

[i-Nova2]

[Installation guide]

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1. Recommended System Configuration

The following system configuration is recommended when using the camera.

- OS – Microsoft Windows 7/8/10 (32-bit, 64-bit), Linux, other OS capable of Ethernet communication
- Software – Microsoft Visual Studio 2010, 2012, 2017 (to compile and run example code)

2. Preparation for camera configuration

The following components are required to install the camera.

- Ethernet cable (Refer to [6.1.2 Ethernet Connector](#), [6.2.2 Ethernet Connector](#))
- GPIO cable (Refer to [6.1.3 GPIO Connector](#), [6.2.3 GPIO Connector](#))
- Lens (Refer to [5.1. Attach a Lens](#))
- Interface card

3. Handling Precautions

3.1. Instrument safety instructions

- We are not responsible for any damage caused by user negligence or other equipment connection.
- Handle the i-Nova with care. For example, be careful of strong impact or storage in an unsuitable environment.
- Do not use accessories that are not recommended as they may be dangerous.

3.2. Important safety precautions

- Please check the specifications for each product and use a power supply with the appropriate specifications.
- Keep the product away from radiators, heaters, stoves, or other products (amplifiers, etc.) and heat sources.
- Be careful not to let flammable substances, water, or metal get inside the camera.
- Do not modify the camera or use the camera with the outer cover removed.
- Avoid using the camera in thunder or lightning storms.
- When using the camera outdoors, protect it from moisture. (rain/snow, etc.)

- Board level notes
 - Be careful to avoid electric shocks such as static electricity (ESD).
 - Use a ground (GND), etc. to cope with ESD, etc.
 - Be careful not to get plastic, vinyl, or Styrofoam into the circuit board.
 - Do not touch the parts of the circuit board with your hands or conductive devices.

3.3. Handling and cleaning

Do not attempt to disassemble the camera.

- When replacing or removing the lens or filter, be careful not to allow water or dust to enter.
- Use a blower or lens brush to remove dust from the lens or optical filter.
- Do not disassemble the front flange.
- Clean the case with a soft, dry cloth.
- Do not use benzene, thinner, alcohol, liquid or spray-type cleaners.

3.4. Installation

Avoid installing or storing the camera in the following locations.

- Environments exposed to direct sunlight, rain or snow
- Environments with flammable or corrosive gases
- Excessive temperature or low temperature environment (recommended ambient temperature: 0 ~ 45° C)
- Wet or dusty places
- Places subject to excessive vibration or shock
- Environments exposed to strong electric or magnetic fields
- Do not point the camera at the sun or other strong light sources.
- In case of unfavorable conditions, be sure to inquire about the installation environment.

3.5. Performance and longevity

- Please configure the environment that meets the camera operation specifications. If the ambient temperature is high, the service life may be shortened due to deterioration of the parts. In that case, you also need to consider the cooling system.

3.6. Connector

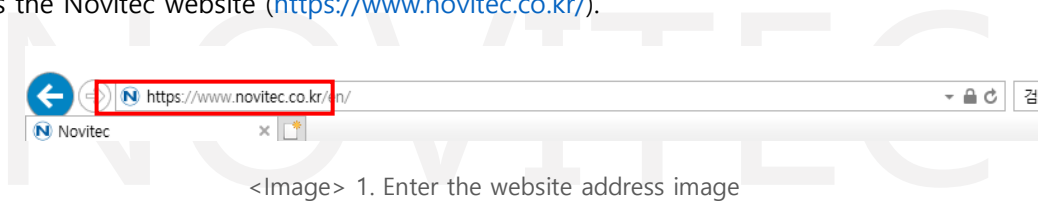
- When manufacturing the I/O connector, be careful with the connection so that the wires fit well.
- Make sure the power is off before connecting or disconnecting I/O connectors.
- To avoid damaging the connector, do not pull by the electric wire, etc.

4. How to install the software

4.1. Download the installation file

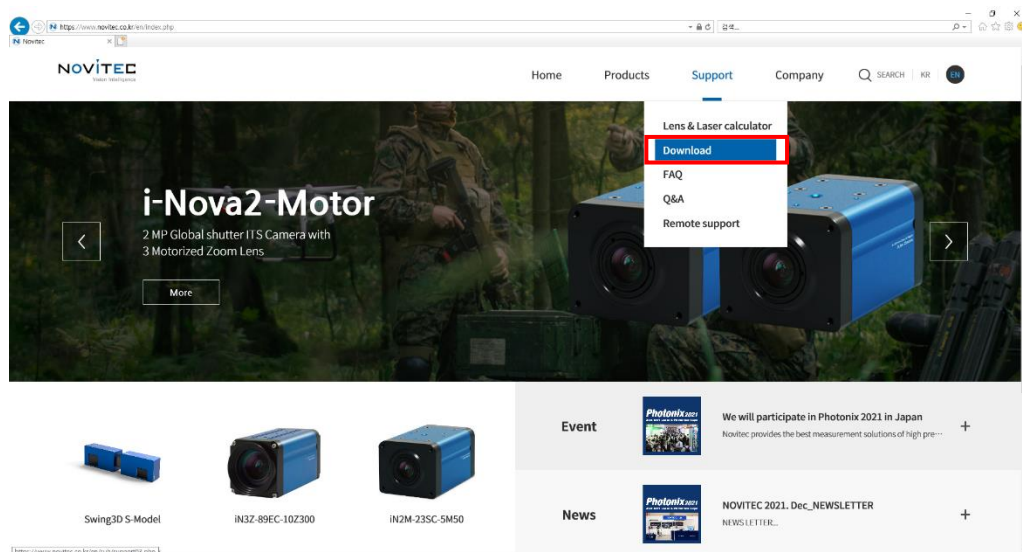
We recommend that you download and install the latest version of the SDK from the Novitec website.

- Access the Novitec website (<https://www.novitec.co.kr/>).



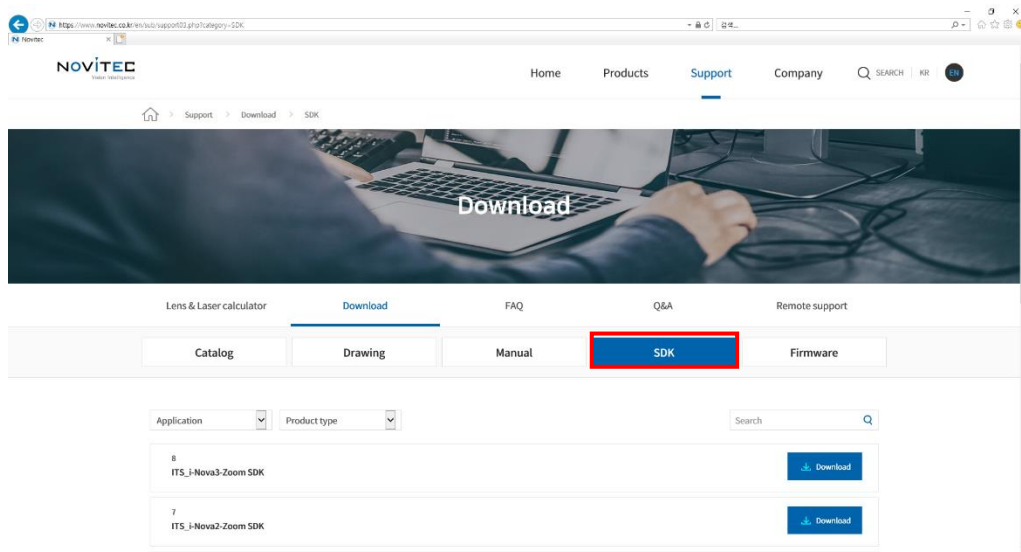
<Image> 1. Enter the website address image

- Click [Download] of [Support] in the top tab.



<Image> 2. Click Download image

c. Click [SDK] in Downloads.



<Image> 3. Click SDK image

d. Click [Download] of ITS_i-Nova2 series SDK to download the installation file.



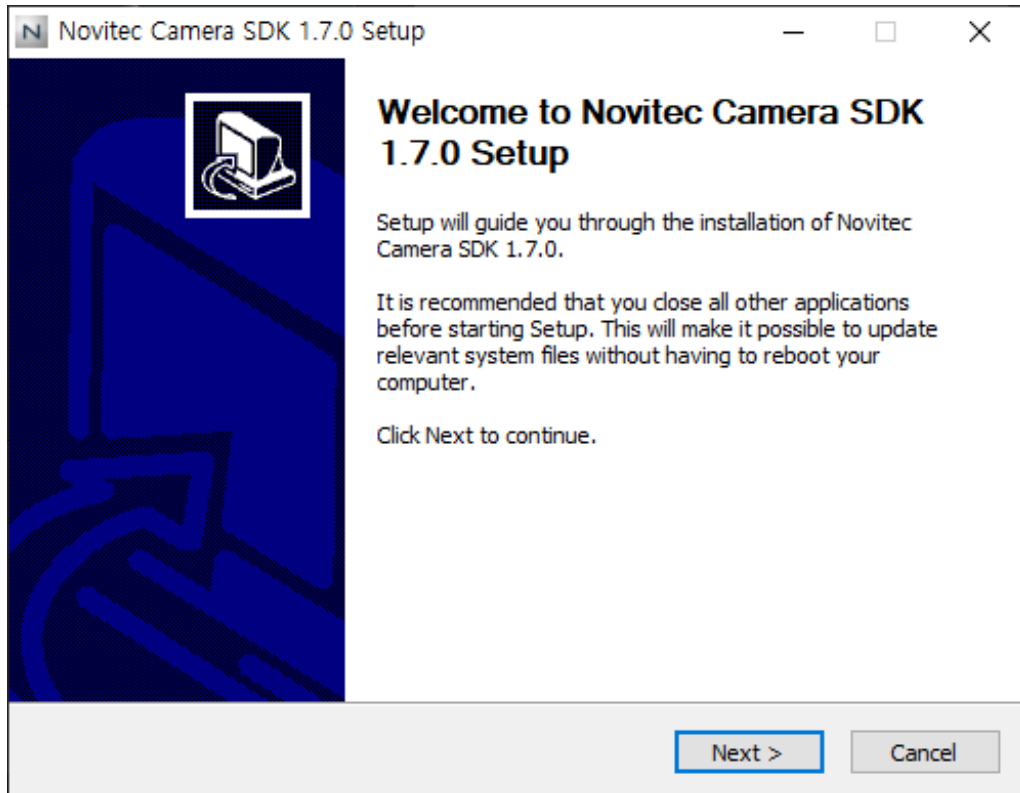
<Image> 4. SDK download window image

4.2. Install the Novitec Software

4.2.1. Windows

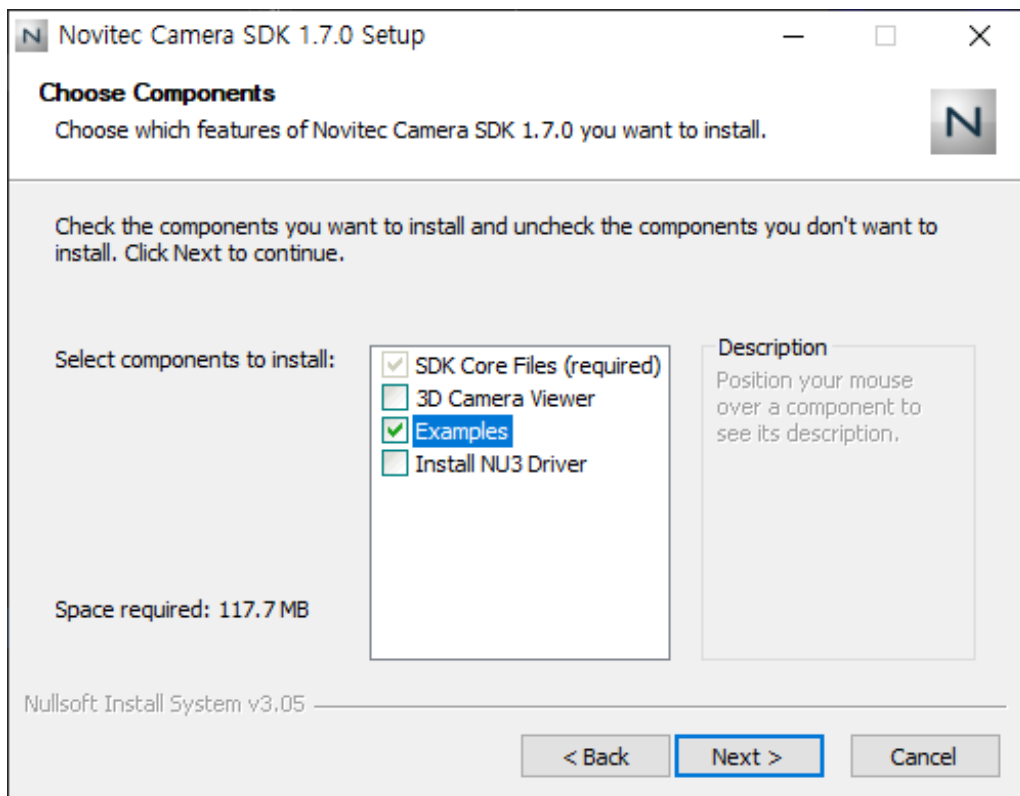
Refer to [4.1. Download the installation file](#) to prepare the installation file for Windows.

- a. Execute the i-Nova2 SDK installation file (NovitecCameraSDK-vX.X.X.exe) and Click [Next >].



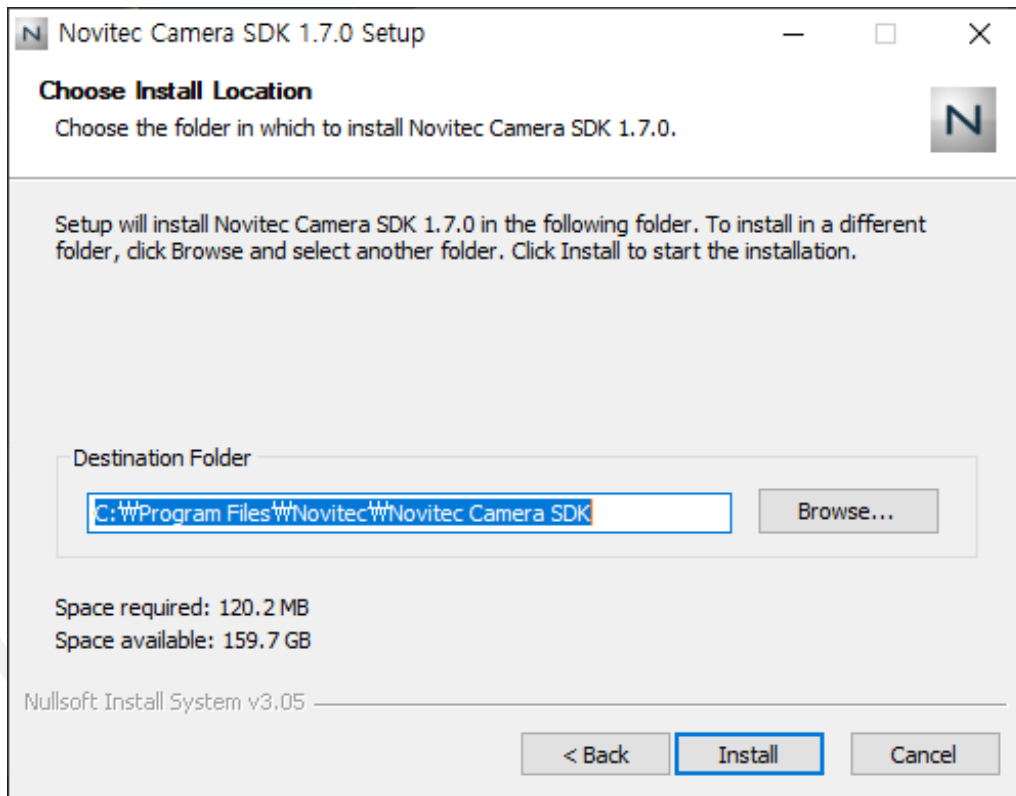
<Image> 5. Installation Startup image

b. Check "Examples" and click [Next >].

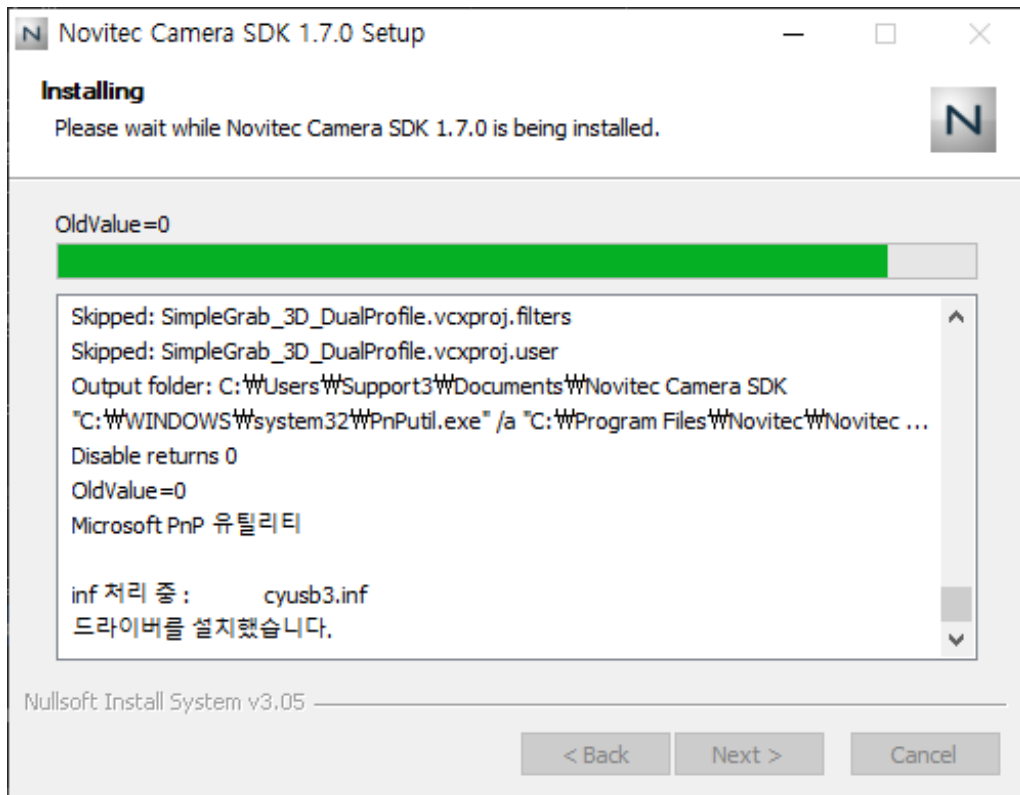


<Image> 6. Install item selection image

- c. After selecting the folder to install, click [install].

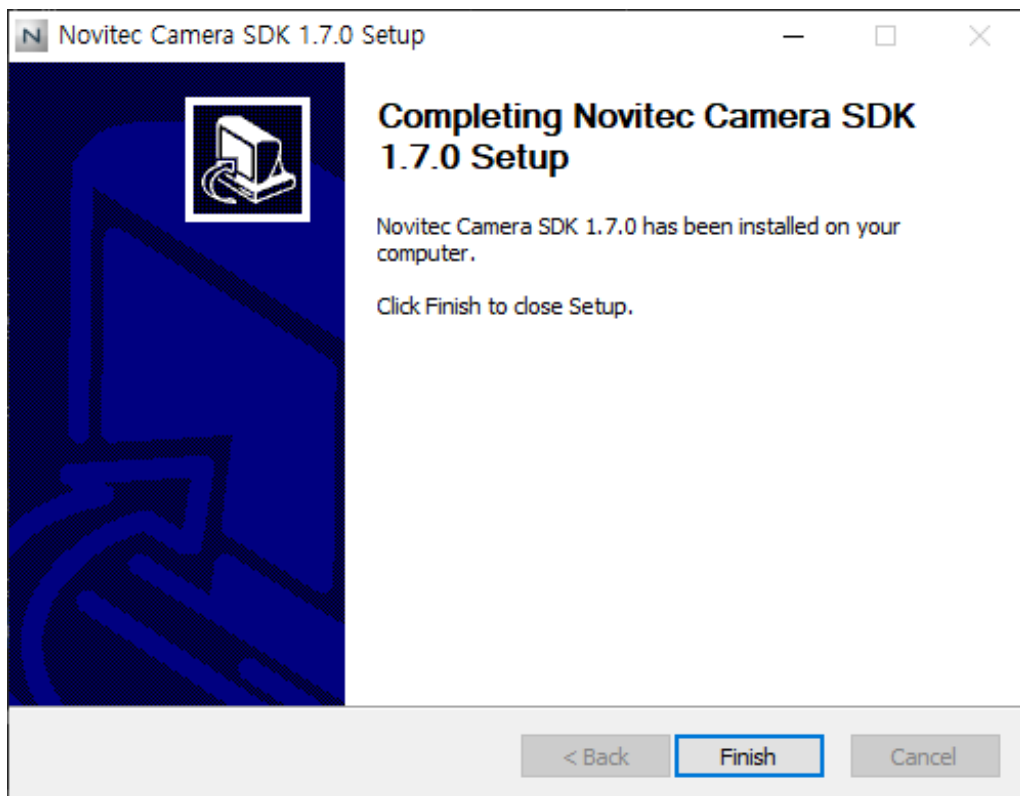


<Image> 7. Choose Install location image



<Image> 8. Installing image

- d. Click [Finish] to finish the installation.

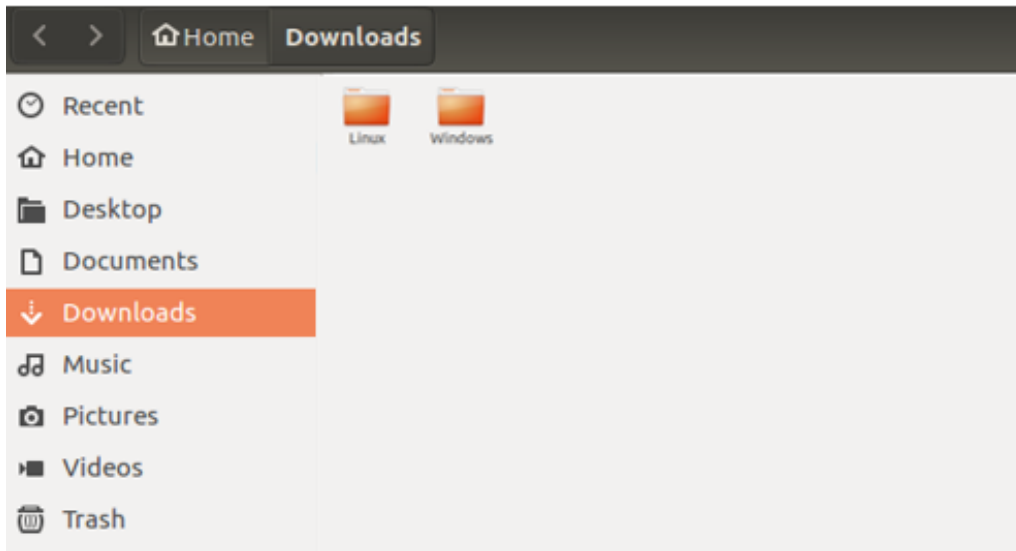


<Image> 9. Installation finish image

4.2.2. Linux

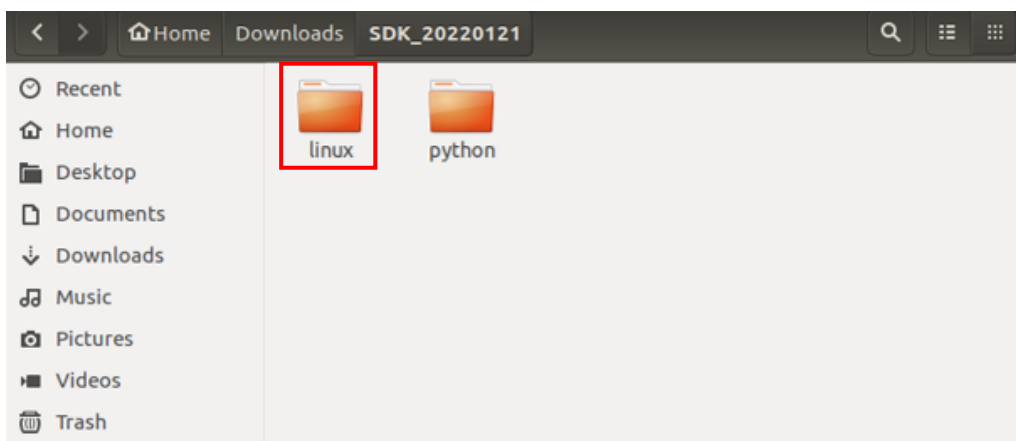
Refer to [4.1. Download the installation file](#) to prepare the installation file for Linux.

- a. Unzip the downloaded SDK file to a desired location.
- b. Click [Linux] folder.



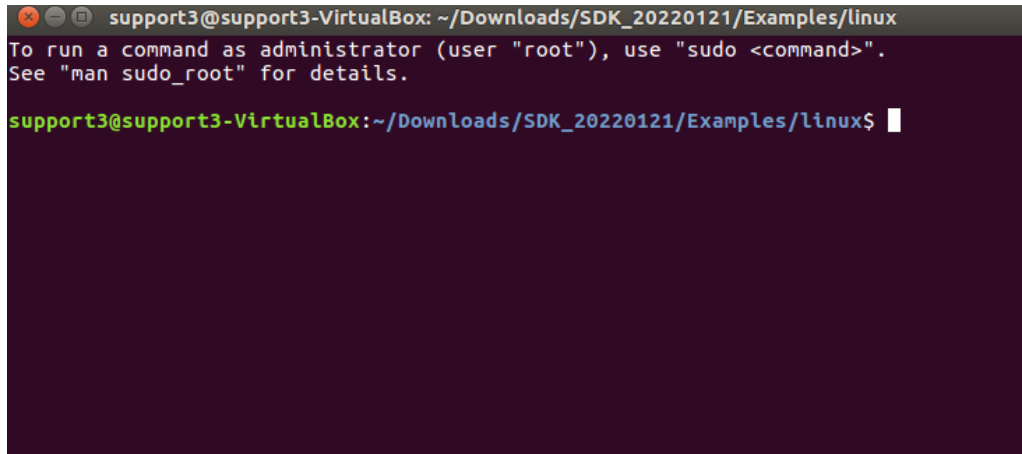
<Image> 10. Linux file image

- c. Click [linux] folder.



<Image> 11. Linux folder list image

- d. Right-click on the Linux folder and click [Open in Terminal] to launch the terminal.



```
support3@support3-VirtualBox: ~/Downloads/SDK_20220121/Examples/linux
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

support3@support3-VirtualBox:~/Downloads/SDK_20220121/Examples/linux$
```

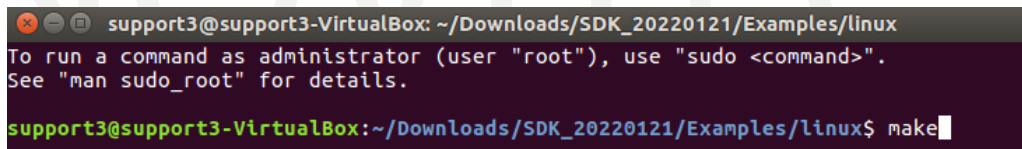
<Image> 12. Launch terminal image

- e. Install required libraries.

```
# sudo apt-get install -y libturbojpeg0-dev
```

```
# sudo apt-get install libjpeg-turbo8-dev libgtk-3-dev libturbojpeg
```

- f. Type [Make] to create an executable file.

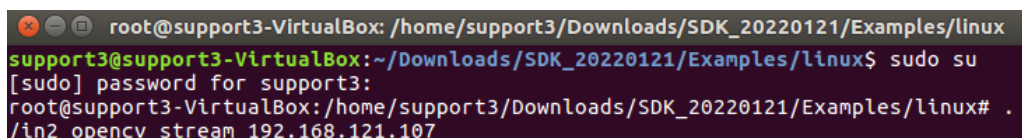


```
support3@support3-VirtualBox: ~/Downloads/SDK_20220121/Examples/linux
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

support3@support3-VirtualBox:~/Downloads/SDK_20220121/Examples/linux$ make
```

<Image> 13. Make image

- g. After typing [sudo su], type [./in2_opencv_stream Camera IP] to run the viewer.



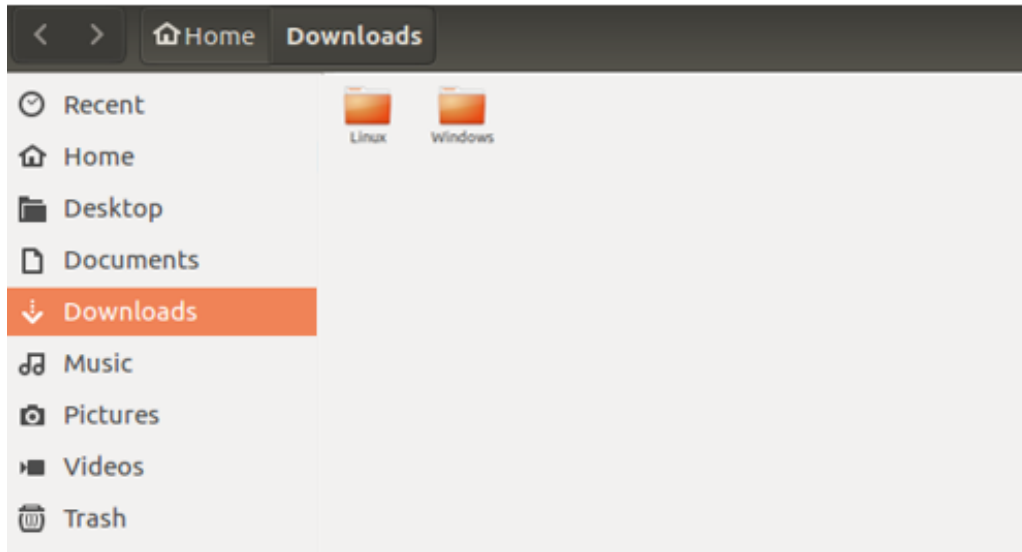
```
root@support3-VirtualBox: /home/support3/Downloads/SDK_20220121/Examples/linux
support3@support3-VirtualBox:~/Downloads/SDK_20220121/Examples/linux$ sudo su
[sudo] password for support3:
root@support3-VirtualBox: /home/support3/Downloads/SDK_20220121/Examples/linux# ./
in2_opencv_stream 192.168.121.107
```

<Image> 14. Launch viewer image

4.2.3. Python (Linux)

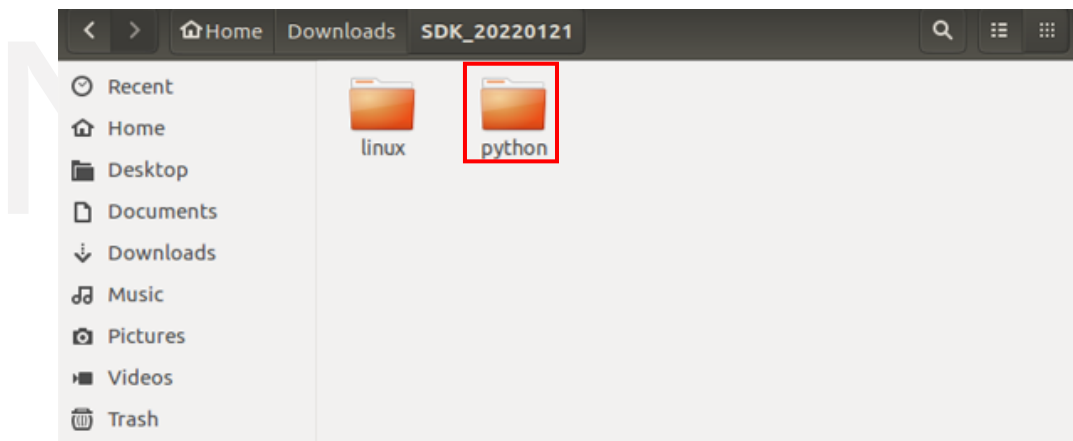
Refer to [4.1. Download the installation file](#) to prepare the installation file for Linux.

- Unzip the downloaded SDK file to a desired location.
- Click [Examples] folder.



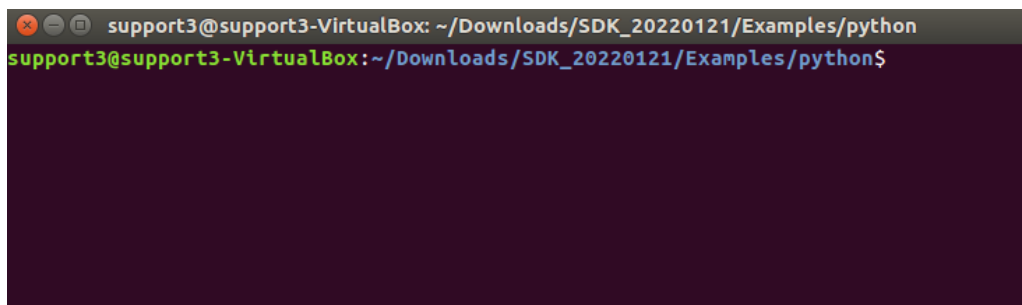
<Image> 15. Linux file image

c. Click [Python] folder.



<Image> 16. Linux folder list image

d. Right-click on the python folder and click [Open in Terminal] to launch the terminal.

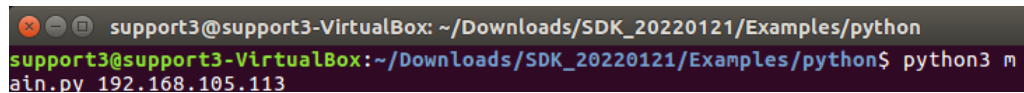


<Image> 17. Launch terminal image

e. Install required libraries.

```
# sudo apt-get install python3-pip
# sudo apt-get install libturbojpeg
# export OPENBLAS_CORETYPE=ARMV8
# sudo -H pip3 install --upgrade --ignore-installed pip setuptools
# pip install opencv-python
# pip3 install -U git+git://github.com/lilohuang/PyTurboJPEG
```

f. Type [python3 main.py Camera IP] to run the viewer.



```
support3@support3-VirtualBox: ~/Downloads/SDK_20220121/Examples/python
support3@support3-VirtualBox:~/Downloads/SDK_20220121/Examples/python$ python3 m
ain.py 192.168.105.113
```

<Image> 18. Launch Python viewer image

5. Installing the Camera

5.1. Attach a Lens

Attach the lens after removing the cap from the lens holder.

i-Nova2 has a removable 5mm C mount adapter is installed as standard, and it can be used as a CS mount by removing the adapter.



<Image> 19. i-Nova mount(CS) and extension ring(CS to C) image

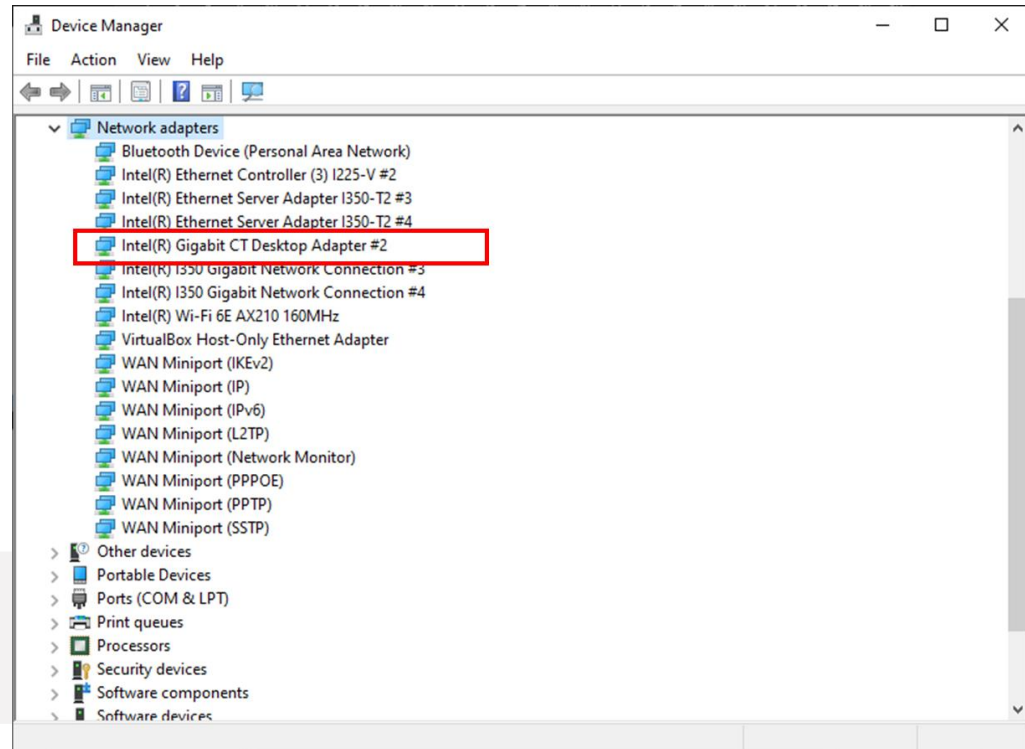
5.2. Connect the interface Card and Cable to the Camera

Connect the camera and the PC using an Ethernet cable.

Recommended NIC(Network Interface Card) is refer to [1. Recommended System Configuration](#).

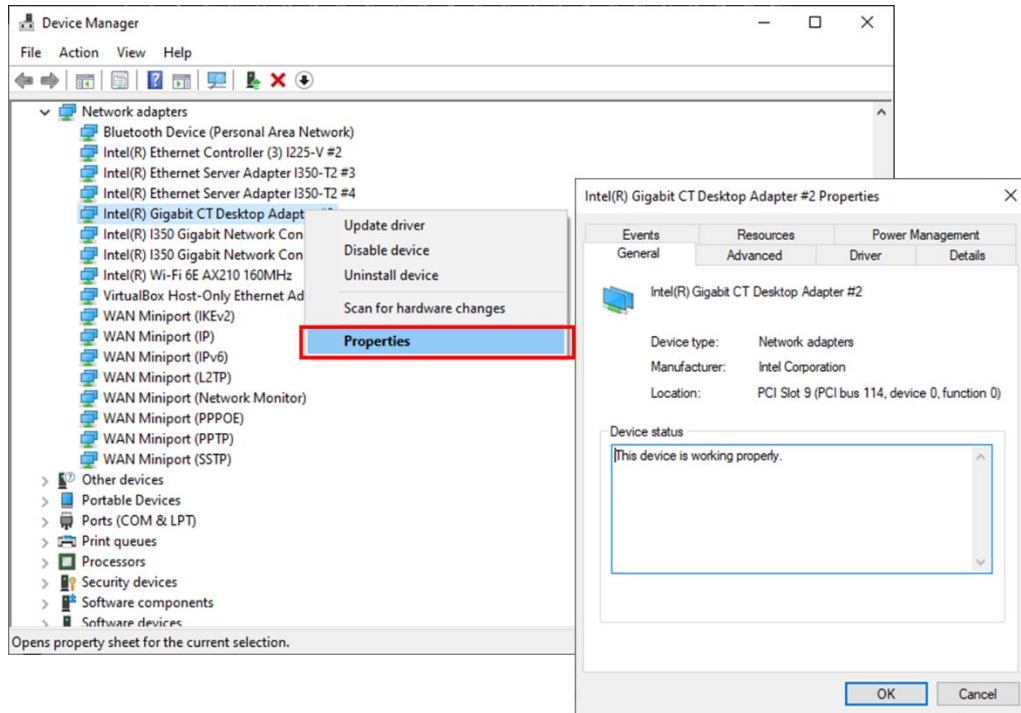
In order to acquire camera data normally, the following initial settings are required.

- a. Go to Control Panel-Device Manager-Network Adapters to check information about the NICs installed on PC.



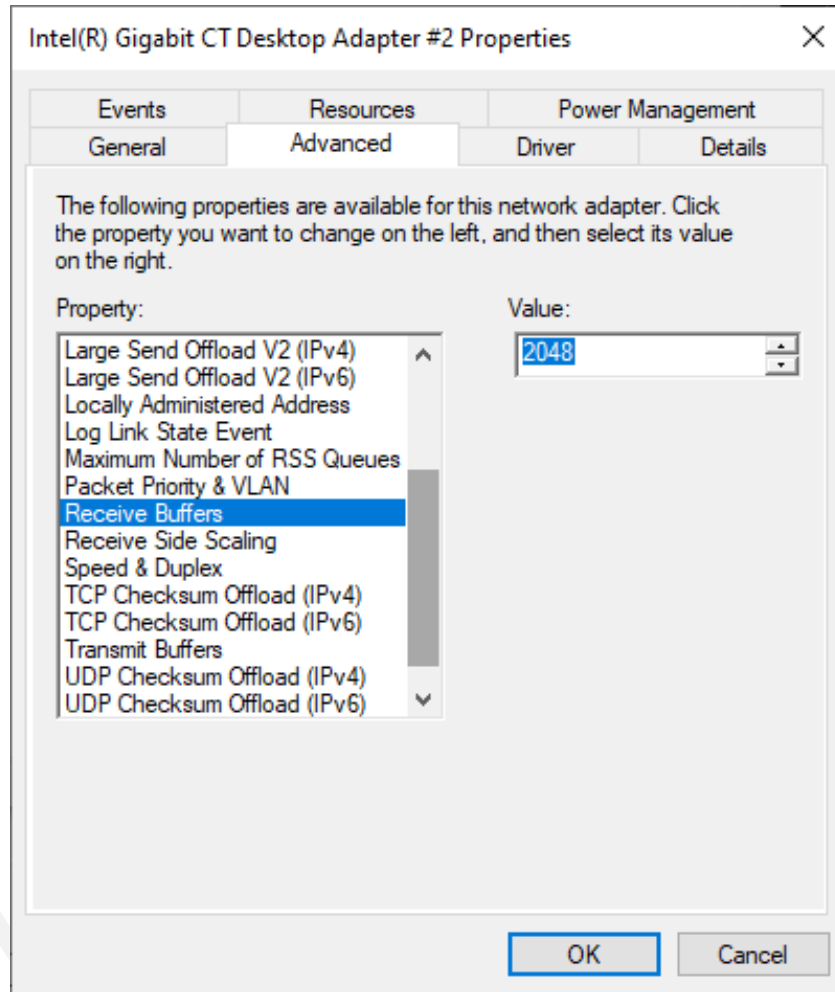
<Image> 20. Check network adapter information image

- b. Right-click the network adapter to which the camera is connected and click [Properties].



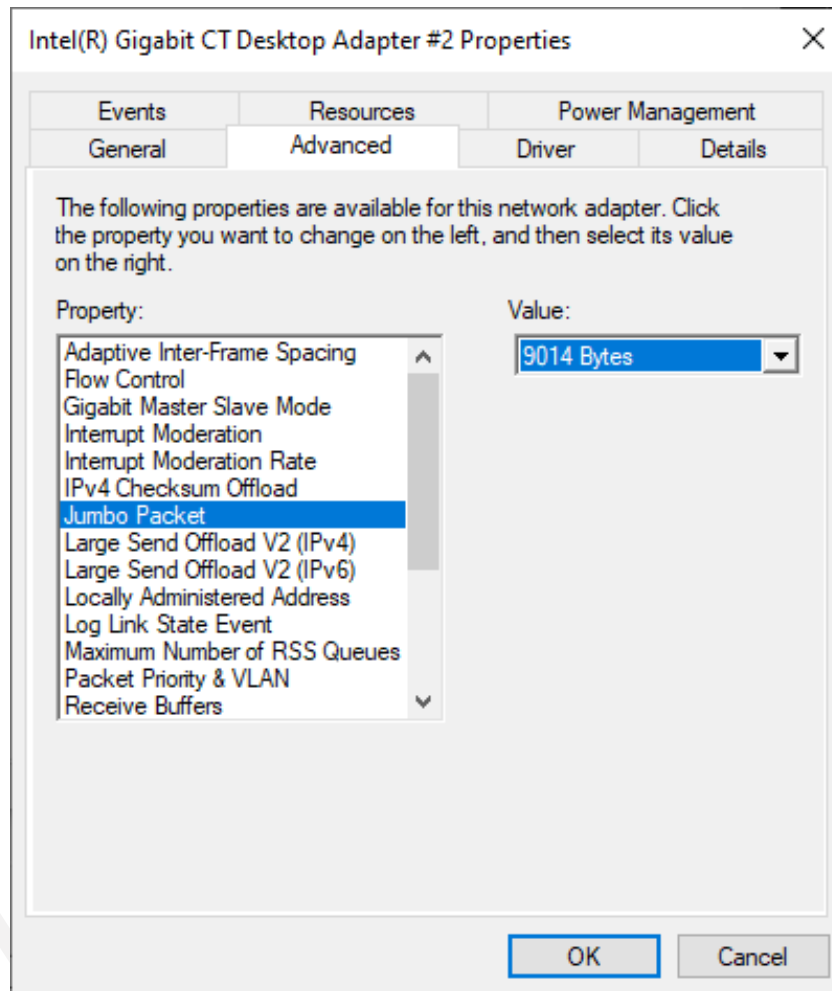
<Image> 21. Network adapter properties image

- c. In the properties window, click the [Advanced] tab and set Receive buffers to the maximum value.



<Image> 22. Change receive buffers size image

- d. Set Jumbo Packet to the maximum value.



<Image> 23. Jumbo Packet resizing image

5.3. Configure IP Settings

When the camera is shipped, the IP of the camera is set to be automatically assigned from DHCP.

DHCP connection fails, the IP will be set as the LLA.

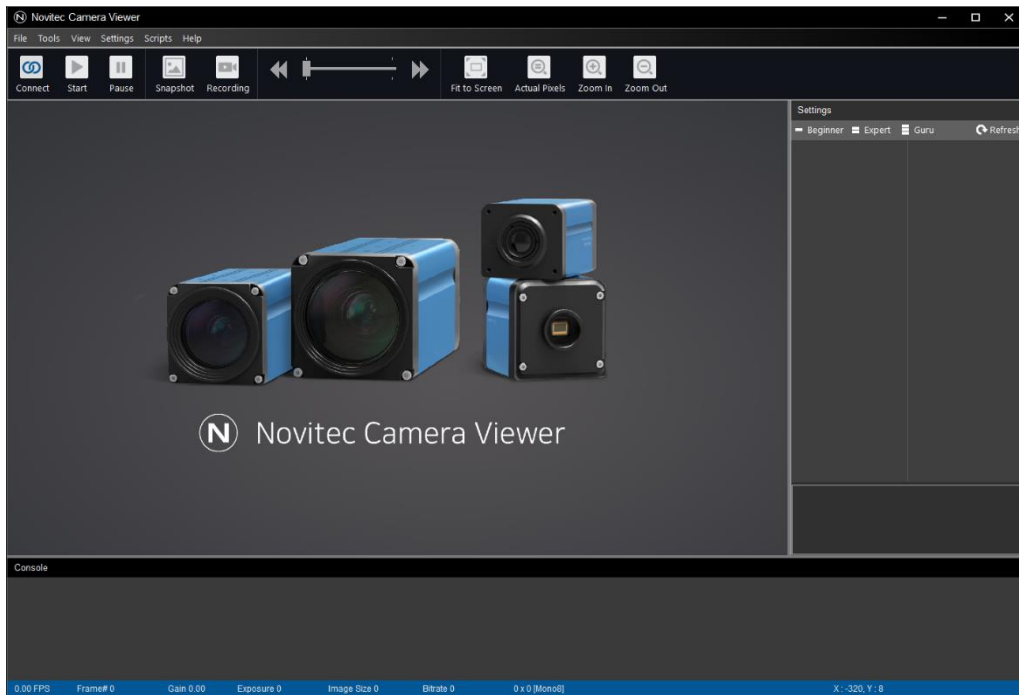
When the camera is first powered on, the camera is assigned an IP in the following order: DHCP/Persistent/ LLA.

5.4. Launch Viewer

3 ways to launch the camera viewer.

- Click the shortcut icon of "Novitec Camera Viewer" on the desktop.
- Click Novitec - "Novitec Camera Viewer" in the Windows Start menu.
- Go to the path below in the File Explorer and run the NovitecCameraViewer.exe.

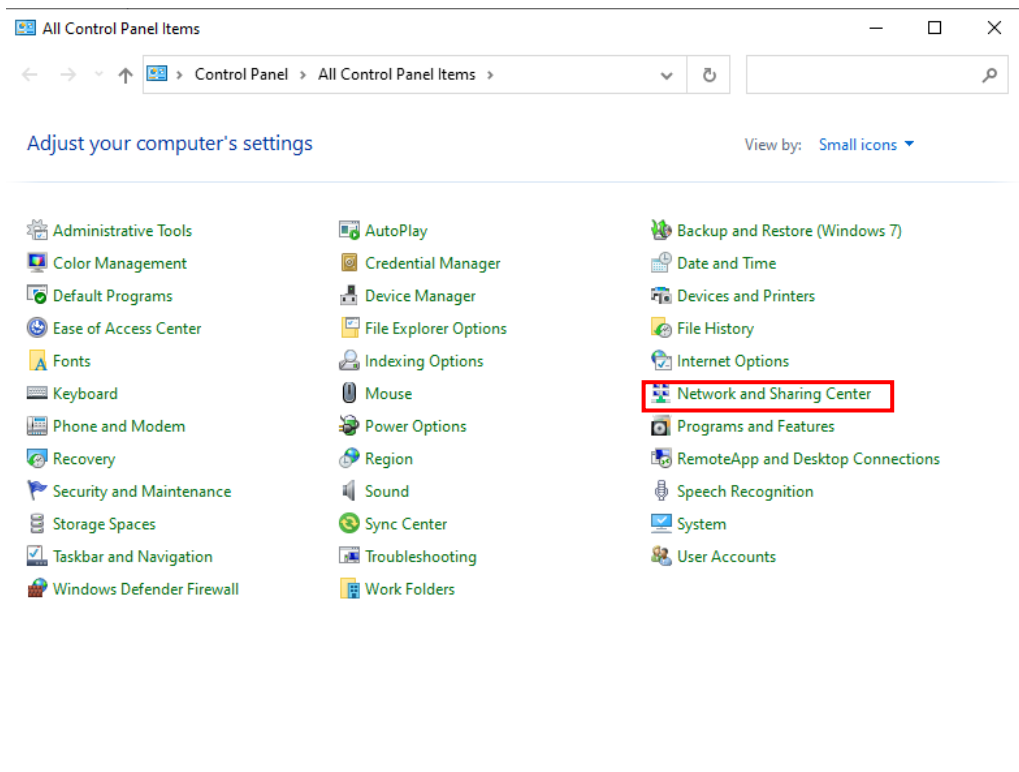
- Default path: C:\Program Files\Novitec\Novitec Camera SDK\utils



<Image> 24. Launch viewer image

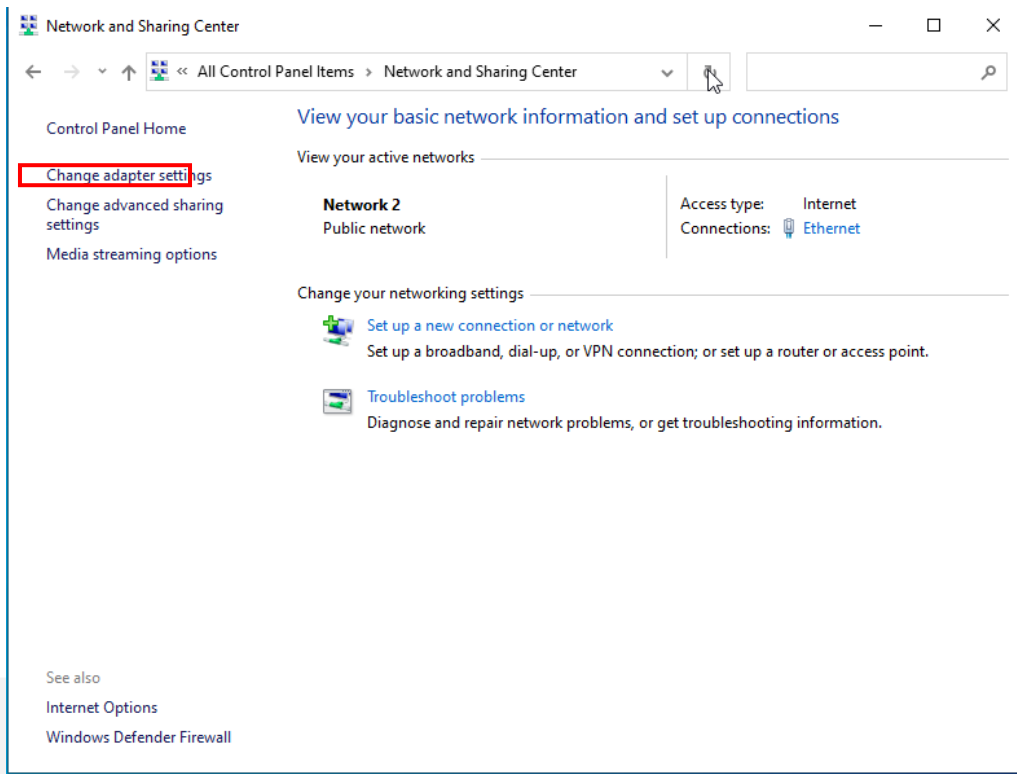
5.5. Connect the Camera

- a. Execute [Network and Sharing Center] from the control panel.



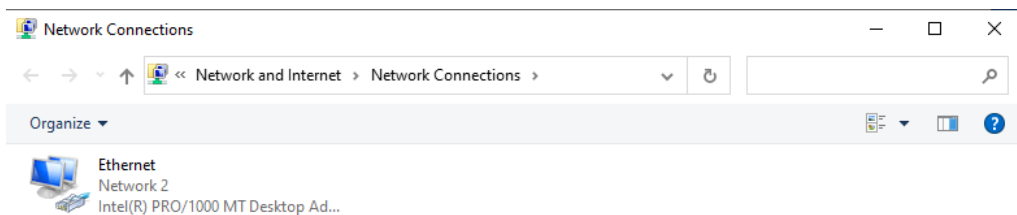
<Image> 25. Control Panel-Network and Sharing Center image

b. Click [Change adapter settings].



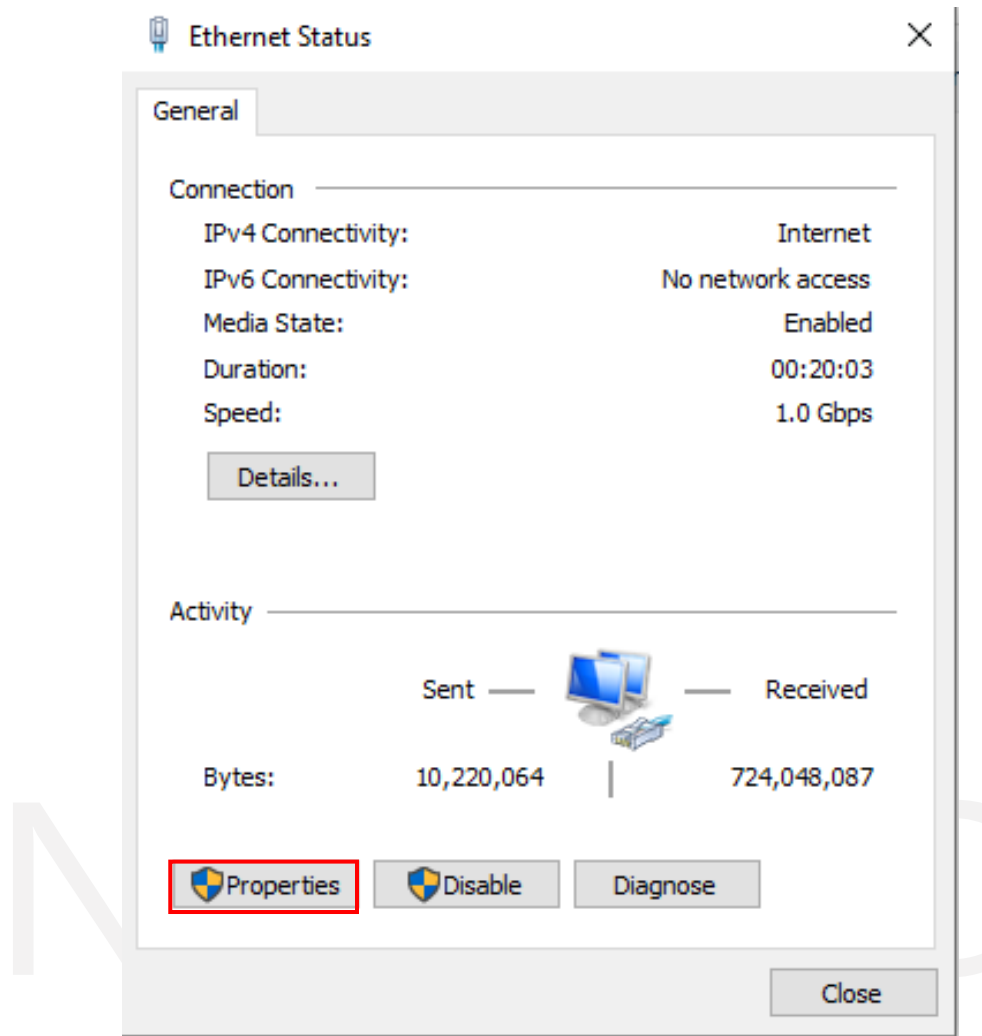
<Image> 26. Network and Sharing Center image

c. Click the network to which the camera is connected.



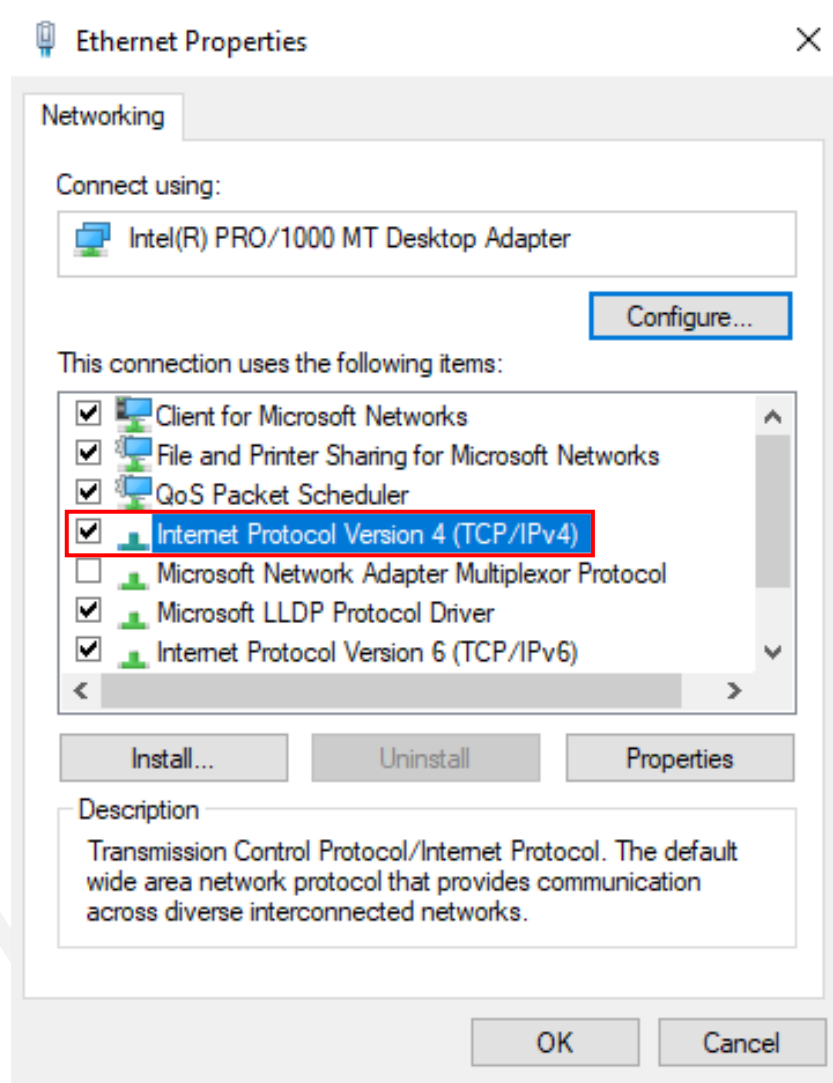
<Image> 27. Network connection image

d. Click [Properties].



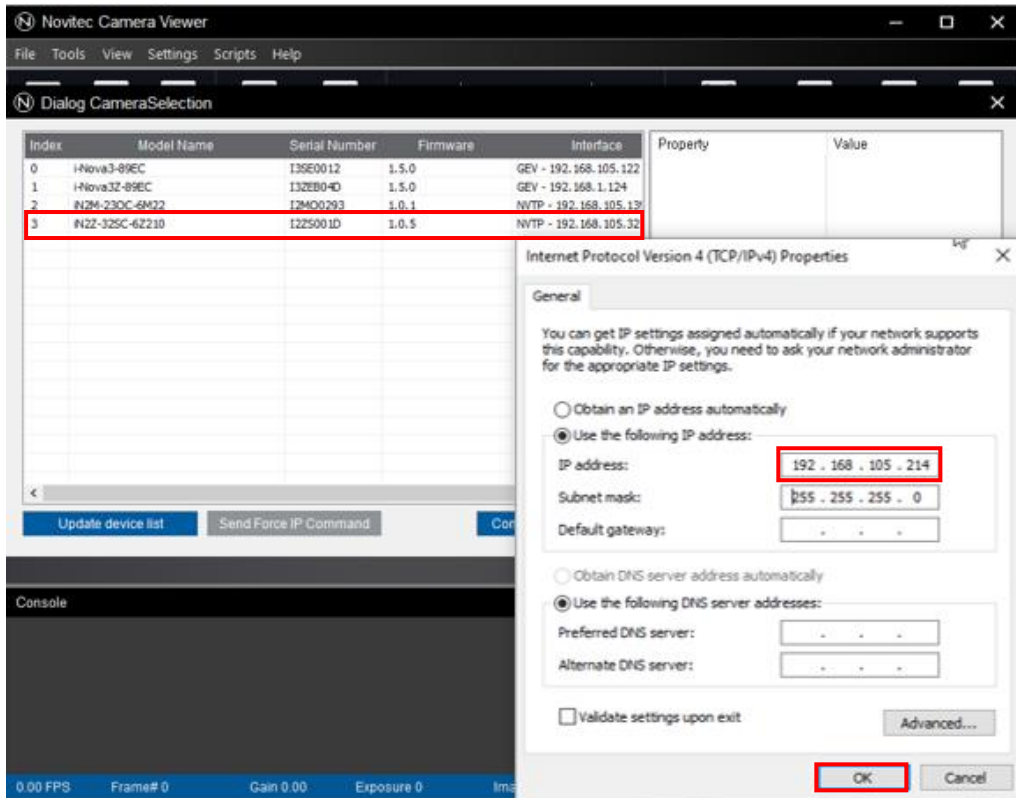
<Image> 28. Network status image

- e. Select "Internet Protocol Version 4 (TCP/IPv4)" in the network properties and click [Properties].



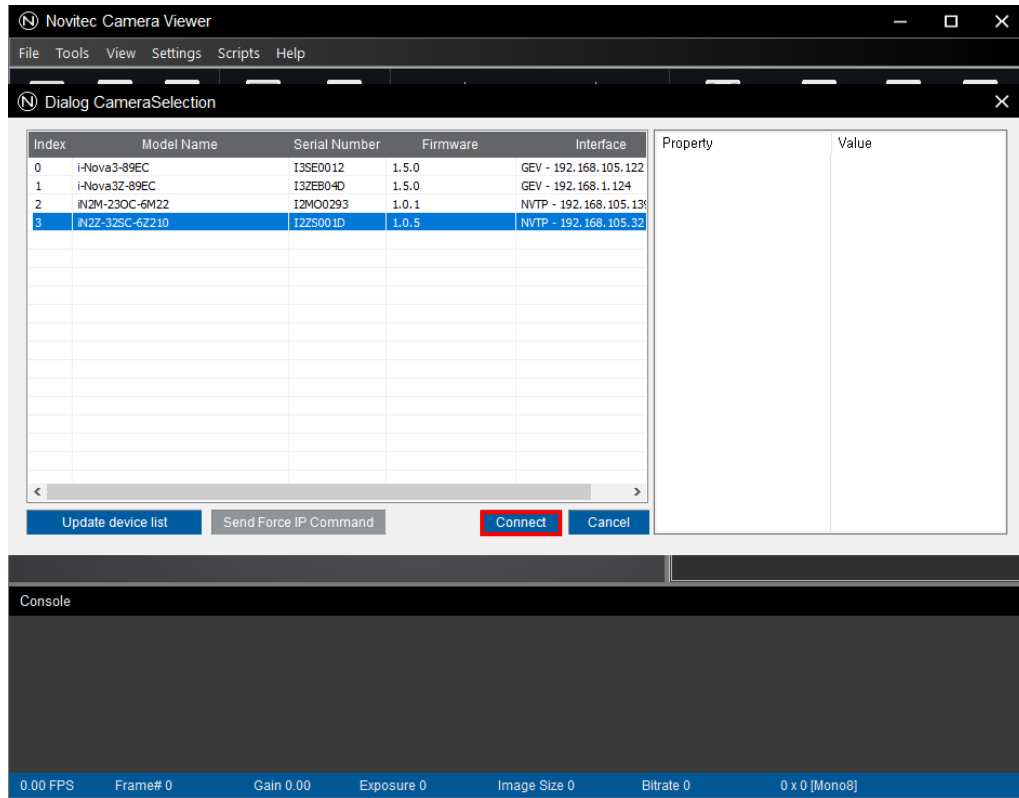
<Image> 29. Network properties image

- f. Enter the same up to the third digit of the camera IP, the last number is different from the camera, and then click [OK].



<Image> 30. PC Network Static IP Settings image

- g. Click [Connect] to connect the camera.

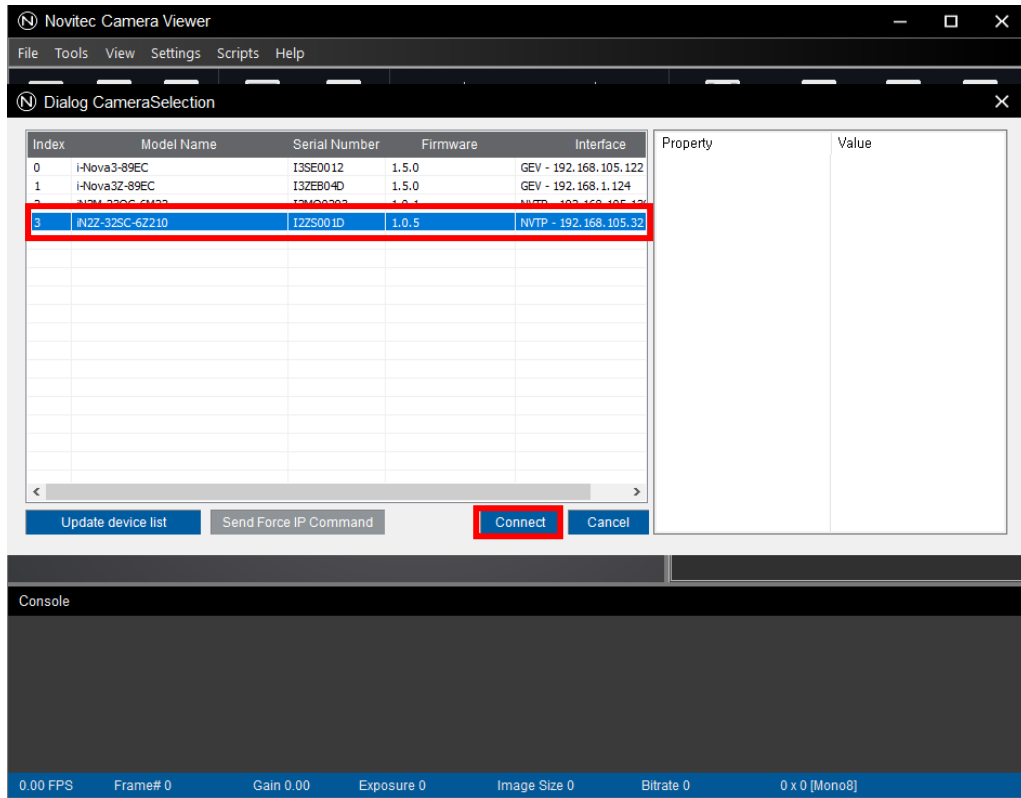


<Image> 31. Launch viewer image

5.6. Account Settings

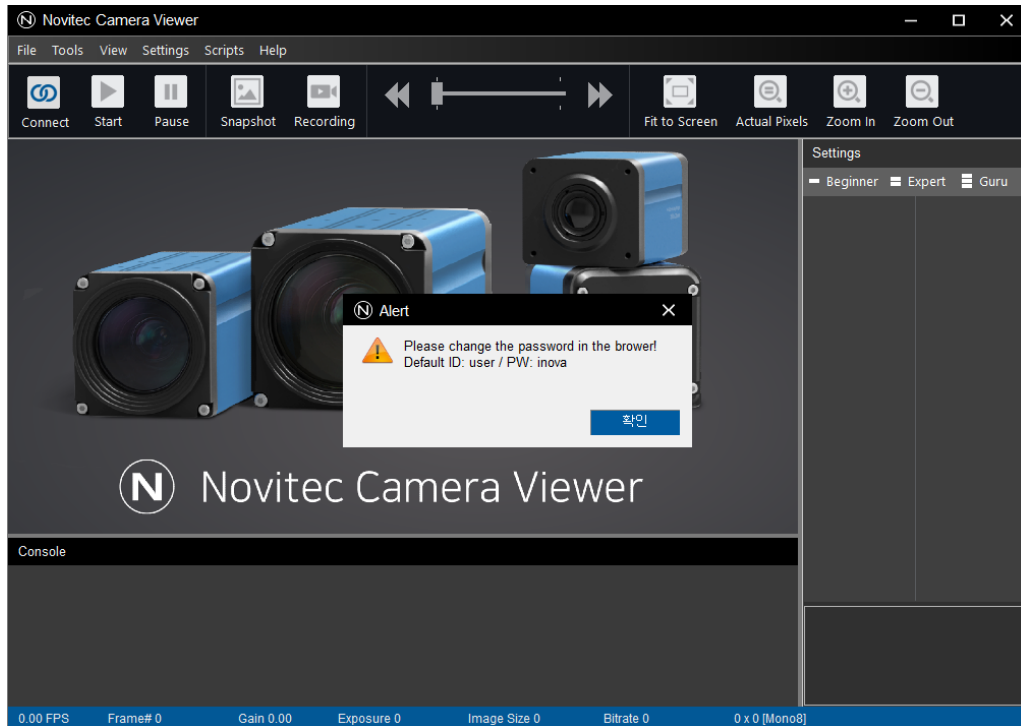
You can view the IP of i-Nova and the network address information of the PC that was discovered within the network.

- Connect and Stream are not available for cameras that have not changed their default password for security reasons. Please change the password in the browser.
- a. Select the IP to connect to from the IP list and click the [Connect] button.



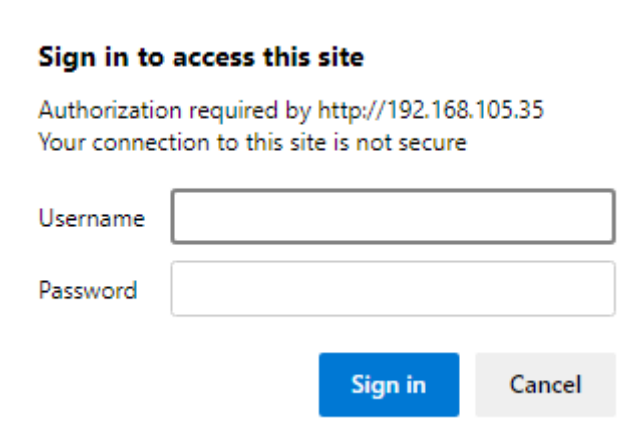
<image> 32 IP Select Image

- b. Cameras that do not have an account set up appear in a notification window and automatically connect to your browser.



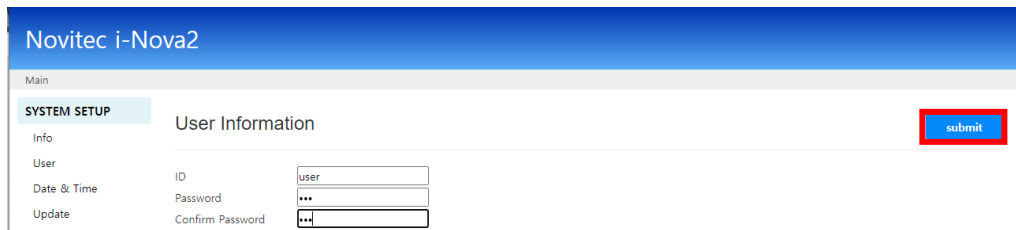
<image> 33 Prompt image

- c. Enter the default ID/PW in the browser login window and log in.
- Default ID: user / PW: inova



<image> 34 Login Image

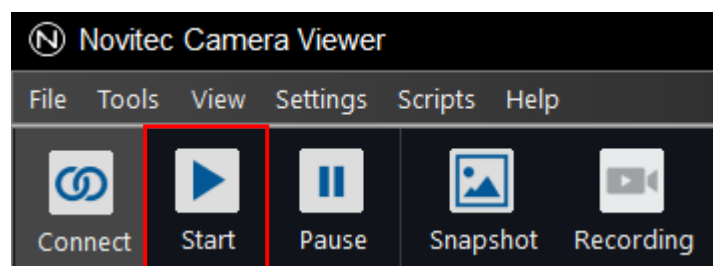
- d. After logging in, enter the password you want in the Password and Confirm Password, and click the [submit] button in the upper right corner to finish setting up your account.



<image> 35 Account Settings Image

5.7. Get the Image

Run the Novitec CameraViewer to connect the camera and press the Start button to output the image.



<Image> 36. Running video image

6. Physical Interface

6.1. i-Nova2 Standard Model

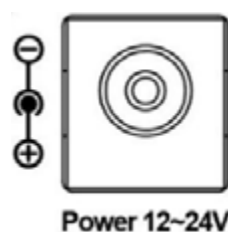
6.1.1. Power/Voltage

The 1-pin connector provides a power connection between the camera and the power supply.

The ideal input voltage is 12V~24V DC.

To power the camera, the 1-pin connector must be connected to the power supply.

Use the typical 12~24V, 1-Pin DC Jack (Inner 2.1mm, outer 5.5mm).



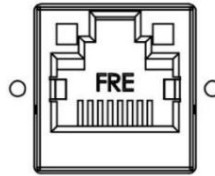
<Image> 37. i-Nova standard power connector image

6.1.2. Ethernet Connector

The 8-Pin RJ-45 Ethernet jack is equipped with two M2 screw holes for secure connection.

Pin assignments conform to the RJ-45 standard.

The green LED is on when the network is connected, and the orange LED is on when data is being sent or received.



<Image> 38. Network connector (RJ45 type) image

6.1.3. GPIO Connector

The camera is equipped with a 4-pin GPIO connector on the back of the case for using external triggers or lights.

A general 4 pin mini clamp socket connector is used. In case of an external trigger input, the contacts of pins 1 and 4 are recognized as signals.

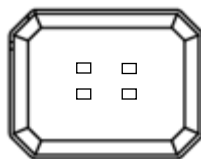
Refer to the diagram for the number of each pin.

Diagram	Pin	Function	Description
	1	Trigger In	Trigger Input (Low voltage: 0~0.8V / High level: 2~5V)
	2	Strobe Out	Strobe Output (3.3V LVTTTL)
	3	GP Out	General purpose output (3.3V LVTTTL)
	4	GND	TTL Ground

<Table> 1. 4pin GPIO Connector table

6.1.4. DC iris Connector

Use a typical DC iris connector and control it with the OP AMP output.



<Image> 39. DC Iris Connector image

6.2. i-Nova2-Zoom, Compact, Motor Model

6.2.1. Power/Voltage

The above models are powered by 12~24V DC using a 2-Pin Screw terminal block.

The 2-pin connector provides a power connection between the camera and the power supply.

The ideal input voltage is 12V~24V DC.

To power the camera, the 2-pin connector must be connected to the power supply.

Diagram	Pin	Function	Description
	1	Power	Camera Power (12V ~ 24V)
	2	GND	Power ground

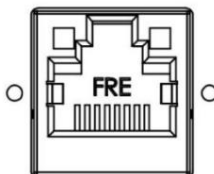
<Table> 2. 2pin Power/Voltage table

6.2.2. Ethernet Connector

The 8-Pin RJ-45 Ethernet jack is equipped with two M2 screw holes for secure connection.

Pin assignments conform to the RJ-45 standard.

The green LED is on when the network is connected, and the orange LED is on when data is being sent or received.



<Image> 40. Network connector (RJ45 type) image

6.2.3. GPIO Connector

The camera is equipped with a 5-pin GPIO connector on the back of the case for using external triggers or lights.

Out port can be controlled separately using Novitec protocol.

Refer to the diagram for the number of each pin.

Diagram	Pin	Function	Description
	1	Trigger In	Trigger input (3.3V ~ 24V)
	2	Out 1(TTL)	LVTTTL output
	3	GND	GND
	4	Out 2(OC)	Open collector output
	5	I/O GND(OC)	I/O GND (OC)

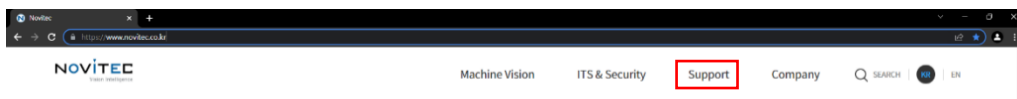
<Table> 3. 5pin GPIO connector table

7. Troubleshooting

7.1. Upgrading Camera Firmware

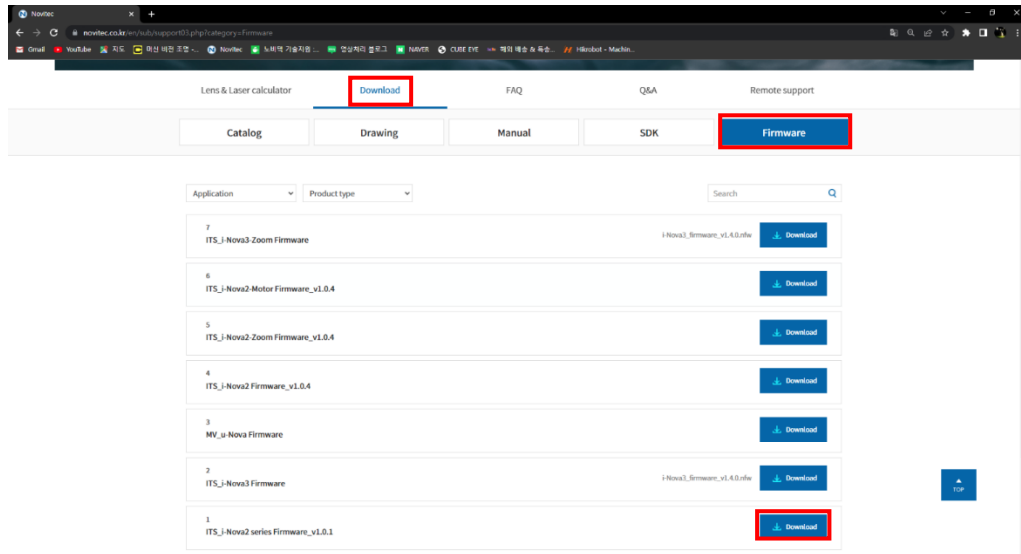
Users can download the latest version of firmware from Novitec website.

- Go to Novitec website(<https://www.novitec.co.kr/>) and click [Support] in the top tab.



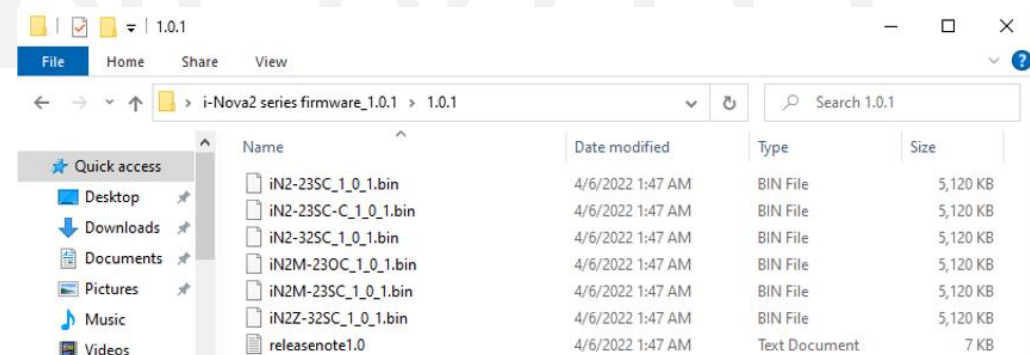
<Image> 41. Novitec website image

- Click [Firmware] in Downloads.
- Click [Download] of ITS_i-Nova2 series Firmware to download the installation file.



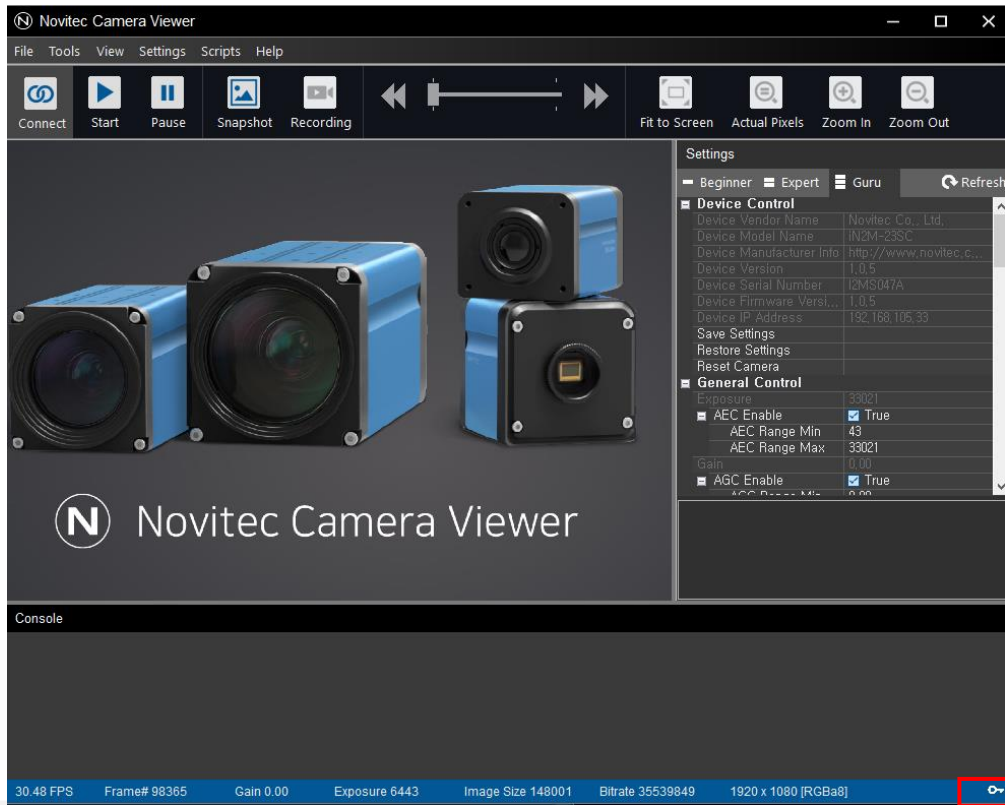
<Image> 42. Firmware Download image

- d. Unzip the downloaded firmware file to a desired location.
- e. Verify that the folder created has been decompressed successfully
 - txt, bin files must exist.



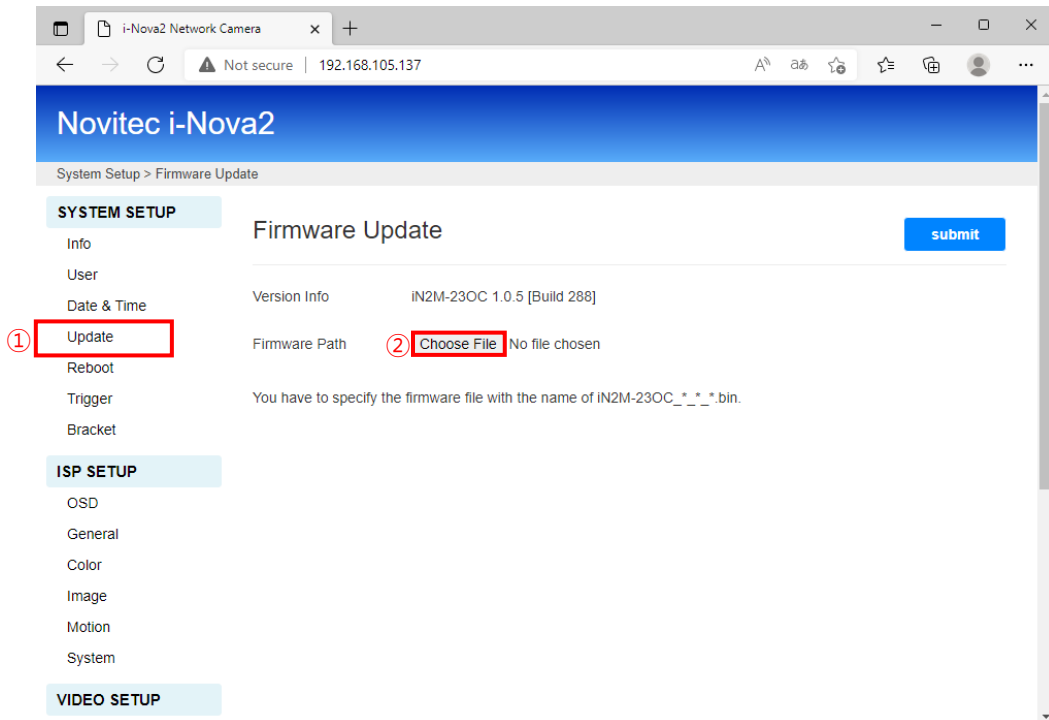
<Image> 43. Firmware folder list image

- f. Run Novitec Camera Viewer to connect the camera and click [] at the bottom of the viewer to access the browser.
 - Or enter the camera IP in an Internet browser.



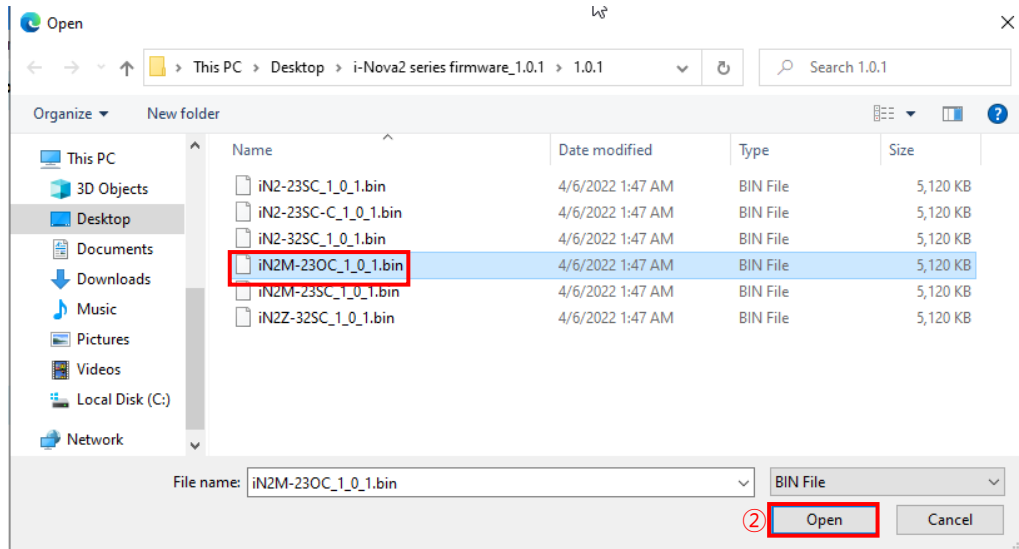
<Image> 44. Launch browser image

- g. Click [Firmware Update] on the left in the browser and click [Choose File].



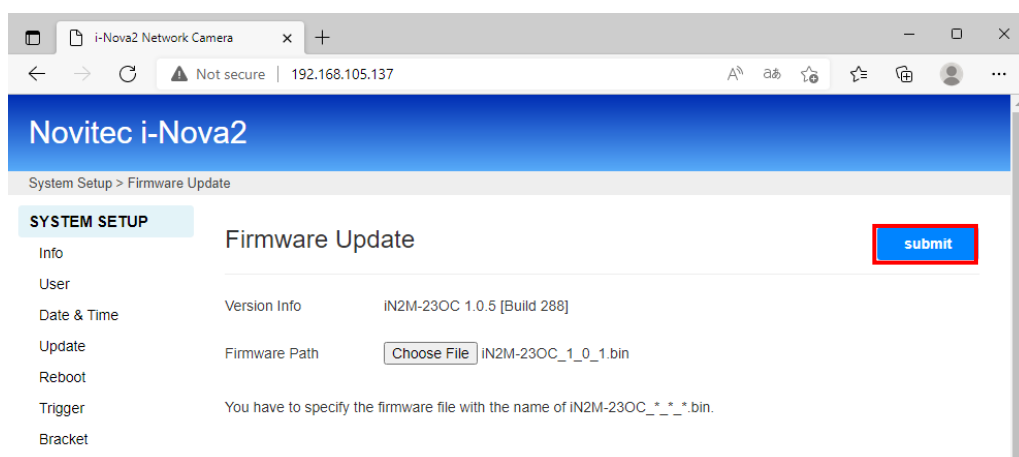
<Image> 45. Firmware update image

- h. Select the (.bin) of the appropriate camera model from the downloaded firmware file and click [Open].



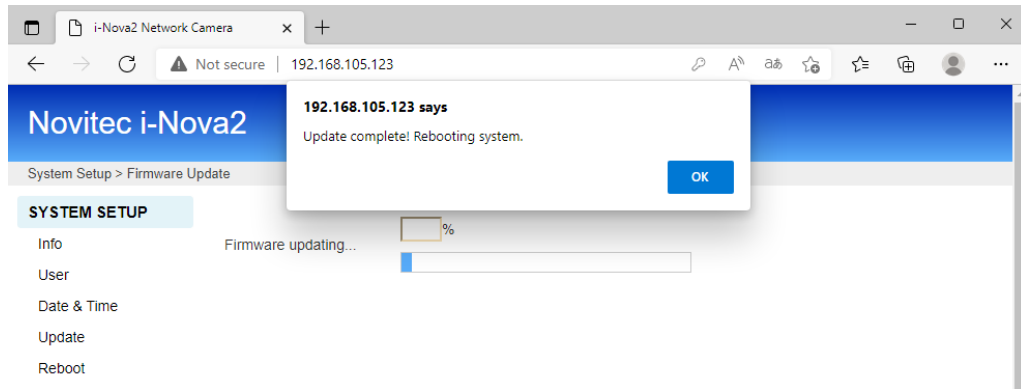
<Image> 46. Firmware selection image

- i. Click [submit] to start updating the firmware.
- Do not turn off the camera for 2 minutes after pressing the submit button.
 - Do not leave the upload page or manipulate the camera during firmware upload.
 - Updating the firmware initializes settings such as IP addresses.



<Image> 47. Firmware applied image

- j. After loading, the firmware update is complete



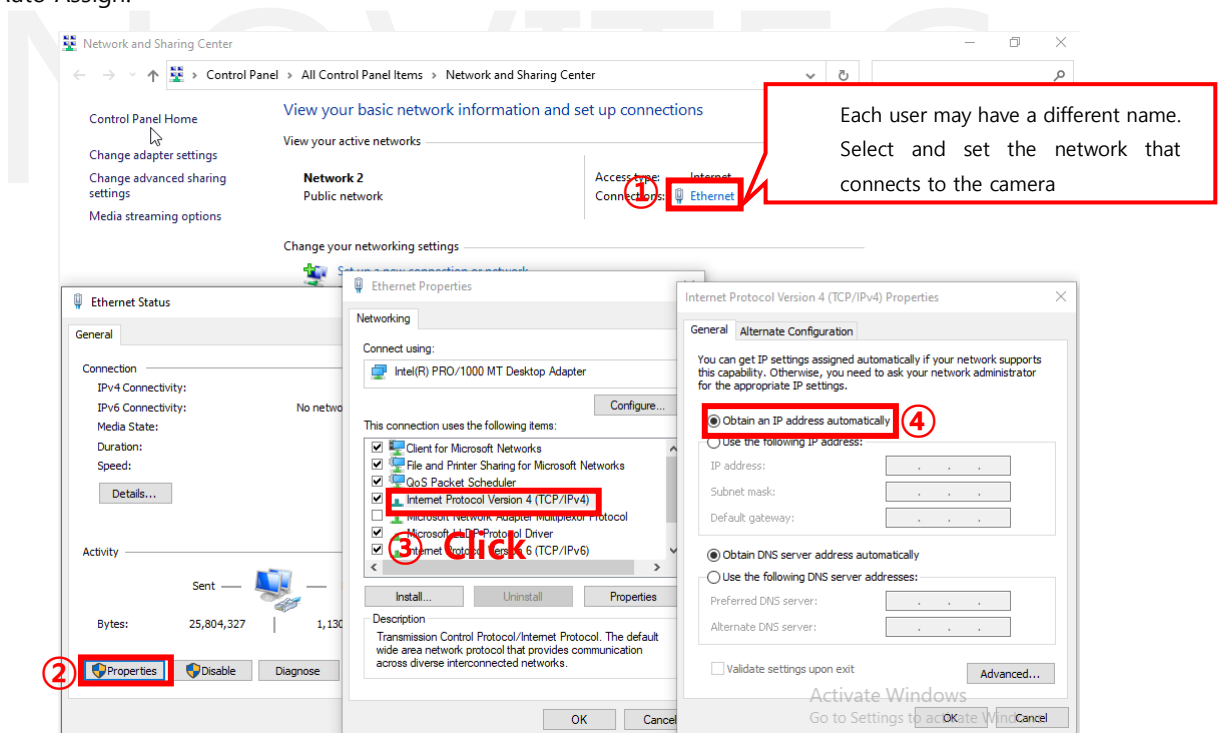
<Image> 48. Complete update image

7.2. Unable to connect to IP

7.2.1. The camera's IP is set to DHCP

The camera is shipped with the DHCP enabled and set to receive an IP automatically.

To connect the camera to a PC with the camera's DHCP function enabled, the PC's IPv4 IP must also be set to Auto Assign.



<Image> 49. PC's IP setting image

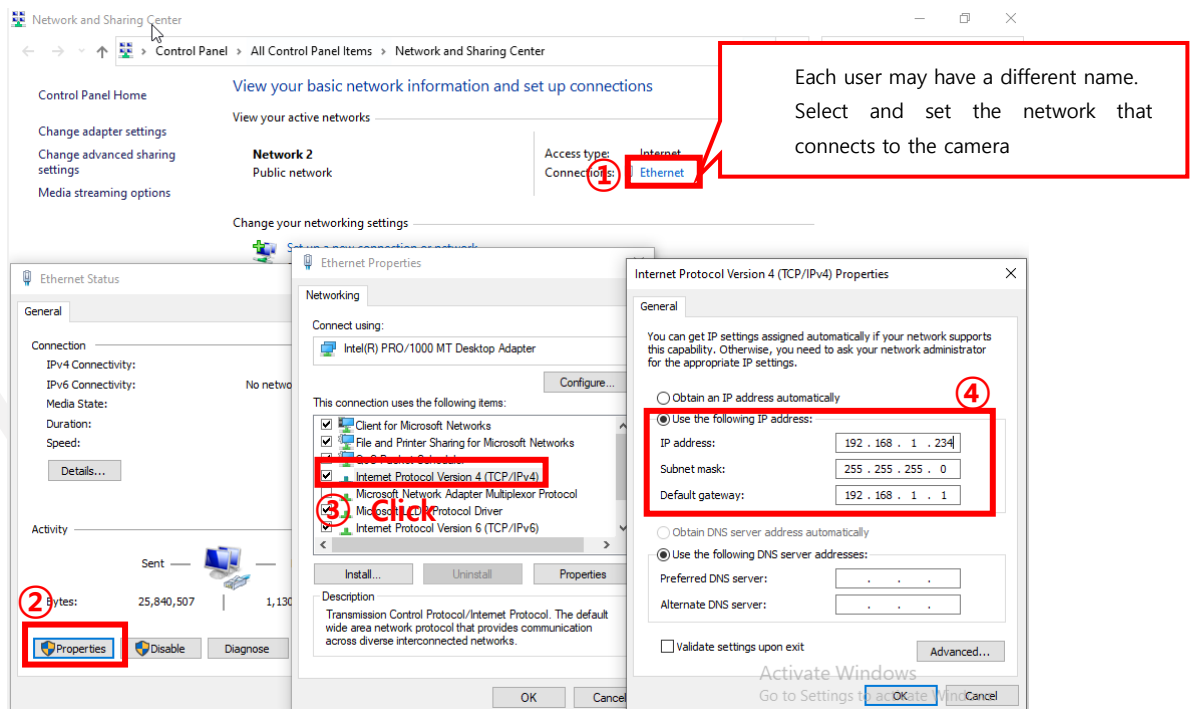
- a. Click TCP/IPv4 properties of local connection in Network settings of the connected PC.
- b. Check "Obtain an IP address automatically".

- c. If you run the viewer after the change, you can check the video by selecting the IP address of the i-Nova found in the IP list box at the top left and checking JPEG Streaming (TCP/UDP)

7.2.2. The camera's IP is set to Static IP

The camera is factory set to receive an IP from the DHCP server, but if you set it to use a static IP, it will not automatically assign an IP.

In this case, the IP area fixed by the user is used, and the IPv4 address of the connected PC must also match the IP area of the i-Nova.



<Image> 50. Change the IP address setting of the connected PC image

- a. The TCP/IPv4 properties of the local connection in the network settings of the connected PC.
- b. Please change to using the following IP address.
- c. Match the IP class C of the i-Nova you have set, and the last digit should not overlap with other equipment. You just need to decide. (Especially, if i-Nova is 234, numbers other than 234)
- d. Unless there are special circumstances, you can set the default gateway to 1 of class C.
- e. If you run the viewer after the change, it will be connected to the i-Nova of the static IP shown in the upper left corner.

7.2.3. When using multiple fixed LAN ports

When multiple ports exist due to the addition of a LAN card, etc., each connected port If you use the IP address as a fixed value, configuring the 3rd digit differently can help prevent problems.

Ex) A: 192.168.1.10, B: 192.168.2.10, C: 192.168.3.10

7.2.4. Disabling DHCP

The camera is shipped with DHCP enabled by default. To disable DHCP and assign a fixed IP address to i-Nova, you must access the i-Nova 's web page.

7.3. Firewall issues, such as not being able to detect IP (Windows)

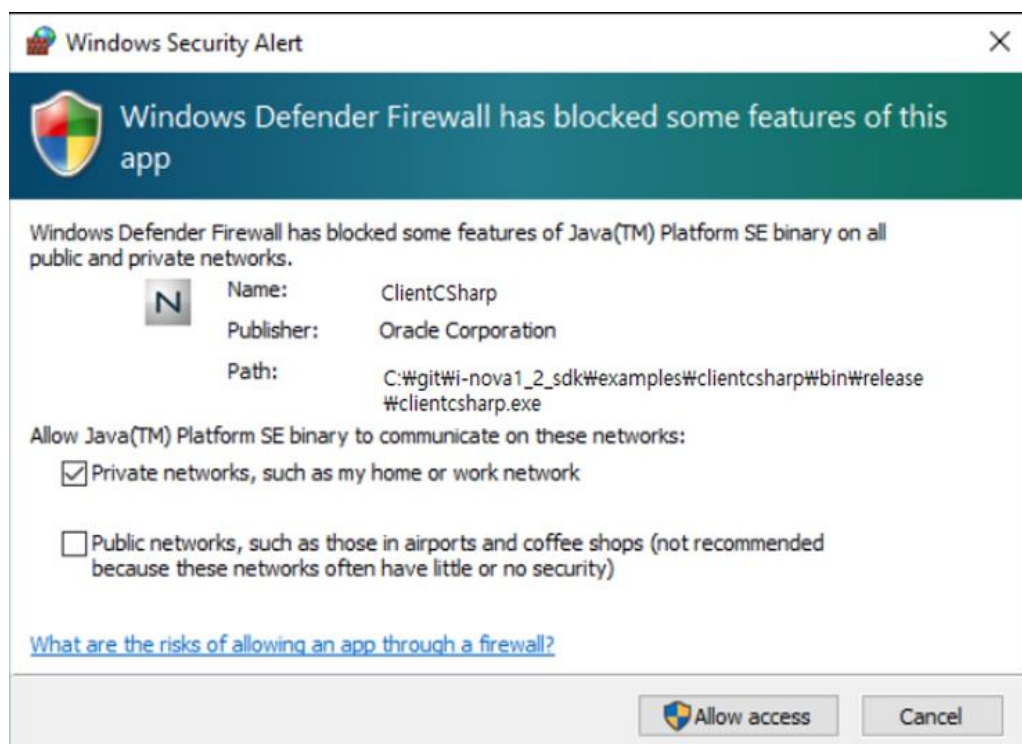
Running the viewer program to connect and use i-Nova, the IP address may not appear in the list or the video may be cut off during video playback because the SSDP transmitted from the camera cannot be received due to a firewall problem. (It can be solved by simply turning the viewer off and on.)

7.3.1. Windows security warning (network connect Set)

When you run the ClientCSharp Viewer for the first time, check the firewall settings.

(Based on Windows 7) When with private network items such as home network or work network, then you must check all items displayed in the window regarding public networks such as airports and coffee shops.

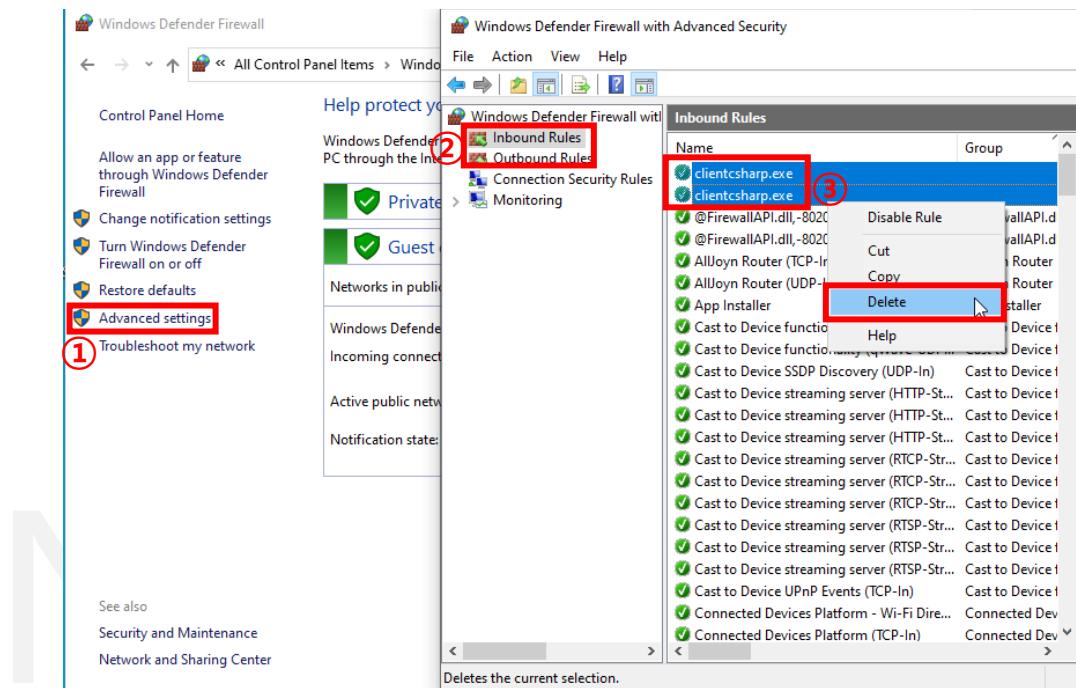
In case of checking only home and work networks, in case of 1:1 connection between PC and i-Nova, due to firewall problem The IP of i-Nova may not be searched, and if you check only Public, the effect of DHCP server The IP of the receiving i-Nova may not be detected.



<image> 51. Firewall settings confirmation window image

If you check the settings incorrectly in the window or select Cancel, delete the rule in "Advanced Settings" in Control Panel -> All Control Panel Items -> Windows Defender (Firewall) and run it again.

rule name defaults to ClientCshrap for C# viewers and IpSDKSample for C++ (MFC) viewers.



<Image> 52. Resetting viewer-related settings of firewall image

"Home, Work" and "Public" networks in the "Windows Security Alert" (Firewall) window that pops up again, you can confirm that i-Nova is normally searched in the viewer.

(If it is not found, please re-run the viewer program)

7.4. Problem with video suddenly not appearing

7.4.1. Trigger Mode

Make sure you are in Free Run mode in the camera's Trigger Modes.

If it is not in Free Run mode, you must input a trigger signal to acquire an image.



<Image> 53. Trigger modes setting change image

7.4.2. Broken Buffer / Time Out, etc.

Check the network status between the camera and the connected PC. In general, this is a situation that occurs when some packets are not received normally due to a network quality problem.

It is necessary to check whether the firewall of the OS is normally allowed for the program being tested.

7.4.3. Just updating the firmware

If you update the firmware while streaming, the streaming will be paused to avoid interfering with the firmware upload. If this is the case, you need to restart the camera by turning off and then turning on the camera.

7.5. Settings can not be changed

There can be several reasons for the entered value not being set.

7.5.1. The value does not set correctly when you have not rebooted

setting by entering a number, after you finish typing, you must press Enter to send the command normally.

In some cases such as Exposure and Gain values, the set value could be different from the input value to adjust the actually applied values.

7.5.2. If the changes you made are gone after rebooting

If you do not press the Save Setting button before rebooting, the setting value after the previous saving will return to the original values.

As described above, after sending the command normally by pressing the Enter key, the save setting is completed only by pressing the Save Setting button.

7.5.3. Set on the web page If the value is not set properly

You need to press Submit button in order to make changes to be applied.

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10. Revision History

Date	Version	Description	SDK / Firmware Version
2022.01.14	V1.0	Initial Version	
2022.07.05	V1.1	Change the image by applying the integrated viewer	V1.7.0/ V1.5.0
2022.07.27	V1.2	Add account setup method	V1.7.0/ V1.5.0

<Table> 4. Revision History table

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