Industrial Long Wave Infrared Camera

User Manual

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Note

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Conditions

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

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CE

This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable

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2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: http://www.recyclethis.info

Warning: This is a class A 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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The symbols that may be found in this document are defined as follows.

Symbol	Description
NOTE	Provides additional information to emphasize or supplement important points of the main text.
WARNING	Indicates a potentially hazardous situation, which if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
DANGER	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

Available Model

This manual is applicable to the industrial long wave infrared camera.

Safety Instruction

These instructions are intended to ensure that the user can use the device correctly to avoid danger or property loss.

⚠Caution:

- In the use of the device, you must be in strict compliance with the electrical safety regulations of the nation and region.
- Use the power adapter provided by the official manufacturer. For the specific requirements of the power adapter, please refer to the device's specifications.
- To reduce the risk of fire or electric shock, do not expose the device to rain or moisture.
- Make sure that the device is firmly fixed when installing it in the use environment.
- If the device does not work properly, please contact your dealer or the nearest service center. Never attempt to disassemble the device yourself (we shall not assume any responsibility for problems caused by unauthorized repair or maintenance).
- Avoid installing the device in a vibration or shock environment, and keep it away from electromagnetic interference sites (ignoring this may damage the device).
- Do not directly touch the heat dissipation parts of the device to avoid burns.
- Do not install the indoor device in an environment where it may be exposed to water or other liquids.
- Do not use the device in high temperature, low temperature or high humidity environment. For specific temperature and humidity requirements, please refer to the device's specifications.
- Avoid aiming the lens at strong light (such as lighting, sunlight, or laser beams, etc.), otherwise the image sensor will be damaged.
- Do not touch the image sensor directly. If cleaning is necessary, please slightly dampen a soft clean cloth with alcohol and gently wipe off the dust. When the device is not in use, please attach a dust cover to protect the image sensor.

Personnel Requirement

Quality requirements for installation and maintenance personnel: Qualification certificate or working experience in weak current system installation and maintenance, and relevant working experience and qualifications. Besides, the personnel must possess the following knowledge and operation skills:

- The basic knowledge and operation skills of low voltage wiring and low voltage electronic circuit connection.
- The ability to comprehend the contents of this manual.

Contact Information

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Chapter 1 Overview

1.1 Introduction

The industrial long wave infrared camera adopts a high-sensitivity vanadium oxide uncooled detector and uses GigE interface to transmit data in real time. It supports remotely acquiring data and setting parameters via client software or SDK.

1.2 Key Feature

- Adopts high-sensitivity vanadium oxide uncooled detector with 0.3 MP.
- Supports multiple palette modes, grayscale detection, image adjustment, etc.
- Compact design with mounting holes on panels for flexible mounting from 4 sides.
- Adopts GigE interface and max. transmission distance of 100 meters without relay.
- Compatible with GigE Vision Protocol, GenlCam Standard, and third-party software based on the protocol and standard.

Note

Refer to the device's specifications for specific parameters.

Chapter 2 Appearance

Note

- For specific appearance and dimension, please refer to the device's specification for details.
- The appearance is subject to change, and the actual device you purchased shall prevail.

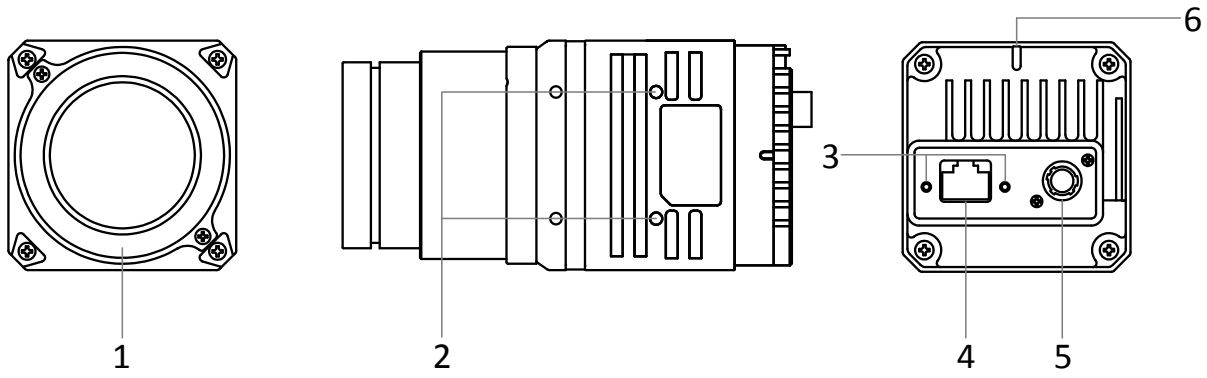


Figure 2-1 Appearance

Table 2-1 Component Description

No.	Interface	Description
1	Lens	It is the device's lens. Refer to the device's specification for details.
2	Screw Hole	It is used to fix the device to the installation position. You should use M3 screws.
3	Screw Hole for GigE Interface	It refers to the M2 screw hole for securing the network cable.
4	GigE Interface	It is used to transmit data.
5	Power and I/O Connector	It provides power and I/O signals. Refer to section ***Power and I/O Connector*** for details.
6	Indicator	It indicates the operation status of the device. Refer to section ***Indicator*** for details.

Chapter 3 I/O Connector and Indicator

3.1 Power and I/O Connector

The device has a 6-pin P7 connector as the power and I/O connector that provides power and I/O signals. Read the table below to get its pin definitions.

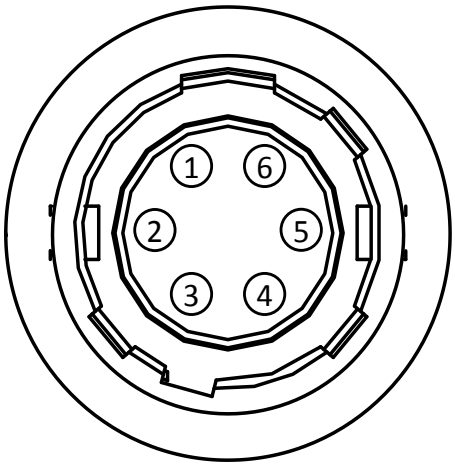


Figure 3-1 6-Pin P7 Connector

Note

You should refer to the table below and the label attached to the power and I/O cable to wire the device.

Table 3-1 Pin Definitions

No.	Signal	I/O Signal Source	Description
1	DC_PWR	--	Device's power supply
2	OPTO_IN	Line 0+	Opto-isolated input
3	GPIO	Line 2+	Can be configured as input or output
4	OPTO_OUT	Line 1+	Opto-isolated output
5	OPTO_GND	Line 0/1-	Opto-isolated signal ground
6	GND	Line 2-	Power supply ground

3.2 Indicator

The device's indicator is used to indicate the operation status of the device.

Note

- When the indicator is flashing rapidly, flashing slowly, or flashing very slowly, its unlit interval is 0.2 s to 0.3 s, 1 s, and 2 s respectively.
- The indicator sometimes may show a purple color when red and blue colors flashing at the same time.

Table 3-2 Indicator Description

No.	Indicator Color	Status	Device Status Description
1	Red	Flash very slowly	The device's wiring exception occurs.
2	Red	Solid	The device exception occurs.
3	Blue	Flash slowly	The device is acquiring images in trigger mode.
4	Blue	Flash rapidly	The device is acquiring images normally.
5	Blue	Solid	The device is in an idle status.
6	Red and Blue	Flash alternatively	● The device is updating firmware. ● The function of finding me is executed. Go to **Device Control** → **Find Me** in the client software, and click **Execute** to find the currently operating device.

Chapter 4 Installation

4.1 Installation Preparation

You need to prepare following accessories before device installation.

Table 4-1 Accessories

No.	Name	Quantity	Description
1	Power and I/O Cable	1	It refers to the 6-pin power and I/O cable that you need to purchase separately.
2	DC Power Supply	1	You should select suitable power adapter or switch power supply according to the device's power supply and consumption. You need to purchase separately.
3	Network Cable	1	It refers to CAT-5e network cable or above. You need to purchase separately.
4	Lens Cover	1	It is used to avoid dusts into lens and lens mount. It is included in the package.
5	Lens	1	It refers to the device's lens, and it is included in the package.

4.2 Install Device

Before You Start

- Make sure that the device in package is in good condition and all assembly parts are included.
- Make sure that all related devices are powered off during the installation.

Steps

1. Fix the device to the installation position.
2. Install the lens to the device.
3. Use a proper network cable to connect device to a GigE switch or a GigE network interface card.
4. Select a power supply method:

- Direct power supply: Use the 6-pin power and I/O cable to connect device to a proper power adapter.
- PoE (Power over Ethernet): For the device that supports PoE, use a network cable to connect it to a switch or a network interface card that supports PoE.

Note

You can follow steps below to install or remove the lens according to actual demands.

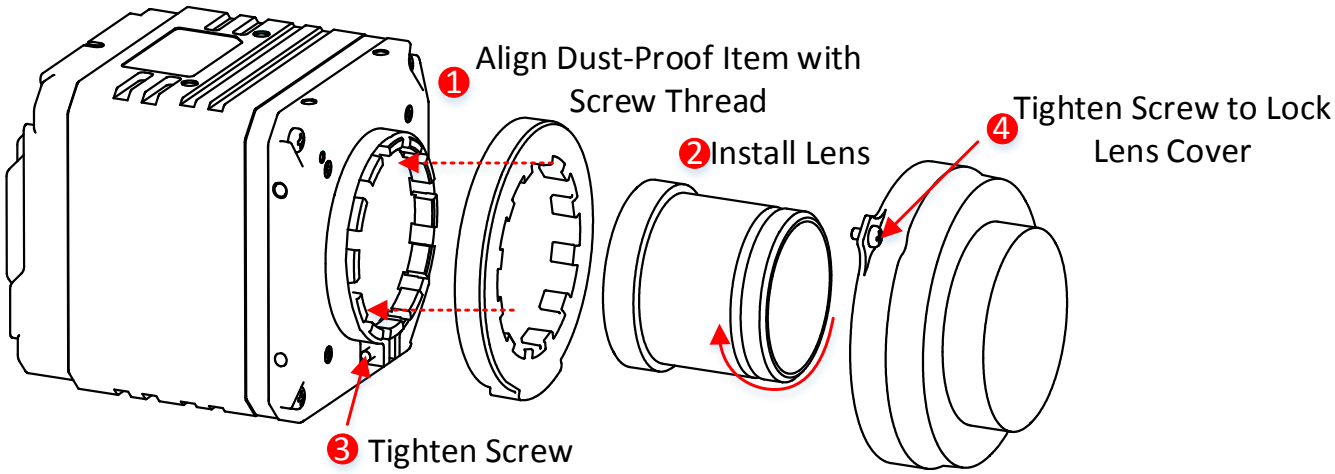


Figure 4-1 Lens Installation

Chapter 5 Device Connection

Device connection to the client software is required for device's configurations and remote operations. This section introduces how to install the client software, connect the device to the client software, etc.

5.1 Install MVS Client Software

MVS client software is used to connect and set device's parameters, and acquire images.

Note

- The MVS client software is compatible with 32/64-bit Windows XP/7/10, 32/64-bit Linux, and 64-bit MacOS operating systems. Here we take Windows as an example.
- The graphic user interface may differ by different versions of the client software you use.
- You can download Windows version client software from ***en.hikrobotics.com***. For other versions, you can mail to ***tech_support@hikrobotics.com*** to get client software installation package.

Steps

1. Double click the MVS installation package.
2. Select the language.
3. Read and check **Terms of the License Agreement**.

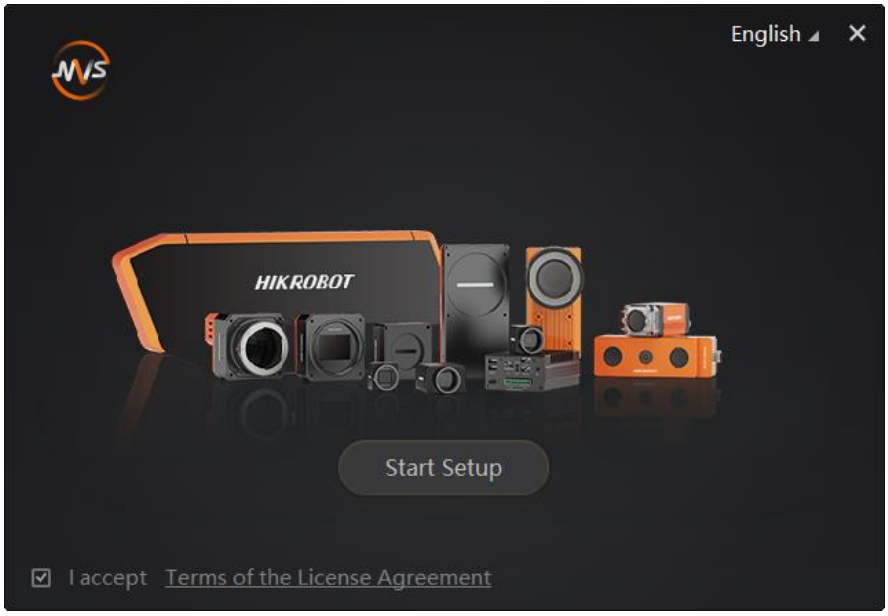


Figure 5-1 Installation Interface

4. Click **Start Setup**.

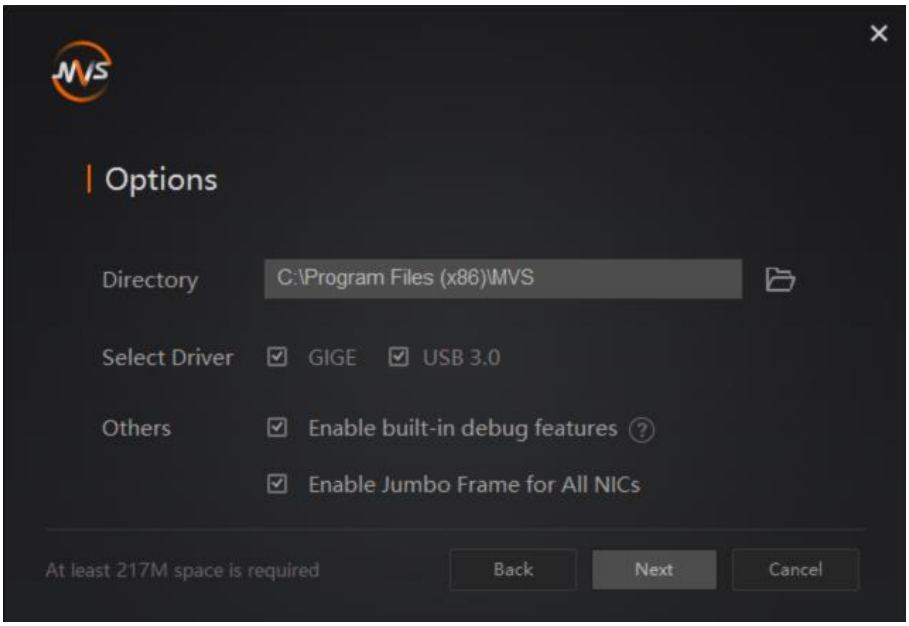


Figure 5-2 Default Settings

5. Keep default settings, and click **Next**.
6. Finish the installation according to the interface prompts.

5.2 Set PC Environment

To ensure stable client running and data transmission, you are recommended to set PC environment.

5.2.1 Turn off Firewall

Steps

Note

For different Windows versions, the path name or interface may differ. Please refer to the actual condition.

1. Go to Windows Firewall.
- Windows XP system: Click **Start** → **Control Panel** → **Security Center** → **Windows Firewall**.
- Windows 7 system: Click **Start** → **Control Panel** → **Windows Firewall**.
- Windows 10 system: Click **Start** → **Control Panel** → **System and Security** → **Windows Defender Firewall**.

2. Click **Turn Windows Defender Firewall on or off** on the left.
3. Select **Turn off Windows Defender Firewall (not recommended)**.

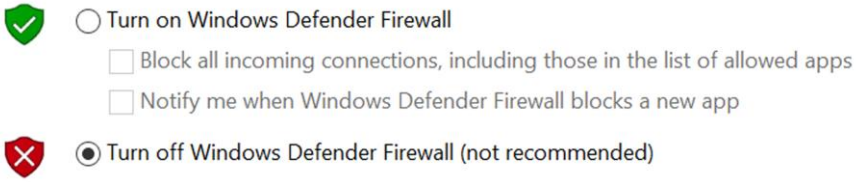


Figure 5-3 Windows Defender Firewall

4. Click **OK**.

5.2.2 Set PC Network

Steps

Note

For different Windows versions, the specific setting path and interface may differ. Please refer to the actual condition.

1. Go to PC network settings page: **Start** → **Control Panel** → **Network and Internet** → **Network and Sharing Center** → **Change adapter settings**.
2. Select NIC and set the IP obtainment mode.

- Select **Obtain an IP address automatically** to get an IP address of the PC automatically.
- Or select **Use the following IP address** to set an IP address for the PC manually.

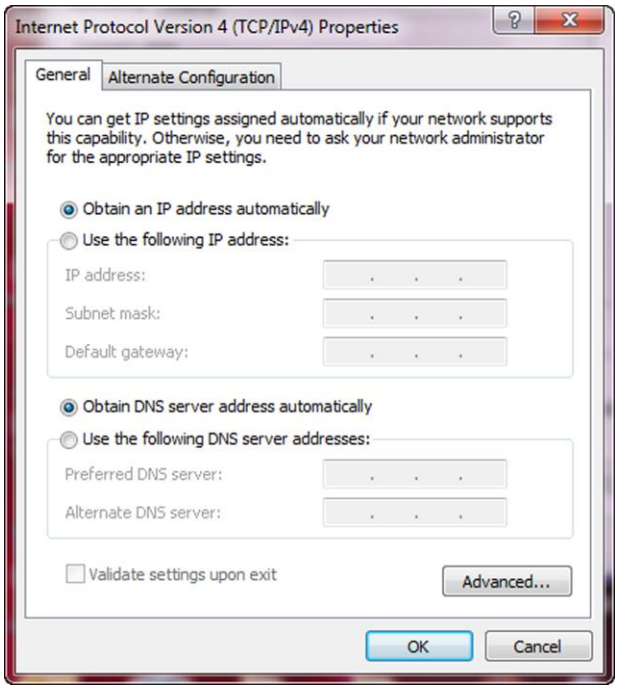


Figure 5-4 Set PC Network

3. Set NIC property via the PC.

1) Go to NIC settings page: **Control Panel** > **Hardware and Sound** > **Device Manager** > **Network Adapter**.

2) Select corresponding network interface card, and click **Advanced**.

3) Set **Jumbo Packet** value to 9014 Bytes, **Transmit Buffers** and **Receive Buffers** to 2048, **Interrupt Moderation Rate** to **Extremum**.

4. (Optional) Set NIC property via the MVS.

1) Right click the **GigE**, and click **NIC Settings**.

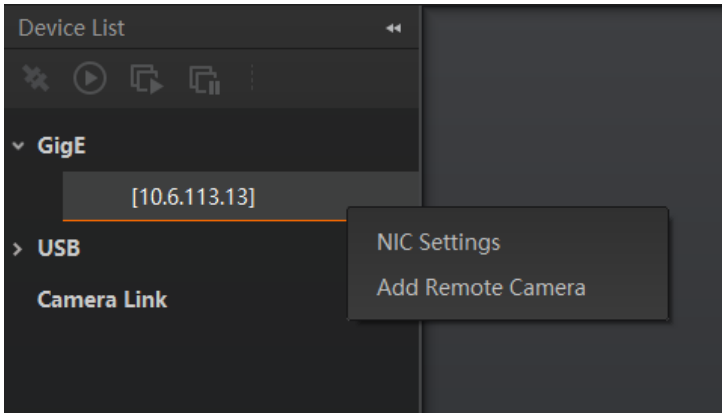


Figure 5-5 Click NIC Settings

2) Enable **Jumbo Frame**, and set **Receive Buffers** and **Transmit Buffers** to 2048.

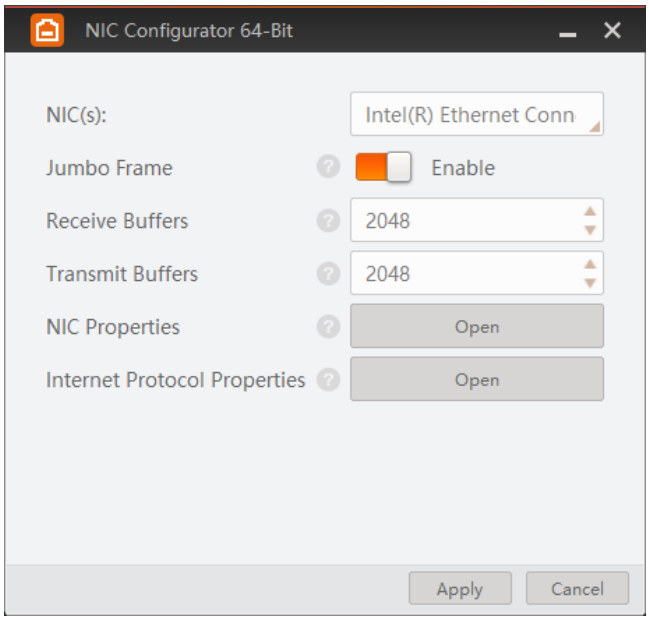


Figure 5-6 NIC Configurator

Note

The max. value of receive buffers and transmit buffers may differ by network interface cards.

5.3 Set Device Network

You can set and operate the device in the client software only when the device is in the same network segment with the PC where the client software is installed.

Steps

1. Double click the client software to run it.
2. Click in device list to search the device.
3. Select a device to be connected.
4. Right click the device and click **Modify IP**.
5. Set the IP address of the device in the same network segment with the PC.
6. Click **OK**.

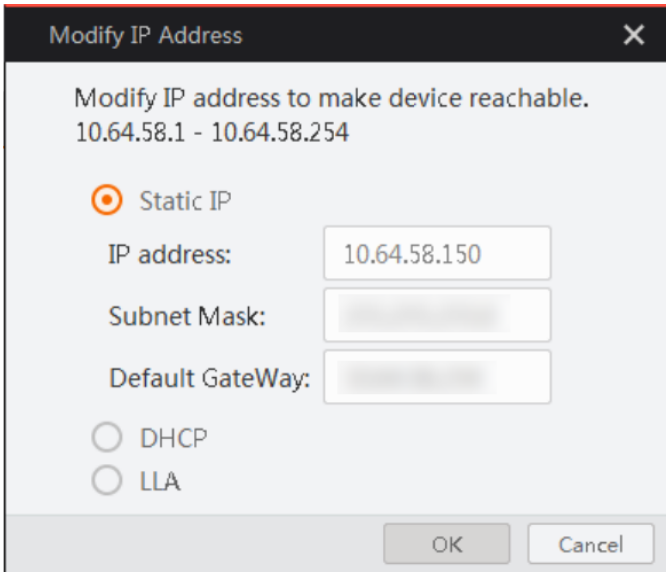


Figure 5-7 Set Device Network

5.4 Connect Device to MVS Client Software

Note

Make sure that your device's IP address is in the same network segment with the PC where you installed the client software before connecting the device to it.

Double click the device name in the device list, or click to connect the device to the client software.

Chapter 6 Client Software Layout

After connecting to the device, the client software can read the its attributes and display them.

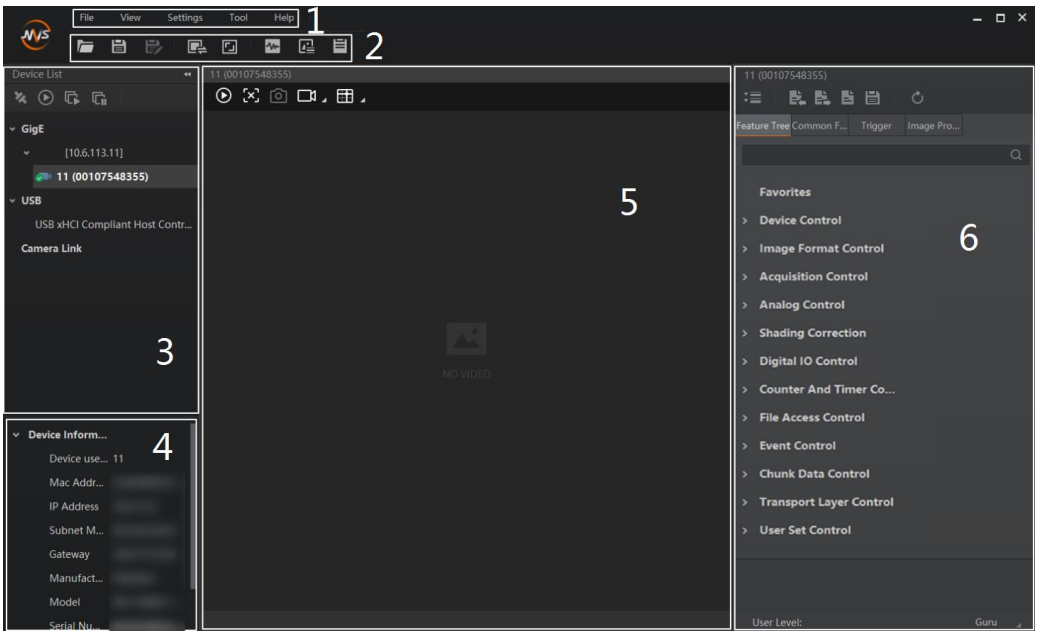


Figure 6-1 Main Window

Note

For specific main window of the client software, please refer to the actual one you got.

Table 6-1 Main Window Description

No.	Name	Description
1	Menu Bar	The menu bar displays function modules, including File, View, Settings, Tool, and Help.
2	Control Toolbar	The control toolbar provides quick operations for the device.
3	Device List Panel	This panel displays device list, and you can connect or disconnect device, modify device IP address, etc.
4	Device Information Panel	This panel displays the detailed device information.
5	Display Window	This area displays the acquisition images in real-time. You can click different icons to capture and save image, record, etc.

No.	Name	Description
6	Feature Panel	You can view and set features of the selected device, and perform operations such as importing, exporting, and saving features.

Click ▸ in the device's feature panel to unfold the specific parameters, and set them according to actual demands.

Note

The device's feature tree and parameters may differ by device models.

Table 6-2 Feature Tree Description

Feature Name	Description
Device Control	You can view the device's information, edit its name and reset it.
Image Format Control	You can view and set the device's resolution, pixel format, etc.
Acquisition Control	You can view and set the device's acquisition mode, frame rate, trigger mode, etc.
Analog Control	You can view and set the device's palettes mode, grayscale detection, etc.
Shading Correction	You can correct the device's non-uniformity of pixels.
Digital IO Control	You can set input and output signals.
Counter And Timer Control	You can count external trigger signal via this feature.
File Access Control	You can view and set the device's file access control related parameters.
Event Control	You can view and set the device's event control related parameters to let the device generate an event and transmit a related event message to the computer.
Chunk Data Control	You can view and set the device's chunk data control related parameters to generate supplementary image data and append that data to every image that you acquire.
Transport Layer Control	You can view and set parameters of the device's transport layer.
User Set Control	You can save or load the device's parameters.

Chapter 7 Image Acquisition

7.1 Set Frame Rate

Frame rate refers to the image number that is acquired by the device per second. The higher frame rate, and shorter time used for image acquisition will be. The following three factors determine the device's frame rate in real-time.

- Frame readout time: The frame readout time is related with device's sensor performance and image height. The lower the image height and less the frame readout time, and the higher the frame rate will be.
- Bandwidth: The larger the bandwidth, the higher the frame rate will be.
- Pixel format: The more bytes pixel format occupy, the lower the frame rate will be.

Steps

1. Go to **Acquisition Control** → **Acquisition Frame Rate**, and enter **Acquisition Frame Rate**.
2. Enable **Acquisition Frame Rate Control Enable**.

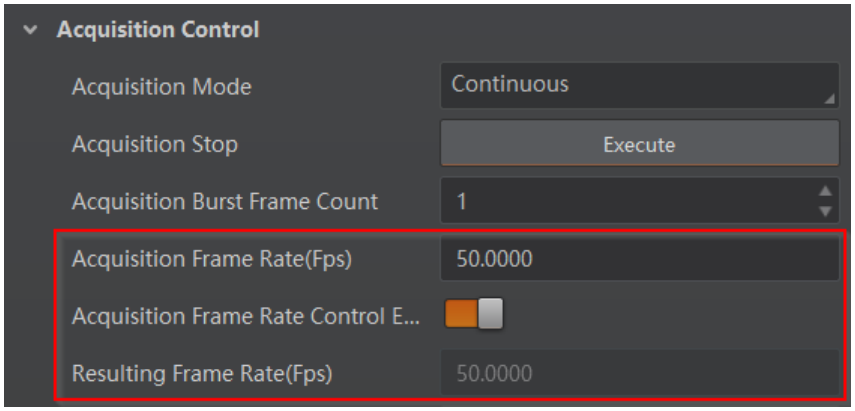


Figure 7-1 Set Frame Rate

Note

- If the real-time frame rate is smaller than the value you set, the device acquires images by the real-time frame rate.
- If the real-time frame rate is larger than the value you set, the device acquires images by the value you set.

3. View the device's final frame rate in **Resulting Frame Rate**.

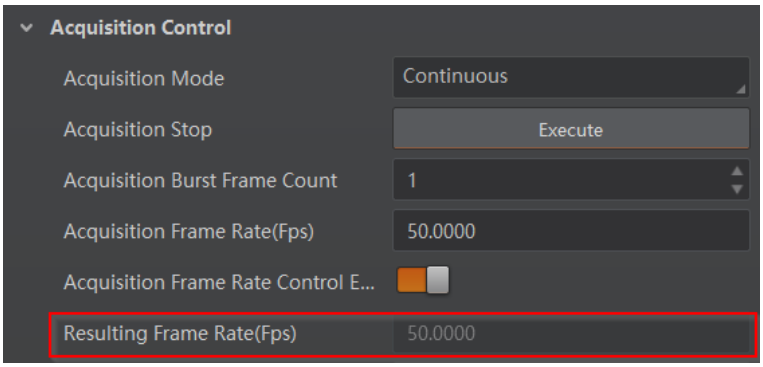


Figure 7-2 View Resulting Frame Rate

7.2 Set Acquisition Mode

The device supports two types of acquisition modes, including **SingleFrame** mode and **Continuous** mode. Go to **Acquisition Control** → **Acquisition Mode**, and select **Continuous** or **SingleFrame** as **Acquisition Mode** according to actual demands.

- **SingleFrame**: When device starts image acquisition, it acquires one image only, and then stops.
- **Continuous**: When device starts image acquisition, it acquires images continuously. Real-time frame rate decides the acquisition frame number per second. You can stop image acquisition manually.

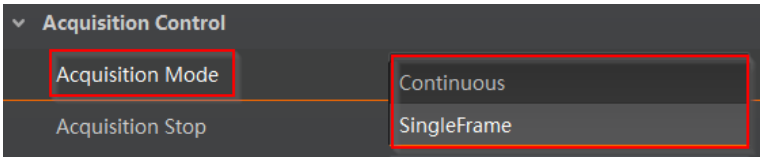


Figure 7-3 Set Acquisition Mode

7.3 Set Trigger Mode

The device supports two types of trigger modes, including internal trigger mode and external trigger mode. Go to **Scan Control** → **Trigger Control** → **Trigger Mode** and set it.

- **Internal Trigger Mode**: In this mode, the device acquires images via its internal signals.
- **External Trigger Mode**: In this mode, the device acquires images via external signals like software signal and hardware signal. The trigger source of external trigger mode includes software trigger, hardware trigger, counter trigger, and free trigger.

7.3.1 Enable Internal Trigger Mode

Go to **Acquisition Control** → **Trigger Mode**, and select **Off** as **Trigger Mode**.

Note

Off refers to the internal trigger mode.

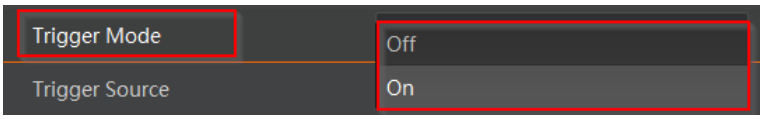


Figure 7-4 Enable Internal Trigger Mode

7.3.2 Enable External Trigger Mode

Go to **Acquisition Control** → **Trigger Mode**, and select **On** as **Trigger Mode**.

Note

On refers to the external trigger mode.

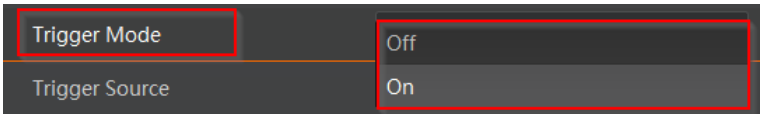


Figure 7-5 Enable External Trigger Mode

7.4 External Trigger Mode

In the external trigger mode, you can select different trigger sources to trigger the device to acquire images, and the device outputs images at a fixed period 1/frame rate (s).

- If the device receives the trigger signal at the beginning of outputting each frame of image, it will output the current frame of image, as shown in figure 7-6.
- If the device receives the trigger signal during the output of each frame of image, the device will acquire images at the next frame, as shown in figure 7-7.

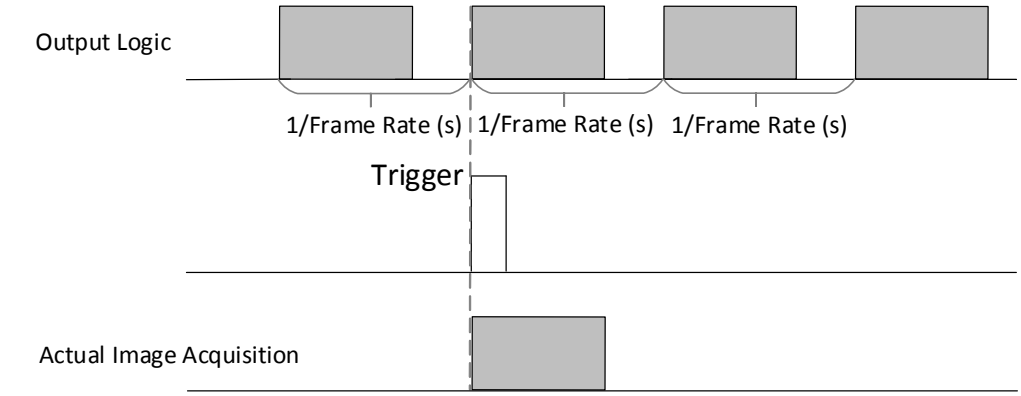


Figure 7-6 Output Current Frame of Image

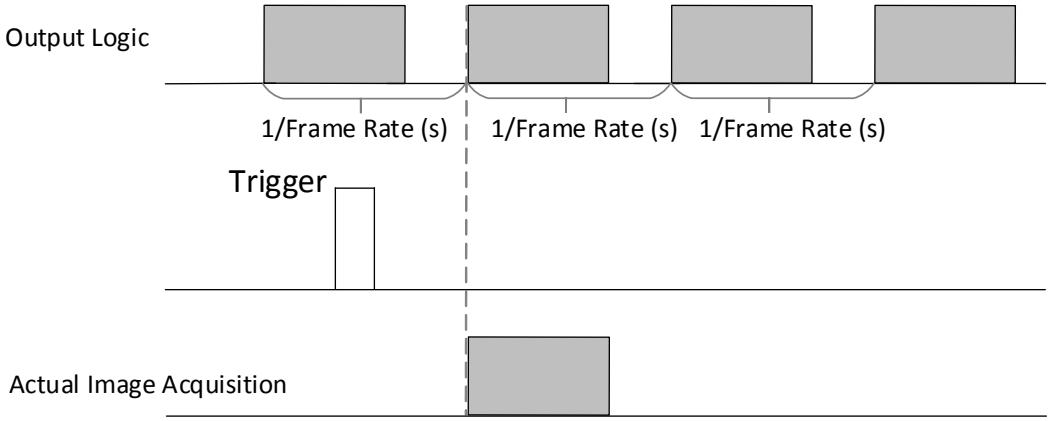


Figure 7-7 Output Next Frame of Image

Note

The figures above uses the rising edge as the trigger activation.

7.4.1 Set Trigger Source

The device's trigger source includes software trigger, hardware trigger (Line 0, Line 2), counter trigger (Counter 0), and free trigger (Anyway). Go to **Acquisition Control** → **Trigger Source**, and select **Trigger Source** according to actual demands.

Table 7-1 Trigger Source Description

Trigger Source	Corresponding Parameter	Description
Software Trigger	Software	The software sends trigger signal to the device via GigE interface to acquire images.
Hardware Trigger	Line 0, Line 2	External device connects to the device via I/O connector. External device sends

Trigger Source	Corresponding Parameter	Description
		trigger signal to the device to acquire images.
Counter Trigger	Counter 0	The counter sends trigger signal to the device to acquire images.
Free Trigger	Anyway	The device can receive software trigger and hardware trigger to acquire images.

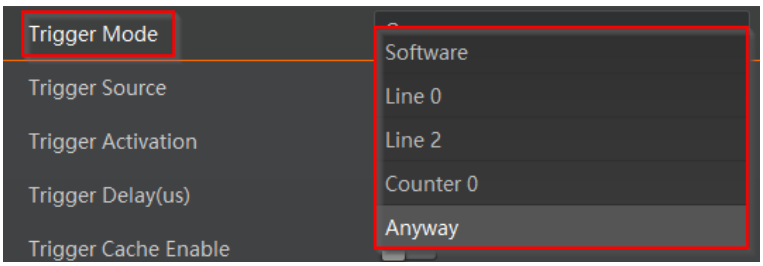


Figure 7-8 Set Trigger Source

Note

These four external trigger sources are valid only when the **Trigger Mode** is **On.**

Set and Execute Software Trigger

In software trigger, the software sends trigger signal to the device via GigE interface to acquire images.

Steps

1. Go to **Acquisition Control** → **Trigger Mode**, and select **On** as **Trigger Mode**.
2. Select **Software** as **Trigger Source**.
3. Click **Execute** in **Trigger Software**.

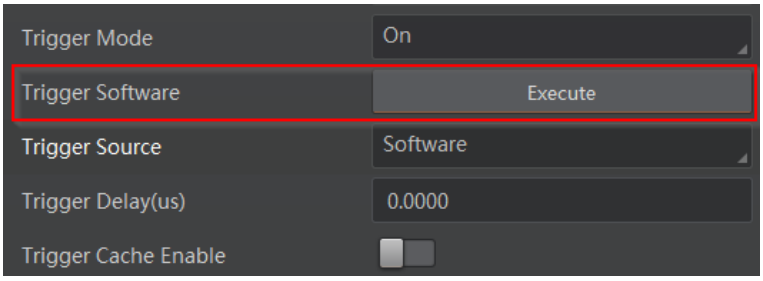


Figure 7-9 Set and Execute Software Trigger

Set and Execute Hardware Trigger

The device has one opto-isolated input (Line 0), and one bi-directional I/O (Line 2) that can

be configured as input signal. The steps for configuring Line 2 as input signal as follows.

Steps

1. Go to **Digital IO Control** and select **Line 2** as **Line Selector**.
2. Select **Input** as **Line Mode**.

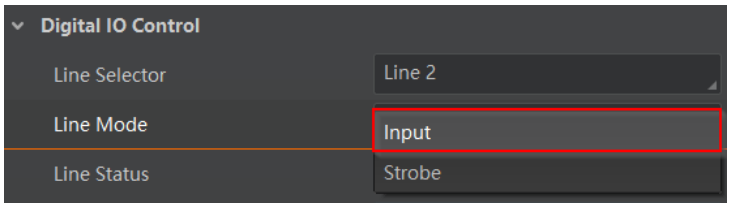


Figure 7-10 Set Line 2 as Input Signal

In hardware trigger, external device sends trigger signal to the device to acquire images via I/O connector.

Steps

1. Go to **Acquisition Control** → **Trigger Mode**, and select **On** as **Trigger Mode**.
2. Select **Line 0** or **Line 2** as **Trigger Source** according to actual demands.

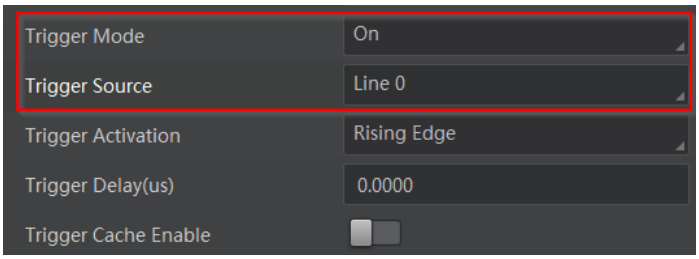


Figure 7-11 Set and Execute Hardware Trigger

Set and Execute Counter Trigger

In counter trigger, the counter sends trigger signal to the device to acquire images.

Steps

1. Go to **Acquisition Control** → **Trigger Mode**, and select **On** as **Trigger Mode**.
2. Select **Counter 0** as **Trigger Source**.

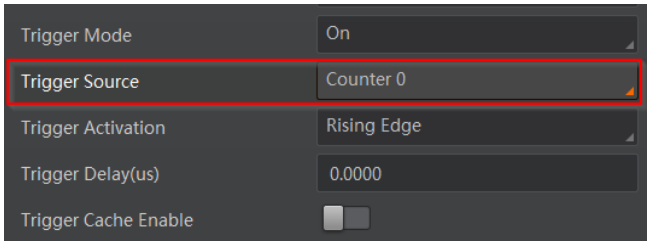


Figure 7-12 Set and Execute Counter Trigger

When using counter trigger, you need to set parameters of **Counter And Timer Control** as shown below.

Table 7-2 Parameters of Counter And Timer Control

Parameter	Read/Write	Description
Counter Selector	Read and write	It selects counter source. **Counter 0** is available only at present.
Counter Event Source	Read and write	It selects the signal source of counter trigger. **Line 0** or **Line 2** is available. This parameter is disabled by default.
Counter Reset Source	Read and write	It selects the signal source of resetting counter. **Software** is available only. This parameter is disabled by default.
Counter Reset	Write is available under certain condition	It resets counter and it can be executed only when selecting **Software** as **Counter Reset Source**.
Counter Value	Read and write	It is the counter value with the range of 1 to 1023.
Counter Current Value	Read only	It displays the number of executed external trigger.

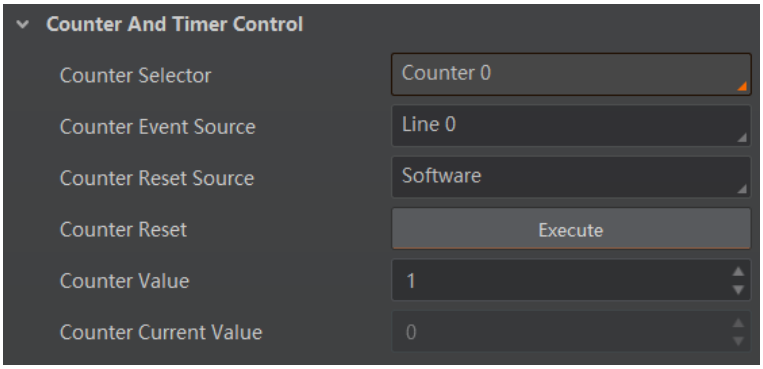


Figure 7-13 Counter And Timer Control

Set and Execute Free Trigger

In free trigger, the device can receive software trigger and hardware trigger to acquire images.

Steps

1. Go to **Acquisition Control** → **Trigger Mode**, and select **On** as **Trigger Mode**.
2. Select **Anyway** as **Trigger Source**.

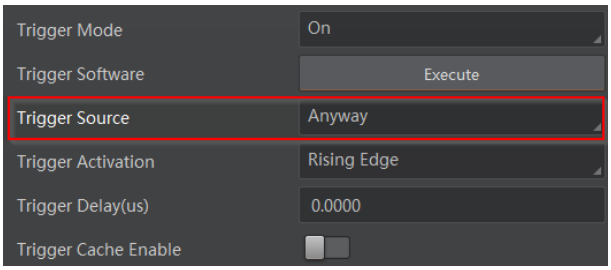


Figure 7-14 Set and Execute Free Trigger

7.4.2 Set Related Parameters about External Trigger Mode

In external trigger mode, you can set five related parameters, including acquisition burst frame count, trigger activation, trigger delay, trigger cache, and trigger debouncer.

Note

- Different trigger sources can set various parameters in external trigger mode.
- When hardware or counter is trigger source, you can set all five parameters mentioned above.
- When software is trigger source, you can set acquisition burst frame count, trigger delay, and trigger cache only.
- When the device is in free trigger, you can set acquisition burst frame count, trigger activation, trigger delay, trigger cache, and trigger debouncer (under certain conditions).

Set Acquisition Burst Frame Count

In external trigger mode, you can set acquisition burst frame count. Go to **Acquisition Control** → **Acquisition Burst Frame Count**, and enter **Acquisition Burst Frame Count** according to actual demands.

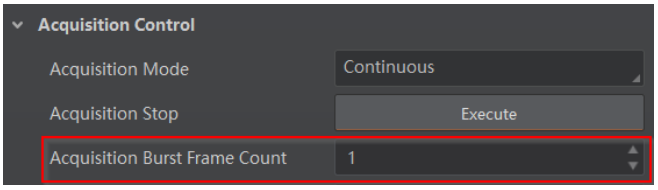


Figure 7-15 Set Acquisition Burst Frame Count

Note

- The range of **Acquisition Burst Frame Count** is from 1 to 1023.
- If **Acquisition Burst Frame Count** is 1, the device is in single frame trigger mode. If **Acquisition Burst Frame Count** is larger than 1, the device is in multi-frame trigger mode.
- If **Acquisition Burst Frame Count** is n, when input 1 trigger signal to the device, the device stops acquiring images after exposing n times and outputting n frame images.

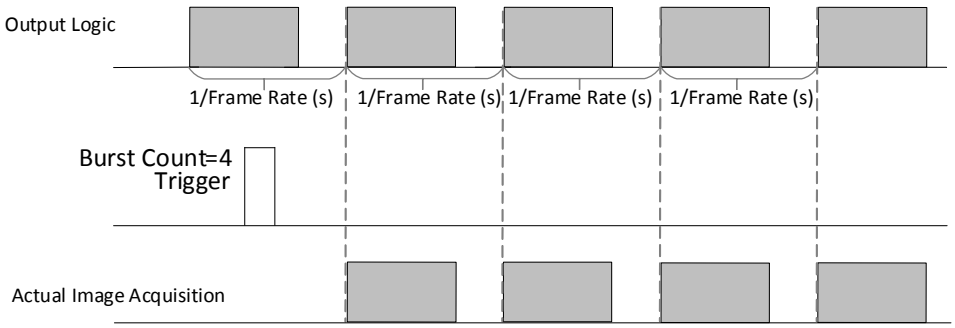


Figure 7-16 Sequence Diagram of Acquisition Burst Frame Count

Set Trigger Activation

The device supports triggering image acquisition in the rising edge, falling edge, level high, level low or any edge of the external signal. Go to **Acquisition Control → Trigger Activation**, and select **Rising Edge**, **Falling Edge**, **Level High**, **Level Low** or **Any Edge** as **Trigger Activation**.

- **Rising Edge**: It means that when the level signal sent by external device is in rising edge, the device receives trigger signal and starts to acquire images.
- **Falling Edge**: It means that when the level signal sent by external device is in falling edge, the device receives trigger signal and starts to acquire images.
- **Level High**: The level high of the trigger signal is valid. As long as the trigger signal is in level high, the device is in image acquisition status.
- **Level Low**: The level low of the trigger signal is valid. As long as the trigger signal is in level low, the device is in image acquisition status.
- **Any Edge**: It means that when the level signal sent by external device is in rising edge, falling edge, level high or level low, the device receives trigger signal and starts to acquire images.

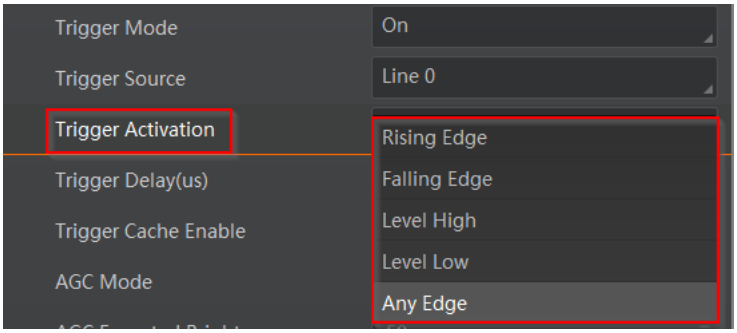


Figure 7-17 Set Trigger Activation

Set Trigger Delay

The trigger delay function allows the device to add a delay between the receipt of trigger signal and the moment the trigger becomes active. Go to **Acquisition Control → Trigger Delay**, and enter **Trigger Delay**, and the unit is μs.

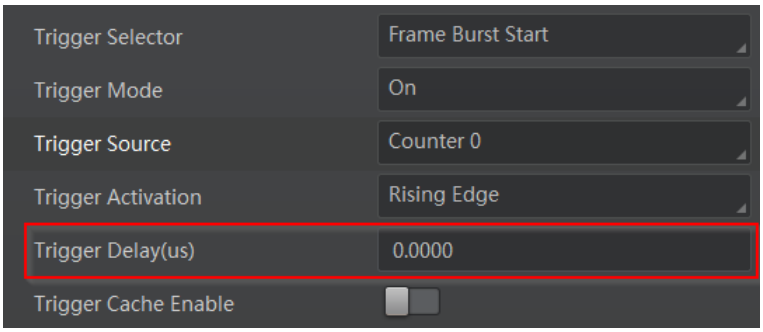


Figure 7-18 Set Trigger Delay

Set Trigger Cache

The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process three trigger signals at most. Go to **Acquisition Control → Trigger Cache Enable**, and enable **Trigger Cache Enable**.

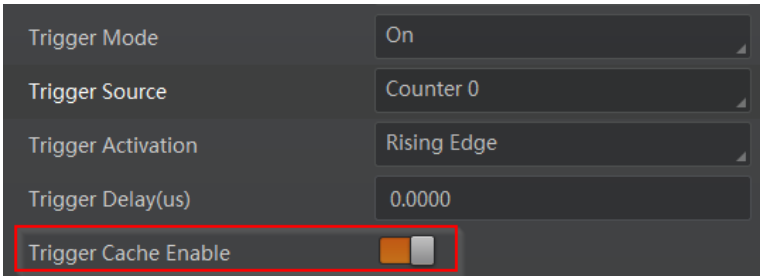


Figure 7-19 Set Trigger Cache

For example, if the device receives the 2nd trigger signal when it is processing the 1st trigger signal, and the result will be different depending on whether **Trigger Cache Enable** is enabled or not.

- The 2nd trigger signal will be filtered without processing if **Trigger Cache Enable** is disabled.

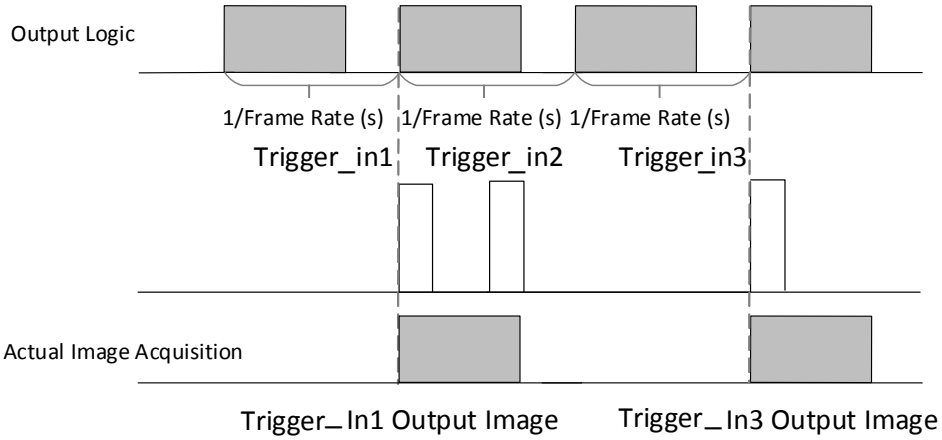


Figure 7-20 Second Frame Filtered

- The 2nd trigger signal will be saved if **Trigger Cache Enable** is enabled.

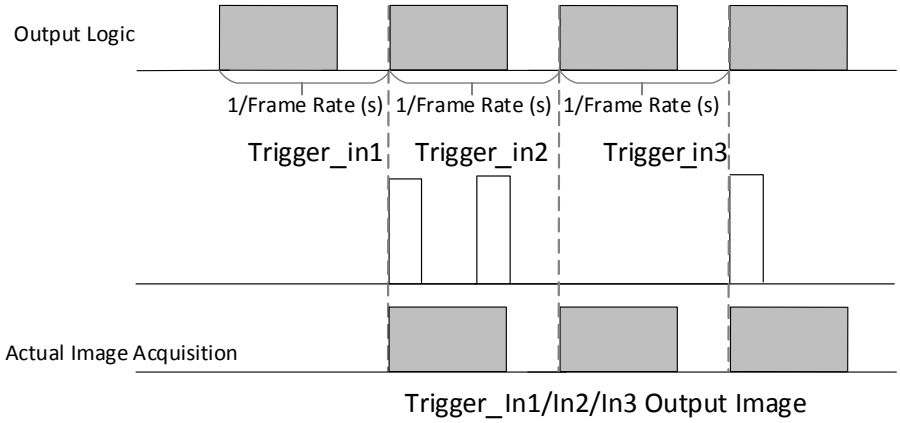


Figure 7-21 Second Frame Created Normally

Note

The two sequence diagrams above use rising edge as trigger activation.

Set Trigger Debouncer

The trigger debouncer function allows the device to filter out unwanted short external trigger signal that is input to the device.

Go to **Digital IO Control** → **Line Debouncer Time**, and enter **Line Debouncer Time** according to actual demands. The range of **Line Debouncer Time** is from 0 μs to 1000000 μs.

Note

If the **Line Debouncer Time** you set is greater than the time of trigger signal, this trigger signal will be ignored.

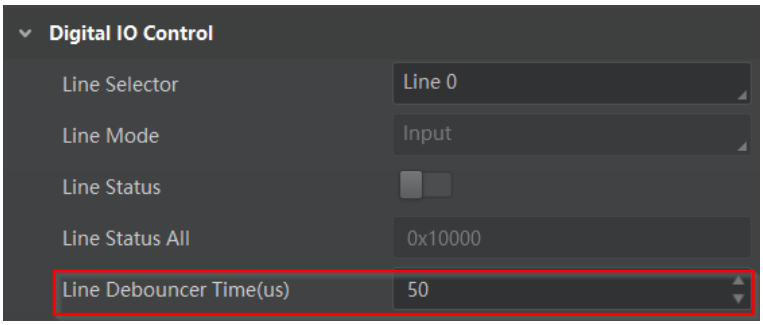


Figure 7-22 Set Trigger Debouncer

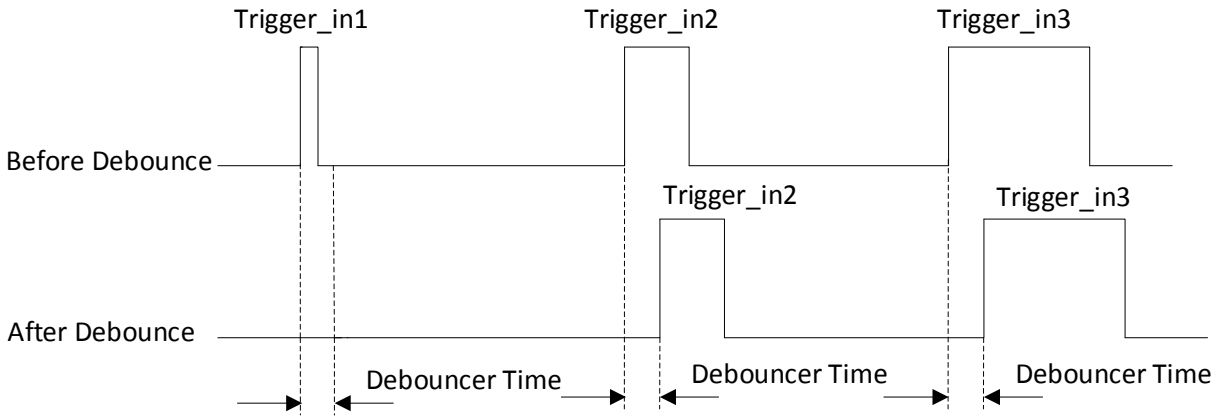


Figure 7-23 Sequence Diagram of Trigger Debouncer

Note

The sequence diagrams above use rising edge as trigger activation.

Chapter 8 Trigger Output

8.1 Select Output Signal

The device has one opto-isolated output (Line 1), and one bi-directional I/O (Line 2) that can be configured as output signal. The steps for configuring Line 2 as output signal as follows.

Steps

1. Go to **Digital IO Control** and select **Line 2** as **Line Selector**.
2. Select **Strobe** as **Line Mode**.

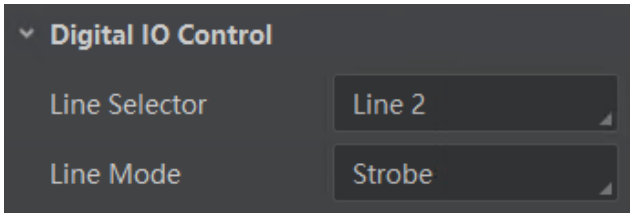


Figure 8-1 Set Line 2 as Output Signal

8.2 Set Output Signal

The output signal of the device is switch signal that can be used to control external devices such as light source, PLC, etc. There are two ways to set output signal, including line inverter and strobe signal.

8.2.1 Enable Line Inverter

The line inverter function allows the device to invert the electrical signal level of an I/O line. Go to **Digital IO Control** → **Line Inverter**, and enable it.

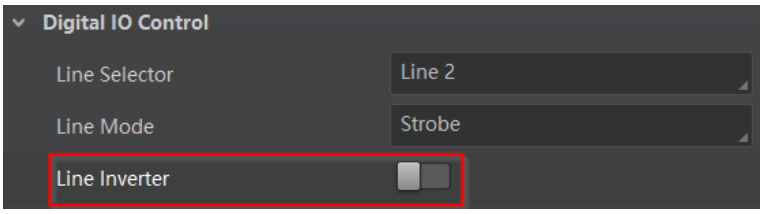


Figure 8-2 Enable Line Inverter

Note

The line inverter function is disabled by default.

8.2.2 Enable Strobe Signal

The strobe signal is used to directly output I/O signal to external devices when the device's event source occurs.

Steps

1. Go to **Digital IO Control** → **Line Source**, and select **Line Source** according to actual demands.
2. Enable **Strobe Enable**.

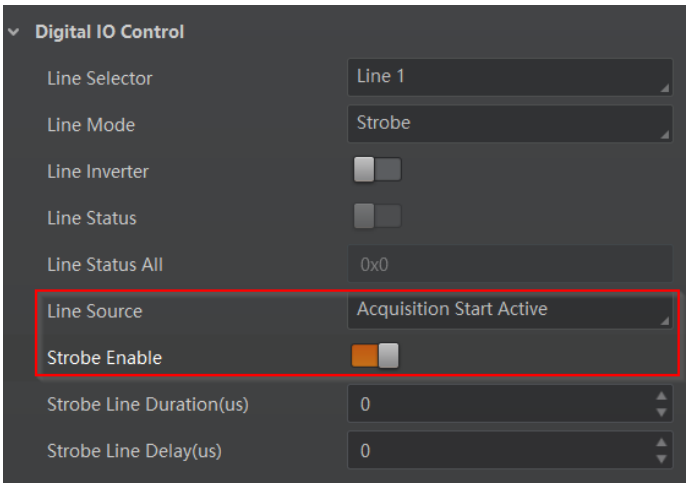


Figure 8-3 Enable Strobe Signal

The supported line sources are as follows:

Table 8-1 Line Source Description

Line Source	Description
Acquisition Start Active	The device outputs signals to external devices when it starts acquiring images.
Acquisition Stop Active	The device outputs signals to external devices when it stops acquiring images.
Frame Burst Start Active	The device outputs signals to external devices when the device's frame burst starts.
Frame Burst End Active	The device outputs signals to external devices when the device's frame burst stops.
Soft Trigger Active	The device outputs signals to external devices when it has a software trigger.
Hard Trigger Active	The device outputs signals to external devices when it has a hardware trigger.
Counter Active	The device outputs signals to external devices when it has a counter trigger.

Line Source	Description
Timer Active	The device outputs signals to external devices when it has a timer trigger.

Note

The specific line sources may differ by device models.

If **Timer Active** is selected as **Line Source**, you can click **Execute** in **Line Trigger Software**, and enter **Strobe Line Delay** according to actual demands. The device will output signals whose duration is configured in **Strobe Line Duration**.

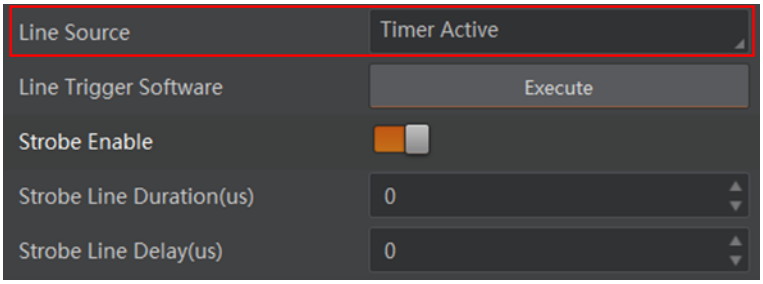


Figure 8-4 Timer Active Parameters

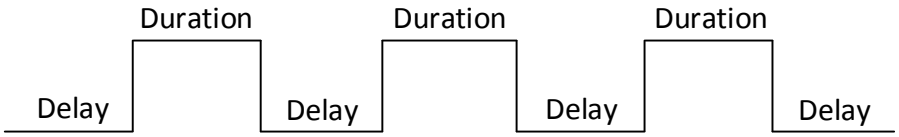


Figure 8-5 Sequence Diagram of Timer Active

Set Strobe Line Duration

After enabling strobe signal, you can set its duration. Go to **Digital IO Control** → **Strobe Line Duration**, and enter it according to actual demands.

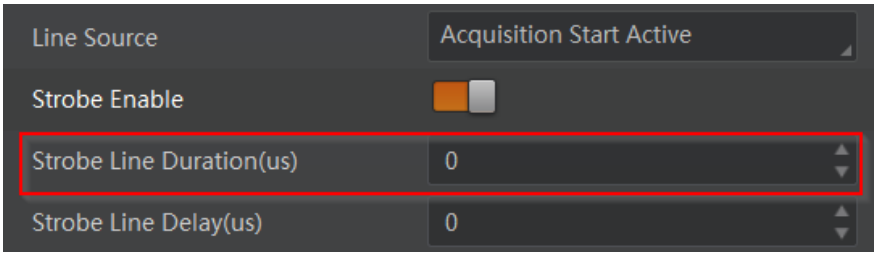


Figure 8-6 Set Strobe Line Duration

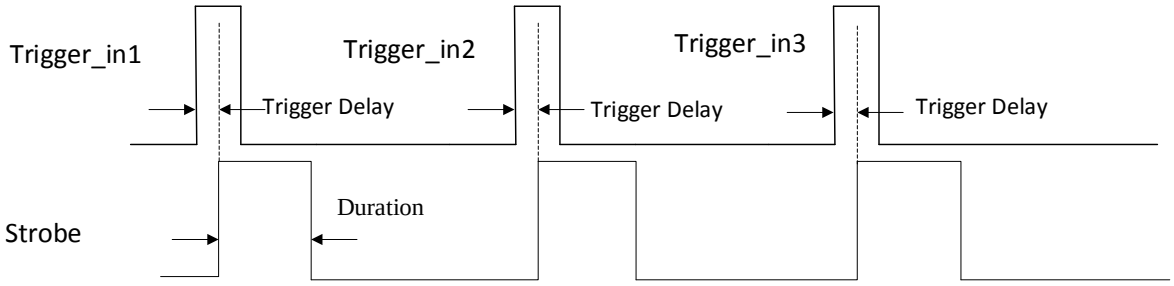


Figure 8-7 Sequence Diagram of Strobe Line Duration

Set Strobe Line Delay

The strobe line delay function allows the device to output signal in a delay time. Go to **Digital IO Control → Strobe Line Delay**, and enter it according to actual demands. The range of **Strobe Line Delay** is from 0 μs to 10000 μs.

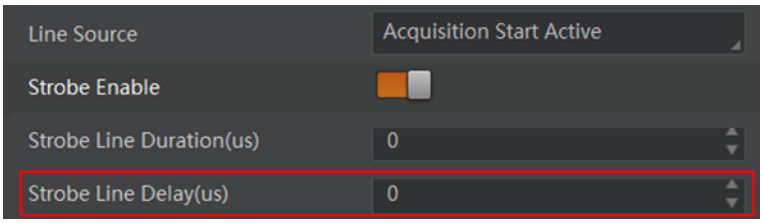


Figure 8-8 Set Strobe Line Delay

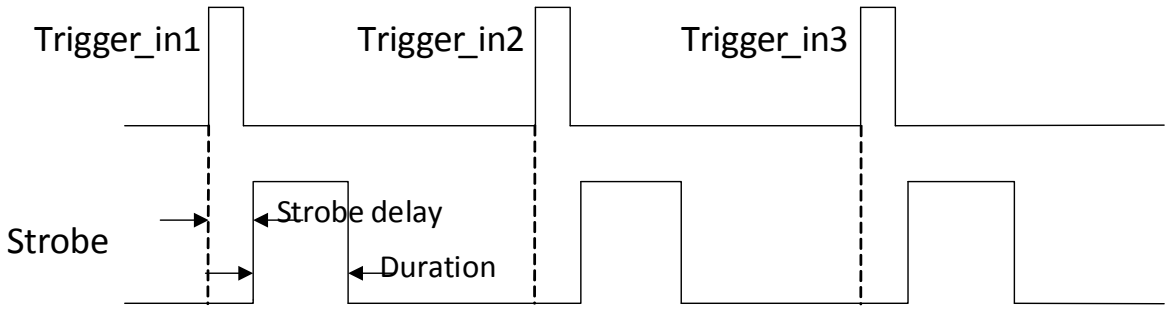


Figure 8-9 Sequence Diagram of Strobe Line Delay

Chapter 9 I/O Electrical Features and Wiring

The device has one opto-isolated input signal (Line 0), one opto-isolated output signal (Line 1), and one bi-directional non-isolated I/O signal (Line 2). This section introduces the I/O electrical features and wiring.

9.1 Input Signal

The device's Line 0 is opto-isolated input signal, and its internal circuit is as follows.

Note

- The maximum input current of Line 0 is 25 mA.
- Make sure that the input voltage is not from 1 VDC to 1.5 VDC as the electric status between these two values are not stable.
- The breakdown voltage is 30 VDC. Keep voltage stable.

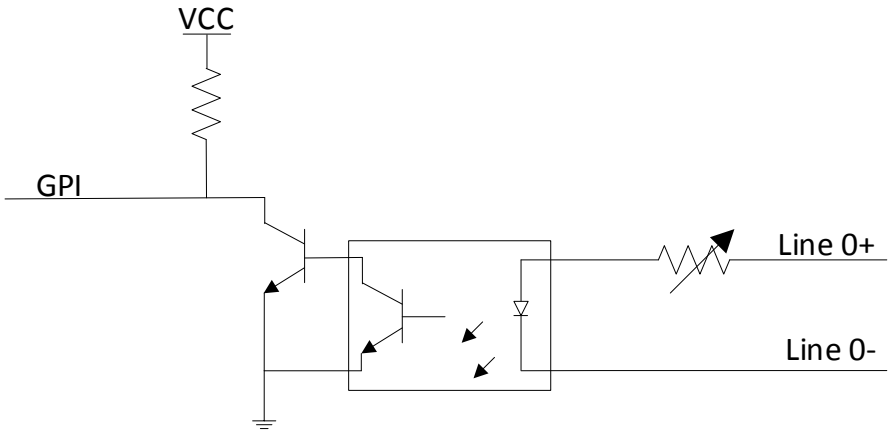


Figure 9-1 Internal Circuit of Input Signal

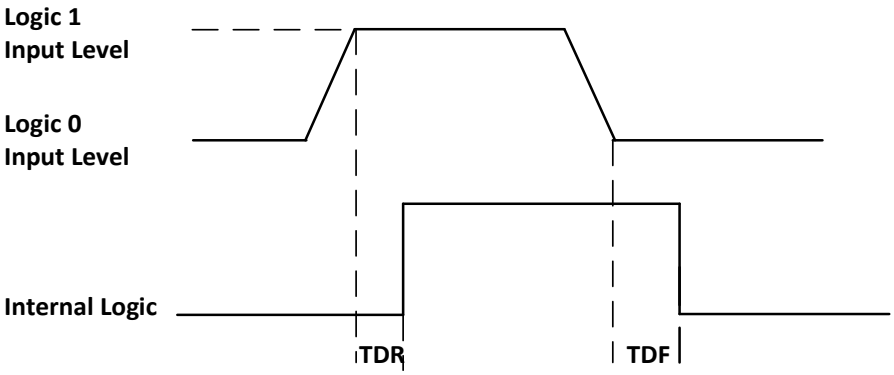


Figure 9-2 Input Logic Level

Table 9-1 Input Electrical Feature

Parameter Name	Parameter Symbol	Value
Input Logic Level Low	VL	0 VDC to 1 VDC
Input Logic Level High	VH	1.5 VDC to 24 VDC
Input Falling Delay	TDF	16.8 μs to 22 μs
Input Rising Delay	TDR	1.8 μs to 4.6 μs

9.2 Output Signal

The device's Line 1 is opto-isolated output signal, and its internal circuit is as follows.

Note

The maximum output current of Line 1 is 25 mA.

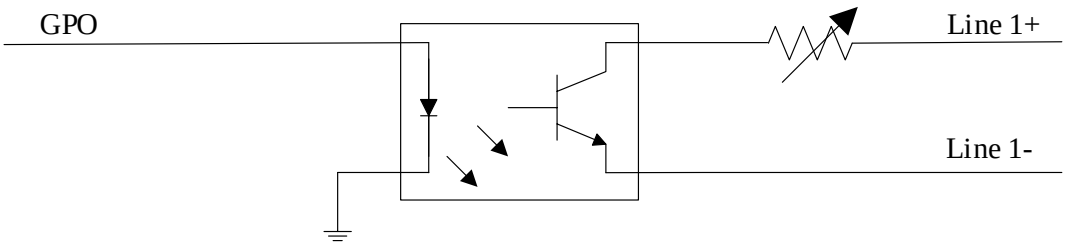


Figure 9-3 Internal Circuit of Output Signal

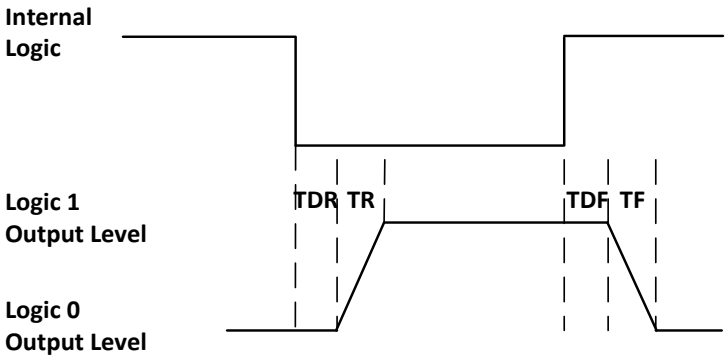


Figure 9-4 Output Logic Level

Opto-isolated output electric feature is shown below when the external voltage is 3.3 VDC and the external resistance is 1 KΩ.

Table 9-2 Output Electrical Feature

Parameter Name	Parameter Symbol	Value
Output Logic Level Low	VL	575 mV

Parameter Name	Parameter Symbol	Value
Output Logic Level High	VH	3.3 VDC
Output Rising Time	TR	8.4 μs
Output Falling Time	TF	1.9 μs
Output Rising Delay	TDR	15 μs to 60 μs
Output Falling Delay	TDF	3 μs to 6 μs

With different external voltage and resistance, the corresponding current and the parameter of output logic level low are shown below.

Table 9-3 Parameters of Output Logic Level Low

External Voltage	External Resistance	VL	Output Current
3.3 VDC	1 KΩ	575 mV	2.7 mA
5 VDC	1 KΩ	840 mV	4.1 mA
12 VDC	2.4 KΩ	915 mV	4.6 mA
24 VDC	4.7 KΩ	975 mV	4.9 mA

9.3 Bi-Directional Signal

The device has one bi-directional non-isolated I/O signal (Line 2), and you can set it as input signal or output signal according to demands. Its internal circuit is as follows.

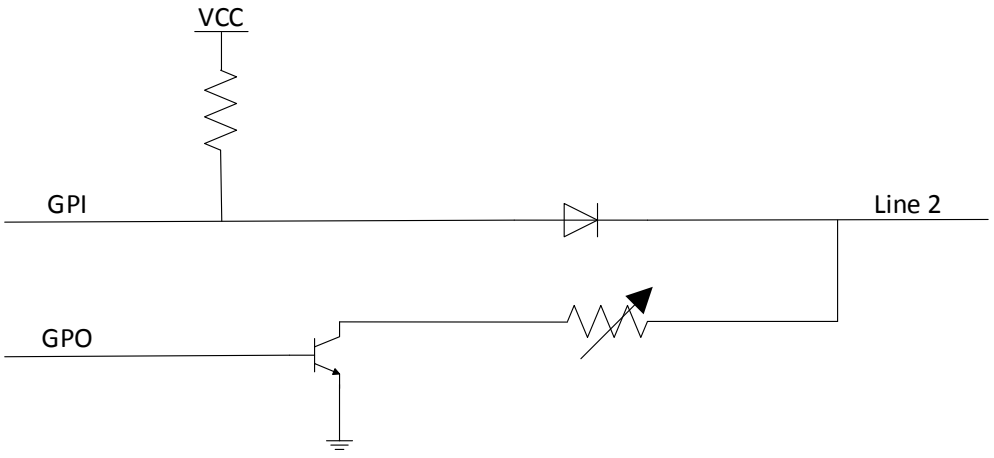


Figure 9-5 Internal Circuit of Bi-Directional Signal

Configured as Input Signal

Note

- Make sure that the input voltage is not from 0.5 VDC to 1.5 VDC as the electric status between these two values are not stable.
- The breakdown voltage is 30 VDC. Keep voltage stable.
- To prevent damage to the GPIO pin, please connect GND first and then input voltage in Line 2.

With the condition of 100 Ω resistance and 5 VDC voltage, the logic level and electrical feature of configuring Line 2 as input signal are shown below.

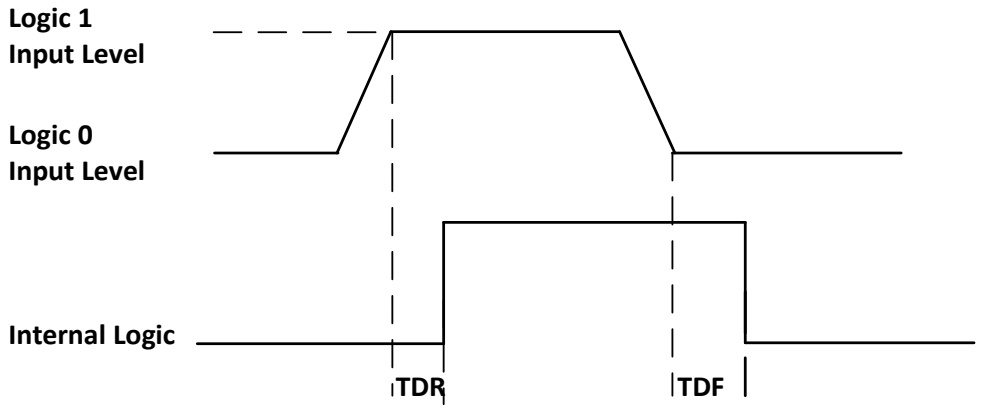


Figure 9-6 Input Logic Level

Table 9-4 Input Electrical Feature

Parameter Name	Parameter Symbol	Value
Input Logic Level Low	VL	0 VDC to 0.5 VDC
Input Logic Level High	VH	1.5 VDC to 24 VDC
Input Falling Delay	TDF	< 1 μs
Input Rising Delay	TDR	< 1 μs

Configured as Output Signal

Note

The maximum current is 25 mA and the output impedance is 40 Ω.

The relation among external voltage, resistance and the output level low is shown below.

Table 9-5 Parameters of Output Logic Level Low

External Voltage	External Resistance	VL (GPIO2)
3.3 VDC	1 KΩ	160 mV
5 VDC	1 KΩ	220 mV
12 VDC	1 KΩ	460 mV
24 VDC	1 KΩ	860 mV
30 VDC	1 KΩ	970 mV

When the voltage of external resistance (1 KΩ) is pulled up to 5 VDC, the logic level and electrical feature of configuring Line 2 as output are shown below.

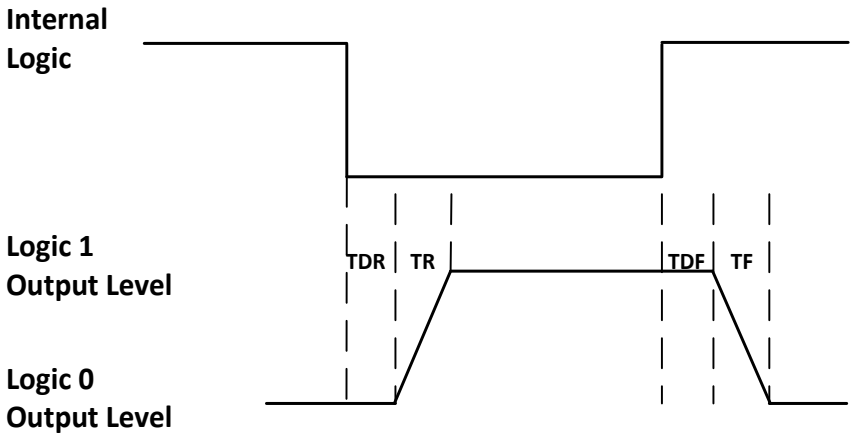


Figure 9-7 Output Logic Level

Table 9-6 Output Electrical Feature

Parameter Name	Parameter Symbol	Value
Output Logic Level Low	VL	220 mV
Output Logic Level High	VH	4.75 VDC
Output Rising Time	TR	0.06 μs
Output Falling Time	TF	0.016 μs
Output Rising Delay	TDR	0 μs to 4 μs
Output Falling Delay	TDF	< 1 μs

9.4 Input Signal Wiring

The input signal wiring is shown below when the device uses Line 0 as trigger source in external trigger mode.

Note

Input signal wiring may differ by the external device type.

PNP Device

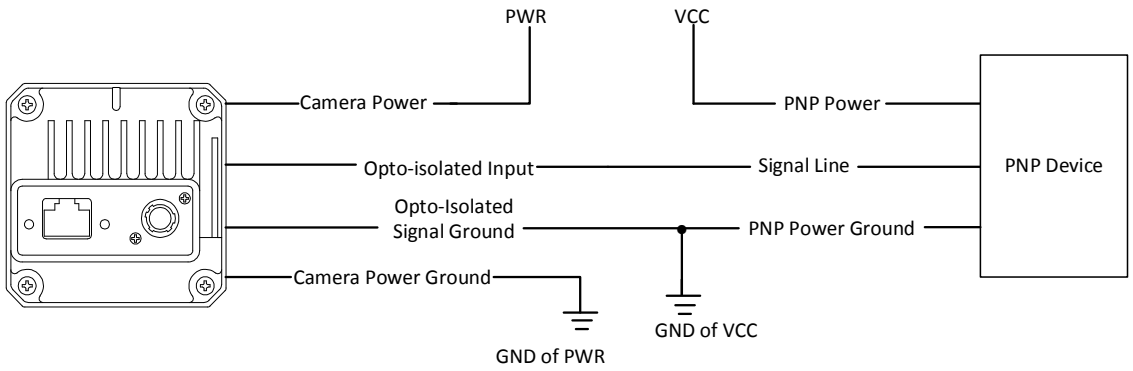


Figure 9-8 Input Signal Connects to PNP Device

NPN Device

- If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
- If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

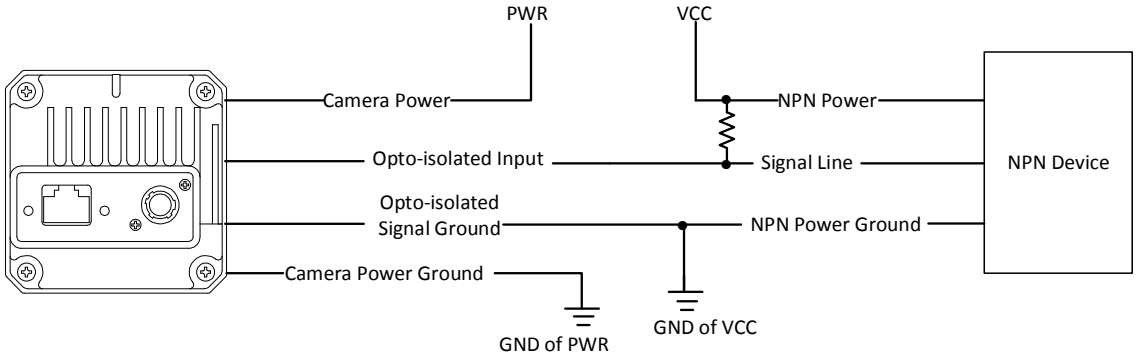


Figure 9-9 Input Signal Connects to NPN Device

Switch

If the VCC of switch is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ resistor to protect circuit.

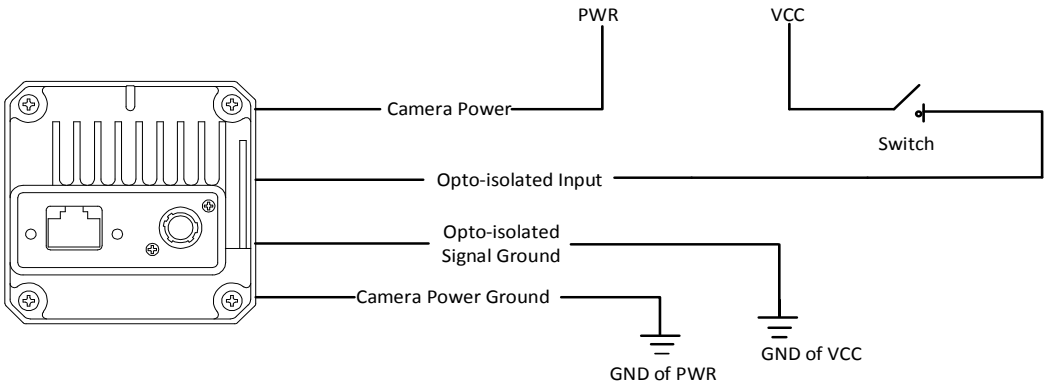


Figure 9-10 Input Signal Connects to Switch

9.5 Output Signal Wiring

The output signal wiring is shown below when the device uses Line 1 as output signal.

Note

Output signal wiring may differ by the external device type.

PNP Device

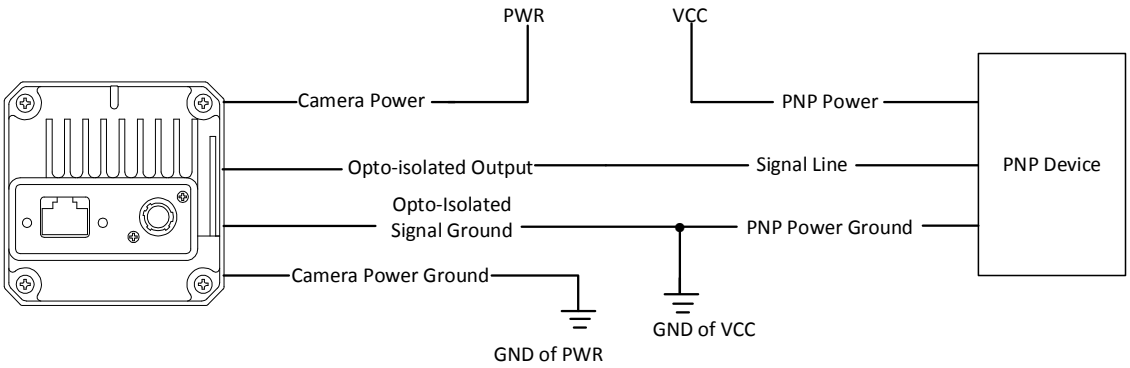


Figure 9-11 Output Signal Connects to PNP Device

NPN Device

- If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
- If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

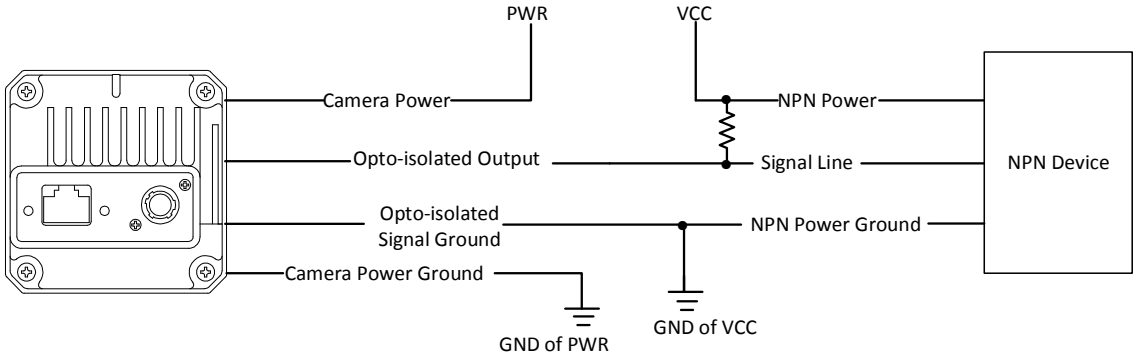


Figure 9-12 Output Signal Connects to NPN Device

9.6 Bi-Directional Signal Wiring

The device's Line 2 can be used as input signal and output signal.

Configured as Input Signal

The input signal wiring is shown below when the device's Line 2 is configured as input signal.

Note

Input signal wiring may differ by the external device type.

PNP Device

It is recommended to use 330 Ω pull-down resistor.

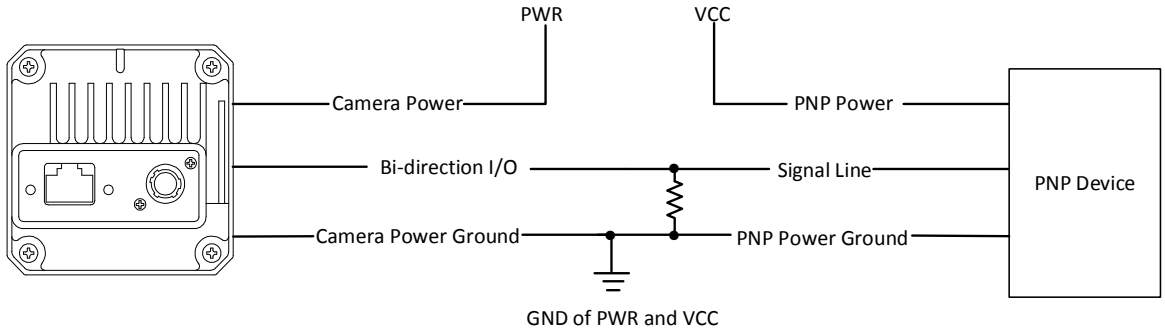


Figure 9-13 Input Signal Connects to PNP Device

NPN Device

- If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
- If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

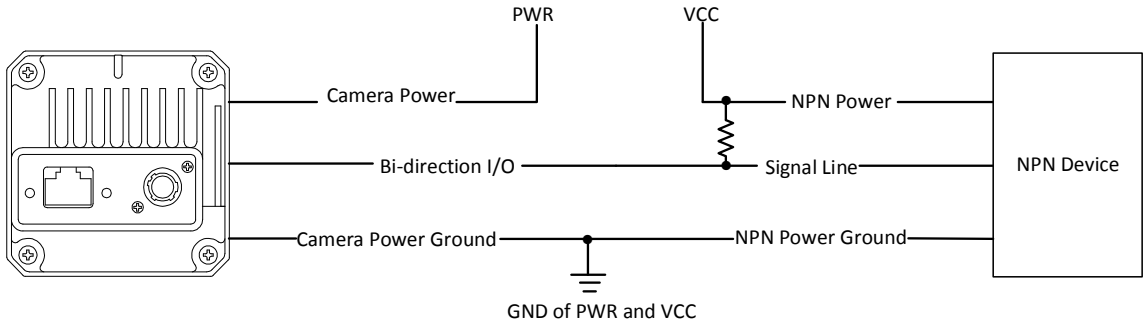


Figure 9-14 Input Signal Connects to NPN Device

Switch

The switch value can provide low electrical level to trigger line 2.

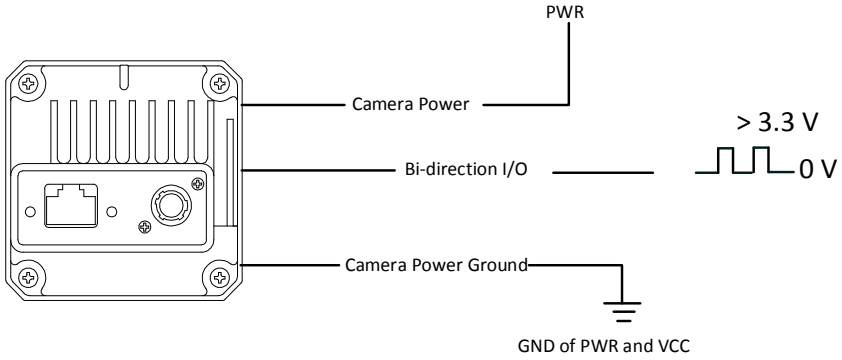


Figure 9-15 Input Signal Connects to Switch

Configured as Output Signal

The output signal wiring is shown below when the device's Line 2 is configured as output signal.

Note

Output signal wiring may differ by the external device type.

PNP Device

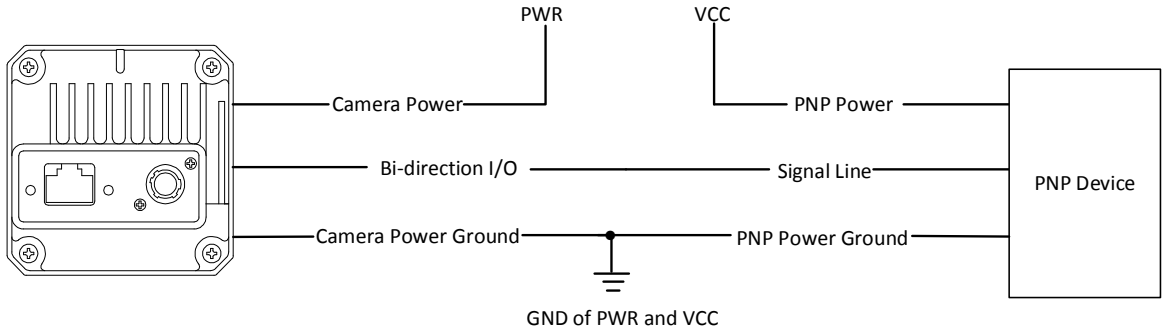


Figure 9-16 Output Signal Connects to PNP Device

NPN Device

- If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
- If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

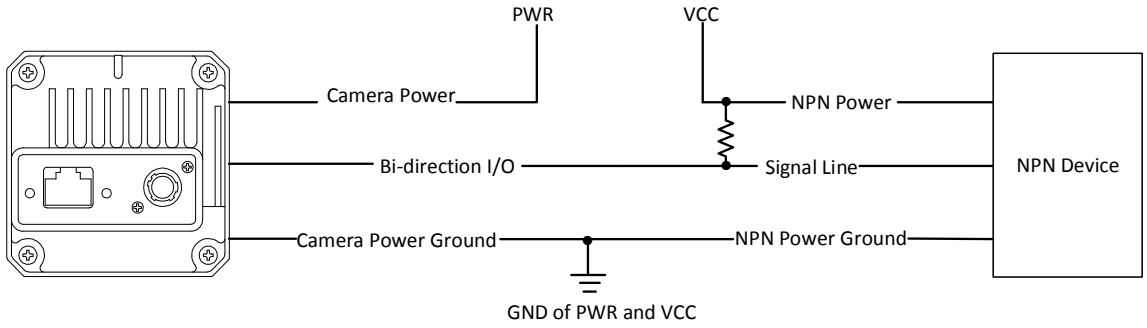


Figure 9-17 Output Signal Connects to NPN Device

Chapter 10 Image Debugging

10.1 Set Image Detail Strength

Image detail function improves the recognizability of the image by increasing the sharpness of edges of objects in the image. Go to **Analog Control** → **DDE Detail Strength**, and set **DDE Detail Strength** according to actual demands.
The higher **DDE Detail Strength** is configured, the more obvious the image details will be, but the noise will be relatively more accordingly.
The lower **DDE Detail Strength** is configured, the more blurred the image details will be, and the noise will be reduced accordingly.

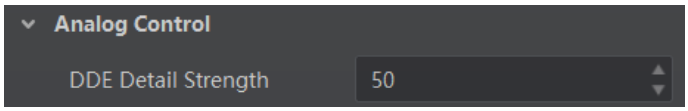


Figure 10-1 Set Image Detail Strength

10.2 Digital Noise Reduction

Digital noise reduction uses digital three-dimensional filtering technology based on space and time, which can effectively eliminate noise in videos and images. Digital noise reduction can be performed on single-frame or multi-frame images to improve image quality and clarity. Digital noise reduction includes spatial noise reduction and temporal noise reduction.

10.2.1 Set Spatial Noise Reduction

Spatial noise reduction performs noise reduction process on the current frame image. Go to **Analog Control** → **DNR Spectral Level**, and set **DNR Spectral Level** according to actual demands.
The higher spectral level is configured, the less noise in the image, but the more blurred the image details. The lower spectral level is configured, the more noise in the image, but the more obvious the image details.

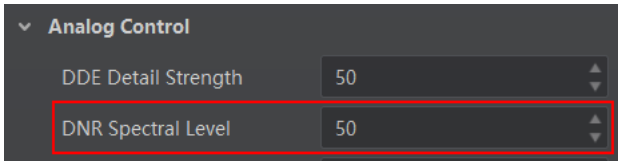


Figure 10-2 Set Spatial Noise Reduction

10.2.2 Set Temporal Noise Reduction

Temporal noise reduction performs noise reduction process on continuous multi-frame images. Go to **Analog Control → DNR Temporal Level**, and set **DNR Temporal Level** according to actual demands.
The higher temporal level is configured, the less noise in the image, but the more blurred the image details. The lower temporal level is configured, the more noise in the image, but the more obvious the image details.

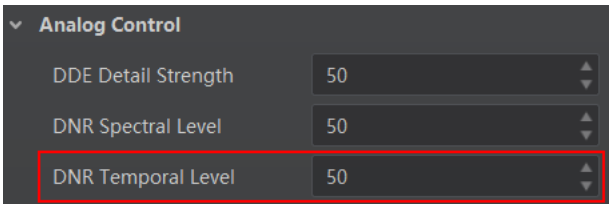


Figure 10-3 Set Temporal Noise Reduction

10.3 Set Palettes Mode

The palettes mode improves the recognizability of the image content in some occasions by overlaying grayscale value of images collected by the device.
The palettes mode has 15 types, including White Hot, Black Hot, Fusion 1, etc. Go to **Analog Control → Palettes Mode**, and set **Palettes Mode** according to actual demands.

Note

The grayscale value of the image captured by the device is related to the acquisition distance from the device to the object. Different grayscale values will present different pseudo-color images. Please refer to the actual display for specific pseudo-color images.

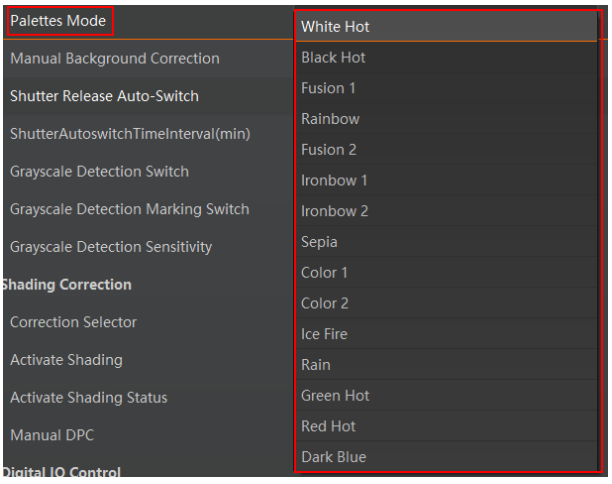


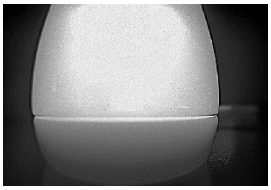
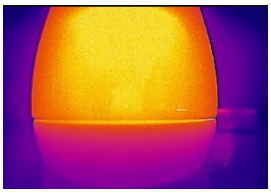
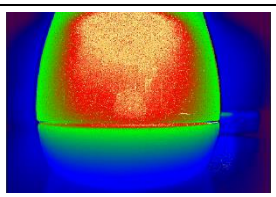
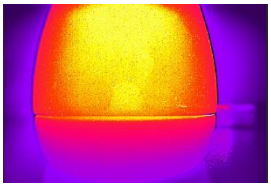
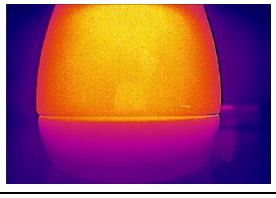
Figure 10-4 Set Palettes Mode

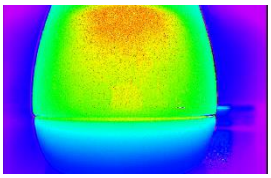
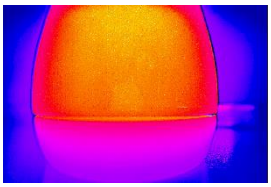
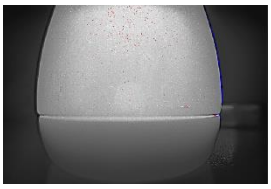
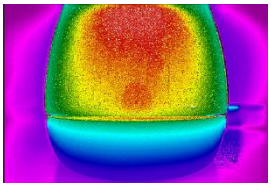
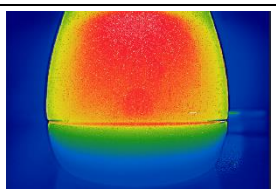
Here we take 100 °C hot water as the target object to introduce different palettes modes and pseudo-color images.

Note

The default palettes mode of the device is **White Hot**.

Table 10-1 Palettes Mode Description

No.	Palettes Mode	Pseudo-Color Images
1	White Hot	
2	Black Hot	
3	Fusion 1	
4	Rainbow	
5	Fusion 2	
6	Ironbow 1	
7	Ironbow 2	

No.	Palettes Mode	Pseudo-Color Images
8	Sepia	
9	Color 1	
10	Color 2	
11	Ice Fire	
12	Rain	
13	Green Hot	
14	Red Hot	
15	Dark Blue	

10.4 Set Background Correction

Background correction can correct degraded images such as noise, light spots, etc. It is necessary to use the black body (object with temperature differences) to collect vignetting data, and then perform background correction by going to **Analog Control → Manual Background Correction**.

Before You Start

- The device is powered on for more than 45 minutes.
- Prepare a high temperature black body at 70 °C or a low temperature black body at 10 °C.

Note

Because the use of objects with temperature requires a certain temperature difference with the device to collect vignetting data, if there is no black body, you can use the palm of your hand or an object such as a clear cloudless sky of about -10 °C to 20 °C instead.

Steps

1. Adjust the device's focus to about 2 m to make sure that collected images are clear.
2. Aim the device to a black body or other objects to make sure that the device's FOV is totally covered.

Note

Avoid contacting the device's lens with the black body or other objects in case of data exception.

3. Perform the image correction by refer to section ***Set Shutter Control***, and the process is finished when the device generates a baffle sound.
4. Go to **Analog Control → Manual Background Correction**, and click **Execute** in **Manual Background Correction** to perform background correction.

Figure 10-5 Background Correction

Note

Avoid touching and moving the device when it is collecting images in case of data accuracy.

10.5 Set Shutter Control

If a degraded image such as noise, light spots, etc. appears in the process of collecting images, you can use auto shutter control conditions or perform manual shutter control to

quickly correct the image. Compared with background correction, using shutter control to correct images is more flexible.
When performing shutter correction, the baffle will fall between the infrared lens and the detector. At this time, the device generates a baffle sound, and collected images will freeze instantly to complete the image correction. Go to **Analog Control → Shutter Release Auto-Switch**, and set **Shutter Release Auto-Switch** according to actual demands.

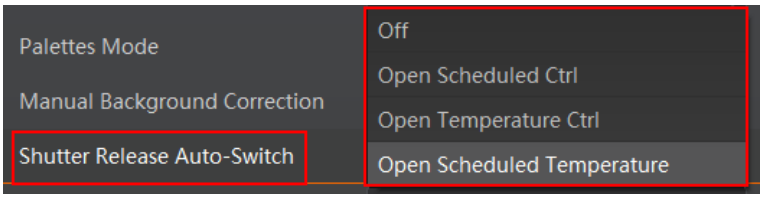


Figure 10-6 Shutter Control

Table 10-2 Shutter Release Auto-Switch

Shutter Release Auto-Switch	Description
Off	Click **Execute** in **Manual Shutter Correction** when the device starts to collect images, and the device generates a baffle sound and image correction is finished.
Open Scheduled Ctrl	Set **Shutter Autoswitch Time Interval (min)** when the device starts to collect images. If the configured time interval reaches, the device generates a baffle sound and image correction is finished.
Open Temperature Ctrl	Whenever the temperature of the collected image changes by 1 °C up and down, the device generates a baffle sound and image correction is finished.
Open Scheduled Temperature	Set **Shutter Autoswitch Time Interval (min)** when the device starts to collect images. If the configured time interval reaches or the temperature of the collected image changes by 1 °C up and down, the device generates a baffle sound and image correction is finished.

10.6 Set Grayscale Detection

The grayscale detection sensitivity corresponds to the infrared thermal radiation intensity of each pixel. The grayscale detection can highlight the area with the grayscale value greater than the preset value.

Steps

1. Go to **Analog Control → Grayscale Detection Switch**, and enable it.
2. Enable **Grayscale Detection Marking Switch**, and enter **Grayscale Detection Sensitivity**.

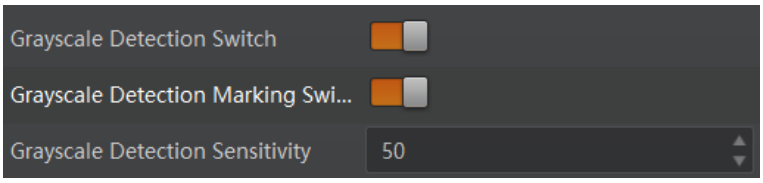


Figure 10-7 Set Grayscale Detection

10.7 View Resolution

Note

The device displays the image with max. resolution by default.

Go to **Image Format Control**, and you can view resolution by reading **Width Max** and **Height Max**.

Width Max stands for the max. pixels per inch in width direction, and **Height Max** stands for the max. pixels per inch in height direction.

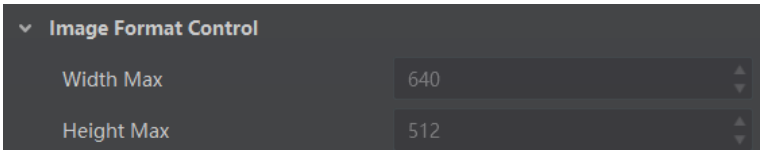


Figure 10-8 View Resolution

10.8 Set ROI

If you are only interested in a certain region of the image, you can set a Region of Interest (ROI) for the device.

Note

- The device currently supports one ROI only, and you can select **Region 0** as **Region Selector**.
- Region of interest can be set only when you stop real-time acquisition.

Go to **Image Format Control** → **Region Selector**, and enter **Width**, **Height**, **Offset X**, and **Offset Y**.

Note

The **Width** plus **Offset X** should not be larger than **Width Max**, and **Height** plus **Offset Y** should not be larger than **Height Max**.

- **Width**: It stands for horizontal resolution in ROI area.
- **Height**: It stands for vertical resolution in ROI area.
- **Offset X**: It refers to the horizontal coordinate of the upper left corner of the ROI.

- **Offset Y**: It refers to the vertical coordinate of the upper left corner of the ROI.

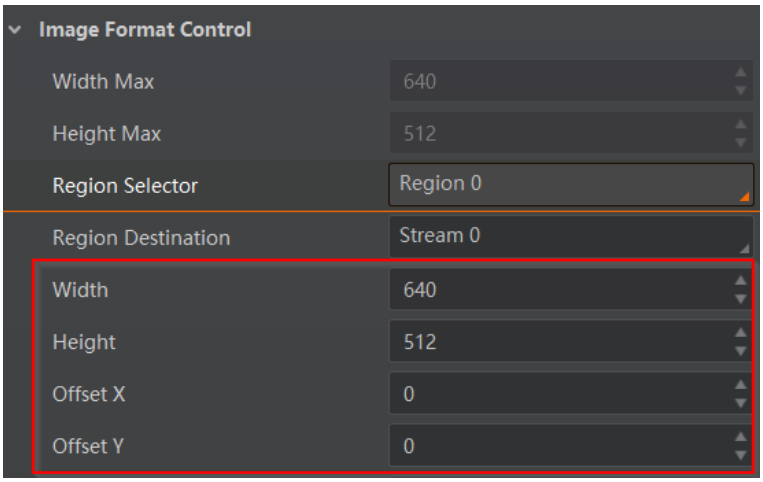


Figure 10-9 Set ROI

10.9 Set Pixel Format

This function allows you to set the pixel format of the image data transmitted by the device. Go to **Image Format Control** → **Pixel Format**, and set **Pixel Format** according to actual demands.

Note

The specific pixel formats may differ by device models

Table 10-3 Pixel Format and Pixel Size

Pixel Format	Pixel Size (Bits/Pixel)
Mono 8	8
Mono 12/14, YUV 422 (YUYV) Packed	16

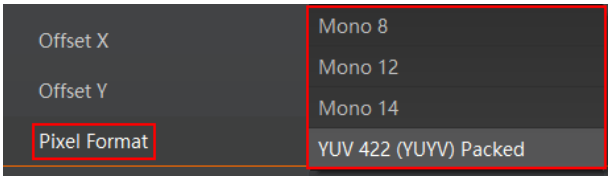


Figure 10-10 Set Pixel Format

10.10 Set Defective Pixel Correction

A single pixel in the device sensor cannot respond to infrared radiation normally, which is

called an invalid pixel. It is reflected in the infrared image as bright and dark spots whose coordinates do not change with the target. Defective pixel correction can eliminate these bright and dark spots. Follow steps below to set the correction.

Steps

1. Go to **Shading Correction** → **Manual DPC**, and set **On** or **Off** as **Manual DPC**.

Note

Off means auto defective pixel correction, and **On** means manual defective pixel correction.

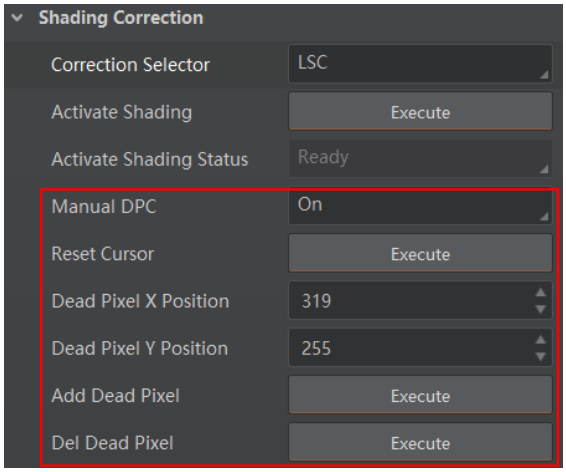


Figure 10-11 Set Defective Pixel Correction

2. Move cursor on defective pixels of the image, and view the corresponding coordinates on the bottom side of the client software main window.

Note

You can click on the bottom side and check position to display coordinates if the client software does not display.

3. Enter coordinates of the pixel in **Dead Pixel X Position** and **Dead Pixel Y Position**, and view the pixel in the image.

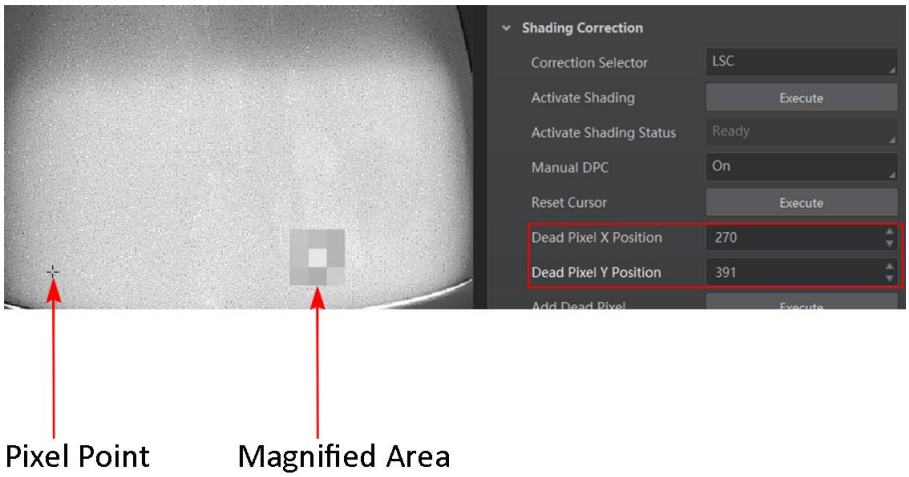


Figure 10-12 Defective Pixel X/Y Position

4. (Optional) Click **Execute** in **Reset Cursor** to let the cursor return to central coordinates.
5. Repair or restore defective pixel.

- Repair defective pixel: Click **Execute** in **Add Dead Pixel** to repair selected defective pixels.
- Restore defective pixel: Click **Execute** in **Del Dead Pixel** to restore repaired defective pixels.

10.11 Set AGC Mode

In order to adapt to differentiated scenes and get clearer images, the AGC mode is divided into two types: manual adjustment and auto adjustment. After selecting different adjustment modes, the brightness value and contrast value of the adjustment mode can be set according to the environmental requirements.

Note

It is recommended to use the auto mode to adjust the image. Because in the same brightness and contrast value, the image quality of the auto adjustment is better than the manual adjustment.

Manual Mode

Steps

1. Go to **Acquisition Control** → **AGC Mode**, and select **Manual Mode** as **AGC Mode**.
2. Enter AGC Expected Brightness and AGC Expected Contrast according to actual demands.

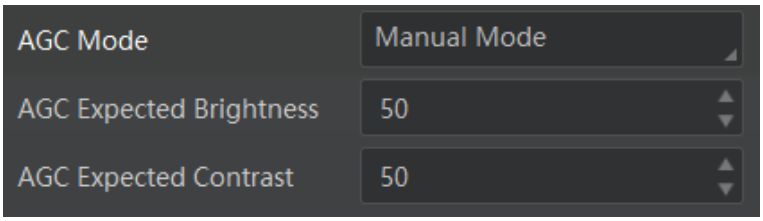


Figure 10-13 Manual Mode

Auto Mode

Note

Auto adjustment is to process the image on the basis of manual adjustment to optimize the brightness value and contrast value of the image.

Steps

1. Go to **Acquisition Control** → **AGC Mode**, and select **Auto Mode** as **AGC Mode**.
2. Enter AGC Expected Brightness and AGC Expected Contrast according to actual demands.

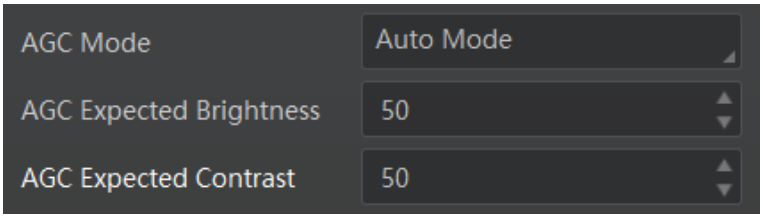


Figure 10-14 Auto Mode

Chapter 11 Other Functions

11.1 Device Control

Note

The specific device control parameters may differ by device models.

In **Device Control**, you can view device information, edit device name, reset device, etc. The specific parameters in **Device Control** are shown below.

Table 11-1 Parameter Description

Parameter	Read/Write	Description
Device Type	Read only	It is the device type.
Device Scan Type	Read only	It is the scan type of the device's sensor.
Device Vendor Name	Read only	It is the name of the manufacturer of the device.
Device Model Name	Read only	It is the model of the device.
Device Manufacturer Info.	Read only	It is the manufacturer information about the device.
Device Version	Read only	It is the APP version of the device.
Device Firmware Version	Read only	It is the FPGA version of the device.
Infrared Version	Read only	It is the APP version of the device module.
Infrared Firmware Version	Read only	It is the FPGA version of the device module.
Device Serial Number	Read only	It is device's serial number.
Device ID	Read only	It is the device's ID.
Device User ID	Read and write	Device name and it is empty by default. You can set according to your preference. ● If User ID is empty, the client software displays the device model. ● If you set it, the client software displays the User ID you set.
Device Uptime (s)	Read only	It is the period of time when device is powered up.
Board Device Type	Read only	It is the device type.

Parameter	Read/Write	Description
Device Connection Selector	Read and write	It selects which Connection of the device to control.
Device Connection Speed (Mbps)	Read only	It indicates the speed of transmission of the specified connection.
Device Link Selector	Read and write	It selects which Link of the device to control
Device Link Speed (Mbps)	Read only	It indicates the speed of transmission negotiated on the specified link.
Device Link Connection Count	Read only	It returns the number of physical connection of the device used by a particular link.
Device Link Heartbeat Mode	Read and write	It activates or deactivates the link's heartbeat.
Device Stream Channel Count	Read only	It indicates the number of streaming channels supported by the device.
Device Stream Channel Selector	Read and write	It selects the stream channel to control.
Device Stream Channel Type	Read only	It reports the type of the stream channel.
Device Stream Channel Link	Read only	It is the index of device's Link to use for streaming the specified stream channel.
Device Stream Channel Endianness	Read only	It is the endianness of multi-byte pixel data for this stream.
Device Stream Channel Packet Size (B)	Read and write	It specifies the stream packet size, in bytes, to send on the selected channel for a transmitter or specifies the maximum packet size supported by a receiver.
Device Event Channel Count	Read only	It indicates the number of event channels supported by the device.
Device Character Set	Read only	It is character set used by the strings of the device's bootstrap registers.
Device Temperature Selector	Read and write	It selects device component to view its temperature. Currently, only sensor can be selected only.
Device Temperature	Read only	It displays the temperature of selected components in **Device Temperature Selector**.
Find Me	Read and	The function of finding me is executed. Click

Parameter	Read/Write	Description
	write	**Execute** to find the currently operating device.
Device Max Throughput (Kbps)	Read only	It is max. bandwidth of the data that can be streamed out of the device.
Device PJ Number	Read Only	It is the device's project number.

11.2 Embed Information into Image

The device supports embedding information into image data. The information will be embedded into the image according to the enabling condition of each type of information in the order of the image embedding information listed in the table below.

Table 11-2 Image Embedding Information

Image Embedding Information	Byte	Data Format
Timestamp	4	Refer to figure 11-1
Brightness Info	4	Ranges from 0 to 4095
Frame Counter	4	Ranges from 0 to 2^{32}-1
Ext Trigger Count	4	Ranges from 0 to 2^{32}-1
Line Input Output	4	The 1st byte is input, and each bit corresponds to 1 input. The 2nd byte is output, 3rd and 4th bytes are reserved.
Width	4	Ranges from 0 to 2^{32}-1
Height	4	Ranges from 0 to 2^{32}-1
Offset X	4	Ranges from 0 to 2^{32}-1
Offset Y	4	Ranges from 0 to 2^{32}-1
Pixel Format	4	Ranges from 0 to 2^{32}-1
ROI Position	8	The starting coordinates occupy two bytes each with the column coordinates at the front and the row coordinates at the back. The length and width coordinates each occupy two bytes.

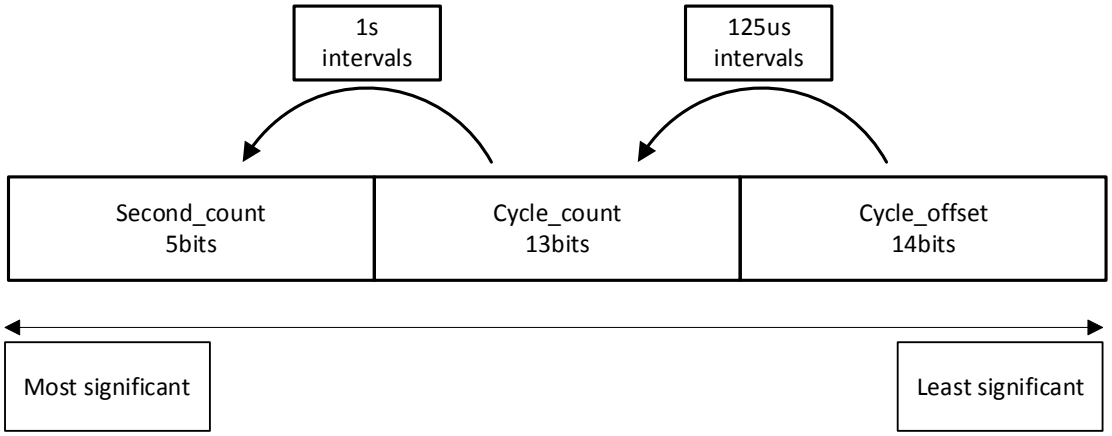


Figure 11-1 Data Format of Timestamp

Note

Width, **Height**, **Offset X**, **Offset Y** and **Pixel Format** are image embedding information that the device supporting Chunk function has.

There are two ways to embed information into the image, including watermark function and Chunk function.

Watermark Settings

Steps

1. Go to **Image Format Control** → **Embedded Image Info Selector**, and select **Embedded Image Info Selector** according to actual demands.

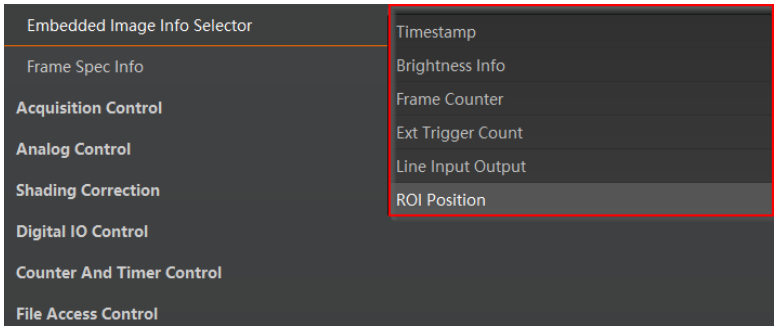


Figure 11-2 Select Embedded Image Info Selector

2. Enable **Frame Spec Info** to add watermark into images.

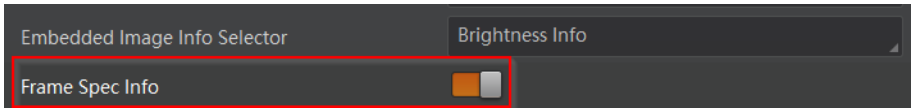


Figure 11-3 Enable Frame Spec Info

3. (Optional) Repeat steps above to add multiple watermarks.

4. Click on the control toolbar of the client software to view specific watermark information.

Note

The watermark is embedded into the starting position of the first line of image data. If the ROI is small and the first line of image data is insufficient to embed information, the information will be embedded into the second line of image data.

Chunk Settings

Steps

1. Go to **Chunk Data Control** → **Chunk Mode Active**, and **Chunk Mode Active**.

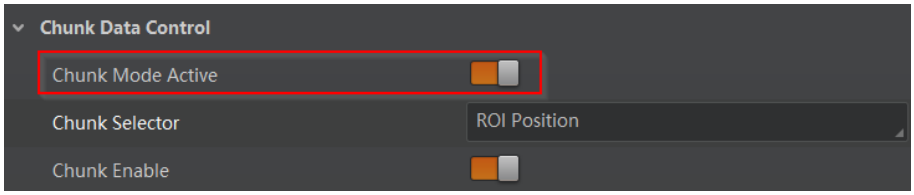


Figure 11-4 Enable Chunk Mode Active

2. Select **Chunk Selector** according to actual demands.

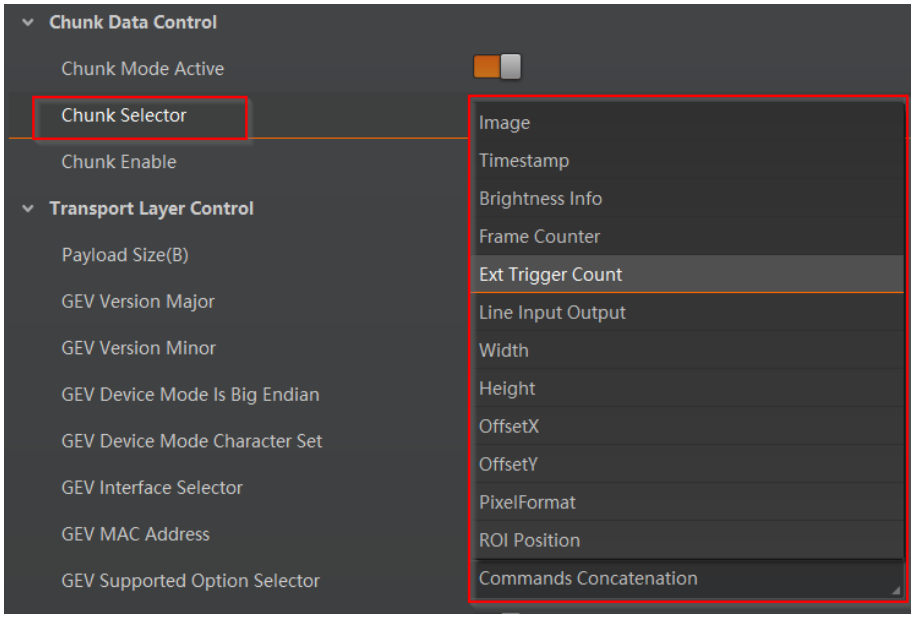


Figure 11-5 Select Chunk Selector

3. Enable **Chunk Enable** to embed information into the image.

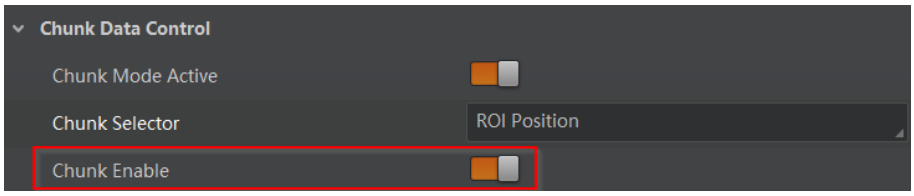


Figure 11-6 Chunk Enable

4. (Optional) Repeat steps above to add multiple Chunk information types.
5. Click on the control toolbar of the client software to view specific information.

11.3 File Access Control

The file access function can import or export the device's feature files and save them in mfa format. The supported feature files include User Set 1, User Set 2, and User Set 3.

Steps

1. Select a device in the device list, and click to open the file access dialogue box.

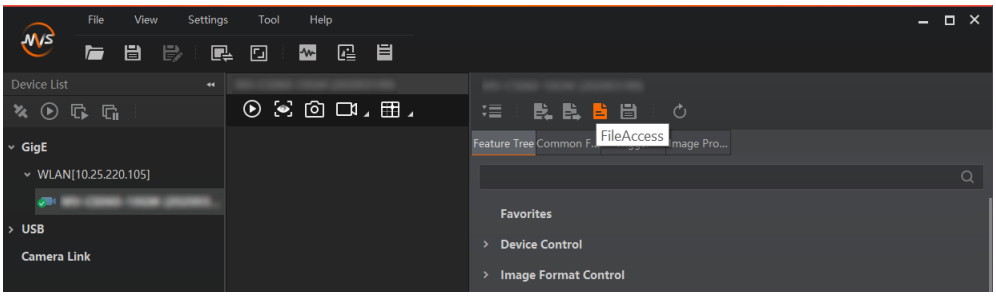


Figure 11-7 File Access

2. Select **Device Feature** and click **Import** or **Export**.

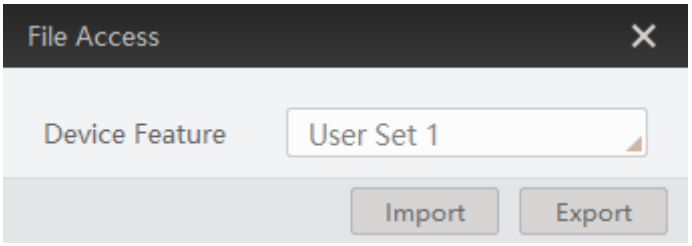


Figure 11-8 Import or Export

3. Select a mfa file from local PC to import or select a saving path and enter file name to save and export.

Note

- After device feature file is imported, you should load it in **User Set Control** if use is needed.
- Importing and exporting the device feature among the same model of devices are supported.

11.4 Event Control

The event control can record events happen to the device and allow you to view them.

Steps

1. Go to **Event Control** → **Event Selector**, and select **Event Selector** according to actual demands.

Note

The specific events may differ by device models.

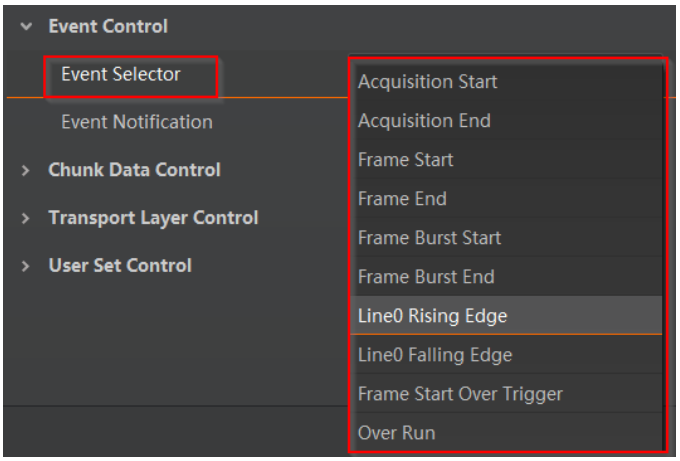


Figure 11-9 Event Selector

2. Select **Notification On** as **Event Notification** to output event.

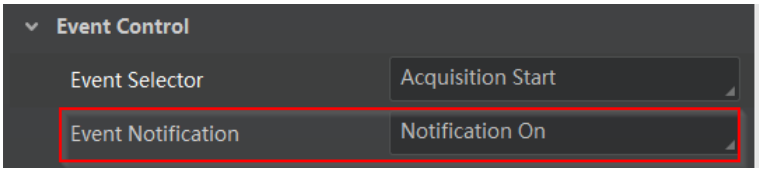


Figure 11-10 Set Event Control

3. Right click the connected device and click **Event Monitor**.

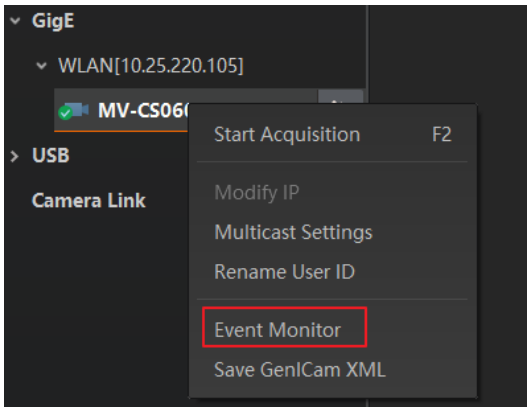


Figure 11-11 Event Monitor

4. Check **Messaging Channel Event**, and view the specific event after the device starts live view.

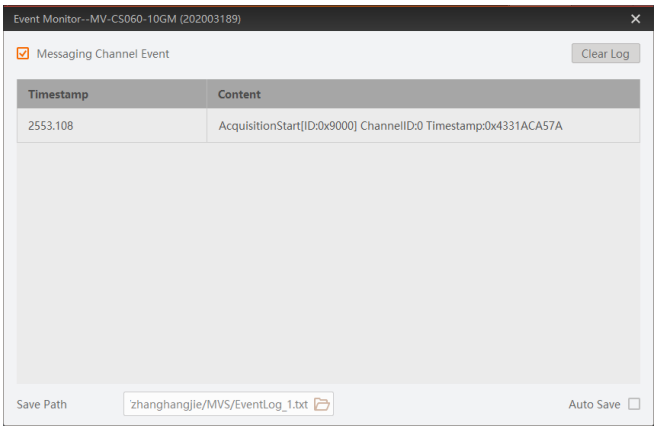


Figure 11-12 Event Monitor Window

11.5 Transport Layer Control

You can go to **Transport Layer Control** to view the device's load size, GEV version, etc.

Note

The specific parameters of transport layer control may differ by device models.

Table 11-3 Parameters of Transport Layer Control

Parameter	Read/Write	Description
Paylode Size (B)	Read only	It is the device's load size.
GEV Version Major	Read only	It is the major version in GEV version.
GEV Version Minor	Read only	It is the minor version in GEV version.
GEV Device Mode Is Big	Read only	It is the endianness in device's register.

Parameter	Read/Write	Description
Endian		
GEV Device Mode Character Set	Read only	It is the character set in device's register.
GEV Interface Selector	Read only	It sets which physical network interface to be controlled.
GEV MAC Address	Read only	It is the MAC address of the network interface.
GEV Supported Option Selector	Read and write	It selects the GEV option to interrogate for existing support.
GEV Supported Option	Read only	It indicates whether the selected GEV option is supported or not.
GEV Current IP Configuration LLA	Read only	It indicates whether the Link Local Address IP configuration scheme is activated on the given network interface.
GEV Current IP Configuration DHCP	Read and write	It indicates whether the DHCP IP configuration scheme is activated on the given network interface.
GEV Current IP Configuration Persistent IP	Read and write	It indicates whether persistent IP configuration scheme is activated on the given network interface.
DEV PAUSE Frame Reception	Read and write	It adjusts the device's transmission bandwidth automatically.
GEV Current IP Address	Read only	It is the current IP address of the given interface.
GEV Current Subnet Mask	Read only	It is the current subnet mask of the given interface.
GEV Current Default Gateway	Read only	It is the default gateway IP address to be used on the given network interface.
GEV First URL	Read only	It is the first choice of URL for the XML device description file.
GEV Second URL	Read only	It is the second choice of URL to the XML device description file.
GEV Number Of Interfaces	Read only	It indicates the number of physical network interfaces supported by this device.
GEV Persistent IP	Read and write	It indicates the persistent IP address for

Parameter	Read/Write	Description
Address		this network interface. It is only used when the device boots with the persistent IP configuration scheme.
GEV Persistent Subnet Mask	Read and write	It indicates the persistent subnet mask associated with the persistent IP address on this network interface. It is only used when the device boots with the persistent IP configuration scheme.
GEV Persistent Default Gateway	Read and write	It indicates the persistent default gateway for this network interface. It is only used when the device boots with the persistent IP configuration scheme.
GEV Link Speed	Read only	It indicates the speed of transmission negotiated by the given network interface in Mbps.
GEV Message Channel Count	Read only	It indicates the number of message channels supported by this device.
GEV Stream Channel Count	Read only	It indicates the number of stream channels supported by this device.
GEV Heartbeat Timeout (ms)	Read and write	It indicates the current heartbeat timeout in milliseconds.
GEV Heartbeat Disable	Read and write	It disables the GEV Heartbeat.
Timestamp Control Latch	Read and write	It latches the current timestamp value of the device.
Timestamp Control Reset	Read and write	It resets the timestamp value for the device.
Timestamp Control Latch Reset	Read and write	It resets the timestamp control latch.
Timestamp Value	Read only	It is a read only element. It indicates the latched value of the timestamp.
GEV CCP	Read and write	It controls the device access privilege of an application.
GEV MCP Host Port	Read and write	It controls the port to which the device must send messages. Setting this value to 0 closes the message channel.
GEV MCDA	Read and write	It controls the destination IP address for

Parameter	Read/Write	Description
		the message channel.
GEV MCTT (ms)	Read and write	It provides the transmission timeout value in milliseconds.
GEV MCRC	Read and write	It controls the number of retransmissions allowed when a message channel message times out.
GEV MCSP	Read only	It indicates the source port for the message channel.
GEV Stream Channel Selector	Read only	It selects the stream channel to control.
GEV SCP Interface Index	Read only	It is the Index of network interface to be used.
GEV SCP Host Port	Read and write	It is the host port of the channel
GEV SCP Direction	Read only	It transmits or receives the channel.
GEV SCPS Fire Test Packet	Read and write	It sets whether the GVSP test package is enabled.
GEV SCPS Do Not Fragment	Read and write	It sets whether the flag bit used for sending and controlling GVSP is configured.
GEV SCPS Big Endian	Read only	It is the Endianness of multi-byte pixel data for this stream.
GEV SCPS Packet Size(B)	Read and write	It is the device's packet size during transmission.
GEV SCPD	Read and write	It indicates the delay (in timestamp counter units) to insert between each packet for this stream channel.
GEV SCDA	Read and write	It indicates the destination IP address for this stream channel.
GEV SCSP	Read only	It indicates the source UDP port address for this stream channel.
GEV GVSP Extended ID Mode	Read and write	It can enable the extended ID mode.

11.6 User Set Customization

This function allows you to save or load device settings. The device supports four sets of

parameters, including one default set and three user sets, and the relation among four sets of parameters is shown below.

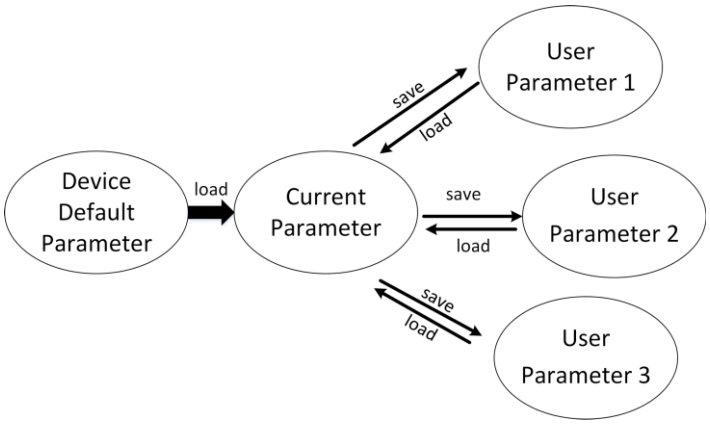


Figure 11-13 Parameter Relation

Note

After setting user parameters, it is recommended to save user parameters and select them as the default parameters.

11.6.1 Save User Set

Steps

1. Go to **User Set Control**, and select a user set in **User Set Selector**.

Note

Here we take selecting **User Set 1** as an example.

2. Click **Execute** in **User Set Save** to save parameter.
3. View **User Set Save Status**:

- Saving: User parameters are being saved.
- Ready: User parameters have been saved.

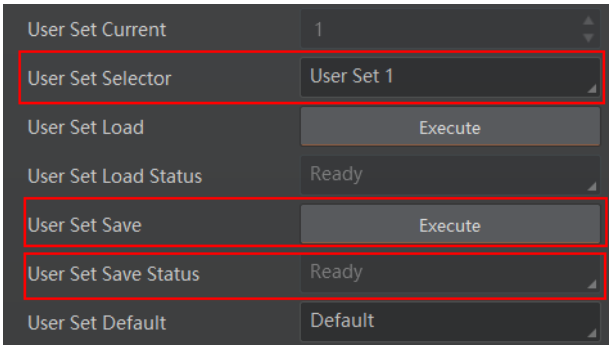


Figure 11-14 Save User Set

11.6.2 Load User Set

Note

Loading user set is available only when the device is connected but without live view.

Steps

1. Go to **User Set Control**, and select a user set in **User Set Selector**.

Note

Here we take selecting **User Set 1** as an example.

2. Click **Execute** in **User Set Load** to load parameter.
3. View **User Set Load Status**:

- Saving: User parameters are being loaded.
- Ready: User parameters have been loaded.

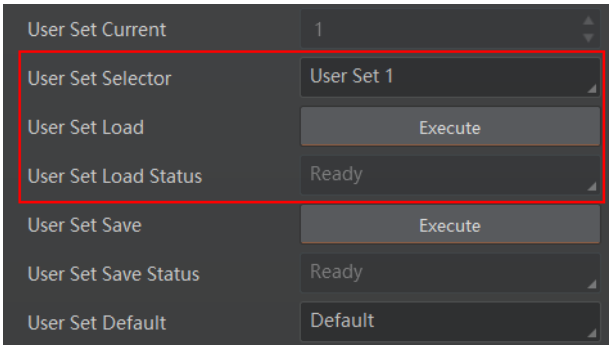


Figure 11-15 Load User Set

11.6.3 Set User Default

You can also set default parameter by going to **User Set Control**, and select a user set in **User Set Default**.

Note

Here we take selecting **User Set 1** as an example.

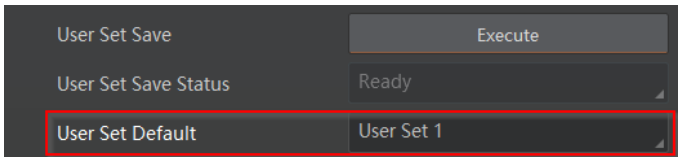


Figure 11-16 Set User Default

11.7 Multicast Function

The multicast function enables multiple PCs to access the same device at the same time. At the same time, the same device can only be connected by one client in controller and data receiver mode or controller mode, but can be connected by multiple clients in data receiver mode. The multicast mode of each device within the client is controlled individually. The description of three multicast modes is shown below.

Table 11-4 Multicast Mode Description

Multicast Mode	Description
Controller and Data Receiver	This mode allows you to read and edit the device's parameters, and get its image data.
Controller	This mode allows you to read and edit the device's parameters, but you cannot get its image data.
Data Receiver	This mode allows you read the device's parameters and get its image data, but you cannot edit its parameters.

When the multicast function is enabled, the device icon on the client software of other PCs will become , and you can connect the device via the data receiver mode.
You can set multicast function for both the available device and connected device in the device list, but the specific settings are different.

11.7.1 Set Multicast (Available Status)

Follow steps below to set multicast function if the device is in available status.

Steps

1. Right click the available device, and click **Multicast Settings**.

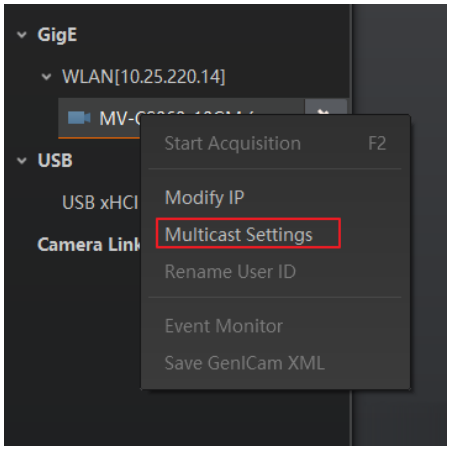


Figure 11-17 Multicast Settings

2. Select **Role**, and enter the **IP Address** and **Port**.

Note

- The available status device can use multicast function in Controller and Data Receiver mode or Controller mode.
- The IP address should be class D IP address, and the port ranges from 0 to 65535.

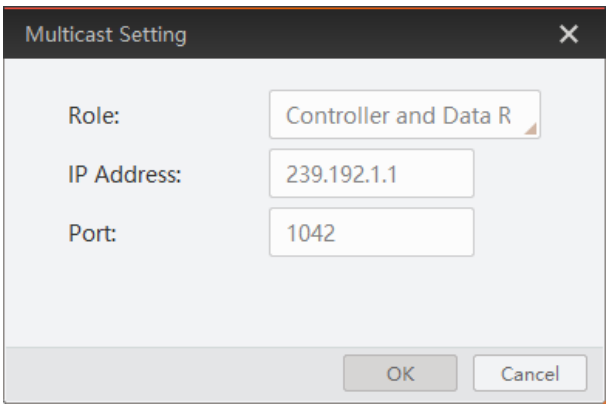


Figure 11-18 Set Parameters

3. Click **OK**.

11.7.2 Set Multicast (Connected Status)

Follow steps below to set multicast function if the device is in connected status.

Steps

1. Right click the available device, and click **Multicast Settings**.

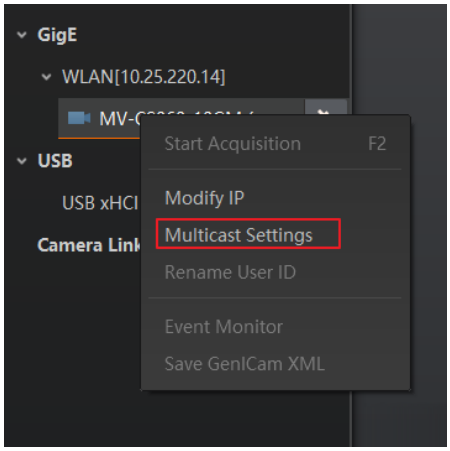


Figure 11-19 Multicast Settings

2. Enable the multicast function, and edit the **IP Address** and **Port**.

Note

- The connected status device can use multicast function in Controller and Data Receiver mode only.

- The IP address should be class D IP address, and the port ranges from 0 to 65535.

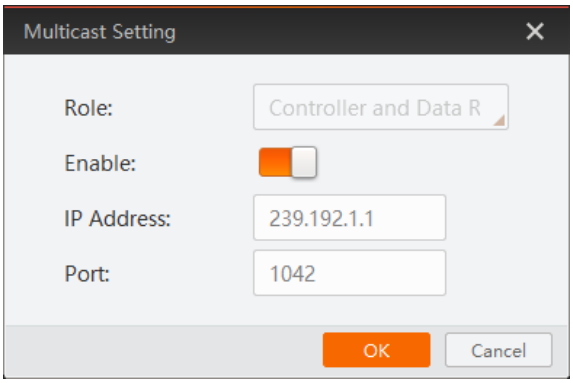


Figure 11-20 Set Parameters

3. Click **OK**.

11.8 Update Firmware

The device supports updating firmware by using the MVS client software via the network cable. At this time, the system will detect the current version of the device's module to check if it is the latest version. Refer to the table below for the device's firmware and module updating description.

Table 11-5 Firmware and Module Updating Description

Device Module Version	Description	Update Order
Latest Version	Whenever the firmware is updated, if it is detected that the device's module version is the latest one, only the firmware is updated without updating the module, and the update time is about 1 minute.	--
Not Latest Version	Whenever the firmware is updated, if it is detected that the device's module version is not the latest one, both the firmware and the module require updating, and the update time is about 12 minutes.	• The progress of updating the firmware is about 0 % to 38 %. • The progress of updating the FPGA of the module is about 39 % to 91 %. • The progress of updating the module APP is about 92 % to 100 %.

Note

- When updating the FPGA of the module, if the update progress does not reach 91 %,

power off and restart the device, and the module version will be the version that took effect last time.

- When updating the module APP, if the update progress has not reached 100 %, power off and restart the device, and the module version will be the original version that requires firmware updating.

Follow steps below to update firmware:

Steps

1. Go to **Tool** → **Firmware Updater** on the client software to open the update window.
2. Click in right side of GigE to find the device to be updated.

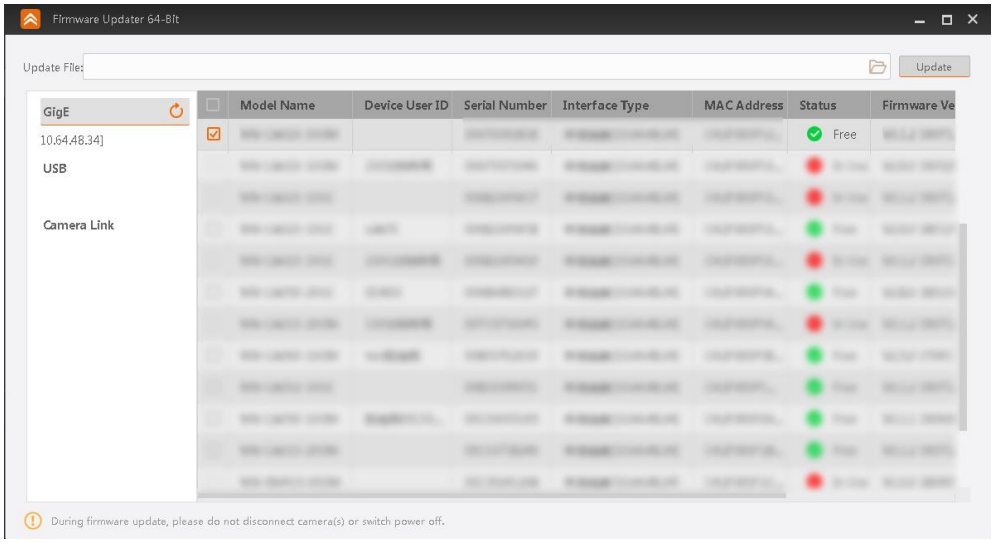


Figure 11-21 Update Firmware

Note

Make sure that the device to be updated is in free status.

3. Check to select the device you want to update.
4. Click to select the update file (dav file) from the local PC.
5. Click **Update** to start updating.

Note

- When updating both the device's firmware and module, after the progress bar reaches 100 % and the update is finished, you need to restart the device to let update take effect.
- You can go to **Device Control** to view device's firmware version, infrared firmware version, etc.

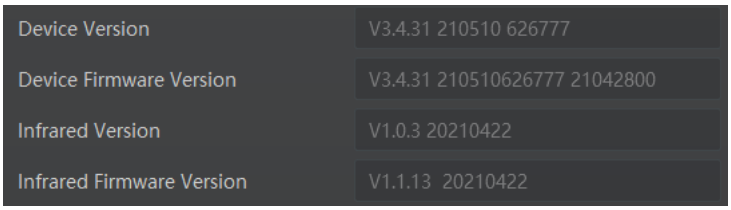


Figure 11-22 View Firmware Version

Chapter 12 FAQ (Frequently Asked Question)

12.1 Why the client software cannot list devices?

Reason

- The device is not powered on.
- Incorrect network cable connection.

Solution

Check the device's power supply and network connection by observing the device's indicator and network link indicator.

12.2 Why device connection fails after the device is listed in the client software?

Reason

- The device and the client software are not in the same network segment.
- The device has been connected by other programs.

Solution

- Use IP configurator tool to edit the device's IP address to make sure that the device and the client software are in the same network segment.
- Disconnect the device with other programs, and reconnect it to the client software.

12.3 Why the live view is back?

Reason

- The device's lens aperture is not removed.
- The device exception occurs.

Solution

- Remove the device's lens aperture.
- Power off and restart the device.

12.4 Why the device cannot be triggered although the live view is normal?

Reason

- The trigger mode is not enabled or the device is not triggered.
- Incorrect trigger wiring.

Solution

- Enable the trigger mode and make sure that the selected trigger source matches with the corresponding I/O signal.
- Check if the input of trigger signal and wiring are correct or not.

12.5 Why the network changes from GigE Ethernet to Fast Ethernet?

Reason

The network cable may be damaged.

Solution

Check the network cable, and replace it if it is damaged.


See Far, Go Further