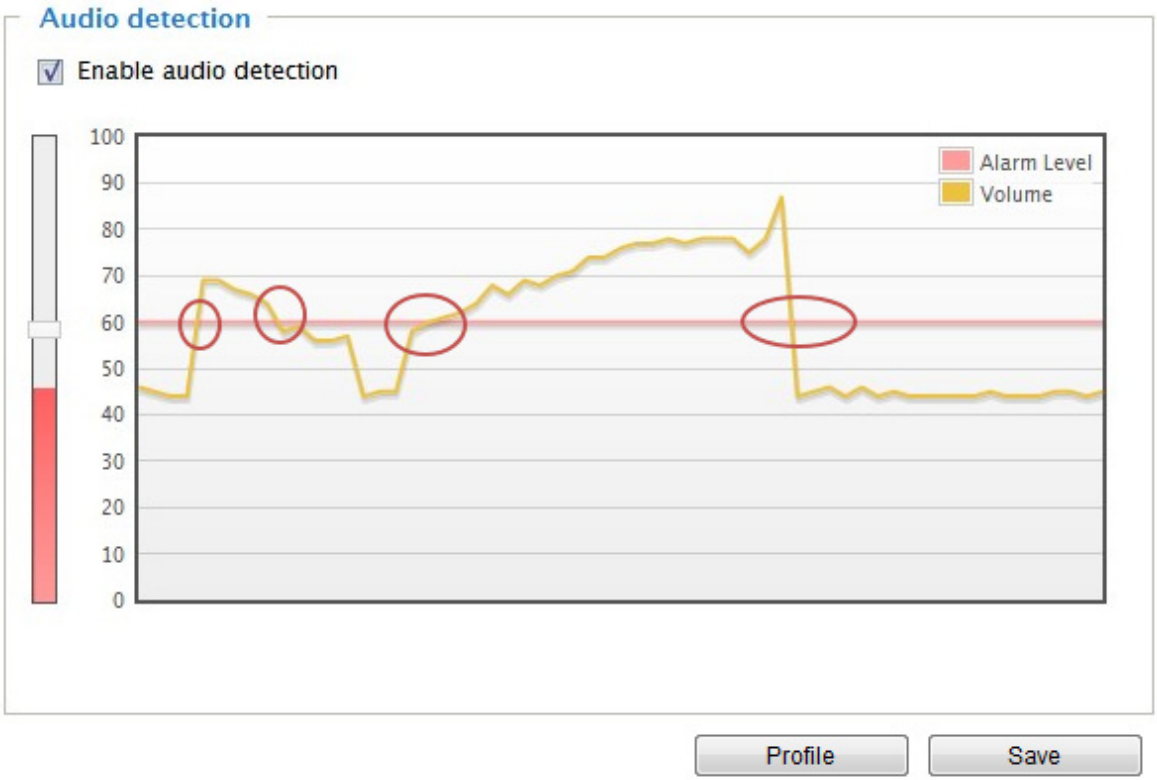
   The tamper alarm will be triggered only when the tampering factor (the difference between current frame and pre-saved background) exceeds the trigger threshold. Conditions such as image too dark, too bright, or too blurry (defocused) can also be configured as tampering conditions. The Trigger threshold determines how sensitive your is tamper detection setting. Lower the threshold number, easier to trigger.

   Too bright: shining a flash light. The average lighting level of the scene is taken into consideration.
   Too dark: covering the objective or spraying paint.
   Too blurry: blurry scene can be the result of strong interference on the device, such as EMI interference.

2. You can configure Tampering Detection as a trigger element to the proactive event configurations in **Event -> Event settings -> Trigger.** For example, when the camera is tampered with, camera can be configured to send the pre- and post-event video clips to a networked storage device. Please refer to page 134 for detailed information.

Applications > Audio detection

Audio detection, along with video motion detection, is applicable in the following scenarios:
1. Detection of activities not covered by camera view, e.g., a loud input by gun shots or breaking a door/window.
2. A usually noisy environment, such as a factory, suddenly becomes quiet due to a breakdown of machines.
3. A PTZ camera can be directed to turn to a preset point by the occurrence of audio events.
4. Dark environments where video motion detection may not function well.



The red circles indicate where the audio alarms can be triggered when breaching or falling below the preset threshold.

How to configure Audio detection:
1. Once the Audio detection window is opened, the current sound input will be interactively indicated by a fluctuating yellow wave diagram.
2. Use a mouse click to drag the Alarm level tab to a preferred location on the slide bar.
3. Select the “Enable audio detection“ checkbox and click Save to enable the feature.

NOTE:

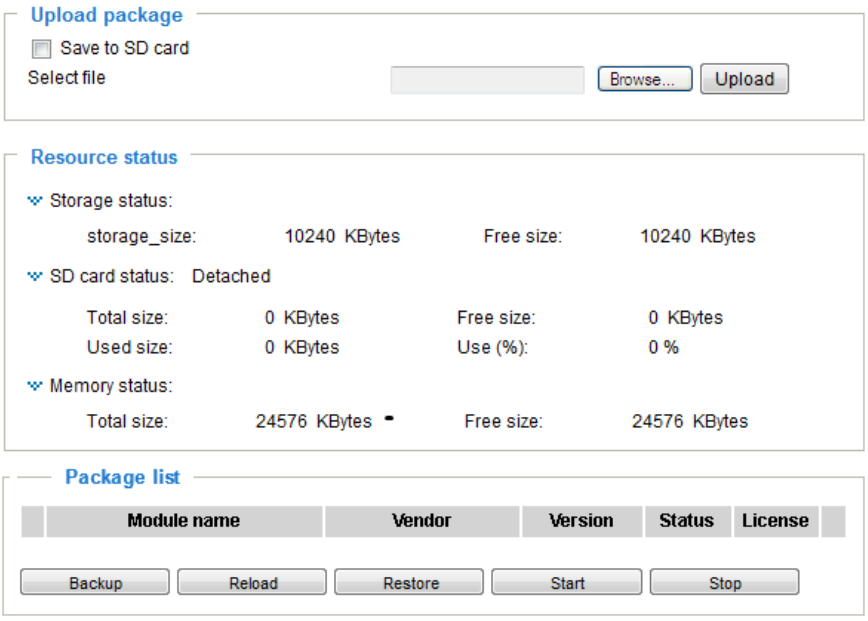
1. Note that the volume numbers (0~100) on the side of wave diagram does not represent decibel (dB). Sound intensity level has already been mapped to preset values. You can, however, use the real-world inputs at your installation site that are shown on the wave diagram to configure an alarm level.

2. To configure this feature, you must not mute the audio in **Configuration > Media > Audio***. The default of the camera can be muted due to the lack of an internal microphone. An external microphone is provided by users.*

IMPORTANT:

- If the Alarm level and the received volume are set within a range of 20% on the wave diagram, frequent alarms will be triggered. It is recommended to set the Alarm level farther apart from the detected sound level.
- To configure and enable this feature, you **must not** configure video stream #1 into **Motion JPEG**. If an external microphone input is connected and recording of audio stream is preferred, audio stream is transmitted between camera and viewer/recording station **along with stream #1**.
- Refer to page 92 for Audio settings, and page 86 for video streaming settings.

Applications > Package management - a.k.a., VADP (VIVOTEK Application Development Platform)



Users can store and execute VIVOTEK's or 3rd-party software modules onto the camera's flash memory or SD card. These software modules can apply in video analysis for intelligent video applications such as license plate recognition, object counting, or as an agent for edge recording, etc.

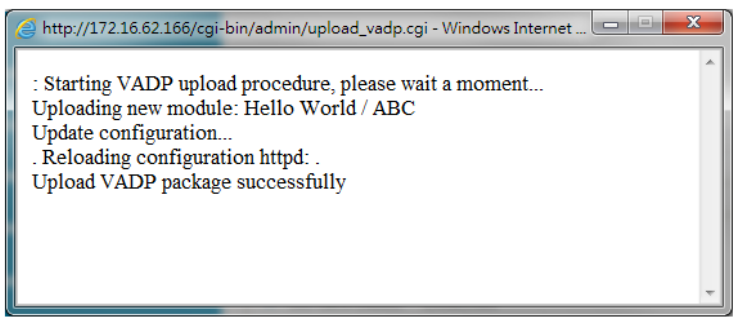
- Once the software package is successfully uploaded, the module configuration (vadp.xml) information is displayed. When uploading a module, the camera will examine whether the module fits the predefined VADP requirements. Please contact our technical support or the vendor of your 3rd-party module for the parameters contained within.

- Users can also run VIVOTEK's VADP packages as a means to access updated functionality instead of replacing the entire firmware.

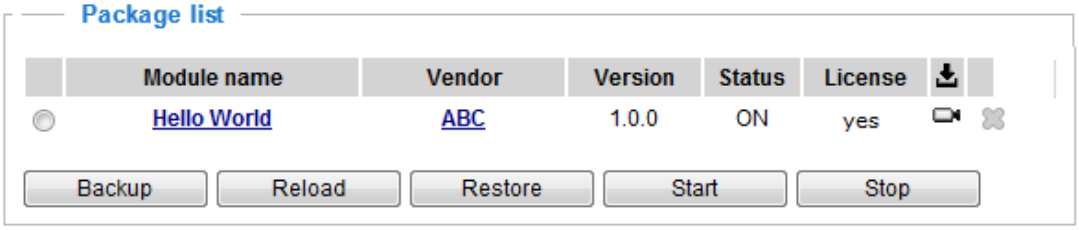
- Note that for some cameras the flash is too small to hold VADP packages. These cameras will have its "Save to SD card" checkbox selected and grayed-out for all time.

- The file system of SD card (FAT32) does not support soft (symbolic) link. It will return failure if your module tries to create soft links on SD card.

To utilize a software module, acquire the software package and click **Browse** and **Upload** buttons. The screen message for a successful upload is shown below:

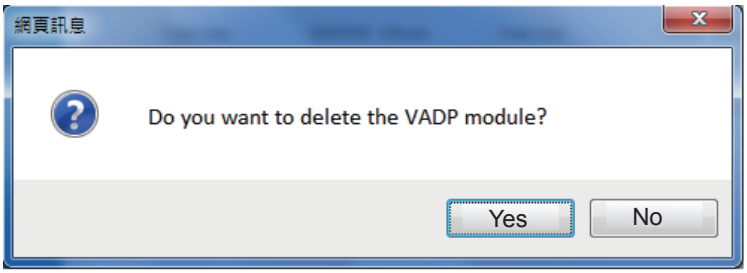


To start a module, select the checkcircle in front, and click the **Start** button.



If you should need to remove a module, select the checkcircle in front and then click the **Stop** button. By then the module status will become **OFF**, and the **X** button will appear at the end of the row. Click on the **X** button to remove an existing module.

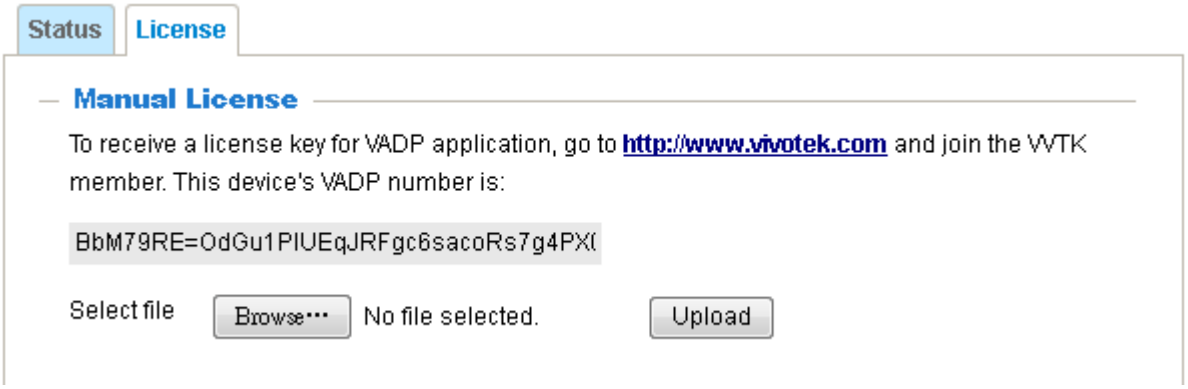
When prompted by a confirm message, Click **Yes** to proceed.



Note that the actual memory consumed while operating the module will be indicated on the **Memory status** field. This helps determine whether a running module has consumed too much of system resources.

On the License page, register and activate the license for using VIVOTEK's VADP modules. You should acquire the license key elsewhere, and manually upload to the network camera.

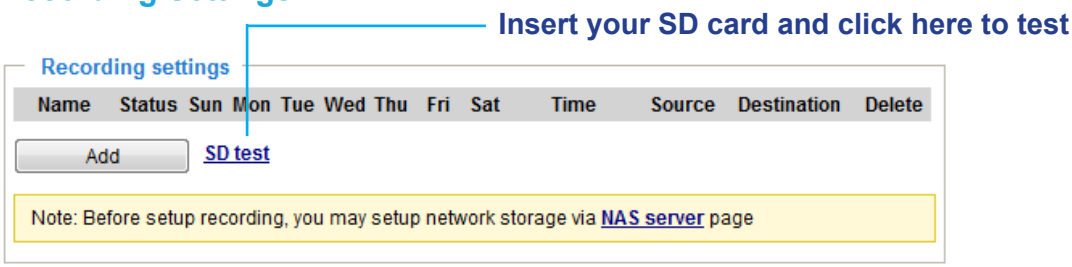
Follow the onscreen instruction on VIVOTEK's website for the registration procedure.



Recording > Recording settings

This section explains how to configure the recording settings for the Network Camera.

Recording Settings

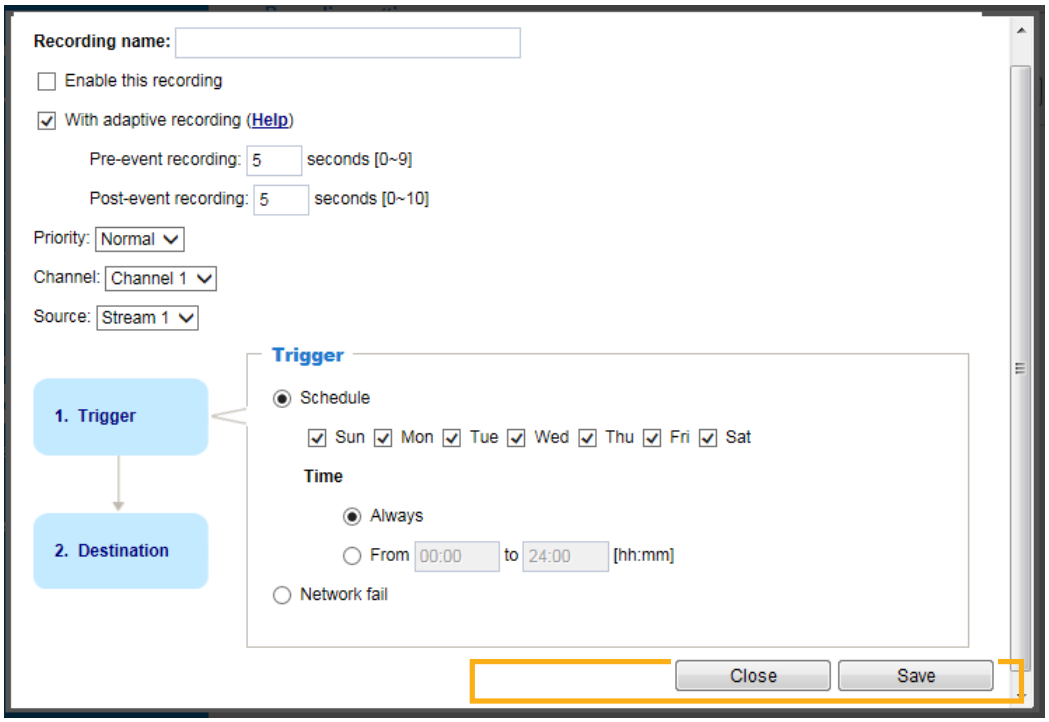


NOTE:

► *Please remember to format your SD card via the camera's web console (in the Local storage . SD card management page) when using it for the first time. Please refer to page 166 for detailed information.*

Recording Settings

Click **Add** to open the recording setting window. On this page, you can define the adaptive recording, recording source, recording schedule, and recording capacity. A total of 2 recording settings can be configured.

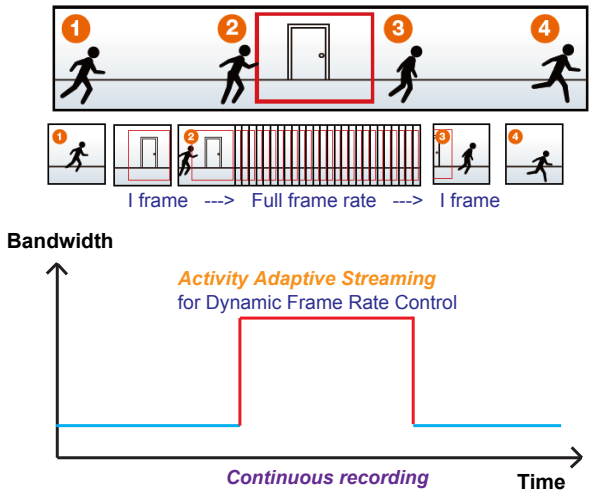


■ Recording name: Enter a name for the recording setting.

■ Enable this recording: Select this option to enable video recording.

■ With adaptive recording:
Select this option will activate the frame rate control according to alarm trigger.
The frame control means that when there is a triggered alarm, the frame rate will raise up to the value you've configured on the Video quality page. Please refer to page 87 for more information.

If you enable adaptive recording on a camera, only when an event is triggered on Camera A will the server record the full frame rate streaming data; otherwise, it will only request the I frame data during normal monitoring, thus effectively saves bandwidths and storage space.



NOTE:

► *To enable adaptive recording, please make sure you've set up the trigger source such as Motion Detection, DI Device, or Manual Trigger.*

► *When there is no alarm trigger:*
- JPEG mode: record 1 frame per second.
- H.265/H.264 mode: record the I frame only.

► *When the I frame period is >1s on Video settings page, firmware will force decrease the I frame period to 1s when adaptive recording is enabled.*

The alarm trigger includes: motion detection and DI detection. Please refer to Event Settings on page 134.

■ Pre-event recording and post-event recording
The Network Camera has a buffer that temporarily holds data for a period of time. Therefore, when an event occurs, the camera can restrieve image frames taken several seconds ago. Enter a number to define the duration of recording before and after a trigger is activated.

■ Priority: Select the relative importance of this recording (High, Normal, or Low). Recording with a higher priority setting will be executed first.

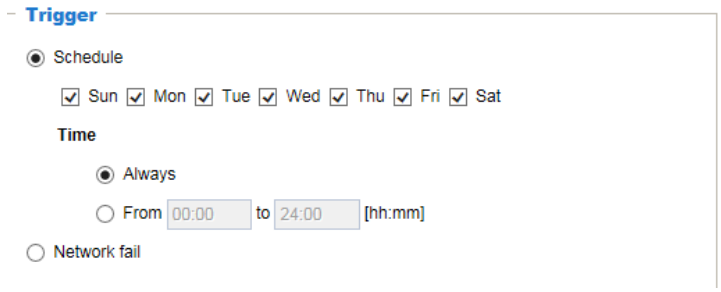
■ Source (Channel/Stream): Select a video stream as the recording source.

NOTE:

► *To enable recording notification please configure **Event settings** first . Please refer to page 134.*

Please follow the steps below to set up the recording.

1. Trigger
Select a trigger source.

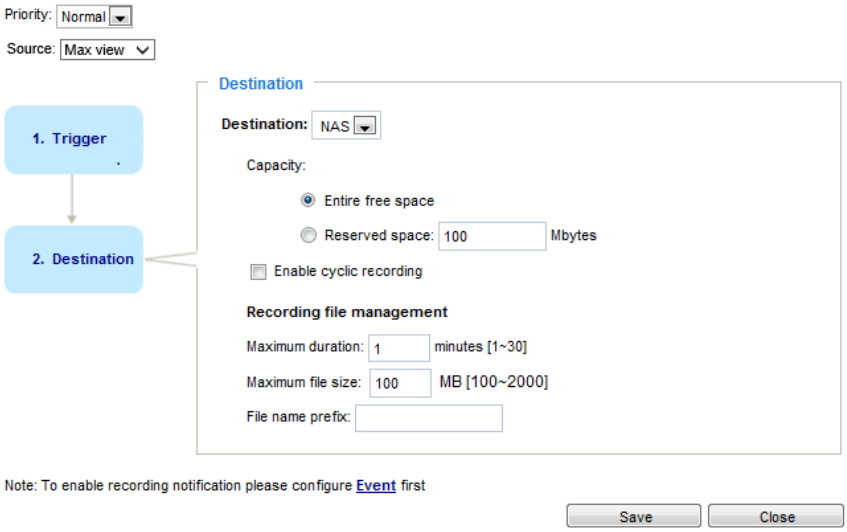


■ Schedule: The server will start to record files on the local storage or network storage (NAS).

■ Network fail: Since network fail, the server will start to record files on the local storage (SD card).

2. Destination

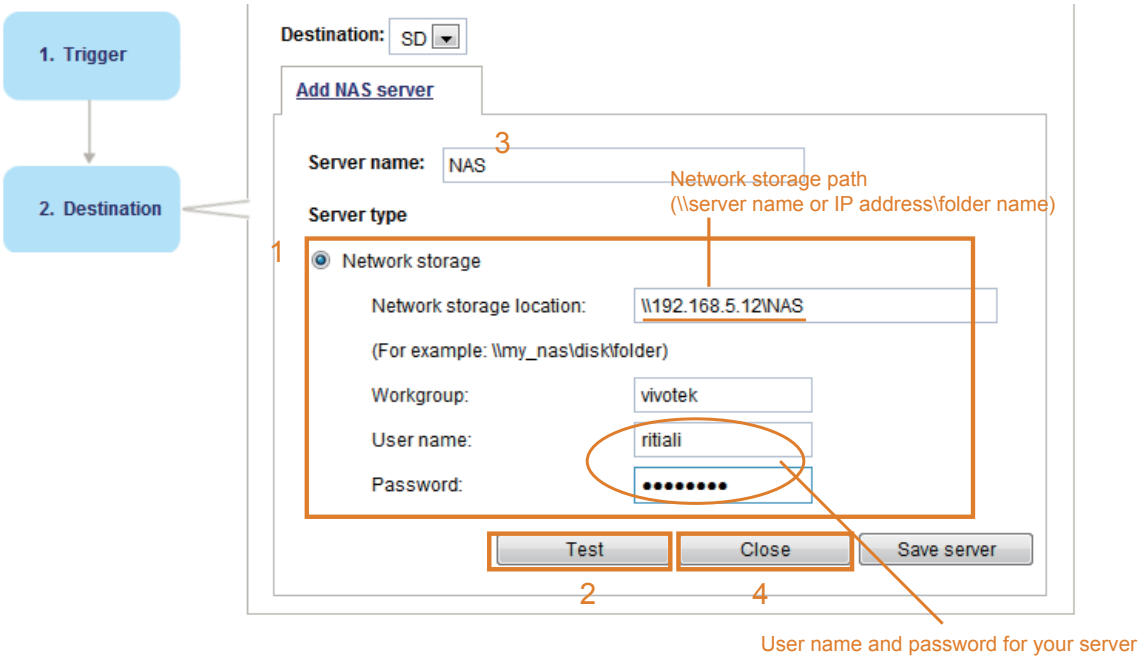
You can select the SD card or network storage (NAS) for the recorded video files. If you have not configured a NAS server, see details in the following.



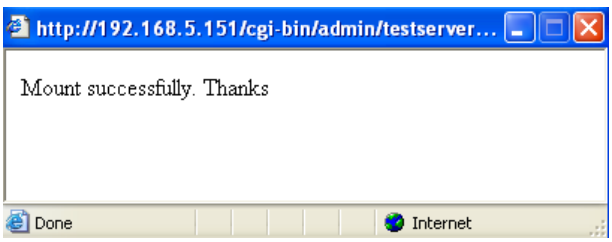
NAS server

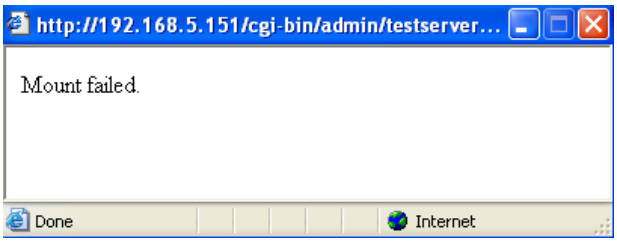
Click **Add NAS server** to open the server setting window and follow the steps below to configure:

1. Fill in the information for your server.
   For example:

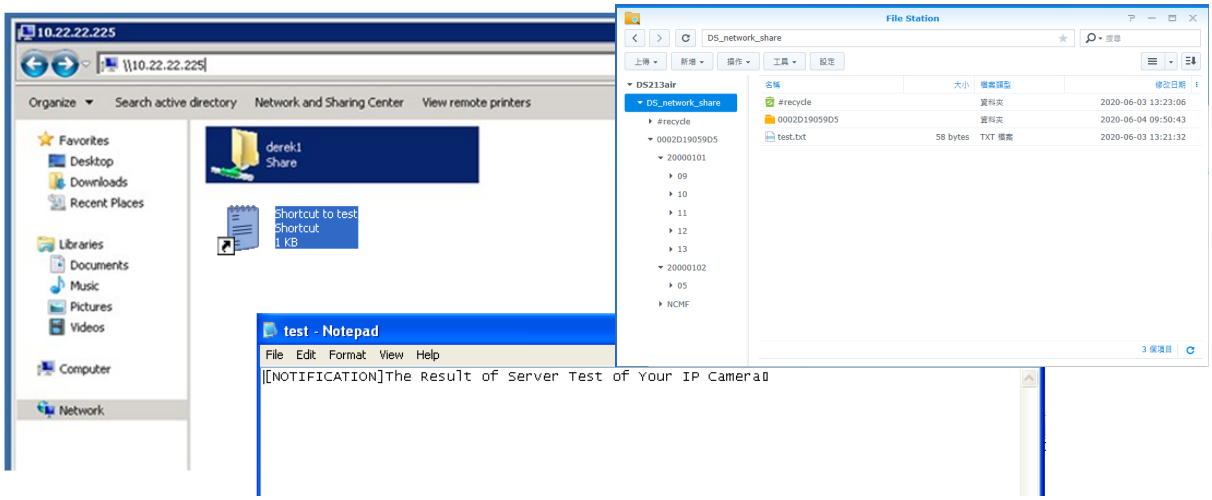


2. Click **Test** to check the setting. The result will be shown in the pop-up window.

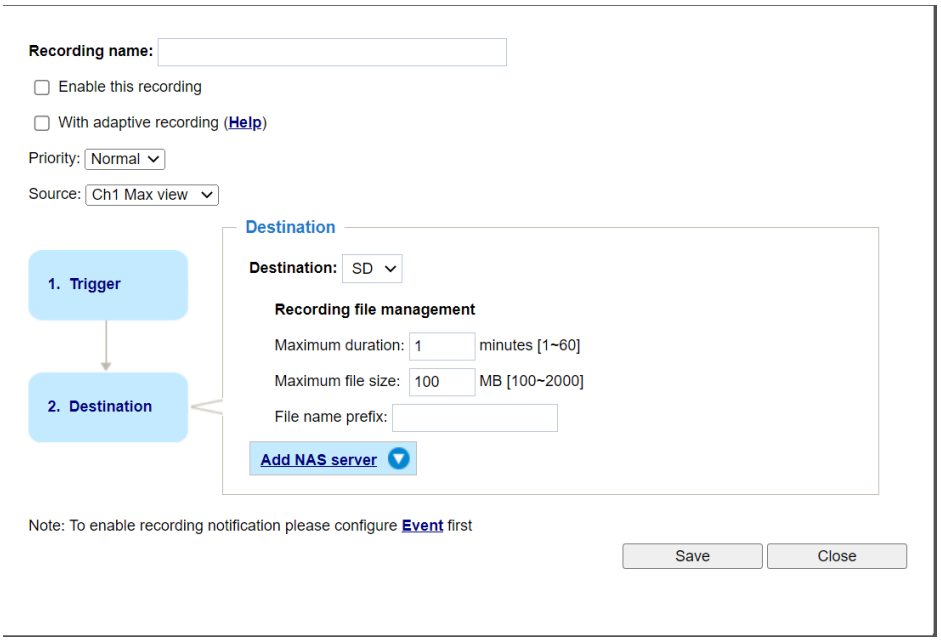




If successful, you will receive a test.txt file on the network storage server.



3. Enter a server name.
4. Click **Save** to complete the settings and click **Close** to exit the page.



■ Capacity: You can either choose the entire free space available or limit the reserved space. The recording size limit must be larger than the reserved amount for cyclic recording.

■ Enable cyclic recording: If you check this item, when the maximum capacity is reached, the oldest file will be overwritten by the latest one. The reserved amount is reserved for the transaction stage when the storage space is about to be full and new data arrives. The minimum for the Reserved space must be larger than 15 MegaBytes.

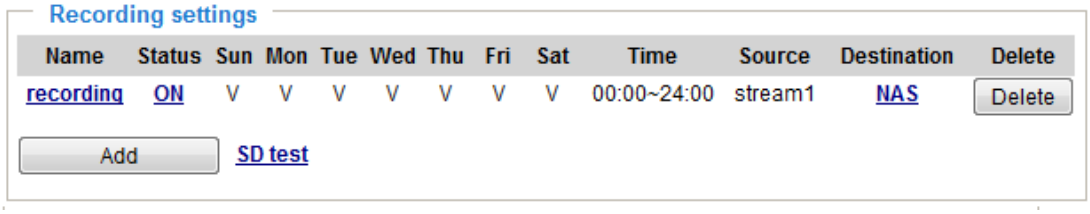
■ Recording file management: You can manually assign the Maximum duration and the Maximum file size for each recording footage. You may need to stitch individual files together under some circumstances. You may also designate a file name prefix by filling in the responsive text field.

■ File name prefix: Enter the text that will be appended to the front of the file name.

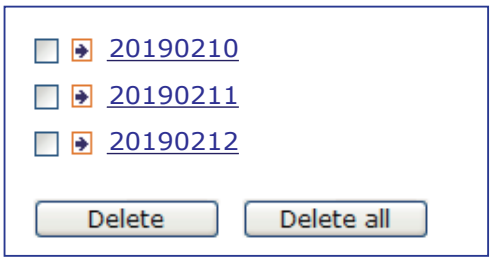
f you want to enable recording notification, please click ***Event*** to configure event triggering settings. Please refer to **Event > Event settings** on page 134 for more details.

When completed, select **Enable this recording**. Click **Save** to enable the setting and click **Close** to exit this page. When the system begins recording, it will send the recorded files to the network storage. The new recording name will appear in the drop-down list on the recording page as shown below.

To remove a recording setting from the list, select a recording name from the drop-down list and click **Delete**.



- Click **recording (Name)**: Opens the Recording Settings page to modify.
- Click **ON (Status)**: The Status will become **OFF** and stop recording.
- Click **NAS (Destination)**: Opens the file list of recordings as shown below. For more information about folder naming rules, please refer to page 145 for details.



Storage

NOTE:

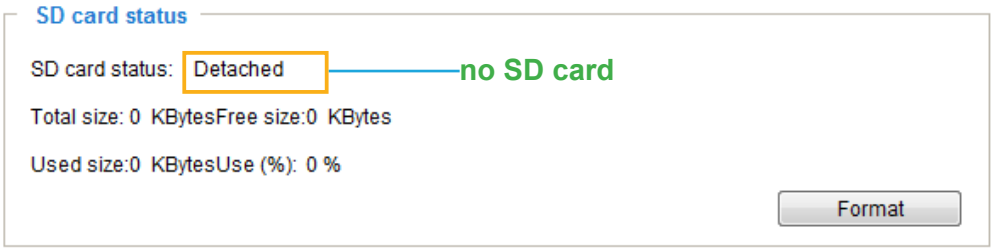
- It is recommended to turn OFF the recording activity before you remove an SD card from the camera.
- The lifespan of an SD card is limited. Regular replacement of the SD card can be necessary.
- Camera filesystem takes up several megabytes of memory space. The storage space cannot be used for recording.
- Using an SD card that already contains data recorded by another device should not be used in this camera.
- Please do not modify or change the folder names in the SD card. That may result in camera malfunctions.

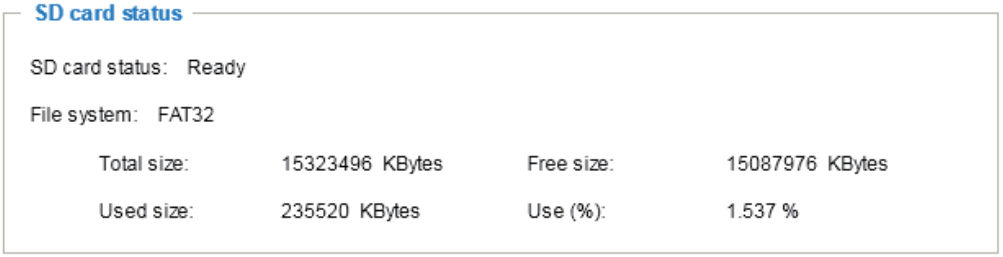
Storage > SD card management

This section explains how to manage the local storage on the Network Camera. Here you can view SD card status, and implement SD card control.

SD card staus

This column shows the status and reserved space of your SD card. Please remember to format the SD card when using for the first time.

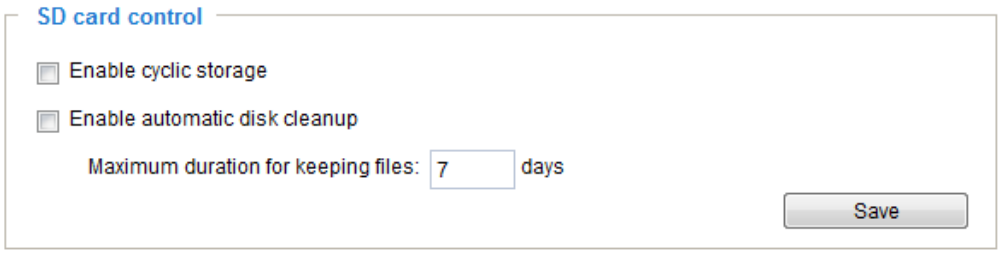




SD card format

The Linux kernel EXT4 file system format applies to SD card larger than 32GB. However, if EXT4 is applied, the computers running Windows will not be able to access the contents on the SD card unless using some 3rd-party software .

SD card control



- Enable cyclic storage: Check this item if you want to enable cyclic recording. When the maximum capacity is reached, the oldest file will be overwritten by the latest one.
- Enable automatic disk cleanup: Check this item and enter the number of days you wish to retain a file. For example, if you enter “7 days”, the recorded files will be stored on the SD card for 7 days.

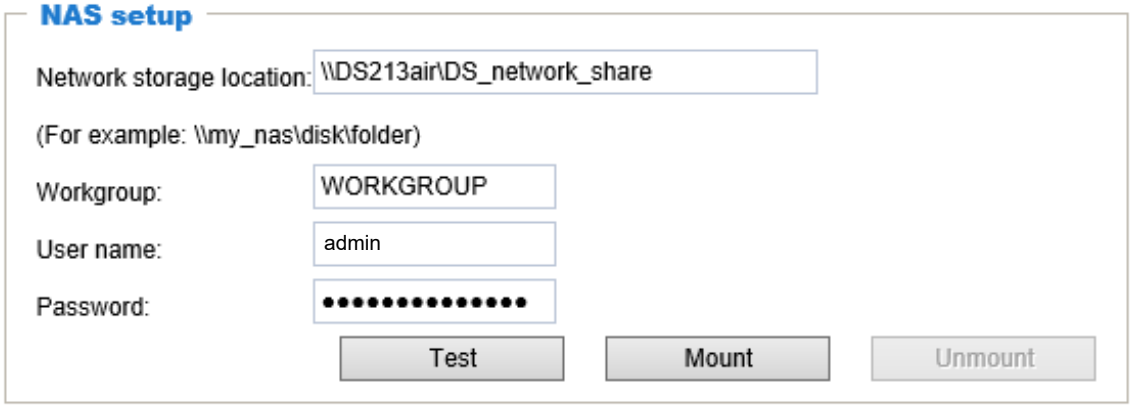
Click **Save** to enable your settings.

Storage > NAS management

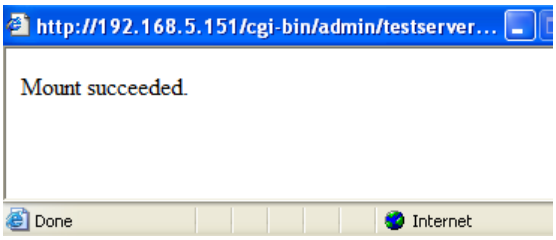
NAS Setup

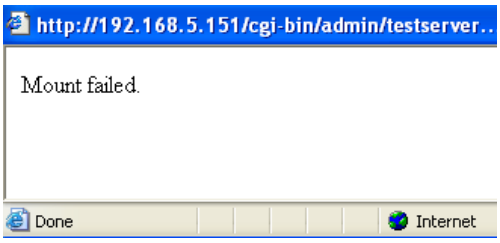
Click **NAS management** tab to open the server setting window and follow the steps below to set up:

1. Fill in the information for the access to the shared networked storage.
   For example:

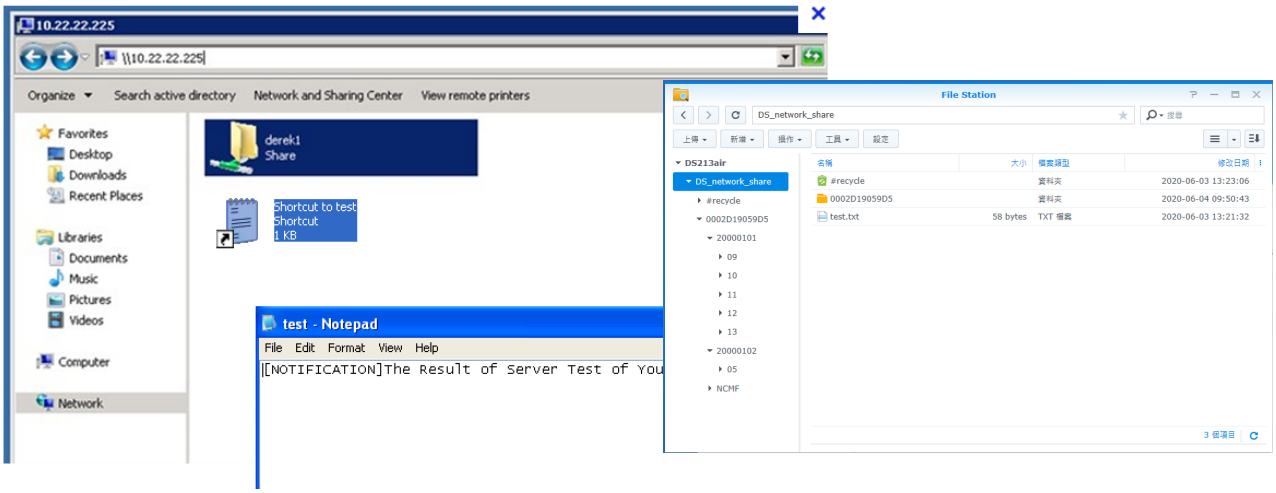


2. Click **Test** to check the setting. The result will be shown in the pop-up window.





If successful, you will receive a test.txt file on the networked storage server.



3. Click **Mount** to complete the settings.

NAS control

■ Minimum reserved storage space: The reserved space can be used as a safe buffer especially when the cyclic recording function is enabled, during the transaction stage when a storage space is full and the incoming streaming data is about to overwrite the previously saved videos.

■ Enable cyclic storage: Allows previous recordings to be overwritten by new recordings.

■ Enable automatic disk cleanup: Allows you to specify how long the recording files will be kept on the NAS storage.

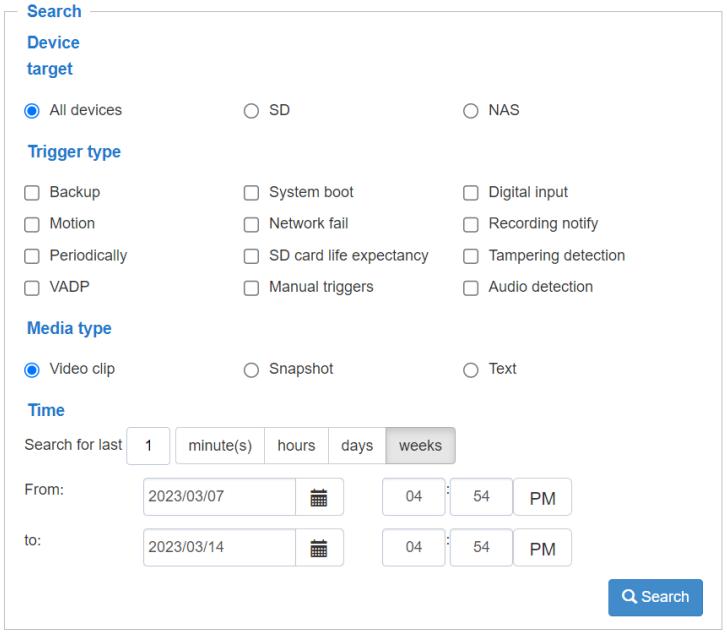
Maximum duration for keeping files: __ days: Specify the days of retention of the video files recorded to the NAS storage.

Storage > Content management

This section explains how to manage the content of recorded videos on the Network Camera. Here you can search and view the records and view the searched results.

Searching and Viewing the Records

This column allows the user to set up search criteria for recorded data. If you do not select any criteria and click **Search** button, all recorded data will be listed in the **Search Results** column.

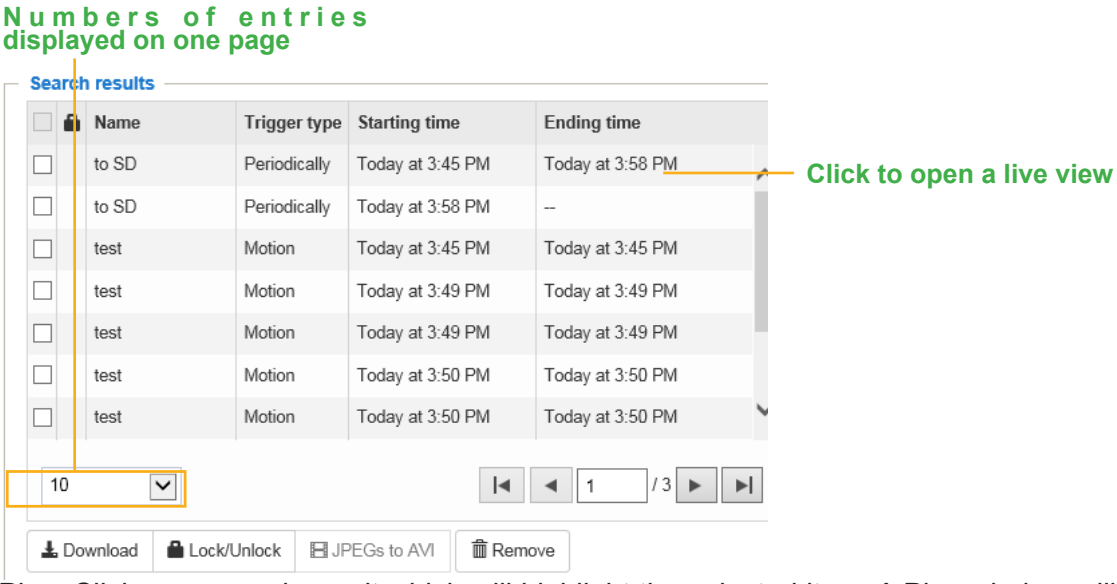


- File attributes: Select one or more items as your search criteria.
- Trigger time: Manually enter the time range you want to search for contents created at a specific point in time.

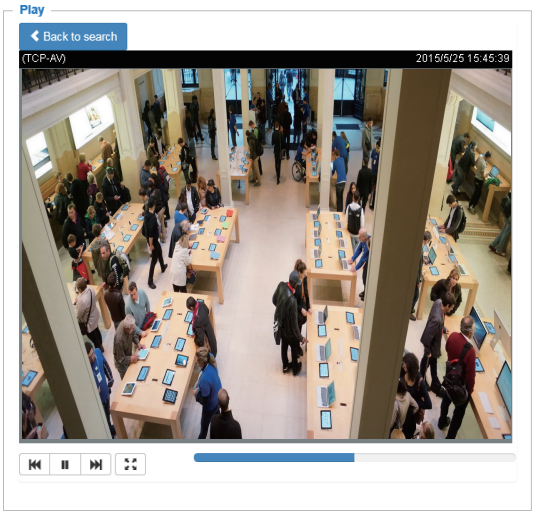
Click **Search** and the recorded data corresponding to the search criteria will be listed in **Search Results** window.

Search Results

The following is an example of search results. There are four columns: Trigger time, Media type, Trigger type, and Locked. Click ⇕ to sort the search results in either direction.



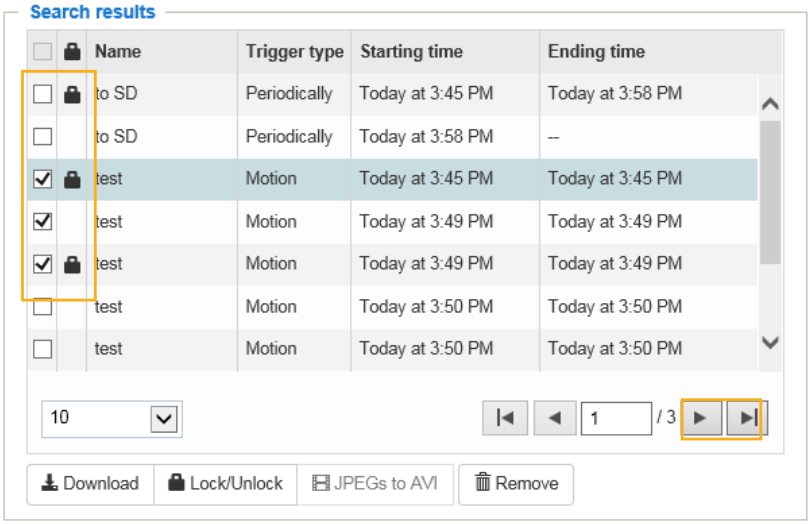
■ Play: Click on a search result which will highlight the selected item. A Play window will appear on top for immediate review of the selected file.
For example:



■ Download: Click on a search result to highlight the selected item in purple as shown above. Then click the **Download** button and a file download window will pop up for you to save the file.

■ JPEGs to AVI: This function only applies to “JPEG“ format files such as snapshots. You can select several snapshots from the list, then click this button. Those snapshots will be converted into an AVI file.

■ Lock/Unlock: Select the checkbox in front of a desired search result, then click this button. The selected items will become Locked, which will not be deleted during cyclic recording. You can click again to unlock the selections.
For example:



Click to switch pages

■ Remove: Select the desired search results, then click this button to delete the files.

NOTE:

- Currently this model does not support URL commands.

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H.264

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Electromagnetic Compatibility (EMC)

FCC Statement

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

■ This device may not cause harmful interference, and

■ This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a partial installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

■ Reorient or relocate the receiving antenna.

■ Increase the separation between the equipment and receiver.

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

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

Shielded interface cables must be used in order to comply with emission limits.

CE Mark Warning

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

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