HIKROBOT

Linear Laser Stereo Camera

User Manual

Legal Information

User Manual

About this Manual

The Manual includes instructions for using and managing the Product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in the Manual is subject to change, without notice, due to firmware updates or other reasons. Please find the latest version of this Manual at the Hikrobot website (https://www.hikrobotics.com/).
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Regulatory Information

FCC Information

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
FCC compliance: 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.
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

FCC Conditions

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

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

EU Conformity Statement

This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the EMC Directive 2014/30/EU, the RoHS Directive 2011/65/EU.

2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: ***http://www.recyclethis.info***

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***

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
Danger	Indicates a hazardous situation which, if not avoided, will or could result in death or serious injury.
Caution	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
Note	Provides additional information to emphasize or supplement important points of the main text.

About This Manual

This manual includes instructions for using and managing the product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in this manual is subject to change without notice, due to firmware updates or other reasons.

Available Model

This manual is applicable to the Linear Laser Stereo Camera.

Safety Instruction

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

Laws and Regulations

The device should be used in compliance with local laws, electrical safety regulations, and fire prevention regulations.

Laser Safety

- This device has a low risk of NIR light hazard measured at 100 millimeters.
- Do not turn on the light source during device installation and maintenance.
- Do not observe the light source in close range during its operation, even though a short time.
- In the absence of proper protection, you should keep safety distance with the light source, or avoid direct eye exposure with the light source during device installation and maintenance.

Power Supply

- When wiring or dismounting, make sure that the device power is cut off, and do not operate under electrification.
- Avoid contact with exposed circuit. When the device is powered on, avoid contact with exposed junctions and parts.
- Use the power adapter provided by the regular manufacturer.
- Do not connect multiple devices to one power adapter, to avoid over-heating or fire hazards caused by overload.
- Make sure the plug is properly connected to the power socket.

Transportation

- The device contains precision optical components and electronic components. During transportation, storage and installation, incorrect operations like heavy pressure and violent vibration should be avoided. Otherwise, the device may be damaged.
- Avoid sudden collision, and pack the device with the accompanied carton and cushioning material or similar package.

Using Environment

- In order to reduce the risk of fire or electric shock, do not let the device get wet or damp.
- Do not drop objects onto the device and avoid vigorous vibration.
- Keep the device away from magnetic interference.

- Do not use the device in extremely heat, extremely cold, dusty environment, corrosive environment or high humidity environment.
- Do not aim the device lens at objects of strong light, such as the sun and incandescent lamp. Otherwise, the lens or sensor may be damaged.
- The device should be stored in dry environment without corrosive gas. Avoid placing the device in direct sunlight and poorly ventilated locations, or near heat sources such as heater or heating (ignoring this warning may lead to fire hazards).
- Do not operate in explosive environment.
- Keep the surrounding area well ventilated to avoid heat accumulation. Do not contact the radiator directly to avoid scald.

Electrostatic Protection

- Remove all conductive objects (such as jewelry, watch, etc.) on the device body before touching the device, and touch the grounding metal bracket by hand to release the static electricity.
- It is suggested to wear anti-static suit to prevent damage to the equipment caused by static electricity.
- When installing or maintaining the device, wear anti-static wristband or anti-static gloves. Make sure that the wristband is tightly attached to the skin and is reliably grounded.
- It is forbidden to touch exposed circuit boards with bare hands. Static electricity generated by human body may damage electrostatic sensitive components on circuit boards.
- When touching electrostatic sensitive components or devices, proper grounding measures must be taken.
- Put electrostatic sensitive components into anti-static bags for protection.
- It is suggested to place humidifier in dry environment to maintain suitable humidity and reduce static electricity generation.

Maintenance

- If the device is not working properly, contact the store or the nearest service center. Do not disassemble or modify the device in any way. (The company does not bear any liability for any problem arising from unauthorized modification or maintenance).
- Properly preserve all the original packaging materials of the device so that when problems arise, the device can be packed with packaging materials and sent to the agent or returned to the manufacturer for processing. The company does not bear any liability for accidental damage during transportation caused by non-original packaging.
- This device is a precision electronic device, no components can be maintained by user, do not disassemble the device arbitrarily.

Cleaning

Do not touch the image sensor directly. If the sensor needs to be cleaned, use a clean rag and wet it with alcohol, then gently wipe off the dirt; if the device is not in use, cover the image sensor with dust cover for protection.

Installation

Do not install the device on vibrating surface or places that are vulnerable to impact.

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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Website: en.hikrobotics.com

Contents

Chapter 1 Appearance

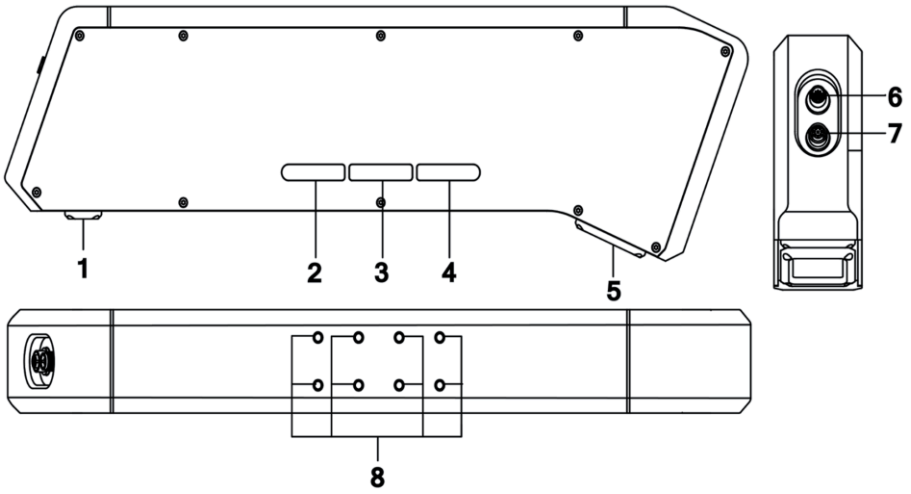

Figure 1-1 Appearance

Table 1-1 Interface Description

No.	Name	Description
1	Laser	It sends out laser to object surface.
2	Laser Indicator	It shows laser status. When the indicator works normally, the indicator is solid green. Otherwise, it is unlit.
3	Device Status Indicator	It shows device status. When the device system works normally, the indicator is solid yellow. Otherwise, it is unlit.
4	Power Indicator	It shows power supply status. When the power supply is normal, the indicator is solid blue. Otherwise, it is unlit.
5	Camera Lens	It acquires laser outline of the surface of the measured object.
6	Power and I/O Interface	It provides power, I/O and serial port function. For different models of device, it has 5-pin M12 interface, or 12-pin M12 interface. The interface is designed with threads to tighten connection between the device and cable.
7	Gigabit Ethernet Interface	It is a RJ45 gigabit Ethernet interface with aviation connector. The interface is designed

No.	Name	Description
		with threads to tighten connection between the device and cable.
8	Screw Hole	There are 8 screw holes on top of the device that are used to fix the device to the mounting plate. It is recommended to use supplied countersunk screws during installation. If other screws are used, the length of screws should be shorter than the total length of mounting bracket thickness and screw hole depth.

Chapter 2 Interface Description

Two types of power and I/O interface are available, 5-pin M12 interface and 12-pin M12 interface. Interface type requirement may vary by different device models. Read the interface and its pin definitions carefully before using it to connect the device.

2.1 5-Pin Interface

Read the following section to get definitions of 5-pin M12 interface.

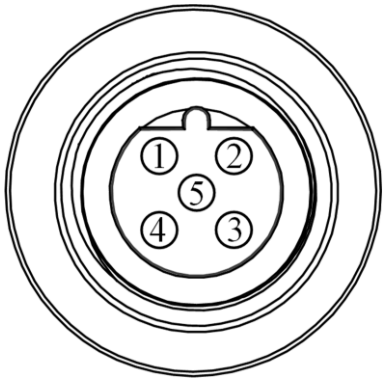

Figure 2-1 5-Pin M12 Interface

Table 2-1 Pin Definitions

No.	Signal	I/O Signal Source	Description
1	Reserved		
2	OPTO_GND	Line 0-	Opto-isolated signal ground
3	OPTO_IN0	Line 0+	Opto-isolated input
4	GND	--	Device power supply ground
5	Power	--	Device power supply

Note

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

2.2 12-Pin Interface

Read the following section to get definitions of 12-pin M12 interface.

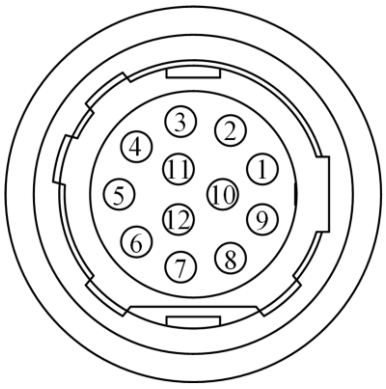

Figure 2-2 12-Pin M12 Interface

Table 2-2 Pin Definitions

No.	Signal	I/O Signal Source	Description
1	Power	--	Device power supply
2	GND	--	Device power supply ground
3	OPTO_OUT0	Line 1+	Opto-isolated output
4	OUT_OUT1	Line 1-	Opto-isolated output ground
5	OPTO_IN0	Line 0+	Opto-isolated input
6	IN_COM	Line 0-	Opto-isolated input ground
7	Reserved		
8	Reserved		
9	Reserved		
10	Reserved		
11	RS232_RXD	--	RS232_RXD
12	RS232_TXD	--	RS232_TXD

Note

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

Chapter 3 Installation

3.1 Installation Preparation

You need to prepare following accessories before installation.

Table 3-1 Accessories

No.	Name	Quantity	Description
1	Power Supply	1	It refers to the supplied switch power supply and its cables, which are included in the package.
2	Power and I/O cable	1	It refers to the supplied 7 m 5-pin or 12-pin power and I/O cable. The interface type is M12. It is included in the package.
3	Network Cable	1	It refers to the supplied 7 m network cable, and its interface is M12 to RJ connector. It is included in the package.
4	Mounting Plate	1	It is used to fix the device to an installation position. It is included in the package.
5	Incremental Encoder	1	It is recommended to use incremental encoder of Kubler, and the model is 8.KIS40.1342.1024. You need to purchase separately.
6	Infrared Supplement Light	1	It is used to provide light during device calibration. It is recommended to use 808 nm/850 nm infrared supplement light, and the model is MV-LB-102-102-00IRL. You need to purchase separately.

3.2 Camera Wiring

To improve the accuracy of conveyor belt direction and get its accurate speed, it is recommended to install an encoder under the conveyor belt.

Kubler Encoder (Recommended)

You are recommended using Kubler encoder (Model: KIS40.1342.1024), which has the same power requirement with the camera (12 VDC).

No matter your device is equipped with 5-pin M12 interface or 12-pin M12 interface, you also can finish the wiring with encoder based on the following demonstration.

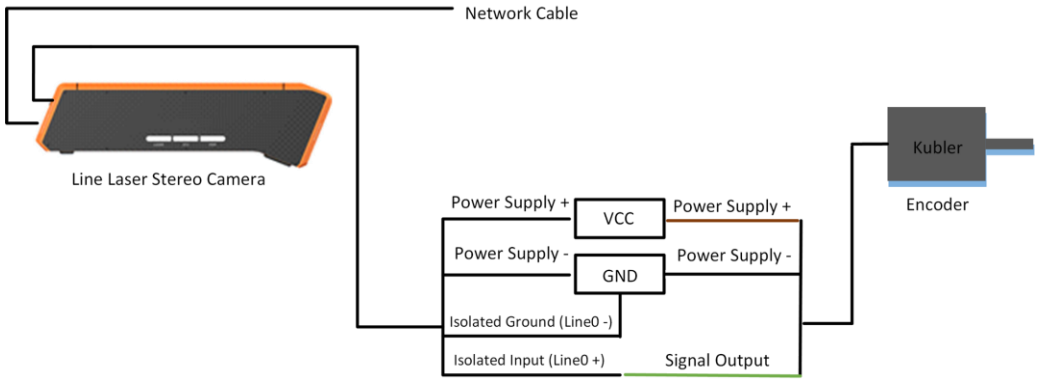

Figure 3-1 Wiring

Other Encoders

If you adopt encoders which do not have the power supply of 12 VDC, you should power the encoder separately when using the encoder with the device. For wiring, please refer to corresponding user manual of encoder you used.

3.3 Install Camera

Before You Start

- Make sure the device in the package is in good condition and all the assembly parts are included.
- The standard power supply is 12 VDC. Make sure your power supply matches with the device.
- Make sure all the related equipment is power-off during the installation.
- Make sure you will install the camera in a right direction. The laser should face front and camera lens face back. When the conveyor belt moves from left to right, the laser should be in the left, and the camera should be in the right.

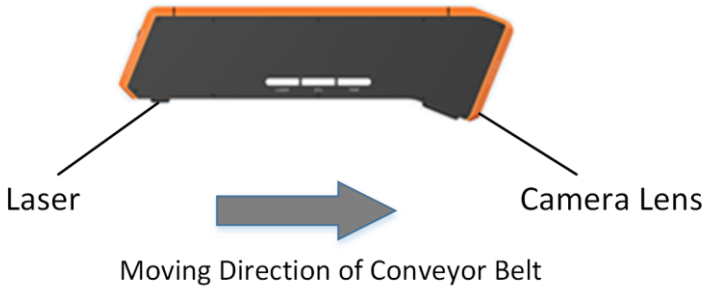

Figure 3-2 Installation Direction

Steps

1. Use countersunk screws to fix the mounting plate to the rear of the device.

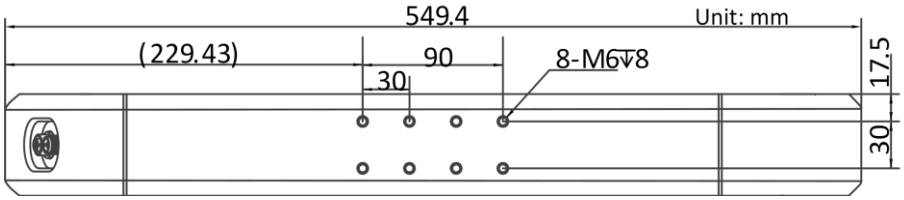

Figure 3-3 Screw Holes

2. Use the T-head bolts to fix the mounting plate to gantry.

Note

- The device should be installed 1750 mm high above the conveyor belt, and at the middle of the conveyor belt.
- The installation should be firm and avoid vibration. Otherwise, the measurement accuracy will be affected.

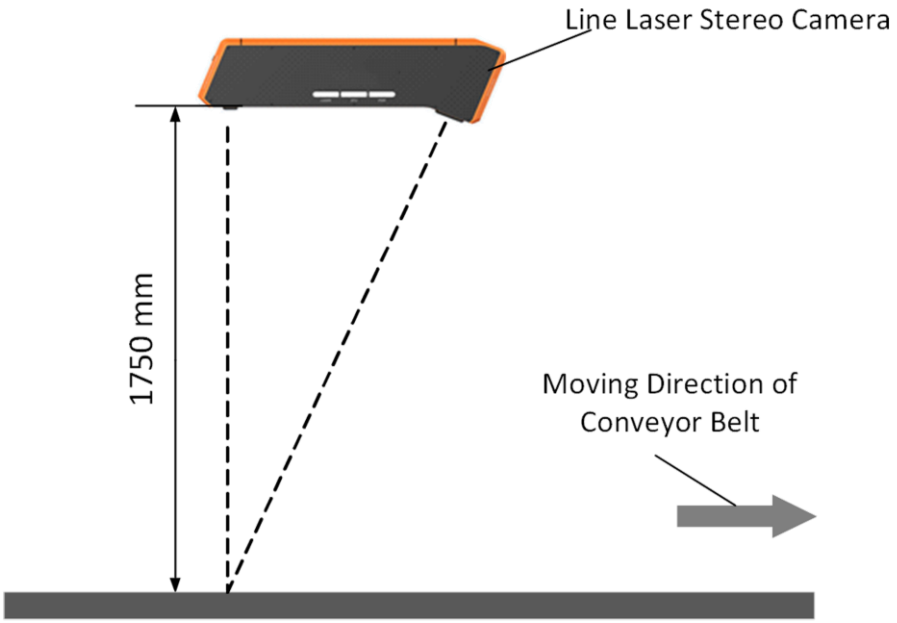

Figure 3-4 Installation

Chapter 4 Camera Connection

Camera connection to the client software is required for camera's configuration and remote operations. This section introduces how to install the client software, set PC and camera network, connect the camera to the client software, etc.

4.1 Install Client Software

3DMVS is a client software for camera configuration and remote operations.

Steps

Note

- Check the Windows version. The client software is compatible with 32/64-bit Windows XP/7/10.
- You can mail to tech_support@hikrobotics.com to get client software installation package.

1. Double click the installation package to start installing the client software.
2. Select the language.
3. Read and check **Terms of the License Agreement**.
4. Click **Start Setup**.
5. Select installation directory and click **Next**.

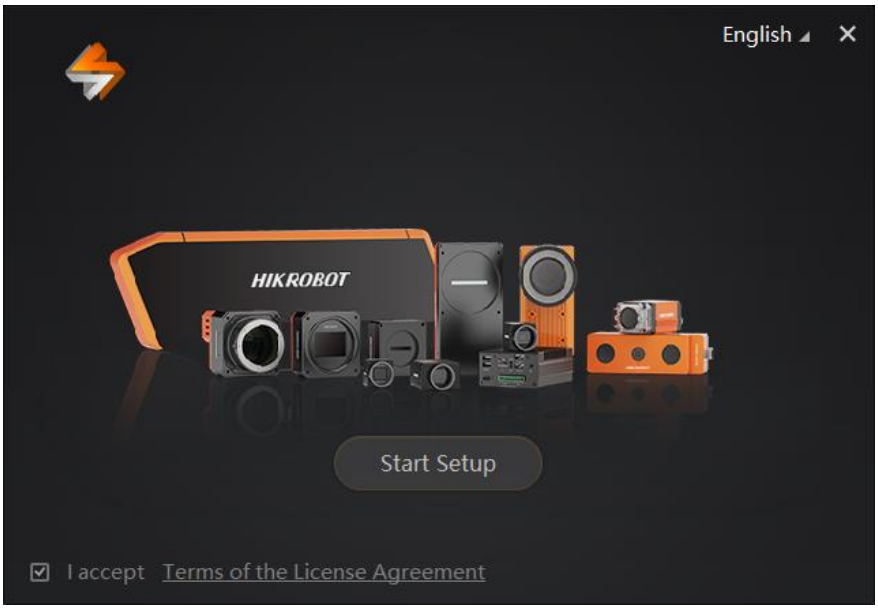

Figure 4-1 Installation Interface

6. Finish the installation according to the interface prompts.

4.2 Turn off Firewall

To ensure stable client running and image transmission, you are recommended turning off Windows firewall before using the client software.

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)**.

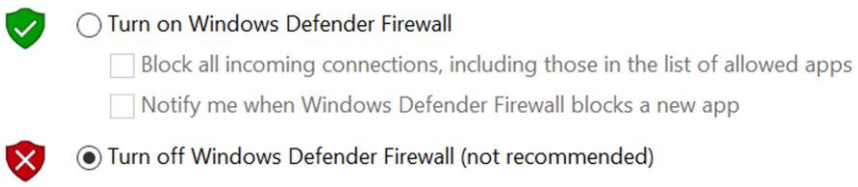

Figure 4-2 Windows Defender Firewall

4. Click **OK**.

4.3 Set PC Network

To ensure stable image transmission and normal communication between the PC and the camera via client software, you need to set the PC network before using the client software.

Before You Start

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

Steps

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.

Note

Enter ***ipconfig*** in **Run** window in your PC, and then you can view the PC's IP address.

- Select **Use the following IP address** to set an IP address for the PC manually.

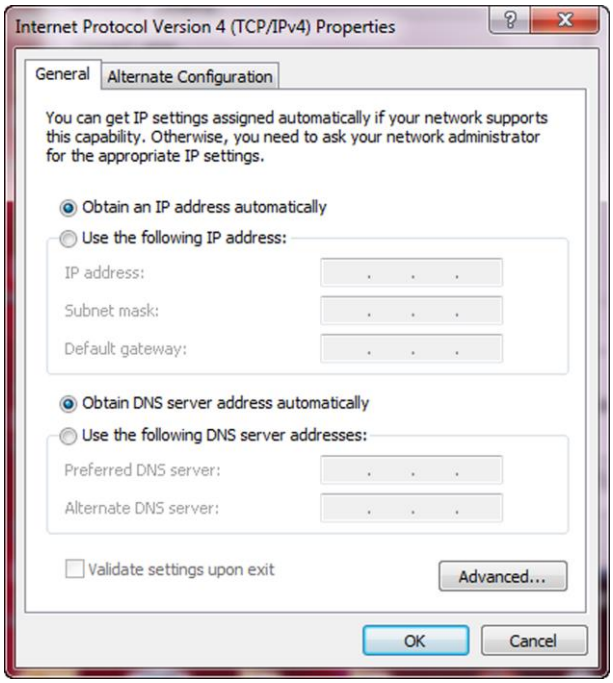

Figure 4-3 Set PC Network

3. Set NIC property.
   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.

Note

The value may vary from different network interface cards. Just set the maximum value if value changes.

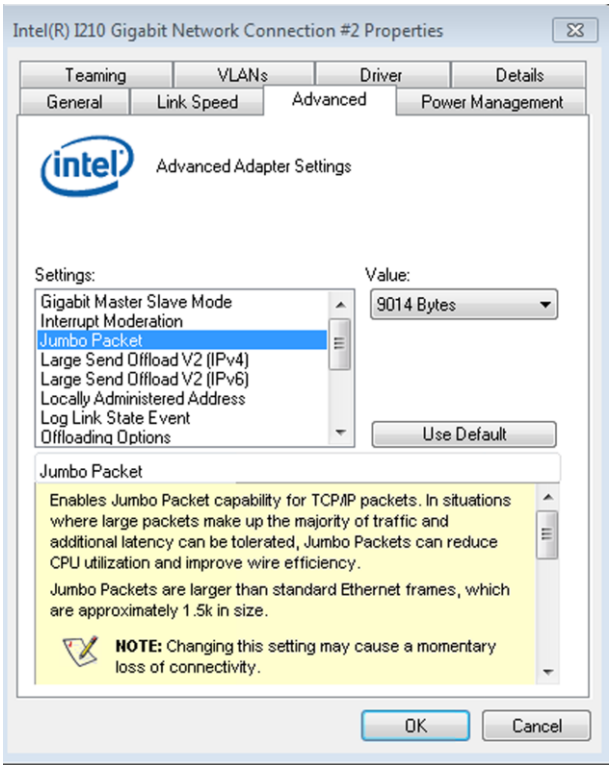

Figure 4-4 NIC Properties Advanced Settings

4.4 Set Camera Network

You can set and operate the camera in the client software only when the camera 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 the control toolbar to connect the device with the client software.
3. Select a device to be connected.
4. Open **Modifying IP Address** window.
   - Right click the device, and click **Modify IP** to open the window.
   - Click to open the window.

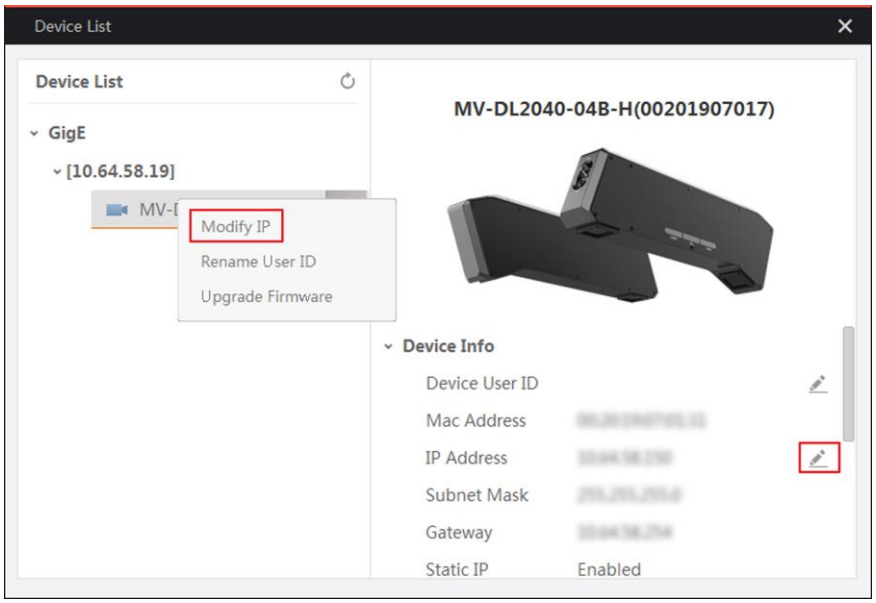

Figure 4-5 Open the Interface of Modifying IP Address

5. Set the IP address of the camera in the same network segment with the PC.

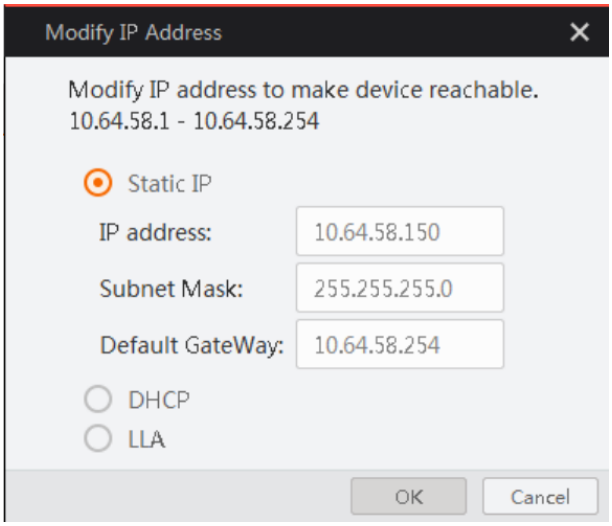

Figure 4-6 Modify Camera IP Address

4.5 Connect Camera to Client Software

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

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

Chapter 5 Client Software Layout

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

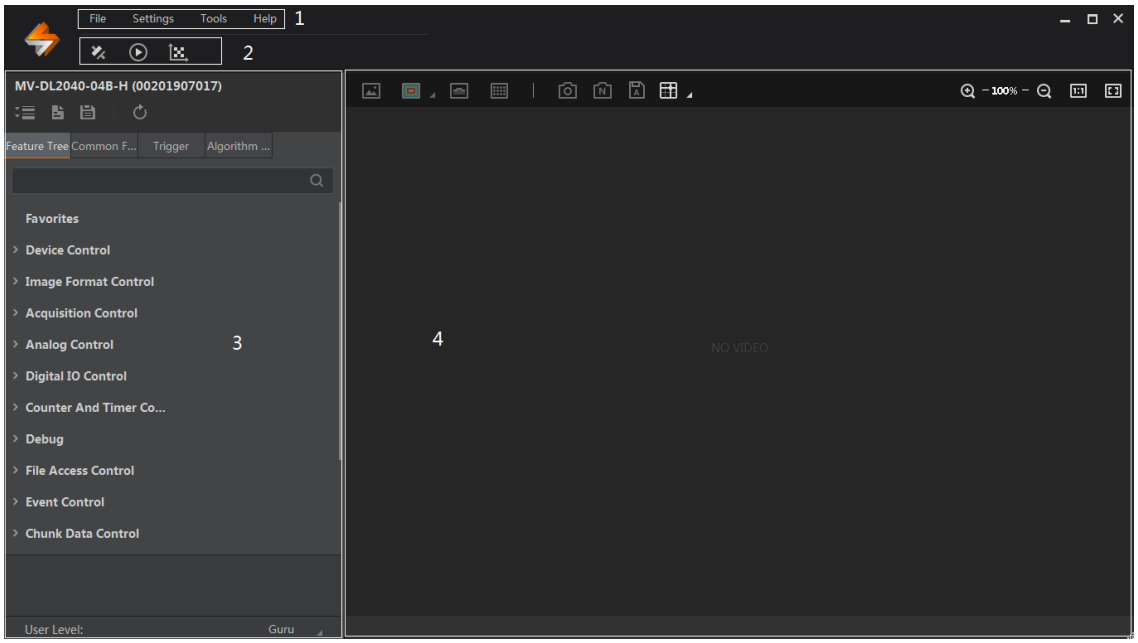

Figure 5-1 Main Window

Note

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

Table 5-1 Description of the Main Window

No.	Name	Description
1	Menu Bar	The menu bar displays function modules, including **File**, **Settings**, **Tools**, and **Help**.
2	Control Toolbar	The control toolbar provides quick operations for the device.
3	Attribute List	The attribute list displays specific attributes of connected device. You can view or set device's attributes. **Note** The attribute list in the feature tree may differ according to different user levels.

No.	Name	Description
4	Live View Area	This area displays device's images, and you can adjust image mode, capture images, etc.

The device setting supports 3 types of user level: Beginner, Expert and Guru, which displays different device attributes. For Guru Level, it provides the most comprehensive camera attributes for professional use. Here we take Guru Level as an example.

Note

For specific attributes, please refer to the actual device you got.

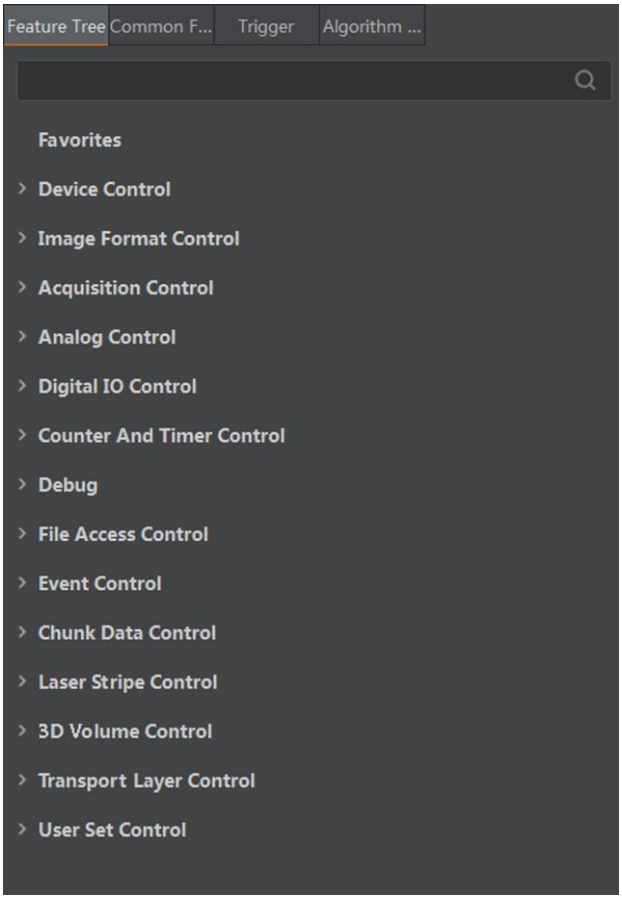

Figure 5-2 Feature Tree

Table 5-2 Device Attribute Description

Attribute	Description
Device Control	You can view device information, edit its name and reset the device.
Image Format Control	You can view and set device's resolution, pixel format, test

Attribute	Description
	pattern, etc.
Acquisition Control	You can view and set the device's acquisition mode, frame rate, exposure time, etc.
Analog Control	You can view and set the device's gain, black level, Gamma correction, etc.
Digital IO Control	You can set the different input and output signals.
Counter And Timer Control	You can set frequency division of the external trigger signal.
File Access Control	You can view and set the file access control related parameters.
Event Control	You can set event control related parameters to let the device generate an event and transmit the event message to the computer.
Chunk Data Control	You can enable Chunk data function and set its content.
Laser Stripe Control	You can set laser stripe related parameters.
3D Volume Control	You can set volume measurement related parameters.
Transport Layer Control	You can set the parameters of transport layer.
User Set Control	You can save or load the device's parameters, and set the default parameter when running the client.

Chapter 6 Operation with Client Software

After installing the client software, you can carry out basic operations like calibration, drawing filtering area, drawing Region of Interest (ROI), measuring volume, etc.

6.1 Calibrate System

Before operating the device, you need to calibrate it via the client software. The purpose of calibration is to set up corresponding relation between the point coordinate of calibrated object and its image point.

Before You Start

- Make sure you have turned off PC firewall, set PC network and device network. Otherwise, client operation and image transmission may be affected.
- Insert the dongle into your PC. Otherwise, the calibration cannot be done.
- Make sure the image is clear during calibration. Otherwise, the calibration may be inaccurate.
- It is recommended to calibrate and measure object after powering on the device for about one hour.
- Recalibration is required after the device installation position is changed.

Steps

1. Go to **Digital I/O Control** → **Laser Enable**, and disable **Laser Enable**.

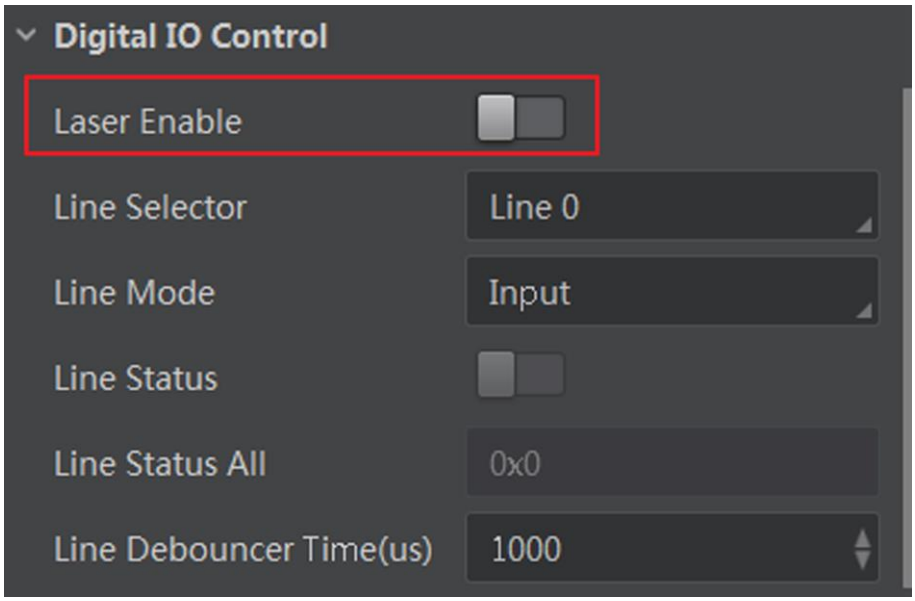

Figure 6-1 Disable Laser Enable

2. Go to **Image Format Control** → **Image Mode**, and select **Origin Image** as **Image Mode**.

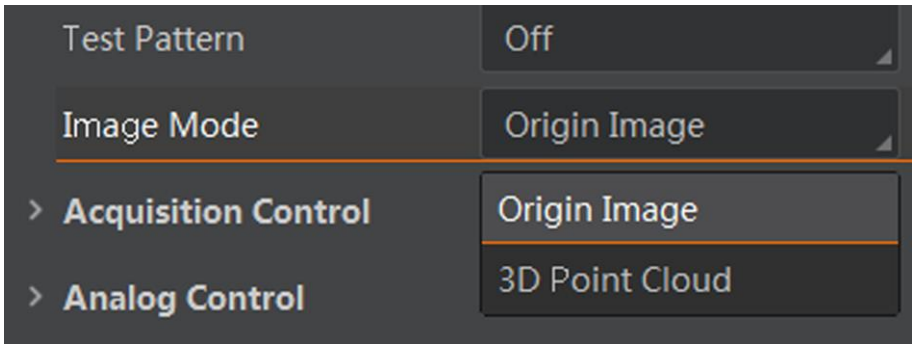

Figure 6-2 Image Mode

3. Click  in the control toolbar of the client to enter calibration interface.
4. Enter **Calibration Board Length**, **Calibration Board Width**, and **Side Length of Square in Board**.

Note

Here we take calibration board length of 6, calibration board width of 4, and side length of square in board of 30 as an example.

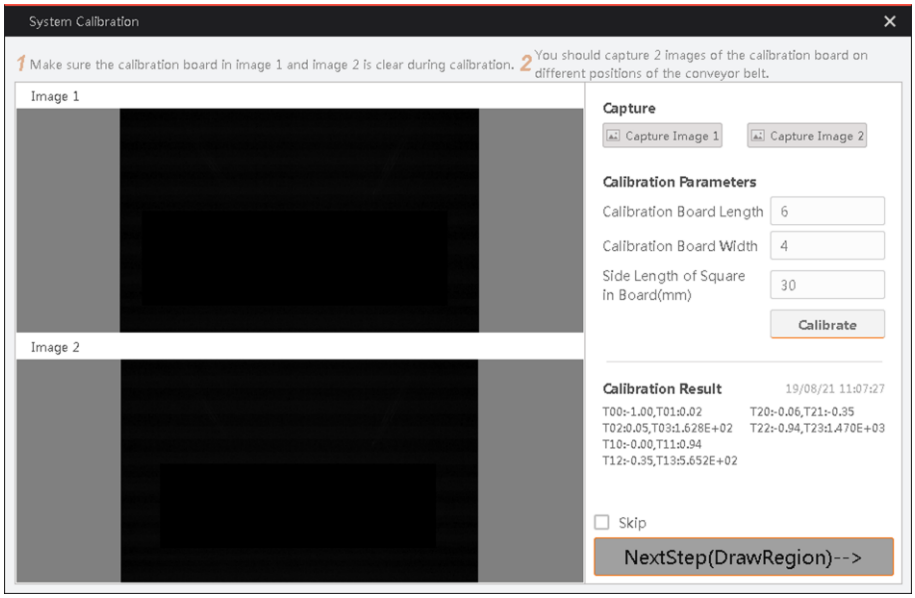

Figure 6-3 System Calibration Interface

5. Put the calibration board on the conveyor belt, and click **Capture Image 1** to capture the first image.
6. Put the calibration board in the different position on the conveyor belt, and click **Capture Image 2** to capture the second image.

Note

- You should capture 2 images of the calibration board on different positions of the conveyor

belt, and move the calibration board along the conveyor belt operation direction only.

- Make sure the calibration board in image 1 and image 2 is clear during calibration. Otherwise, the calibration may be inaccurate.

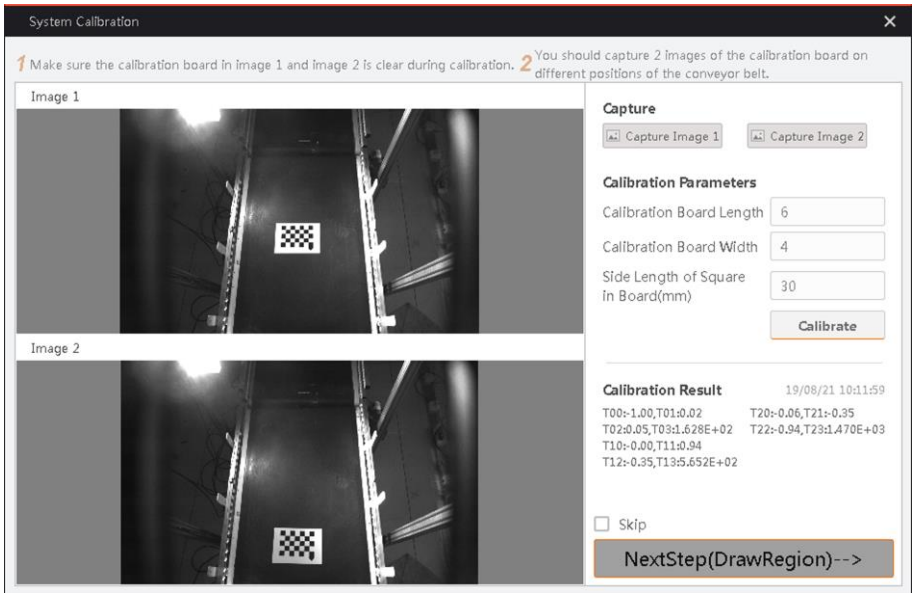

Figure 6-4 Capture Image

7. Click **Calibrate**.
8. Select **Yes** to upload calibration result to the device.

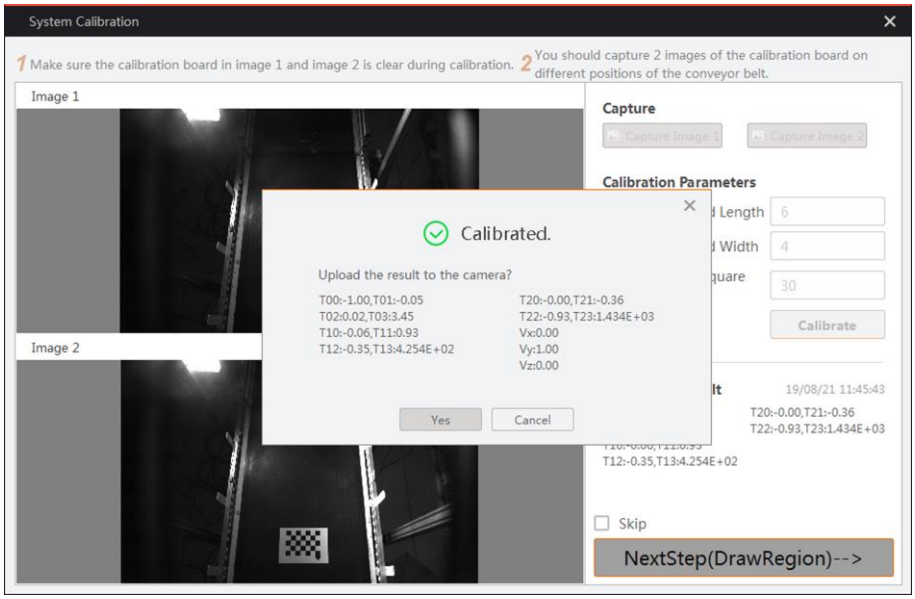

Figure 6-5 Calibration

Note

In the right side of the calibration interface, the data of last calibration is displayed.

6.2 Draw Filtering Area

Drawing filtering region is to limit the width of measured object.

Steps

1. Go to **Digital I/O Control** → **Laser Enable**.
2. Enable **Laser Enable**.

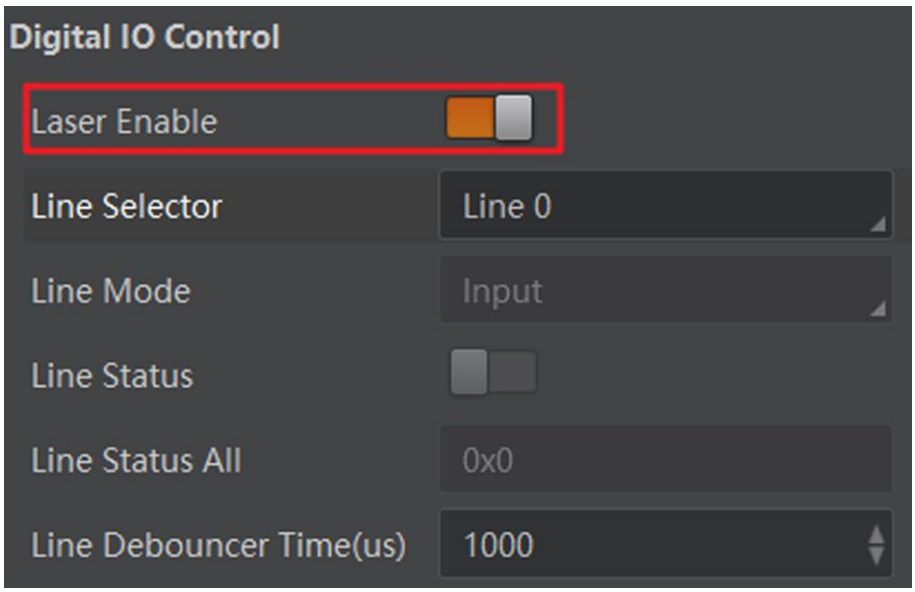

Figure 6-6 Enable Laser Enable

3. Click **NextStep (DrawRegion)** in the system calibration interface.
4. Click **Draw Filer** to draw a filter region.
5. Click **Check Filter Region**.

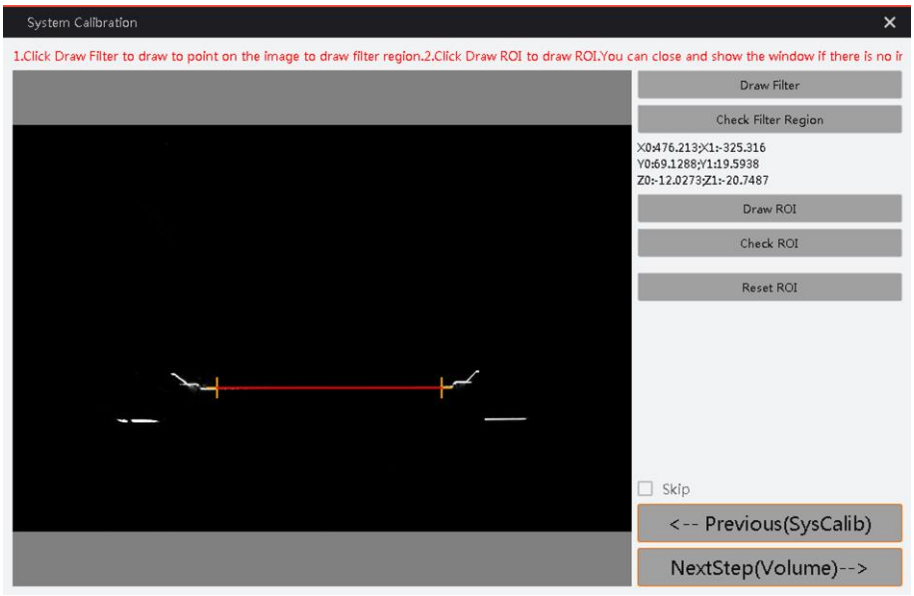

Figure 6-7 Draw Filter Region

6.3 Draw ROI

Drawing filtering region is to limit the height of measured object.

Steps

1. Click **Draw ROI**.

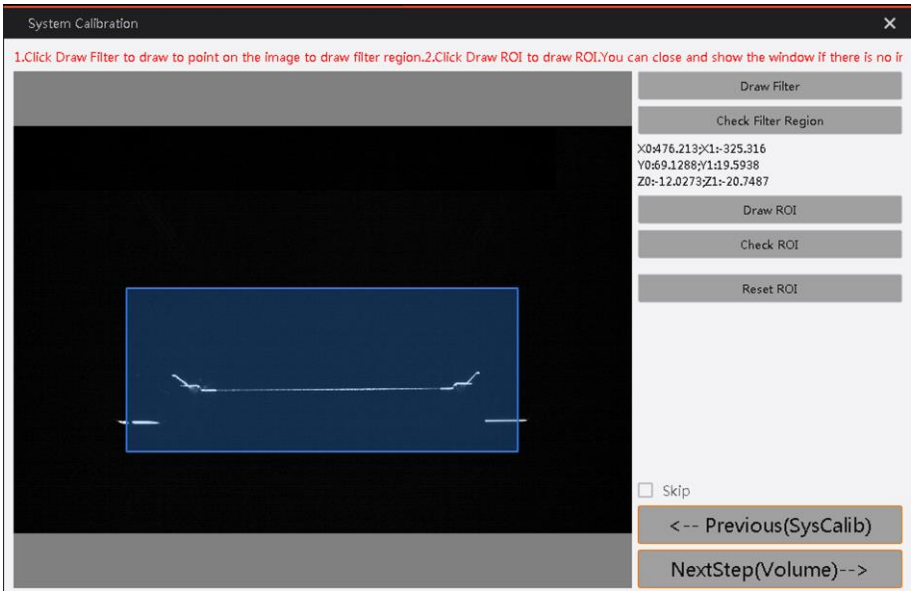

Figure 6-8 Draw ROI

There will be a rectangle in the image area.

2. Adjust the rectangle size according to actual demands.
3. Click **Check ROI**.

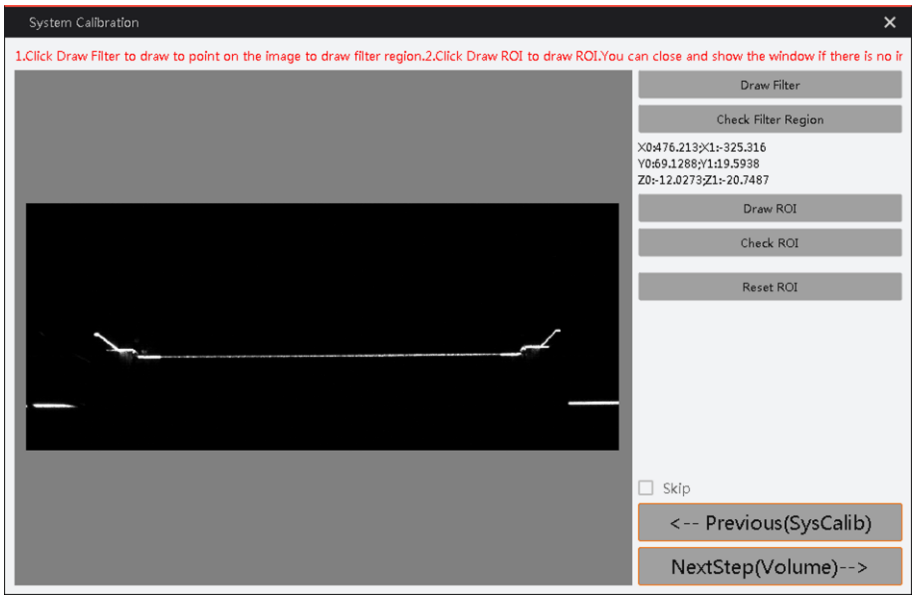

Figure 6-9 Check ROI

There will be ROI area only in the image.

4. Click **Reset ROI** to restore the image size.

6.4 Set Volume Parameters

In the **3D Volume Control** attribute, you can set volume measurement related parameters.

Min Packet Height

It refers to the min. package height that the device can measure, and the unit is mm. The data that is smaller than this parameter will be filtered.

Compensate Height

This parameter value should be adjusted according to standard object's height. After calibration, **Compensate Height** plus average height on conveyor belt should be close to 0. The unit of this parameter is mm.

Step Distance

It refers to the step distance of the conveyor belt, and the unit is nm/um.

Measure Mode

It refers to the algorithm measurement mode, including **Continuous** mode and **Signal** mode.

Click **3D Volume Control**, and enter **Min Packet Height**, **Compensate Height**, **Step Distance**, and **Measure Mode** according to actual demands.

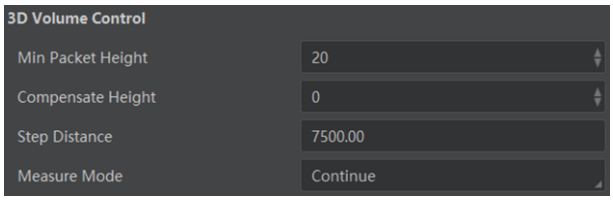

Figure 6-10 Set Volume Parameters

6.5 Measure Volume

Steps

1. Click **NextStop (Volume)** to enter volume measurement interface.
2. Enter standard object's length, width, and height in **StandardLength**, **StandardWidth**, and **StandardHeight**.

Note

The values filled in **StandardLength**, **StandardWidth**, and **StandardHeight** should be the actual ones of the object.

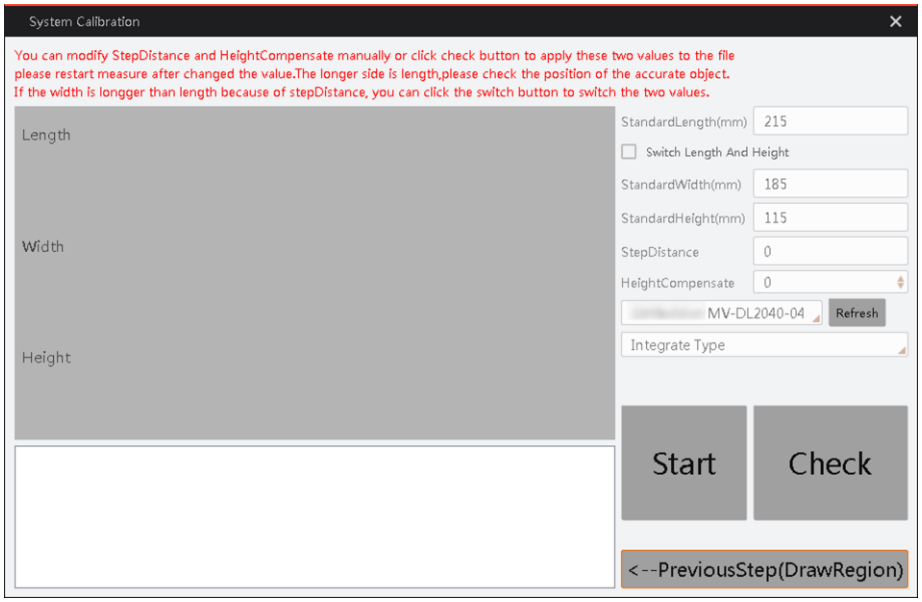

Figure 6-11 Interface

3. Click **Refresh** and select corresponding device.
4. Select **Normal Type**, **Integrate Type**, or **349 Type** as volume output type.
5. Put the standard object on the conveyor belt.

Note

The object should be a rectangular, and the object position must be match with the operation direction of the conveyor belt.

6. Click **Start**, and click **OK** in the popped-up interface to disconnect with the client.

Figure 6-12 Disconnect

Note

After volume measurement, the specific value is displayed in the interface.

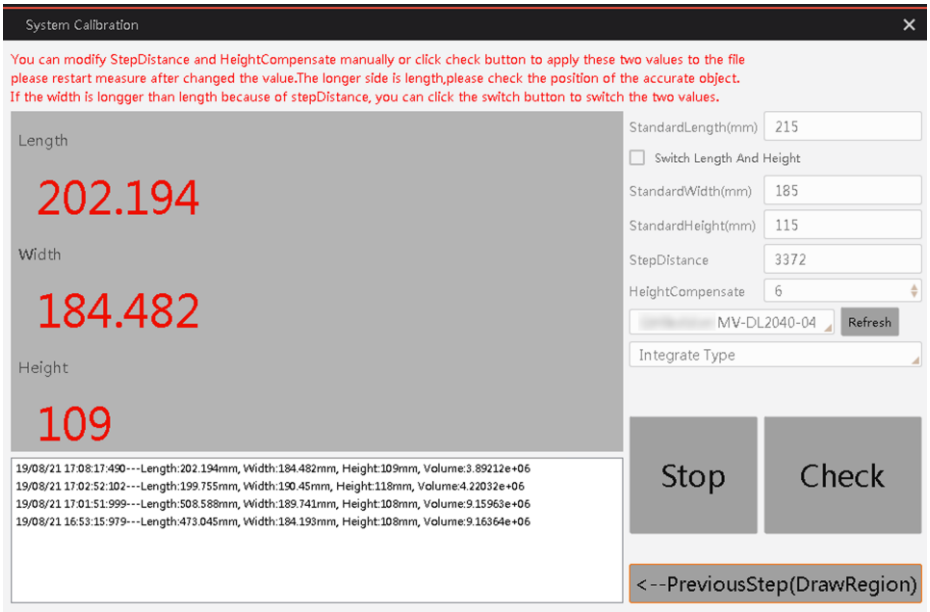

Figure 6-13 Measurement Result Before Checking

7. Click **Check**, and step distance and height compensation value will be created automatically.
8. Click **OK** to upload data to the device.

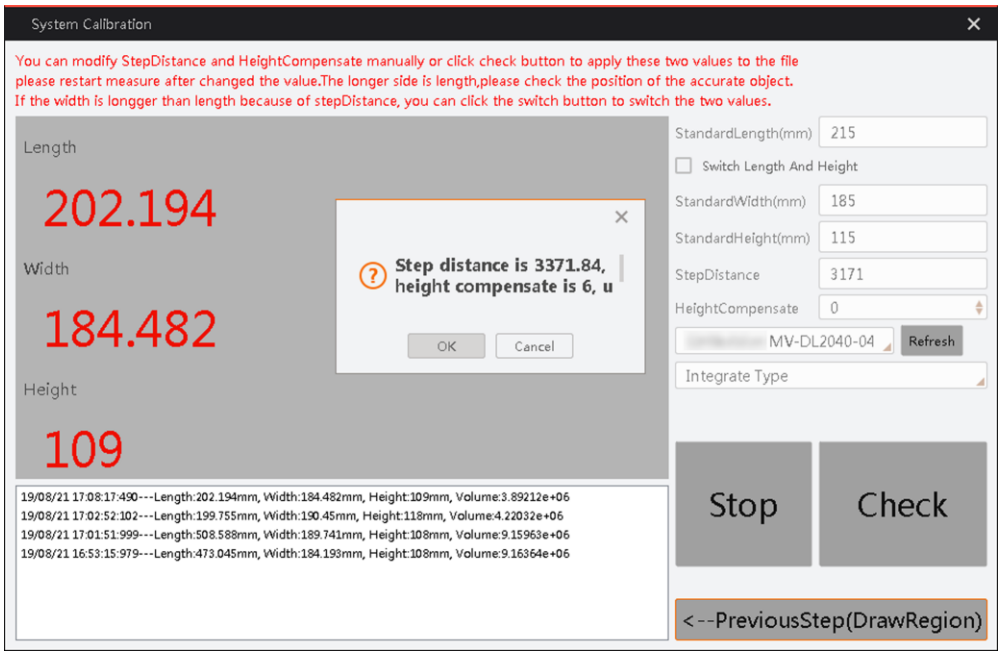

Figure 6-14 Upload Data

9. After uploading data, click **Stop**, and click **Start** to measure object again.
10. Put the standard object on the conveyor belt again.

Note

The object should be a rectangular, and the object position must be match with the operation direction of the conveyor belt.

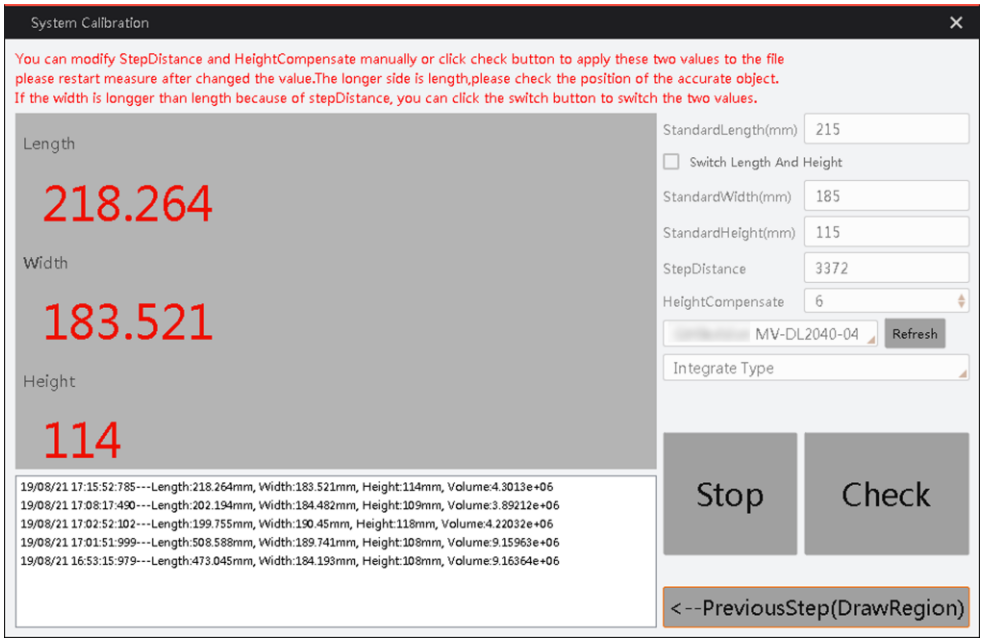

Figure 6-15 Measure Result After Checking

Note

When checking the measurement result, if it is found that the length is smaller than the width due to small step distance, you can click **Switch Length And Height** to exchange the length and width value.

Chapter 7 Image Acquisition Settings

This section introduces how to set image acquisition related parameters, such as acquisition mode, trigger mode, trigger source, etc.

7.1 Set Frame Rate

Frame rate refers to the image number that is acquired by the camera per second. The higher frame rate, and shorter time used for image acquisition will be. The following 4 factors determines the camera's frame rate in real-time.

- Frame readout time: The frame readout time is related with camera'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.
- Exposure time: If the reciprocal of max. frame rate that the camera supports is t, and when the configured exposure time is larger than t, the less the exposure time, the higher the frame rate will be. When the configured exposure time is less than or equal to t, exposure time will not affect the frame rate.
- Bandwidth: The larger the bandwidth, and the higher the frame rate will be.
- Pixel format: The more bytes pixel format occupy, and the lower the frame rate will be.

Steps

1. Click **Acquisition Control** → **Acquisition Frame Rate**.
2. Enter **Acquisition Frame Rate**.
3. Enable **Acquisition Frame Rate Control Enable**.
4. View the camera's final frame rate in **Resulting Frame Rate**.

Note

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

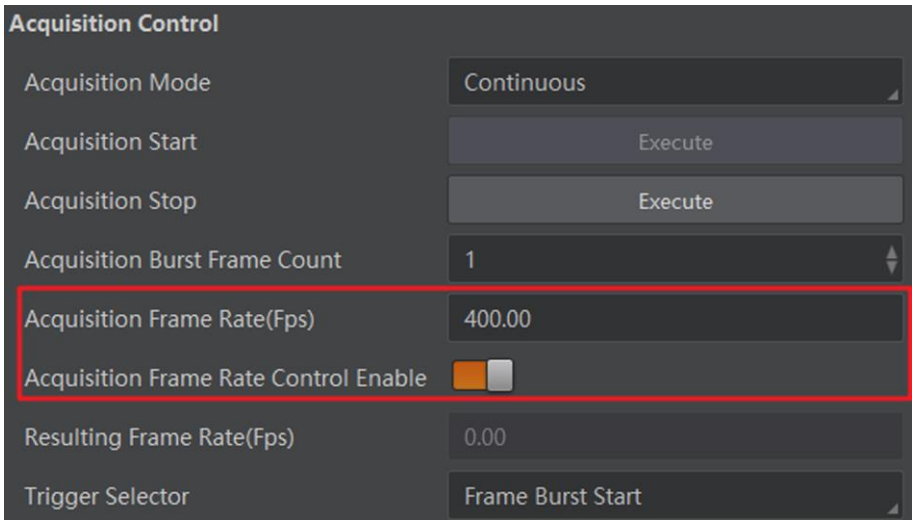

Figure 7-1 Set Frame Rate

7.2 Set Acquisition Mode

The camera supports continuous acquisition mode which means that the camera acquires images continuously, and it will not stop until you stop it manually. In this mode, the real-time frame rate decides the acquisition frame number per second.

You can click **Acquisition Control** → **Acquisition Mode**, and select **Continuous** as **Acquisition Mode**.

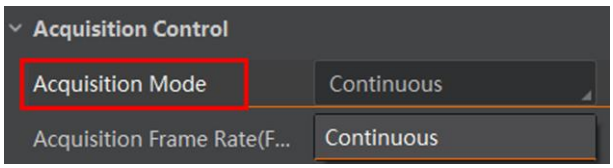

Figure 7-2 Set Acquisition Mode

7.3 Set Trigger Mode

The camera has 2 types of trigger mode, including internal trigger mode and external trigger mode.

Internal Trigger Mode

In this mode, the camera acquires images via its internal signals.

External Trigger Mode

In this mode, the camera acquires images via external signals like software signal and hardware signal. The trigger source of external trigger mode includes software trigger, hardware trigger, and counter trigger.

7.3.1 Enable Internal Trigger Mode

You can click **Acquisition Control** → **Trigger Mode**, and select **Off** as **Trigger Mode**.

Note

Off refers to the internal trigger mode.

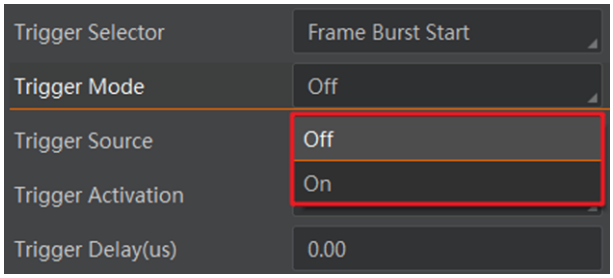

Figure 7-3 Enable Internal Trigger Mode

7.3.2 Enable External Trigger Mode

You can click **Acquisition Control** → **Trigger Mode**, and select **On** as **Trigger Mode**.

Note

On refers to the external trigger mode.

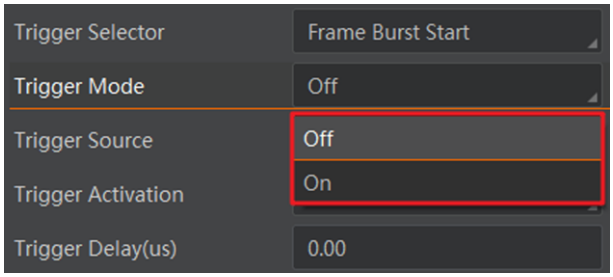

Figure 7-4 Enable External Trigger Mode

Set and Execute Software Trigger Mode

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

Steps

1. Click **Acquisition Control** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **Software** as **Trigger Source**.

4. Click **Execute** in **Trigger Source** to send trigger commands.

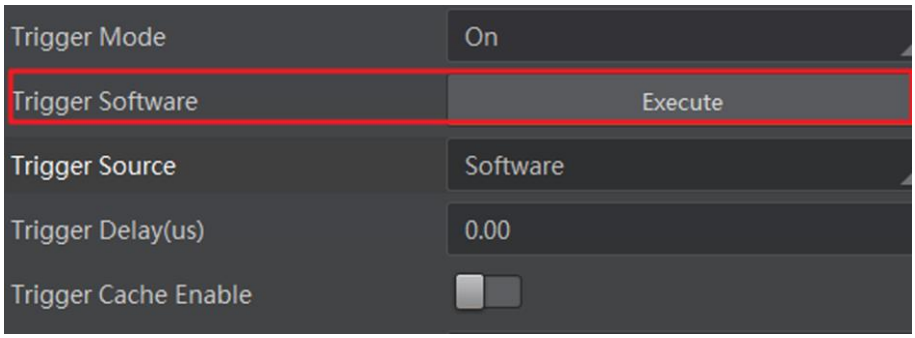

Figure 7-5 Set Software Trigger

Set and Execute Hardware Trigger Mode

In hardware trigger, external device connects with the camera via I/O interface, and sends trigger signal to the camera to acquire images.

Steps

1. Click **Acquisition Control** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **Line 0** as **Trigger Source**.
4. Set **Trigger Activation** according to actual demands.

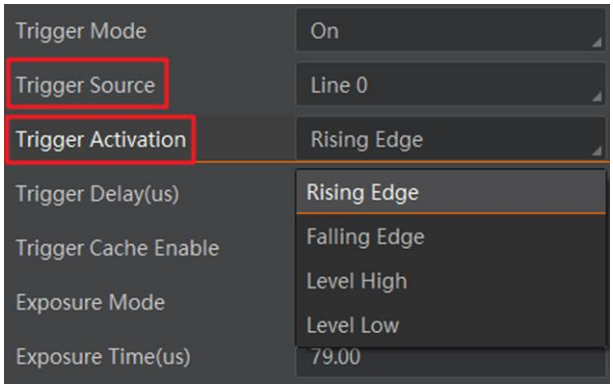

Figure 7-6 Set Hardware Trigger

Set and Execute Counter Trigger Mode

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

Steps

1. Click **Acquisition Control** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **Counter 0** as **Trigger Source**.

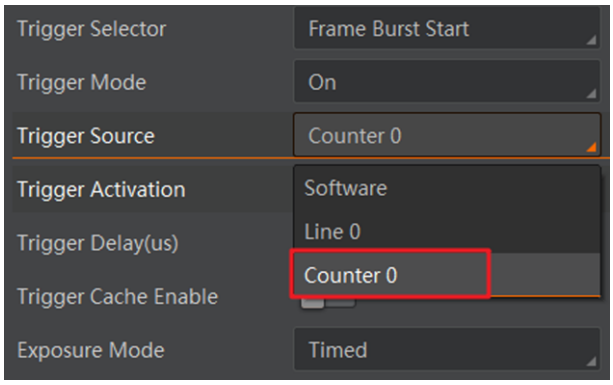

Figure 7-7 Set Counter Trigger

4. Go to **Counter And Timer Control**, and set following parameters according to actual demands.

Counter Selector

It selects counter source. **Counter 0** is available only at present.

Counter Event Source

It selects the signal source of counter trigger. **Line 0** is available. This parameter is disabled by default.

Counter Reset Source

It selects the signal source of resetting counter. **Software** is available only. This parameter is disabled by default.

Counter Reset

It resets counter and it can be executed when you select **Software** as **Counter Reset Source**.

Counter Value

It is the counter value with the range of 1 to 1023.

Counter Current Value

It displays the number of executed external trigger.

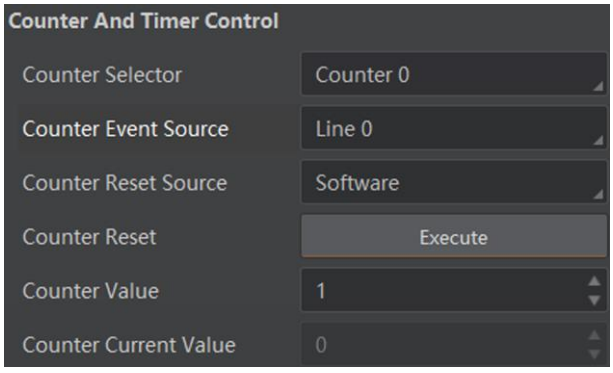

Figure 7-8 Counter and Timer Control Parameters

7.3.3 Set Related Parameters about External Trigger Mode

In external trigger mode, you can set 5 related parameters, including trigger activation, acquisition burst frame count, trigger delay, trigger cache enable, and trigger debouncer.

Note

Different trigger sources can set various parameters in external trigger mode. When hardware trigger or counter trigger is trigger source, you can set all 5 parameters mentioned above. When software trigger is trigger source, you can set acquisition burst frame count, trigger delay, trigger cache enable, and trigger debouncer.

Set Trigger Activation

The camera supports trigger acquisition in the rising edge, falling edge, level high, or level low of the external signal.

Rising Edge

It means that when the level signal sent by external device is in rising edge, the camera 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 camera 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 camera 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 camera is in image acquisition status.

Click **Acquisition Control** → **Trigger Activation**, and select **Rising Edge**, **Falling Edge**, **Level High** or **Level Low** as **Trigger Activation**.

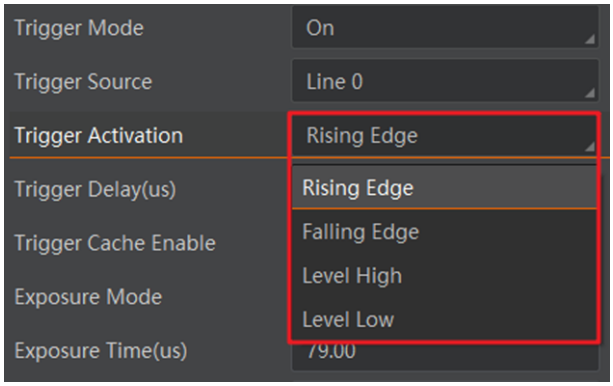

Figure 7-9 Set Trigger Activation

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.

Note

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

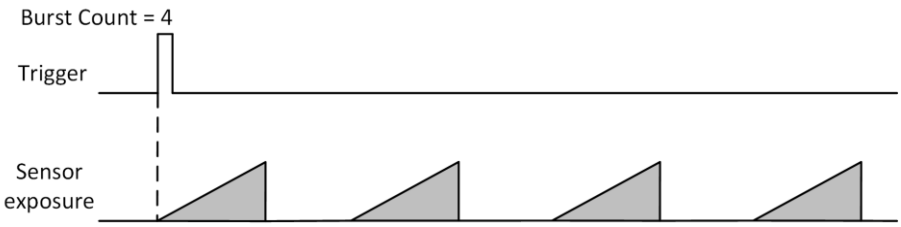

Figure 7-10 Sequence Diagram of Acquisition Burst Frame Count

Set Trigger Delay

The trigger delay function allows the camera to add a delay between the receipt of trigger signal and the moment the trigger becomes active.
Click **Acquisition Control** → **Trigger Delay**, and enter **Trigger Delay**.

Note

The range of **Trigger Delay** is from 0 to 16000000.

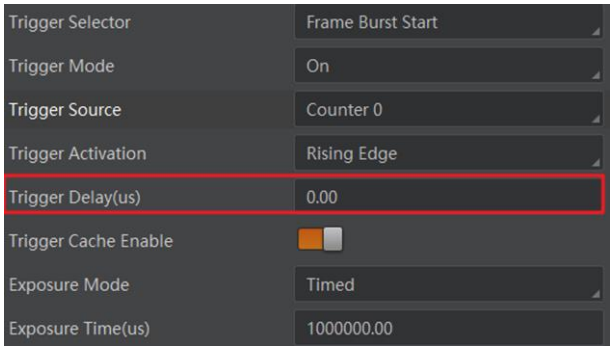

Figure 7-11 Set Trigger Delay

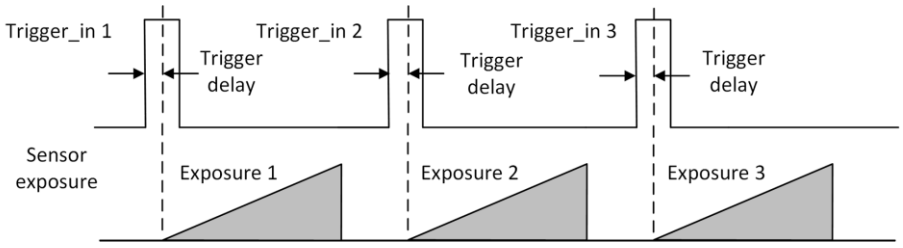

Figure 7-12 Sequence Diagram of Trigger Delay

Set Trigger Cache

The trigger cache function allows the camera to save and process new signal during trigger stage, and the camera can save and process 2 trigger signals at most.
Go to **Acquisition Control** → **Trigger Cache Enable**, and enable **Trigger Cache Enable**.

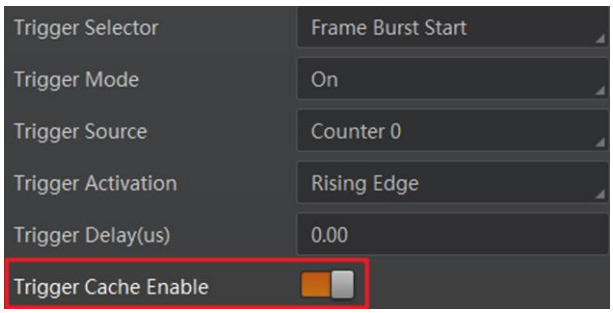

Figure 7-13 Set Trigger Cache

For example, if the camera receives the 2nd trigger signal when it is processing the 1st trigger signal, and the result will be different if you enable **Trigger Cache Enable**.

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

Set Line Debouncer Time

The trigger debouncer function allows the camera to filter out unwanted short external trigger signal that is input to the camera.
Go to **Digital IO Control** → **Line Debouncer Time**, and enter **Line Debouncer Time**.

Note

- The range of **Line Debouncer Time** is from 0 to 1000000.
- When the **Line Debouncer Time** you set is greater than the pulse width of trigger signal, and this trigger signal will be ignored. Otherwise, the trigger signal will be output after delay.

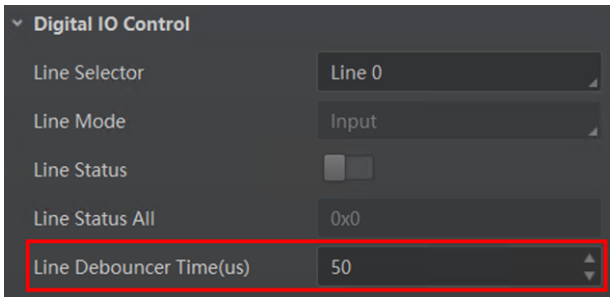

Figure 7-14 Set Line Debouncer Time

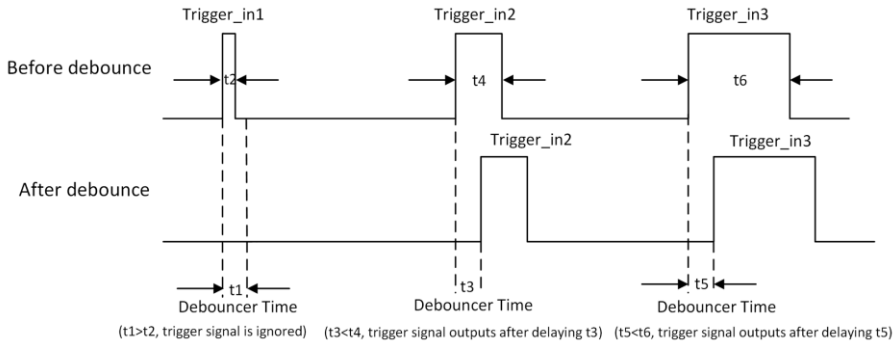

Figure 7-15 Sequence Diagram of Trigger Debouncer

Chapter 8 Image Quality Settings

This section introduces how to set image related parameters of the camera via client software.

Note

For different models of the camera, the specific parameters may differ, and the actual device you purchased shall prevail.

8.1 View Resolution

Note

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

Click **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.

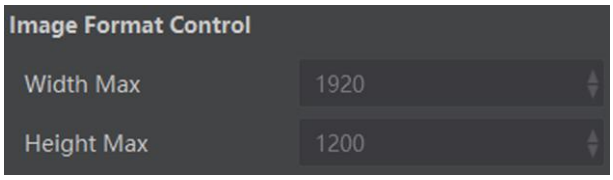

Figure 8-1 View Resolution

8.2 Set ROI

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

Note

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

Click **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.

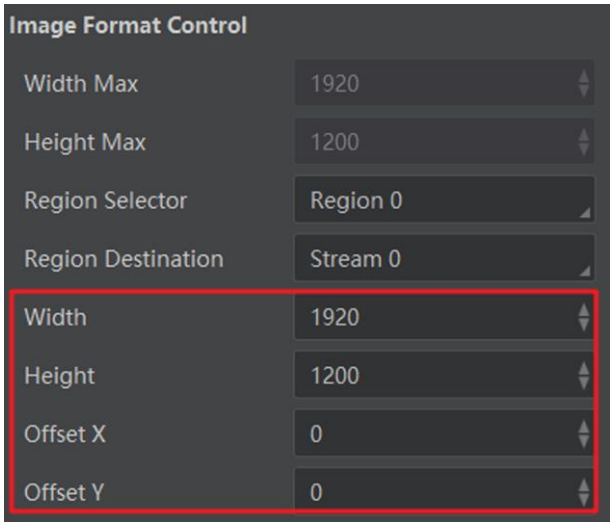

Figure 8-2 Set ROI

8.3 Set Image Reverse

The camera supports horizontal reverse image output which the image is reversed in a horizontal way.

Click **Image Format Control**, and enable **Reverse X**.

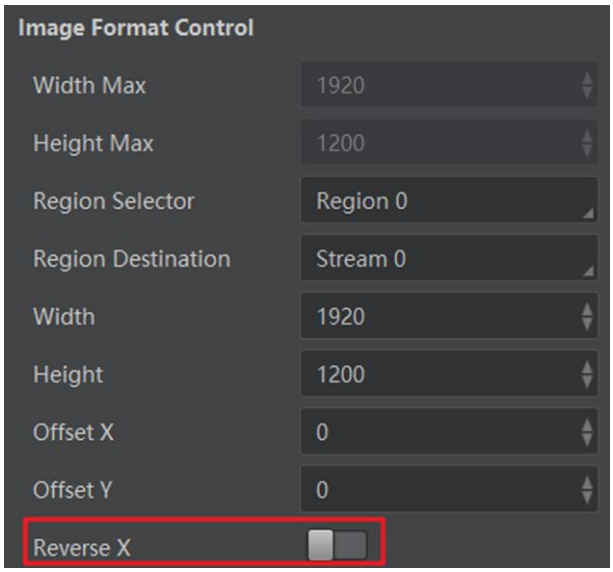

Figure 8-3 Set Image Reverse

8.4 View Pixel Format

This function allows you to view the format of the image data transmitted by the camera.

Note

The camera supports Mono 8 pixel format only.

Click **Image Format Control**, and view **Pixel Format** and **Pixel Size**.

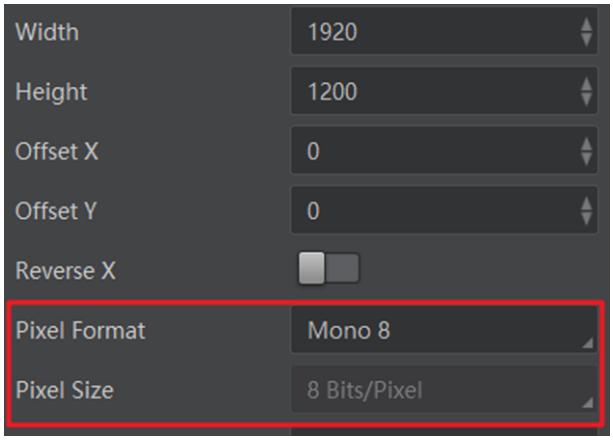

Figure 8-4 View Pixel Format

8.5 Set and Enable Test Mode

This function allows you to check the camera's basic functionality and its ability to transmit

images, and it is used for maintenance purposes and failure diagnostics.

Note

This function is disabled by default. At this point, the outputted image by the camera is real-time image. If this function is enabled, the outputted image is test image.

Click **Image Format Control** → **Test Pattern**, and select **Test Pattern** according to actual demands.

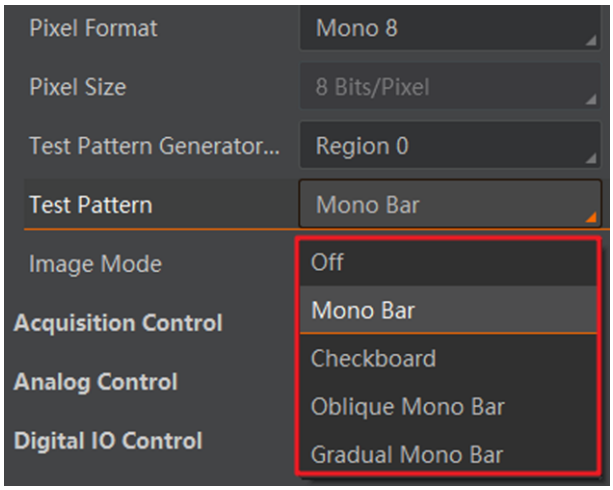

Figure 8-5 Set and Enable Test Mode

The camera offers 4 test patterns, including **Mono Bar**, **Checkboard**, **Oblique Mono Bar**, and **Gradual Mono Bar**.

Figure 8-6 Mono Bar Test Pattern

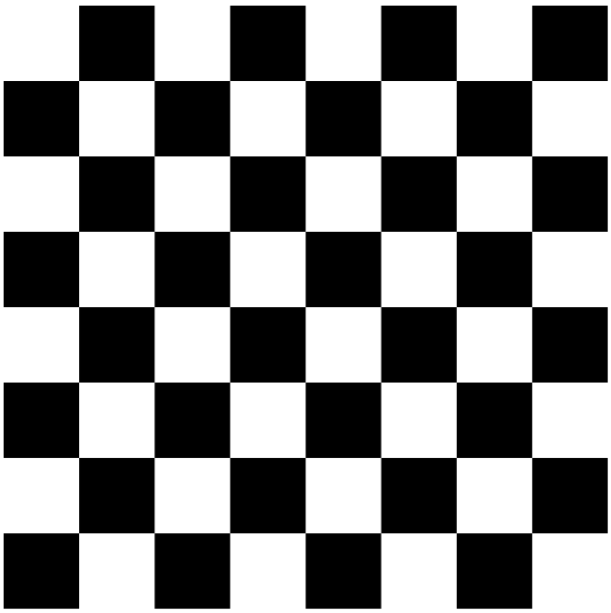

Figure 8-7 Checkboard Test Pattern

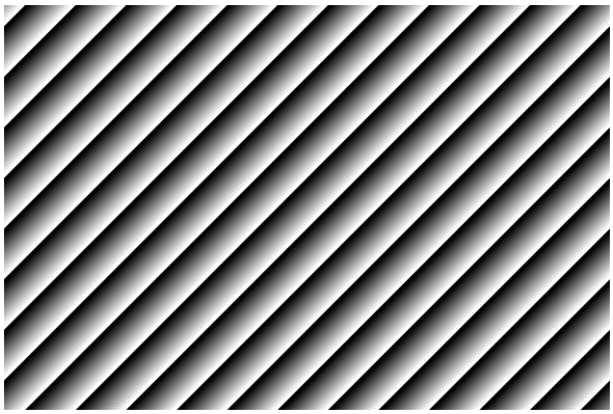

Figure 8-8 Oblique Mono Bar Test Pattern

Figure 8-9 Gradual Mono Bar Test Pattern

8.6 Set Image Mode

The camera supports 2 image modes, including origin image and 3D point cloud. The origin image refers to the original image acquired by the camera, and the 3D point cloud refers to the image that contains height information.
Click **Image Format Control** → **Image Mode**, and select **Image Mode** according to actual demands.

Note

When selecting **3D Point Cloud** as **Image Mode**, make sure you have completed calibration. Otherwise, point cloud data cannot be displayed.

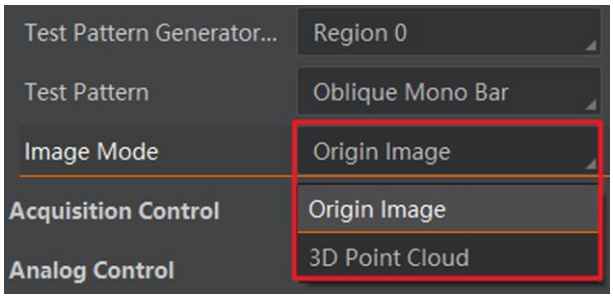

Figure 8-10 Set Image Mode

8.7 Set Exposure Mode

The camera supports 3 types of exposure mode, including **Off**, **Once** and **Continuous**.

Off

The camera exposures according to the value set in **Exposure Time**.

Once

The camera adjusts the exposure time automatically according to the image brightness. After adjusting, it will switch to **Off** mode.

Continuous

The camera adjusts the exposure time continuously according to the image brightness.

Click **Acquisition Control** → **Exposure Auto**, and select **Exposure Auto** according to actual demands.

Note

- When the exposure mode is set as **Once** or **Continuous**, the exposure time should be within the range of **Auto Exposure Time Lower Limit (μs)** and **Auto Exposure Time Upper Limit (μs)**.

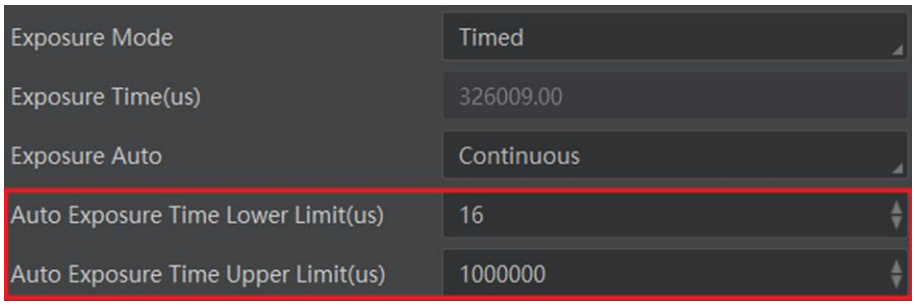

Figure 8-11 Set Exposure Time under Once or Continuous Mode

- If the camera is under **Continuous** exposure mode, once external trigger mode is enabled, the camera will automatically switch to **Off** exposure mode.

8.8 Set Gain

The camera supports 3 types of gain mode, including **Off**, **Once** and **Continuous**.

Off

The camera adjusts gain according to the value configured by user in **Gain**.

Once

The camera adjusts the gain automatically according to the image brightness. After adjusting, it will switch to **Off** mode.

Continuous

The camera adjusts the gain continuously according to the image brightness.

Click **Analog Control** → **Gain Auto**, and select **Gain Auto** according to actual demands.

Note

- When the gain mode is set as **Once** or **Continuous**, the gain should be within the range of **Auto Gain Lower Limit (dB)** and **Auto Gain Upper Limit (dB)**.

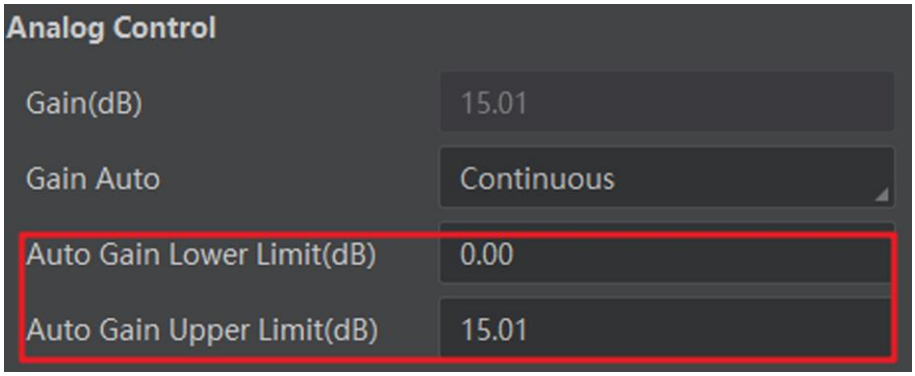

Figure 8-12 Set Gain under Once or Continuous Mode

- When increasing gain, the image noise will increase too, which will influence image quality. If you want to increase image brightness, it is recommended to increase the camera's exposure

time first. If the exposure time reaches its upper limit, and at this point, you can increase gain.

8.9 Set Brightness

The camera brightness refers to the brightness when the camera adjusts image under **Once** or **Continuous** exposure mode, or **Once** or **Continuous** gain mode.

Note

- You should enable **Once** or **Continuous** exposure mode, or **Once** or **Continuous** gain mode first before setting brightness.
- The range of **Brightness** is from 0 to 255.
- After setting brightness, the camera will automatically adjust exposure time to let image brightness reach target one. Under **Once** or **Continuous** exposure mode, or **Once** or **Continuous** gain, the higher the brightness value, and the brighter the image will be.
  Click **Analog Control** → **Brightness**, and enter **Brightness** according to actual demands.

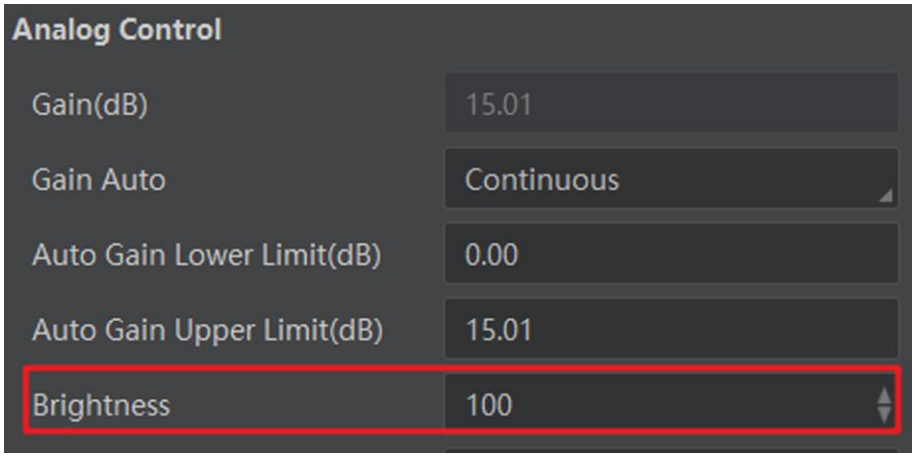

Figure 8-13 Set Brightness

8.10 Set AOI

This function allows the camera to adjust the brightness of the entire image based on the area you set.

Steps

Note

- The camera currently supports selecting **AOI 1** as **Auto Function AOI Selector** only.
- The AOI function is available only when the camera's exposure mode is set as **Once** or **Continuous**.

1. Click **Analog Control** → **Auto Function AOI Selector**.
2. Select **AOI 1** as **Auto Function AOI Selector**.
3. Enter **Auto Function AOI Width**, **Auto Function AOI Height**, **Auto Function AOI Offset X**, and **Auto Function AOI Offset Y** according to actual demands.
4. Enable **Auto Function AOI Usage Intensity**.

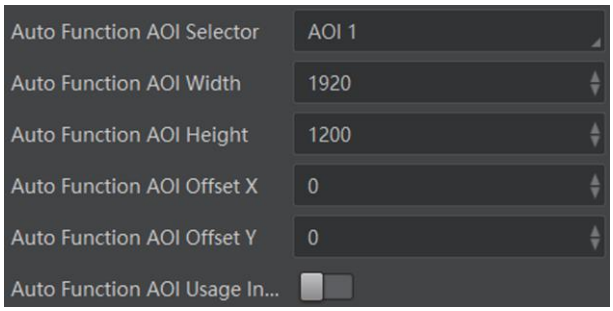

Figure 8-14 Set AOI

8.11 Set Image Output (Chunk)

This function allows you to generate supplementary image data and append that data to every image that you acquire.

Note

- For different models of the camera, this function may differ, and the actual device you purchased shall prevail.
- When the **Image Mode** is **Origin Image**, **Chunk Mode Active** is disabled.
- When the **Image Mode** is **3D Point Cloud**, **Chunk Mode Active** and **Chunk Enable** are enabled automatically.
- **Line Point Num** refers to the effective point number in each line of point cloud image.

Click **Chunk Data Control**, and select **Line Point Num** or **Image** as **Chunk Selector** according to actual demands.

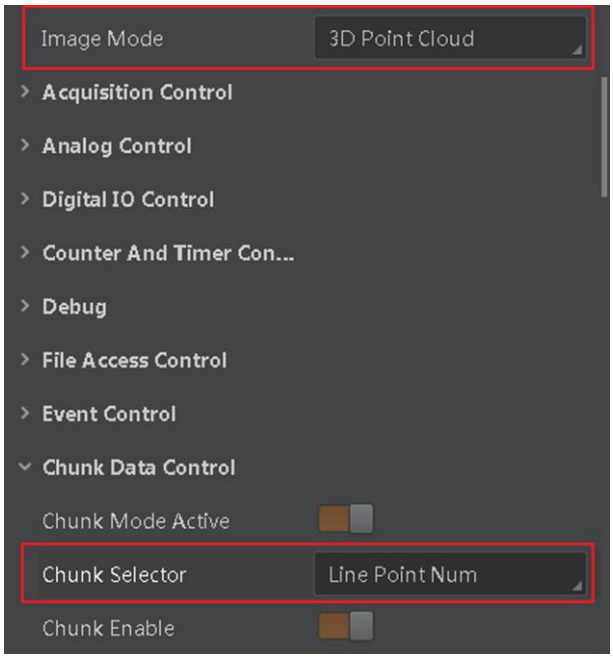

Figure 8-15 Set Image Output (Chunk)

Chapter 9 Signal Output Settings

The signal output settings allow you to set output related parameters. For the camera with a 12-pin power and I/O interface, it has 1 opto-isolated output (Line 1). The output signal of the camera is level signal, and it can be used to control external device like light source.

9.1 Select Output Signal

Steps

1. Click **Digital IO Control** → **Line Selector**.
2. Select **Line 1** as **Line Selector**, and **Strobe** as **Line Mode**.

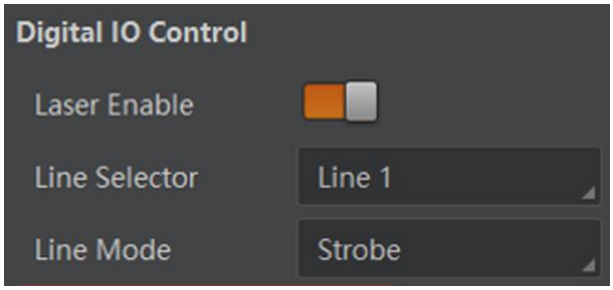

Figure 9-1 Select Output Signal

9.2 Enable line Inverter

The level inverter function allows the camera to invert the electrical signal level of an I/O line, and meets requirements of different devices for high or low electrical signal level.

Steps

1. Click **Digital IO Control** → **Line Selector**.
2. Select **Line 1** as **Line Selector**.
3. Enable **Line Inverter**.

Note

The **Line Inverter** function is disabled by default.

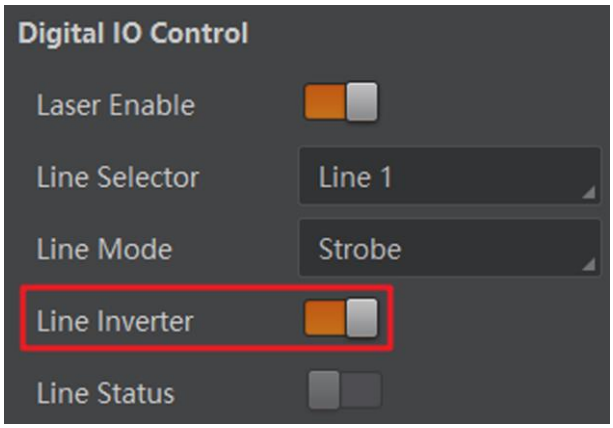

Figure 9-2 Enable line Inverter

9.3 Enable Strobe Signal

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

Steps

1. Click **Digital IO Control**.
2. Set **ExposureActive** as **Line Source**.

Note

The camera currently supports setting **ExposureActive** as **Line Source** only.

3. Enable **Strobe Enable**.

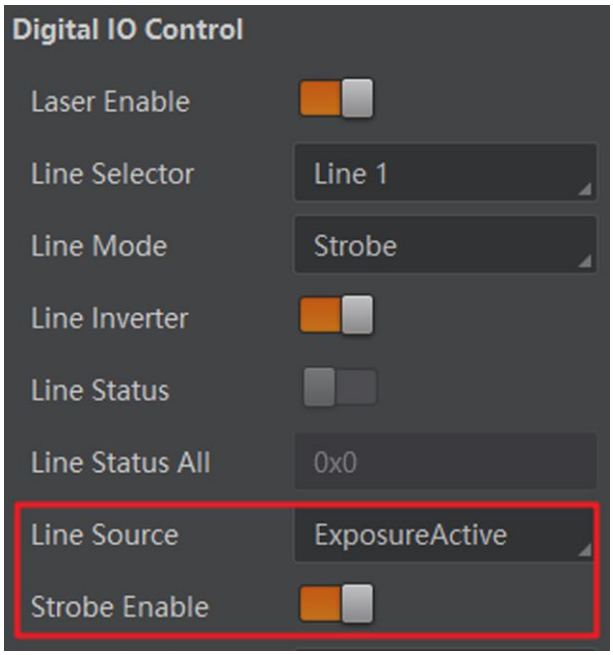

Figure 9-3 Enable Strobe Signal

9.3.1 Set Strobe Line Duration

After enabling strobe signal, you can set its duration. Click **Digital IO Control** → **Strobe Line Duration**, and enter **Strobe Line Duration**.

Note

- The range of **Strobe Line Duration** is from 0 to 10000.
- When the **Strobe Line Duration** value is 0, the strobe duration is equal to the exposure time. Otherwise, the strobe duration is the value you set.

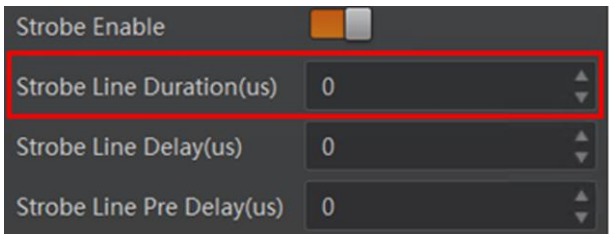

Figure 9-4 Set Strobe Line Duration

9.3.2 Set Line Delay

The strobe line delay function allows the camera to output signal in a delay time. When camera exposure starts, the strobe output does not take effect immediately. Instead, the strobe output

will delay according to the value you set.
Click **Digital IO Control** → **Strobe Line Delay**, and enter **Strobe Line Delay**.

Note

The range of **Strobe Line Delay** is from 0 to 10000.

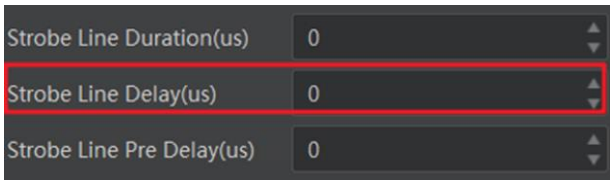

Figure 9-5 Set Strobe Line Delay

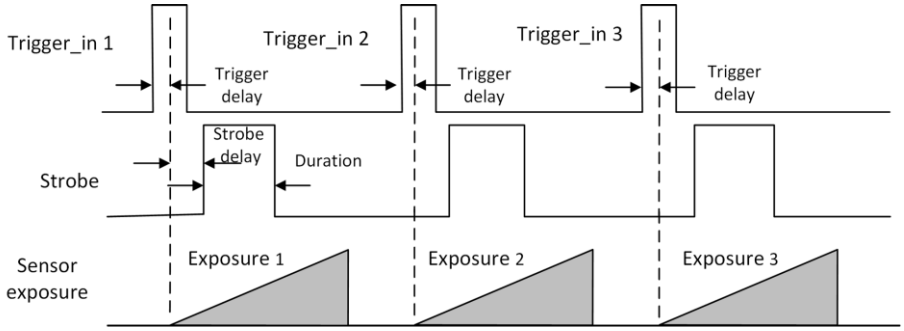

Figure 9-6 Sequence Diagram of Strobe Line Delay

9.3.3 Set Line Pre Delay

The camera supports the function of strobe line pre delay, which means that the strobe signal takes effect early than exposure. This function is applicable to the external devices that have slow response speed.
Click **Digital IO Control** → **Strobe Line Pre Delay**, and enter **Strobe Line Pre Delay**.

Note

The range of **Strobe Line Pre Delay** is from 0 to 5000.

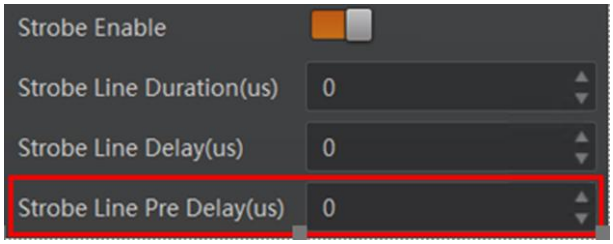

Figure 9-7 Set Strobe Line Pre Delay

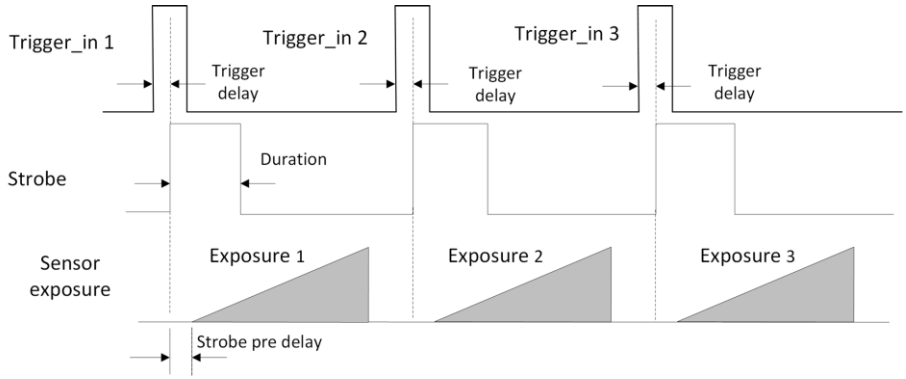

Figure 9-8 Sequence Diagram of Strobe Line Pre Delay

Chapter 10 Laser Settings

10.1 Enable Laser

The laser is used to send laser stripe to the measured object.
Click **Digital IO Control** → **Laser Enable**, and enable **Laser Enable**.

Note

Make sure the laser is enabled during system calibration and device operation.

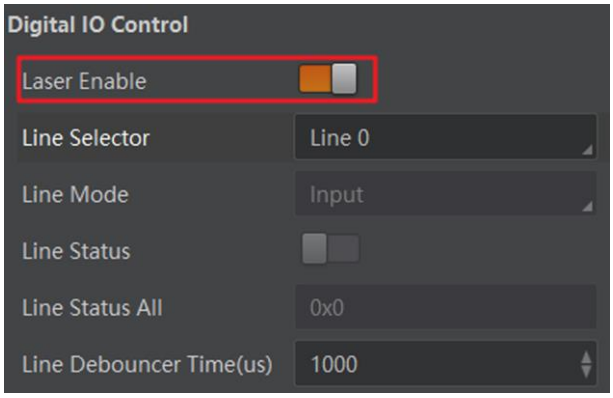

Figure 10-1 Enable Laser

10.2 Set Laser Stripe

In the **Laser Stripe Control** attribute, you can set laser related parameters.

Min Line Width and Max Line Width

It refers to the range of laser stripe width.

Note

Adjusting this parameter will affect the extraction of the laser stripe edge.

Binary Threshold

It refers to the image binarization threshold. When the laser stripe is dark, reduce this parameter value. When the laser stripe is bright, increase this parameter value.

Neighbor Contrast

It refers to the gray difference between the laser stripe edge and image background.

Note

Adjusting this parameter will affect the extraction of the laser stripe edge.

Neighbor Length

It refers to the length between the laser stripe edge and image background.

Note

Adjusting this parameter will affect the extraction of the laser stripe edge.

Click **Laser Stripe Control**, and enter **Min Line Width**, **Max Line Width**, **Binary Threshold**, **Neighbor Contrast**, and **Neighbor Length** according to actual demands.

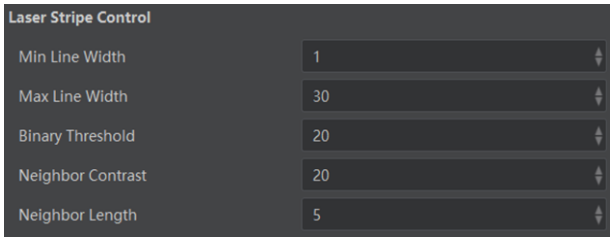

Figure 10-2 Set Laser Stripe

Chapter 11 User Set Customization

This function allows you to save or load camera settings. The camera supports 4 sets of parameters, including 1 default set and 3 user sets, and the relation among 4 sets of parameters is shown below.

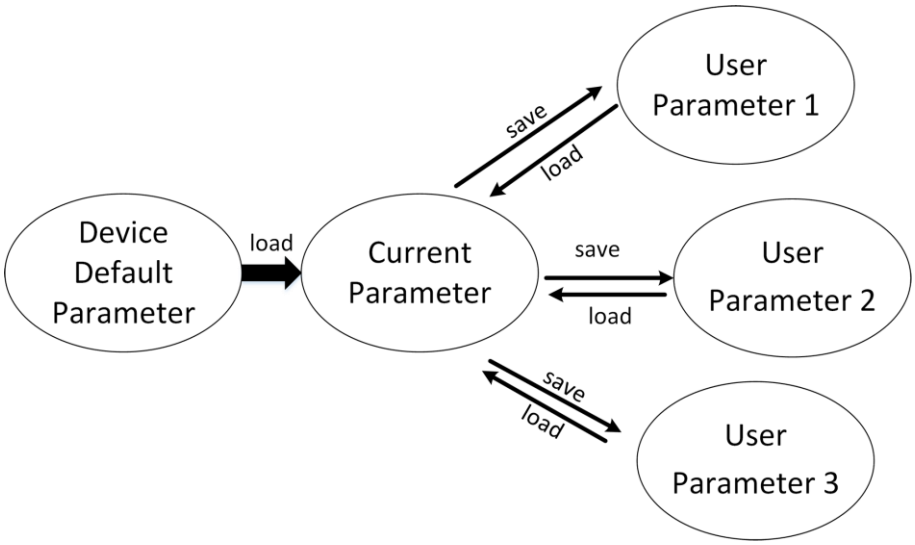

Figure 11-1 Parameter Relation

11.1 Set User Set

You can click **User Set Control** → **User Set Selector** to select user set parameters you want to save or load.

11.2 Save User Set

Steps

1. Click **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.

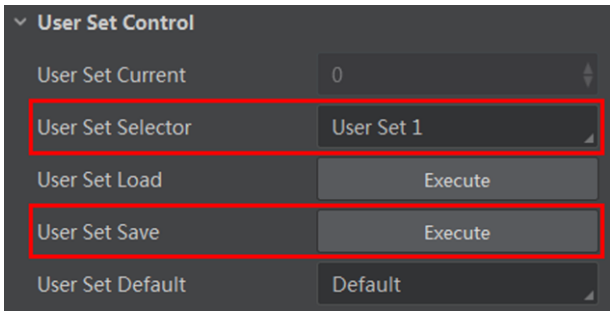

Figure 11-2 Save User Set

11.3 Load User Set

Steps

Note

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

1. Click **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.

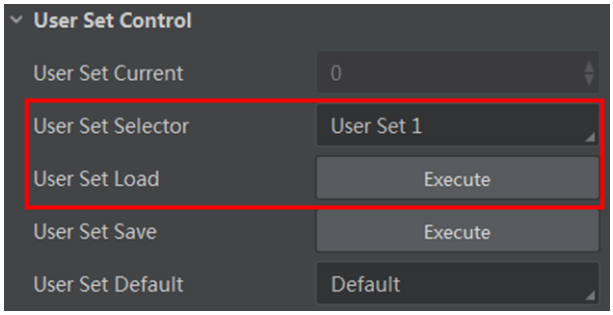

Figure 11-3 Load User Set

11.4 Set User Default

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

Note

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

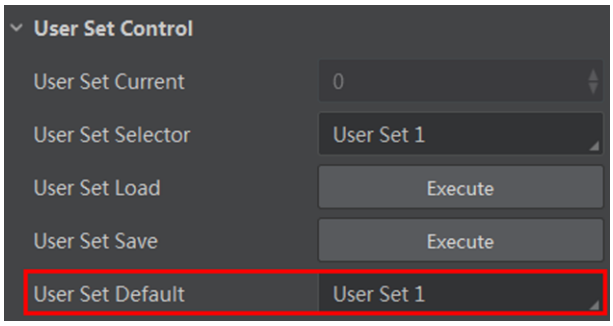

Figure 11-4 Set User Default

Chapter 12 Camera Transport Layer Viewing

12.1 Check Heartbeat

The heartbeat detection function allows you to check if the camera's transmission channel is working properly.
Click **Transport Layer Control** → **GEV Heartbeat Timeout**, and enter **GEV Heartbeat Timeout**.

Note

The heartbeat detection function is enabled by default, and you can go to **GEV Heartbeat Disable** to disable it.

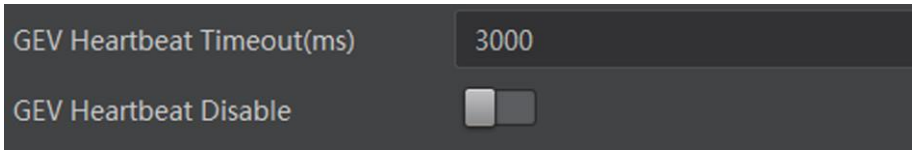

Figure 12-1 Check Heartbeat

12.2 Set Camera Connection Mode

The camera supports connecting with PC via DHCP or persistent IP. The camera will obtain IP according to the following order.

1. If the camera's Persistent IP function is enabled and the configured persistent IP is available, and the camera will load the persistent IP. Otherwise execute 2.
2. If DHCP function is enabled and the obtained IP address is available, and the camera will load the IP address obtained by DHCP. Otherwise execute 3.
3. LLA obtains IP address.

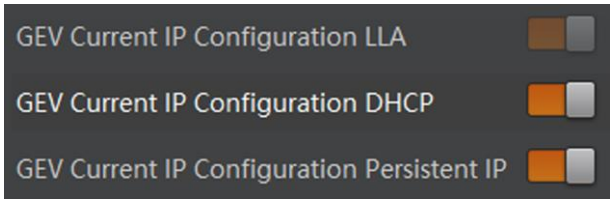

Figure 12-2 Set Camera Connection Mode

Chapter 13 System and Maintenance

13.1 Device Control

In the **Device Control** attribute, you can view camera information, edit camera name, reset camera, etc.

Note

For different models of the camera, the specific parameters may differ, and the actual camera your purchased shall prevail.

Table 13-1 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 sensor.
Device Vendor Name	Read only	It is the name of device manufacturer.
Device Model Name	Read only	It is the device model.
Device Manufacturer Info	Read only	It is the manufacturer information.
Device Version	Read only	It is the device version.
Device Firmware Version	Read only	It is the device firmware version.
Device Serial Number	Read only	It is the device serial number.
Device User ID	Read and write	Device name and it is empty by default. You can set according to your preference.
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.
Device Connection Selector	Read and write	It selects device connection.
Device Connection Speed (Mbps)	Read only	It is the device connection speed.

Parameter	Read/Write	Description
Device Link Selector	Read and write	It selects device link.
Device Link Speed (Mbps)	Read only	It is the link speed.
Device Link Connection Count	Read only	It is the link connection quantity.
Device Link Heartbeat Mode	Read and write	It enables heartbeat mode or not.
Device Stream Channel Count	Read only	It counts stream channel quantity.
Device Stream Channel Selector	Read and write	It selects stream channel.
Device Stream Channel Type	Read only	It is the stream channel type.
Device Stream Channel Link	Read only	It is the stream channel link quantity.
Device Stream Channel Endianness	Read only	It is the image data endianness.
Device Stream Channel Packet Size (B)	Read and write	It is the data packet size.
Device Event Channel Count	Read only	It is the event channel quantity that the device supports.
Device Character Set	Read only	It is the character set used in register.
Device Reset	Read and write	Click **Execute** to reset the device.
Device Temperature Selector	Read and write	It selects device temperature. It currently supports **Sensor** only.
Device Temperature	Read only	It displays the real-time temperature of the device you selected in **Device Temperature Selector.**
Find Me	Read and write	Click **Execute** to find the device.
Device Max Throughput (bps)	Read only	It is the maximum flow of device operation.

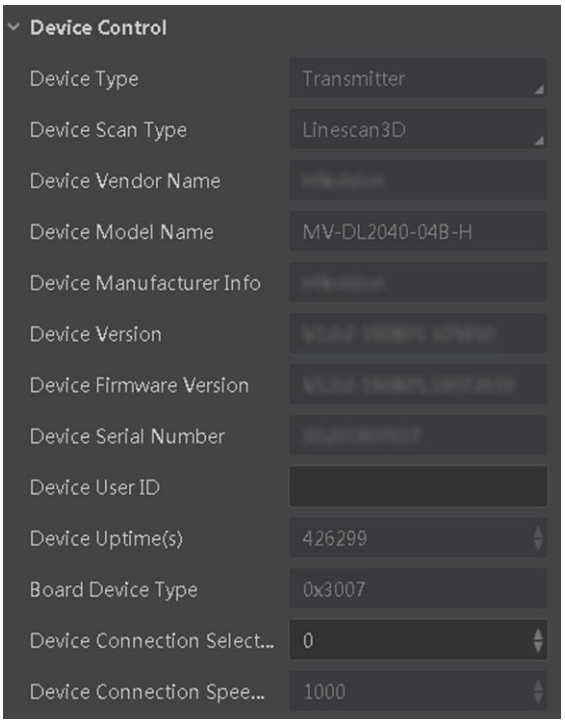

Figure 13-1 Device Control

13.2 Set File Access Control

The file access control function allows you to import and export the device's calibration data, including **LSL Sensor Calibrate LUT**, **LSL Sensor Calibrate**, **LSL System Calibrate**, and **LSL Algorithm Param**.

Steps

LSL Sensor Calibrate LUT

It refers to the Look-Up Table (LUT) of the camera calibration and laser calibration of linear structure light.

LSL Sensor Calibrate

It refers to the camera calibration and laser calibration of linear structure light.

LSL System Calibrate

It refers to the system calibration of linear structure light.

LSL Algorithm Param

It refers to the algorithm parameter of linear structure light.

1. Click **File Access Control** → **File Selector**.
2. Select calibration data you want to import or export as **File Selector**.

3. Click to open file access window.
4. Click **Import** or **Export** to import or export calibration data.

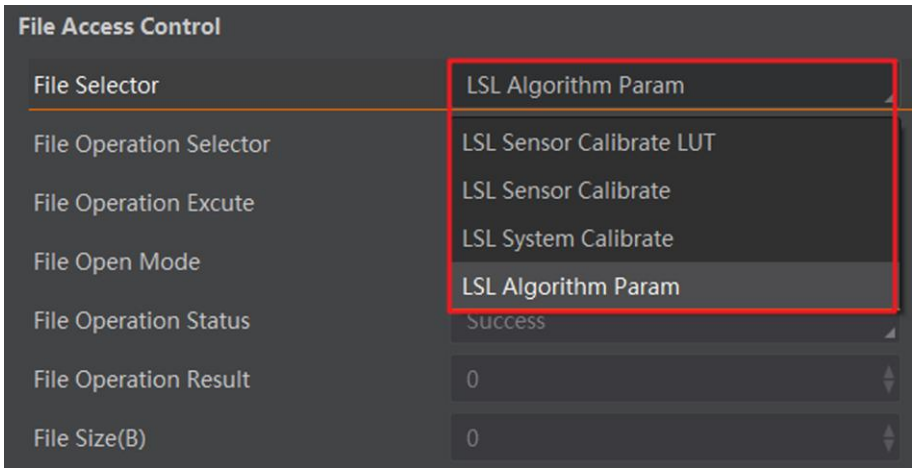

Figure 13-2 Set File Access Control

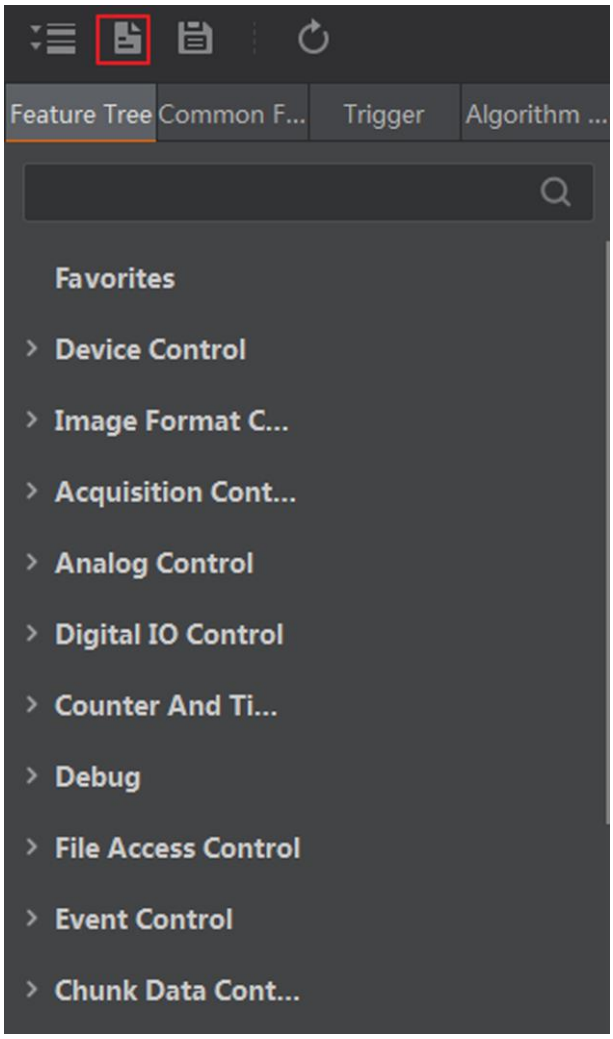

Figure 13-3 Open File Access Window

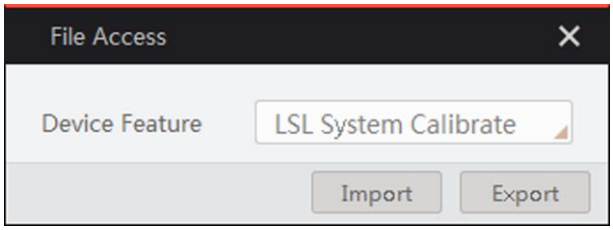

Figure 13-4 Import or Export Calibration Data

13.3 Set Event Control

This function allows the camera to output event messages.

Steps

Note

The camera supports outputting volume measurement result only, and you can select **Dws Volume** as **Event Selector**.

1. Click **Event Control** → **Event Selector**.
2. Select **Dws Volume** as **Event Selector**.
3. Select **Notification On** or **Notification Off** as **Event Notification** to output measurement result or not.

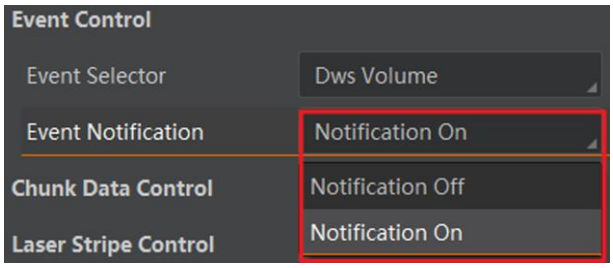

Figure 13-5 Set Event Control

13.4 Upgrade Firmware

The camera supports upgrading firmware via client software.

Before You Start

Disconnect the camera with client software.

Steps

Note

- Please use the firmware package of the corresponding camera model for upgrading.
- Do not power off the camera or disconnect network during upgrading.
- The camera will reboot automatically after updating the firmware.

1. Click in the control toolbar to open **Device List** window.
2. Right click the device, and click **Upgrade Firmware**.

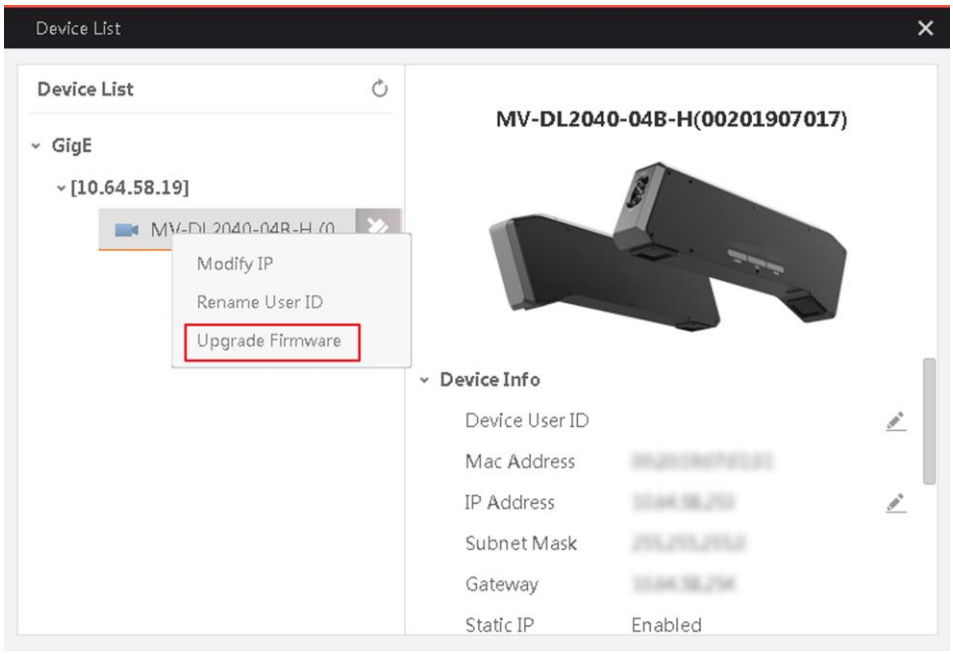

Figure 13-7 Upgrade Firmware

3. Click to select upgrade file.

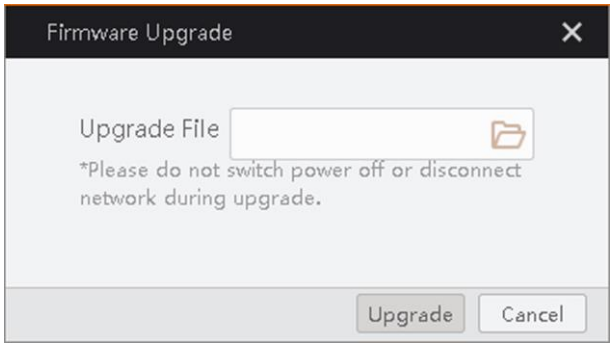

Figure 13-8 Select Upgrade File

4. Click **Upgrade**.

Chapter 14 FAQ (Frequently Asked Question)

14.1 What can I do if the algorithm, the camera, and the client software do not match?

Problem

There are 2 versions for both algorithm library and camera, and many versions for client software. The exception occurs when outputting volume data due to mismatch among algorithm library, camera and client software.

Solution

Use the latest version of camera firmware, 3DMVS, calibration tool, and software.

14.2 What can I do if the system outputs the volume information very slow?

Problem

The system outputting volume information is timed out.

Solution

It is recommended to overlap the first line of the calibration plate with the laser line. After the end of the package leaves the reference point and moves through volume measurement trigger distance within 1 ms (10 ms at most), the algorithm library outputs the volume value.

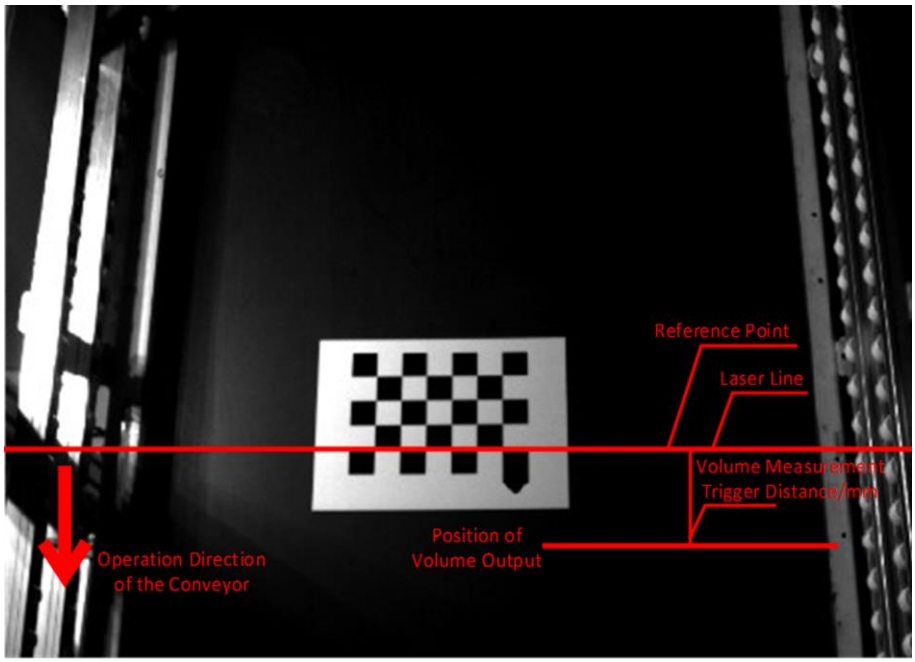

Figure 14-1 Capture Image 1

Most of scenarios are like the figure shown below. After the end of the package leaves the reference point and moves through volume measurement trigger distance within 1 ms (10 ms at most), the algorithm library outputs the volume value.

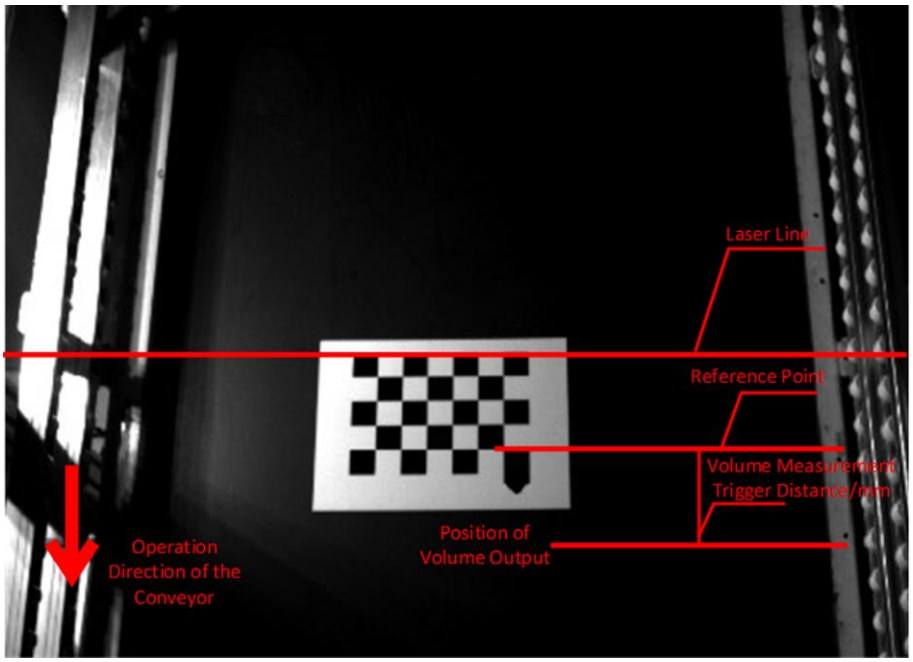

Figure 14-2 Capture Image 2

Note

Only when the end of the package leaves the laser line, the algorithm library outputs the volume value.

14.3 Why the image quality is not good?

Problem

The exposure time is larger than 8000 μs, or the image quality is influenced by the environment lighting.

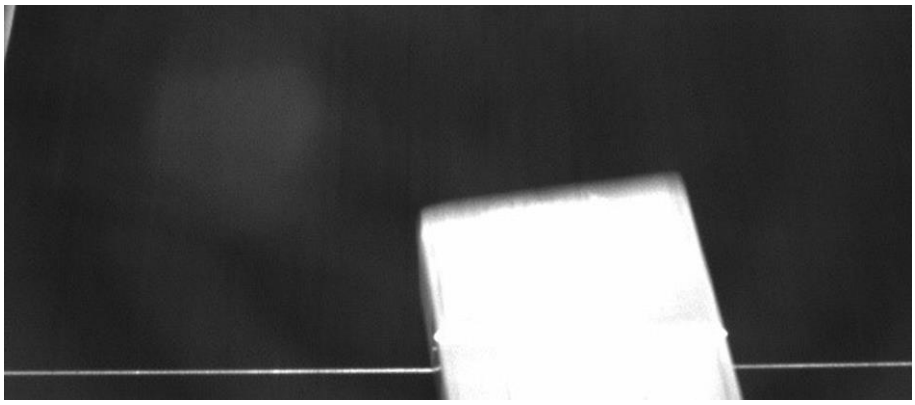

Figure 14-3 Overexposure

Figure 14-4 Environment Lighting

Solution

- Set the exposure time smaller than 4,000 μs.
- Set binary threshold larger than 40.

- Adjust the gain if the black package cannot be detected.
- Avoid the direct sunlight in the scene.

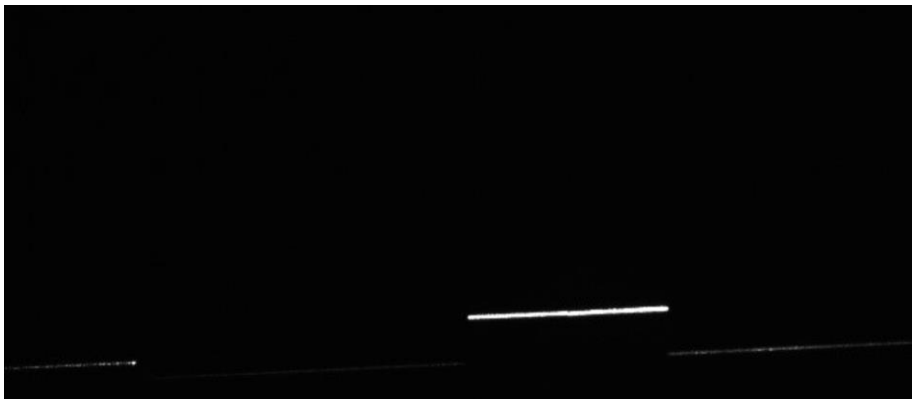

Figure 14-5 High Quality Image Example

14.4 Why the volume information is not correct?

Problem

- The camera is out of focus.
- The camera is not calibrated.
- Related parameters have not been adjusted after system calibration.
- The width and the length of the camera are not accurate.

Solution

- Make sure the camera is not out of focus.
- Make sure you have finished system calibration.
- If the height is not accurate after calibration, you can adjust height compensate as ±10 mm according to actual demands.
- If the length is not accurate after calibration, you can adjust step distance according to actual demands. If the measured object length is longer than the actual value, it is recommended to reduce step distance value.
- Make sure the object to be measured is placed parallel to the laser line first, and then start the conveyor belt to test whether the output width is accurate or not. If the length is not accurate, you should adjust the step distance. If the width is not accurate, you should calibrate again.
- If the problem still exists after trying above solutions, please contact technical support via e-mail: tech_support@hikrobotics.com for assistance.


See Far, Go Further