



Zoom Bullet Series Hardware Manual

B420, B421

2019/07/01



ACTi
Connecting Vision

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Precautions

Read these instructions

Read all the safety and operating instructions before using this product.

Heed all warnings

Adhere to all the warnings on the product and in the instruction manual. Failure to follow the safety instructions given may directly endanger people, cause damage to the system or to other equipment.

Servicing

Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

Trademarks

ACTi and ACTi logo are registered trademarks of ACTi Corporation. All other names and products used in this manual are registered trademarks of their respective companies.

Liability

Every reasonable care has been taken during the writing of this manual. Please inform your local office if you find any inaccuracies or omissions. ACTi will not be held responsible for any typographical or technical errors and reserves the right to make changes to the product and manuals without prior notice.

Federal Communications Commission Statement

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 particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to the equipment that are not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

European Community Compliance Statement

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to European Standard EN 55022 and EN 55024. In a domestic environment, this product may cause radio interference in which cause the user may be required to take adequate measures.

Safety Instructions

Cleaning

Disconnect this product from the power supply before cleaning.

Accessories and Repair Parts

Use only the accessories and repair parts recommended by the manufacturer.

Water and Moisture

Install other devices (such as PoE injector, alarm, etc.) that will be used with the camera in a dry place protected from weather.

Servicing

Do not attempt to service this product yourself. Refer all servicing to qualified service personnel.

Damage Requiring service

Disconnect this product from the power supply immediately and refer servicing to qualified service personnel under the following conditions.

- 1) When the power-supply cord or plug is damaged
- 2) If liquid has been spilled, or objects have fallen into the product.
- 3) If the inner parts of product have been directly exposed to rain or water.
- 4) If the product does not operate normally by following the operating instructions in this manual.

Adjust only those controls that are covered by the instruction manual, as improper adjustment of other controls may result in damage, and will often require extensive work by a qualified technician to restore the product to its normal operation.

Safety Check

Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine if the product is in proper operating condition.

Introduction

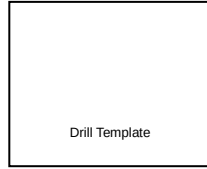
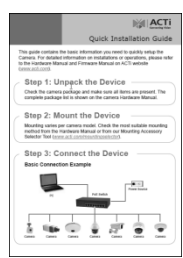
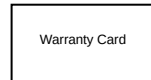
The List of Models

This hardware manual contains the following models:

B420		5MP Outdoor Zoom Bullet with D/N, Adaptive IR, Extreme WDR, SLLS, 36x Zoom lens
B421		3MP Outdoor Zoom Bullet with D/N, Adaptive IR, Extreme WDR, SLLS, 36x Zoom lens

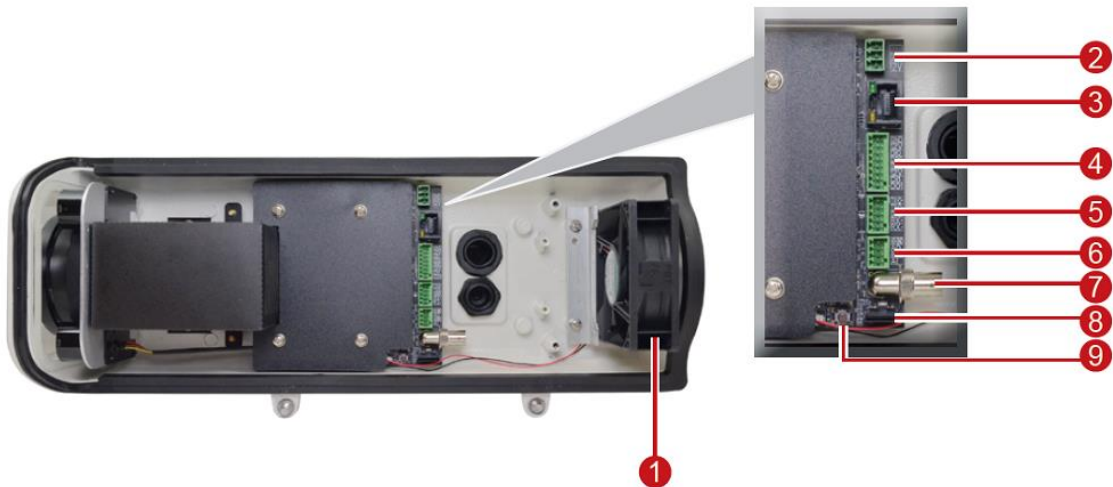
From the installation perspective these models are very similar; therefore you can use one manual for all of them.

Package Contents

Camera	Bracket	Screws, Wall Plugs & Washers
		
Bracket Wrench	Silicon Bags	Drill Template
		
Terminal Block (for Power)	Terminal Block (for DI/DO)	Terminal Block (for Serial Connection)
		
Terminal Block (for Audio)	Quick Installation Guide	Warranty Card
		

NOTE: The pictures are for reference only. Actual items may slightly vary.

Physical Description



Item		Description
1	Fan	Connects to a network using a standard Ethernet cable.
2	DC 12V Power Input	In case the camera is connected to a non-PoE (Power over Ethernet) switch, use this connector to connect the camera to an external power adapter (not included). See Connecting a Power Adapter (Optional) on page 22 for more information.
3	Ethernet Port	Connects to the network using an Ethernet cable.
4	Digital Input / Output	Connects to digital input or output devices, such as an alarm trigger, panic button, etc. Digital Input (DI) and Digital Output (DO) devices are used in applications like motion detection, event triggering, alarm notifications, etc. See Connecting Digital Input / Output Devices (Optional) on page 25 for information on how to connect DI/DO devices to your camera.
5	Audio Input / Output	This connector connects to audio input and output devices, such as microphones and speakers. See Connecting Audio Input / Output Devices (Optional) on page 28 for more information.
6	Serial Port	This port connects to serial devices via RS-485 or RS-422 protocols. Use the supplied serial port terminal block to connect wires from the camera to the

Item		Description
		serial devices. See Connecting a Serial Device (Optional) on page 28 for more information.
7	Analog Video Output	This connector connects to an analog video output device through BNC connection.
8	Memory Card Slot	Insert a memory card into this slot for local video recording purposes. See How to Install / Remove a Memory Card (Optional) on page 30. NOTE: Supports microSDHC and microSDXC cards.
9	Reset Button	Use the reset button to restore the camera to its factory default settings. See How to Reset the Camera on page 31.

Mounting Options

There are several mounting options that you can use to install the camera. Select the most suitable solution for your installation environment.

Mount Types	Accessories	
Wall Mount	Suitable when mounting the camera directly on walls using the integrated bracket. See Installation Procedures on page 12.	
Vertical Pole Mount	Suitable when mounting the camera on vertical poles. Use a junction box (optional and sold separately) to protect the cable connections.	
	PMAX-0508 	

NOTE:

- For more information about the mounting solutions and accessories, please check the [Mounting Accessory Selector](http://www.acti.com/mountingselector) in our website (<http://www.acti.com/mountingselector>).
- The above mounting accessories are not included in the package. Contact your sales agents to purchase.

Installation Procedures

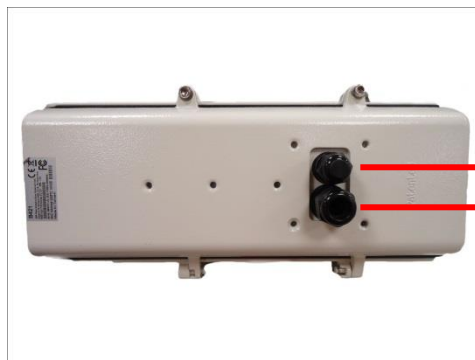
This section describes the procedures in installing the camera on the wall using the integrated bracket.

IMPORTANT! Before installation, make sure the wall can bear more than the weight of the camera and its bracket.

NOTE: The following procedures and pictures are based on the cable going along the wall; same procedures apply when the cable will pass through the wall, unless otherwise specified.

Step 1: Before Installation

Take note that the camera has two (2) cable glands which are already mounted on the camera. One gland is for the Ethernet cable; the other gland that has a rubber insert, is for external devices such as audio, digital input or output devices or DC 12 V power. If no external devices will be connected, do not remove the rubber insert from the gland.



External Devices Cable Gland

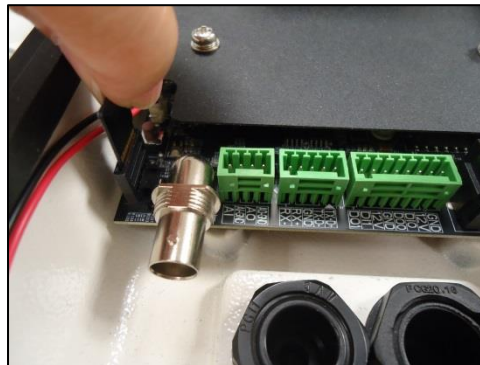
Ethernet Cable Gland

The following steps may or may not be applicable to your installation environment. However, if needed, these steps must be done before installing the camera.

1. Using the bundled screw wrench, open the camera cover.



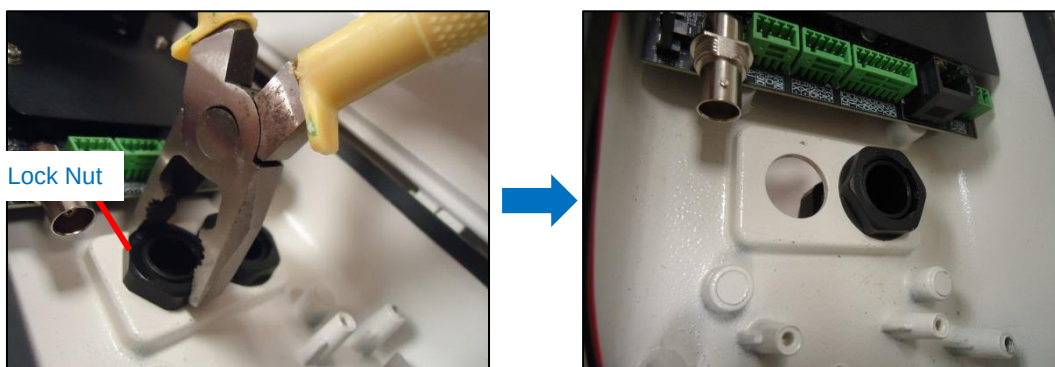
2. If needed, insert the memory card into the slot with the metal contacts facing the video output connector. See [How to Install / Remove a Memory Card \(Optional\)](#) on page 30 for more details.



Step 2: Cable Connections

If other external devices will be connected to the camera, the cables must pass through the cable gland and connect to the corresponding terminal blocks supplied with the camera. Otherwise, skip this step, close the camera cover and proceed to [Step 3: Route the Cables and Mount the Bracket](#) on page 15.

1. Open the camera cover.
2. Remove the smaller cable gland from the camera housing and set it aside (***make sure to keep all its components intact as the cable will be used later***).



3. Whatever device you will connect, make sure to insert the cable through the cable gland.

Detach the cable gland and insert as below:



4. Map the pins to connect the device. See below sections for instructions.
- [Connecting a Power Adapter \(Optional\)](#) on page 22.
 - [Connecting Digital Input / Output Devices \(Optional\)](#) on page 25.
 - [Connecting Audio Input / Output Devices \(Optional\)](#) on page 28.
 - [Connecting a Serial Device \(Optional\)](#) on page 28.
5. Close the camera cover.



Step 3: Route the Cables and Mount the Bracket

1. Attach the supplied drill template on the surface.
2. Determine how the cable will be routed: ***pass through a hole on the surface*** or ***along the surface***.
 - ***If the cables will pass through a hole on the surface***, drill the cable hole and the four (4) screw holes on the surface.
 - ***If the cables will be routed along the surface***, just drill the four (4) screw holes.
3. Detach the drill template and insert the plastic plugs into the screw holes.
4. ***If the cables will pass through a hole on the surface***, route the cables through the hole on the wall.

If the cables will go along the wall, route the cables through the gap on the bracket.



5. Let all the cables pass through the bracket. Pull enough length to be able to connect to the camera later.



IMPORTANT: Make sure that all cables have already passed through before proceeding with mounting the bracket.

- When all cables have passed through the bracket, mount the bracket to the wall.



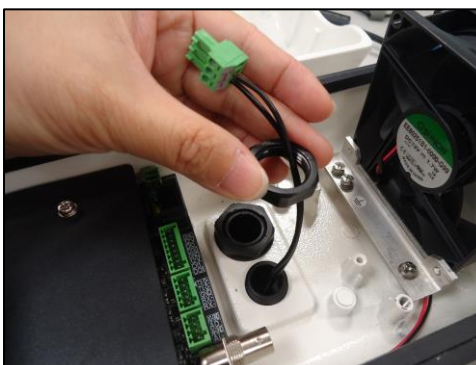
Step 4: Connect the Cables to the Camera

Connect External Devices

- With the cables through the gland and the terminal blocks properly attached, insert the cables through the cable hole on the camera housing.



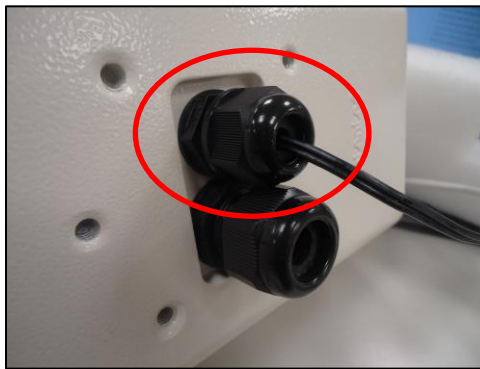
- Let the cable pass through the cable gland lock nut and then attach the lock nut.



3. Connect the terminal blocks to the corresponding connectors on the camera.



4. On the bottom side of the camera, attach the clamping nut and tighten it to seal off the hole.

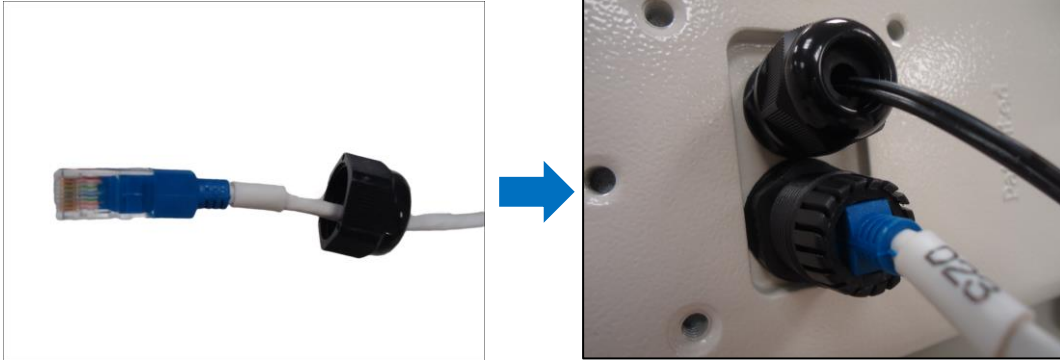


Connect the Ethernet Cable

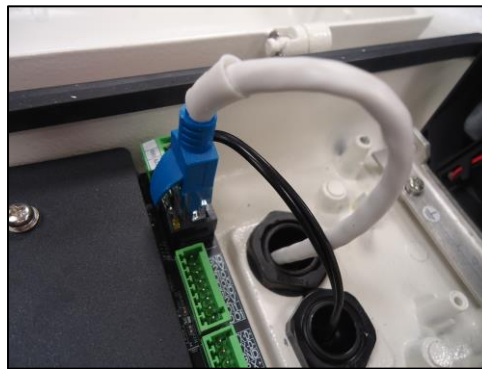
1. Remove the clamping nut of the Ethernet cable gland.



2. Insert the Ethernet cable through the gland and then through the hole.



3. Connect the Ethernet cable to the connector of the camera.



4. Attach the clamping nut and tighten to seal off the hole. Make sure both cable glands are sealed off to avoid moisture from going into the camera.



Step 5: Mount the Camera to the Bracket

1. Once all cables are connected, close the camera cover. Make sure the screws are tight.



2. Align the camera to the bracket and tighten the four (4) screws.



Step 6: Pan and Tilt the Camera

1. Using the bundled screw wrench, slightly loosen the Adjustment Knob. Then, tilt and pan the camera to desired angle.

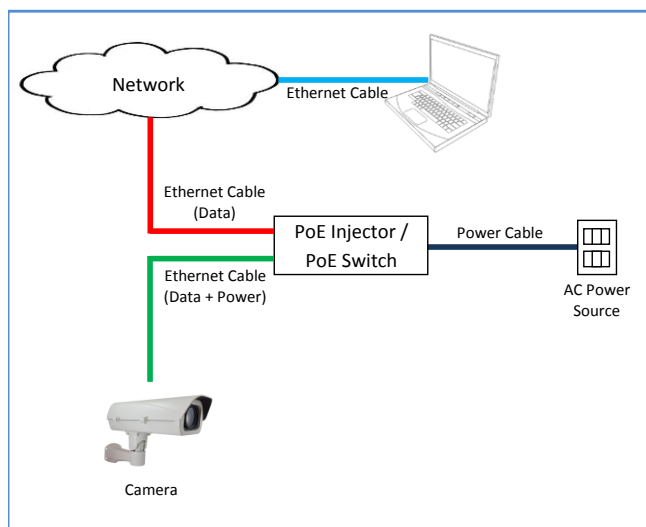


2. When the desired tilt and pan position is achieved, tighten the Adjustment knob to fix its position.



Step 7: Connect Camera to Network

Connect the other end of the Ethernet cable and other cables to the power source. For Power-over-Ethernet (PoE), see connection diagram example below.



In case of using a non-PoE switch, power up the camera using a power adapter (not supplied). As needed, power up the other connected devices.

Step 8: Access Camera Live View

See [Accessing the Camera](#) on page 32 for more information on how to access the camera live view.

Other Connections

This section describes the procedures in preparing the external devices that you can connect to the camera. The camera supports DC12V power input, Digital Input and Output (DI/DO), Audio Input and Output, and Serial devices. The use of these devices, however, is optional.

Connecting a Power Adapter (Optional)

In case of using a non-PoE switch or your PoE switch has limited power supply, you can purchase a power adapter and directly connect the camera to a power outlet. The power adapter must be connected to the supplied terminal block before use.

To do this, follow the procedures below:

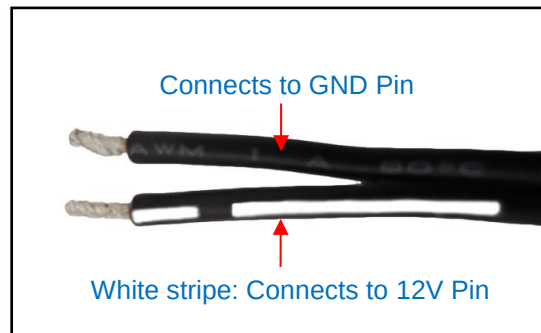
1. Insert the cable through the cable gland as below:



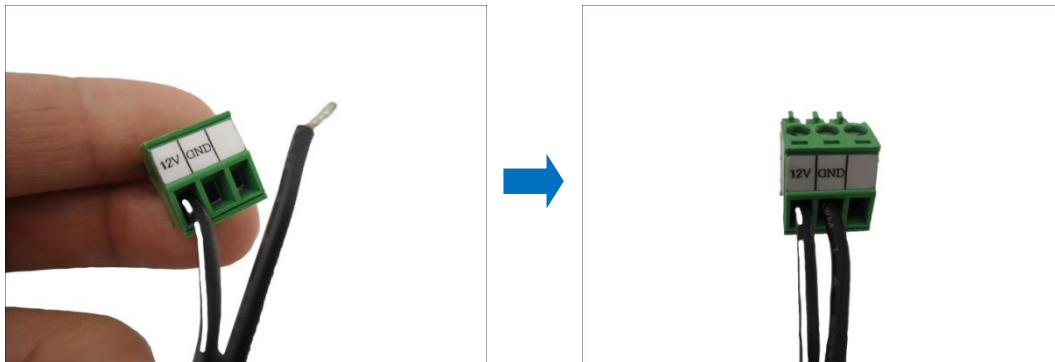
2. Loosen the screws of the **12V** and **GND** pins of the power terminal block.



3. Take note that a standard power adapter cable has two (2) different wires:



3. Connect the wire with the white stripe to the **12V** pin and the other to the **GND** pin.



NOTE: The terminal block pictures are for reference only, note that actual label placement may vary per model.

4. Tighten the screws of the **12V** pin and the **GND** pins to secure the wire connection.



5. Below is an example of a power adapter with an attached terminal block. Connect the terminal block connector to the connector on the camera.



NOTE: The power adapter is not bundled in the package.

Connecting Digital Input / Output Devices (Optional)

Depending on your surveillance needs, you may connect digital input / output devices to your camera using the supplied terminal block.

Digital Input (DI) devices can be used to notify the camera about an activity in the camera site. DI can be triggers of events. For example, you can connect a “panic button” to the camera; as such when the panic button is pressed, the alarm signal will be sent through the camera. Other common DI device applications are emergency button, smoke detector, passive infrared sensor, etc.

Digital Output (DO) devices are external devices that are activated by the camera upon an event inside the camera. For example, you can connect an “alarm horn” to the camera; as such when an event occurs inside the camera (e.g. detected intruder), the alarm horn will sound. Other common DO device applications are motion-triggered lights, electric fence, magnetic door locks, etc.



The camera supports 2 digital input and 2 digital output devices.

Press and hold the corresponding orange tab on the terminal block then insert the cable. Release the orange tab to close the pin.

To connect digital input / output devices (DI/DO), map the pins to one of the pin combinations below:

Device	Pin	Mapping Instructions
Digital Output (DO0 and DO1)	12V	Connect the wires of the output device to 12V and DO .
	DO	
Digital Input (DI0 and DI1)	GND	Connect the wires of the input device to GND and DI .
	DI	

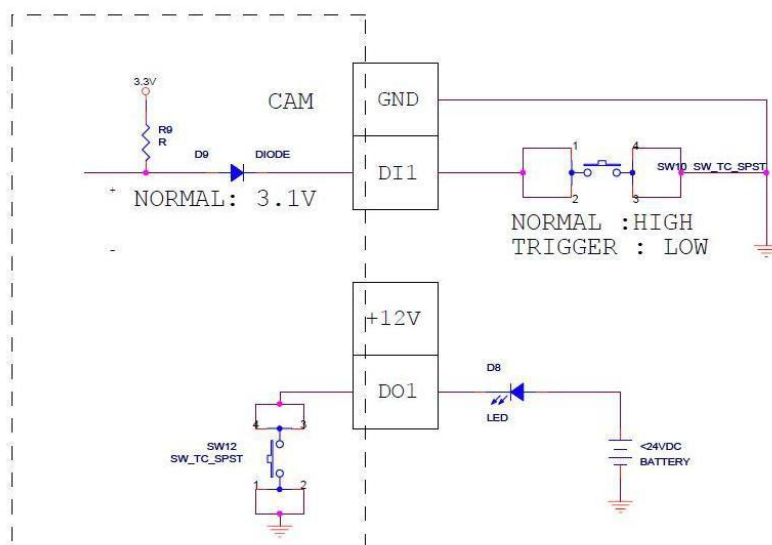
The table below shows the DI/DO connection specifications:

Device			
DI	Connection design		TTL - compatible logic levels
	Voltage	To trigger (low)	Logic level 0: 0V ~ 0.4V
		Normal (high)	Logic level 1: 3.1V ~ 30V
	Current		10mA ~ 100mA
DO	Connection design		Transistor (Open Collector)
	Voltage & Current		< 24V DC, < 50mA

Typical Connection

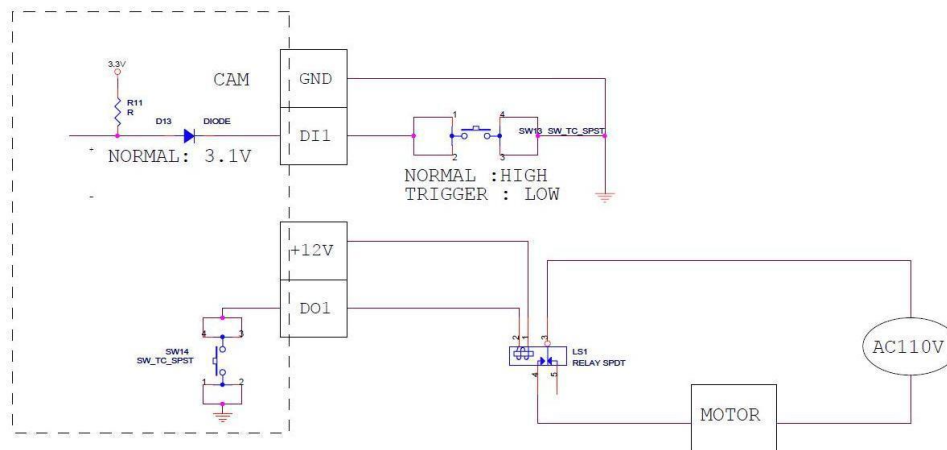
Based on these specifications, if the DI device has a voltage of 0V ~ 30V or the DO device has a voltage of < 24V (< 50mA), then the camera can supply internal power to these devices and there is no need to connect the DI/DO device to an external power source.

In this case, use the **GND** and **DI** pins to connect a DI device and use the **12V** and **DO** pins to connect a DO device. See wiring scheme below:



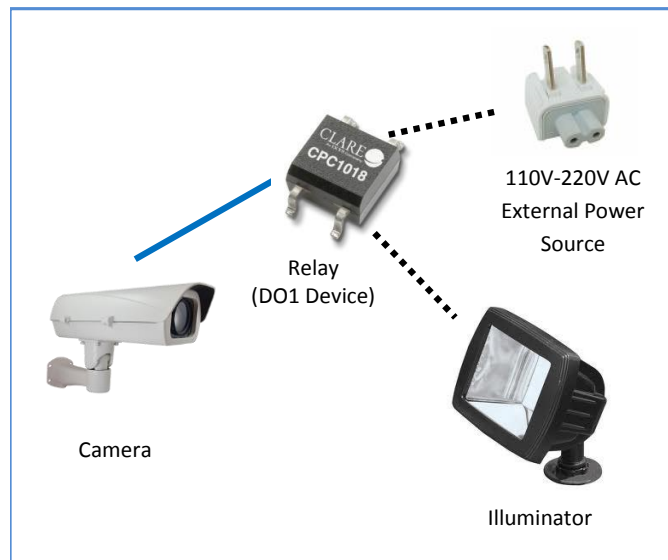
High Voltage DO Device Connection

Even though the camera provides 12V power, this may not be enough for some high voltage DO devices, such as a ceiling light or a motor that opens or closes a gate. In this case, there is a need to connect an external relay. See wiring scheme below:



Note that when choosing an appropriate relay, please refer to its specifications and make sure they match the above design. The triggering circuit voltage has to be around 12V DC and the switch-controlled circuit voltage has to match the external power supply (e.g. 110V AC or 220V AC).

The illustration below is a graphic example of connecting a relay to a high voltage DO device.



NOTE: For more information on DI/DO connections, please refer to the Knowledge Base article [All About Digital Input and Digital Output](http://Download.acti.com?id=516) downloadable from the link below (<http://Download.acti.com?id=516>).

Connecting Audio Input / Output Devices (Optional)

Audio input / output devices, such as an active microphone or speaker can be connected to the camera using the supplied terminal block.

Press and hold the orange tab as you insert the wire through the pin slot, then release the orange tab to secure the wire.



To connect audio devices, map the pins to one of the pin combinations below:

Device	Pin	Mapping Instructions
Audio Output (AO)	AO_GND	Connect the wires of the audio output device to AO_GND and A_OUT or AO .
	A_OUT or AO	
Audio Input (AI)	AI_GND	Connect the wires of the audio input device to AI_GND and A_IN or AI .

NOTE: For more information about AUDIO in connections, please refer to the Knowledge Base article [How to Use Audio-in of ACTi Cameras](http://www.acti.com/support/KnowledgeBase/outside/detail.asp?KB_ID=KB20100114003), downloadable from the link below (http://www.acti.com/support/KnowledgeBase/outside/detail.asp?KB_ID=KB20100114003).

Connecting a Serial Device (Optional)

The camera can be connected to a serial device using RS-485 or RS-422 connection, which are both supported by your camera.

Check the connection available on the PT scanner and connect it to your camera following the procedures below.

1. Map the wires from the PT scanner to your camera using the supplied terminal block according to one of the tables below. The terminal block the comes with the camera may either be labelled as one of the following:

Via RS-485 Connection

Terminal Block		Wire Mapping	
Pin Number / Label		Camera Pin	PT Scanner Pin
1	TX + (D+)	TX + (D+)	DATA +
2	TX – (D-)	TX – (D-)	DATA -
3	GND	GROUND PIN	
4	RX+	-	
5	Rx-	-	

Via RS-422 Connection

Terminal Block		Wire Mapping	
Pin Number / Label		Camera Pin	PT Scanner Pin
1	TX +	TX +	RX +
2	TX -	TX -	RX -
3	GND	GROUND PIN	
4	RX+	RX +	TX +
5	Rx-	RX -	TX -

NOTE: The pins of the PT Scanner may be labeled differently depending on the location or country where the scanner is purchased. For example, some devices may have RS-485 **DATA+** pins labeled as “TX+”, “RX+”, “A” or “485+”, etc. Refer to the scanner documentation or contact the manufacturer to verify the corresponding pin labels and ensure proper wiring connection.



CAUTION: Incorrect wiring may cause damage to the connected devices.

DISCLAIMER: ACTi will not be responsible for any damage caused by improper wiring.

2. Connect a ground wire to one of the **GND** terminal pin to complete the connection.

For more information on connecting PT scanners, please refer to the Knowledge Base article:

[Pan and Tilt Scanner for ACTi Zoom Cameras](#)

http://www.acti.com/support/KnowledgeBase/outside/detail.asp?KB_ID=KB20110120001

available on the website.

Other Adjustments and Accessories

How to Install / Remove a Memory Card (Optional)

The camera supports local video recording to a memory card.

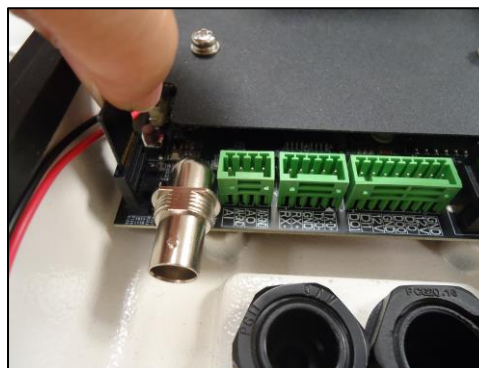
NOTE: Supports microSDHC and microSDXC cards.

How to Insert the Memory Card

1. Loosen the two (2) fixed screws to open the camera cover.



2. Insert a memory card into the slot with the metallic contacts facing the video output connector. Push the card completely into the slot.



3. Once the card is inserted, close the cover.
4. Go to **IP Utility**, on the **Local Storage** menu, select **Utilities** > **Format** to format the card. See Firmware Manual for more details.

How to Remove the Memory Card

In case there is a need to remove the card, make sure to access the camera Web Configurator to safely “unmount” the card first (see the camera Firmware manual for more information). Once unmounted from the firmware, push the card to eject it from the slot.

How to Reset the Camera

The purpose of the Reset Button is to restore the factory default settings of the camera, including the administrator's password.

The reset button can be used for following purposes:

- The administrator's password has been forgotten and therefore the camera cannot be accessed.
- In case of IP address, mask, or allow/deny filter related issues, resulting with inability to modify these settings.
- In case of connectivity issues or abnormal video quality.

To reset the camera, press and hold the Reset Button for at least 5 seconds or until the LED lights turn off.

Accessing the Camera

Configure the IP Addresses

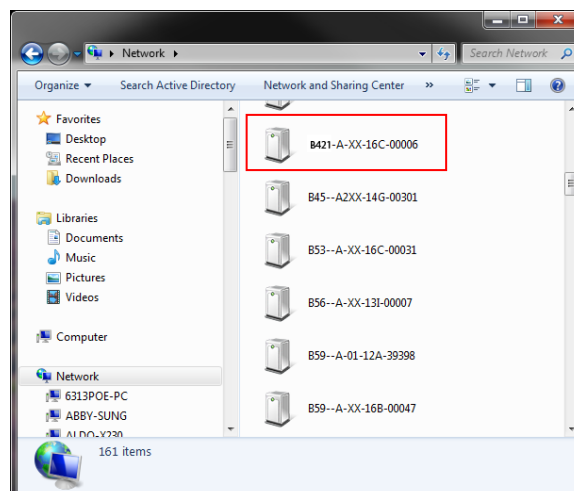
In order to be able to communicate with the camera from your PC, both the camera and the PC have to be within the same network segment. In most cases, it means that they both should have very similar IP addresses, where only the last number of the IP address is different from each other. There are 2 different approaches to IP Address management in Local Area Networks – by DHCP Server or Manually.

Using DHCP server to assign IP addresses:

If you have connected the computer and the camera into the network that has a DHCP server running, then you do not need to configure the IP addresses at all – both the camera and the PC would request a unique IP address from DHCP server automatically. In such case, the camera will immediately be ready for the access from the PC. The user, however, might not know the IP address of the camera yet. It is necessary to know the IP address of the camera in order to be able to access it by using a Web browser.

The quickest way to discover the cameras in the network is to use the simplest network search, built in the Windows system – just by pressing the “Network” icon, all the cameras of the local area network will be discovered by Windows thanks to the UPnP function support of our cameras.

In the example below, we successfully found the camera model that had just connected to the network.

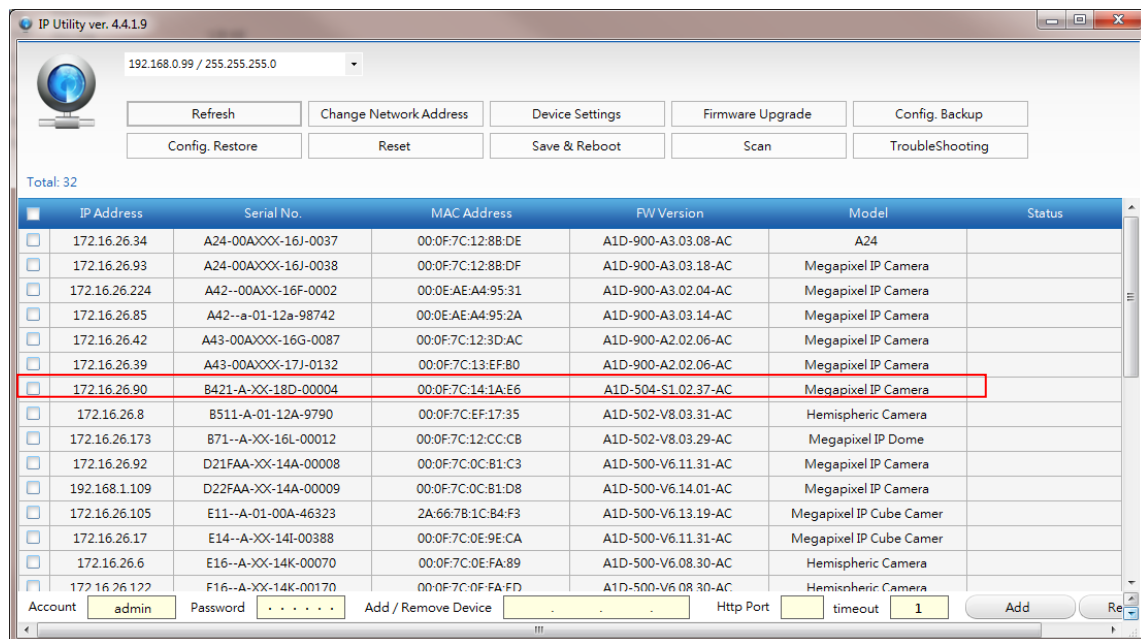


Double-click on the camera model name, the default browser of the PC is automatically launched and the IP address of the target camera is already filled in the address bar of the browser.

If you work with our cameras regularly, then **there is even a better way to discover the cameras in the network** – by using **IP Utility**. The IP Utility is a light software tool that can not only discover the cameras, but also list lots of valuable information, such as IP and MAC addresses, serial numbers, firmware versions, etc, and allows quick configuration of multiple devices at the same time.

Search and download IP Utility for free from <http://www.acti.com/DownloadCenter>.

With just one click, you can launch the IP Utility and there will be an instant report as follows:



You can quickly notice the camera model in the list. Click on the IP address to automatically launch the default browser of the PC with the IP address of the target camera filled in the address bar of the browser already.

Use the default IP address of a camera:

If there is no DHCP server in the given network, the user may have to assign the IP addresses to both PC and camera manually to make sure they are in the same network segment.

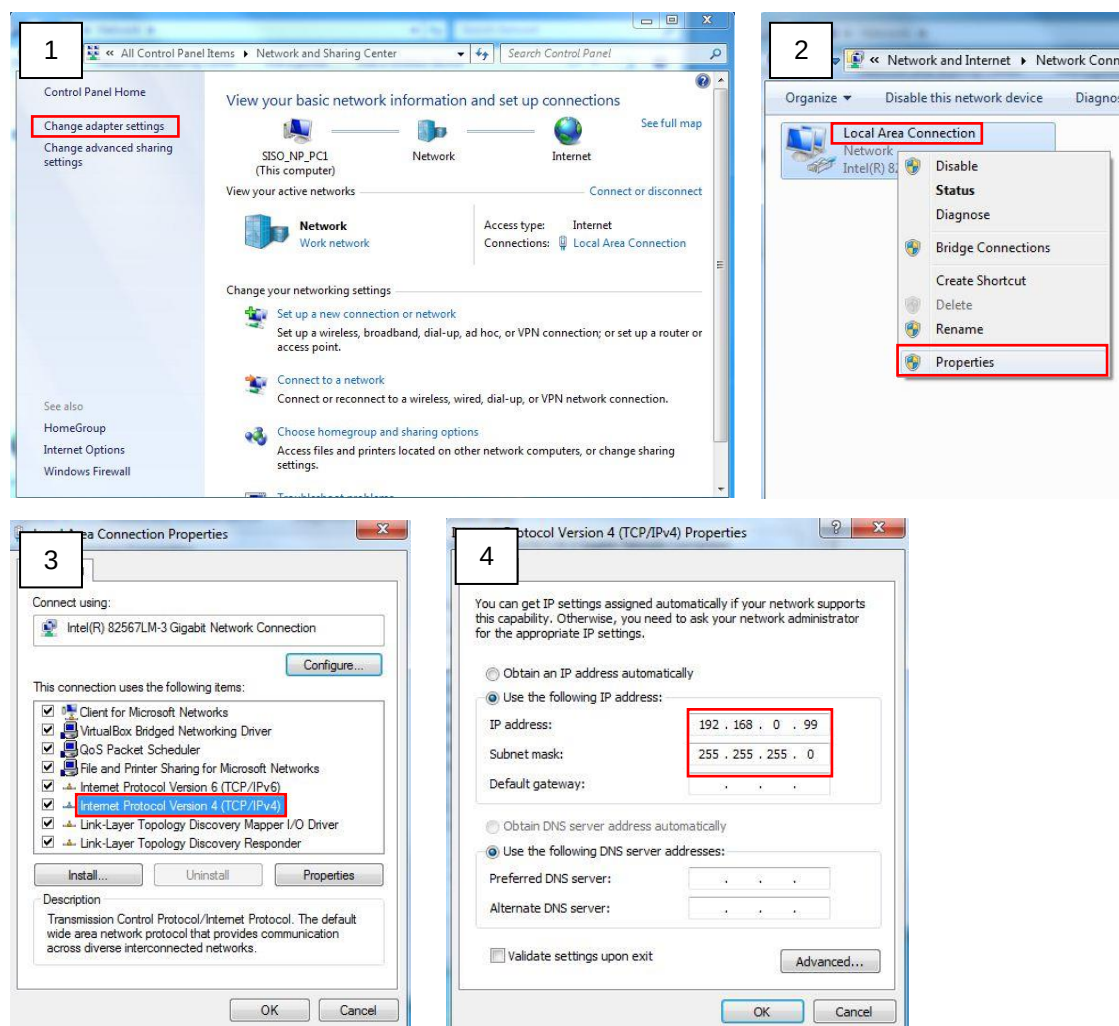
When the camera is plugged into network and it does not detect any DHCP services, it will automatically assign itself a default IP:

192.168.0.100

Whereas the default port number would be **80**. In order to access that camera, the IP address of the PC has to be configured to match the network segment of the camera.

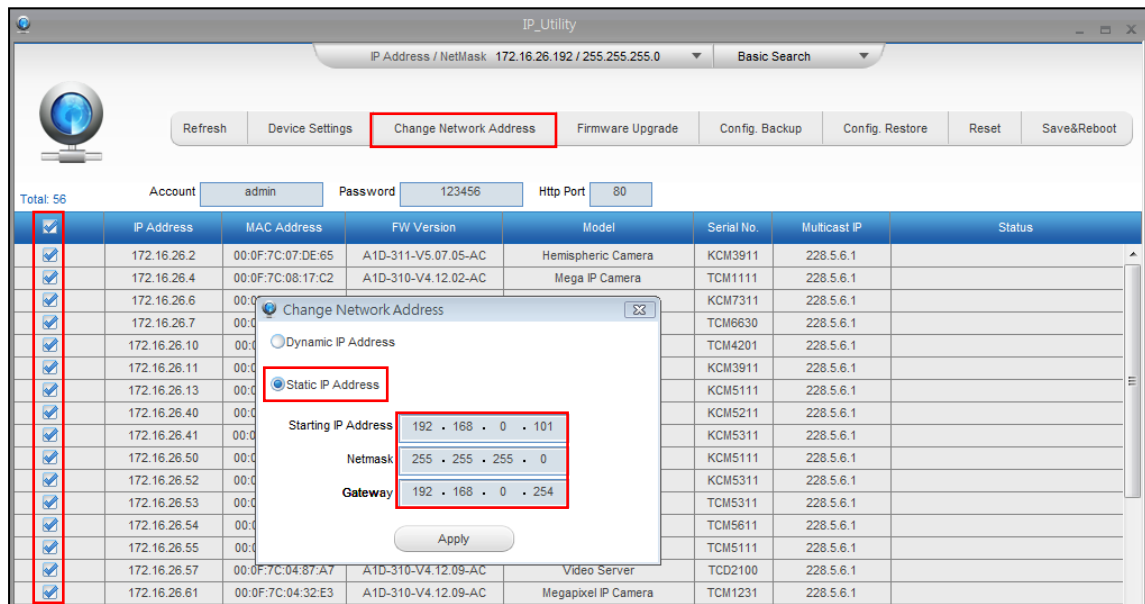
Manually adjust the IP address of the PC:

In the following example, based on Windows 7, we will configure the IP address to **192.168.0.99** and set Subnet Mask to **255.255.255.0** by using the steps below:



Manually adjust the IP addresses of multiple cameras:

If there are more than 1 camera to be used in the same local area network and there is no DHCP server to assign unique IP addresses to each of them, all of the cameras would then have the initial IP address of **192.168.0.100**, which is not a proper situation for network devices – all the IP addresses have to be different from each other. The easiest way to assign cameras the IP addresses is by using **IP Utility**:



With the procedure shown above, all the cameras will have unique IP addresses, starting from 192.168.0.101. In case there are 20 cameras selected, the last one of the cameras would have the IP 192.168.0.120.

Later, by pressing the “Refresh” button of the IP Utility, you will be able to see the list of cameras with their new IP addresses.



Please note that it is also possible to change the IP addresses manually by using the Web browser. In such case, please plug in only one camera at a time, and change its IP address by using the Web browser before plugging in the next one. This way, the Web browser will not be confused about two devices having the same IP address at the same time.

Access the Camera

Now that the camera and the PC are both having their unique IP addresses and are under the same network segment, it is possible to use the Web browser of the PC to access the camera.

You can use **Microsoft Internet Explorer** to access the camera.

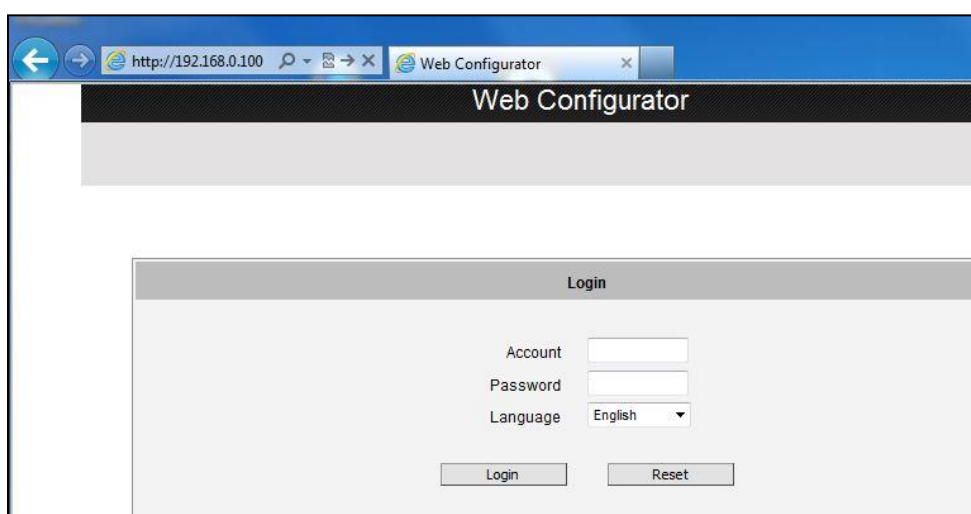
When using Internet Explorer browser, the ActiveX control for video stream management will be downloaded from the camera directly – the user just has to accept the use of such control when prompted so. No other third party utilities are required to be installed in such case.

The examples in this manual are based on Internet Explorer browser in order to cover all functions of the camera.

Assuming that the camera's IP address is **192.168.0.100**, you can access it by opening the Web browser and typing the following address into Web browser's address bar:

http://192.168.0.100

Upon successful connection to the camera, the user interface called **Web Configurator** would appear together with the login page. The HTTP port number was not added behind the IP address since the default HTTP port of the camera is 80, which can be omitted from the address for convenience.



Before logging in, you need to know the factory default Account and Password of the camera.

Account: **Admin**

Password: **123456**

For further operations, please refer to the **Firmware User Manual**.



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