Hikrobot Co., Ltd.

ID5000X Series Industrial Code Reader

User Manual

HIKROBOT

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Symbol	Description
Danger	Indicates a hazard with a high level of risk, which if not avoided, will 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.

Available Model

This manual is applicable to the ID5000X Series Industrial Code Reader.

Contact Information

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Contents

Chapter 1 Safety Instruction

The safety instructions are intended to ensure that the user can use the device correctly to avoid danger or property loss. Read and follow these safety instructions before installing, operating and maintaining the device.

1.1 Safety Claim

- To ensure personal and device safety, when installing, operating, and maintaining the device, follow the signs on the device and all safety instructions described in the manual.
- The note, caution and danger items in the manual do not represent all the safety instructions that should be observed, but only serve as a supplement to all the safety instructions.
- The device should be used in an environment that meets the design specifications, otherwise it may cause malfunctions, and malfunctions or component damage caused by non-compliance with relevant regulations are not within the scope of the device's quality assurance.
- Our company will not bear any legal responsibility for personal safety accidents and property losses caused by abnormal operation of the device.

1.2 Safety Instruction

⚠Caution

- In the use of the device, you must be in strict compliance with the electrical safety regulations of the nation and region.
- It is forbidden to install the indoor device in an environment where it may be exposed to water or other liquids. If the device is damp, it may cause fire and electric shock hazard.
- If the device emits smoke, odor or noise, please turn off the power and unplug the power cord immediately, and contact the dealer or service center in time.
- Use the power adapter provided by the official manufacturer. The power adapter must meet the Limited Power Source (LPS) requirements. For specific requirements, please refer to the device's technical specifications.
- Make sure the plug is properly connected to the power socket.
- It is strictly forbidden to wire, maintain, and disassemble the device is powered on. Otherwise, there is a danger of electric shock.
- Avoid aiming the lens at strong light such as lighting, sunlight, or laser beams, etc., otherwise the image sensor will be damaged.
- It is forbidden to touch the image sensor directly. If necessary, please moisten a soft clean cloth with alcohol and gently wipe off the dust. When the device is not in use, please add a dust cover to protect the image sensor.
- 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.

- Please dispose of the device in strict accordance with the relevant national or regional regulations and standards to avoid environmental pollution and property damage.

Note

- Check whether the device's package is in good condition, whether there is damage, intrusion, moisture, deformation, etc. before unpacking.
- Store and transport the device according to the storage and transport conditions of the device, and the storage temperature and humidity should meet the requirements.
- Do not use the product in extremely heat, extremely cold, dusty environment, corrosive environment or high humidity environment.
- The device should not be placed with exposed flame sources, such as lighted candles.
- Please read the manual and safety instructions carefully before installing the device.
- 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.

1.3 Electromagnetic Interference Prevention

- Make sure that the shielding layer of cables is intact and 360° connected to the metal connector when using shielded cables.
- Do not route the device together with other equipment (especially servo motors, high-power devices, etc.), and control the distance between cables to more than 10 cm. Make sure to shield the cables if unavoidable.
- The control cable of the device and the power cable of the industrial light source must be wired separately to avoid bundled wiring.
- The power cable, data cable, signal cable, etc. of the device must be wired separately. Make sure to ground them if the wiring groove is used to separate the wiring and the wiring groove is metal.
- During the wiring process, evaluate the wiring space reasonably, and do not pull the cables hard, so as not to damage the electrical performance of the cables.
- If the device is powered on and off frequently, it is necessary to strengthen the voltage isolation, and consider adding a DC/DC isolation power supply module between the device and the adapter.
- Use the power adapter to supply power to the device separately. If centralized power supply is necessary, make sure to use a DC filter to filter the power supply of the device separately before use.
- The unused cables of the device must be insulated.
- When installing the device, if you cannot ensure that the device itself and all equipment connected to the device are well grounded, you should isolate the device with an

insulating bracket.

- To avoid the accumulation of static electricity, ensure that other equipment (such as machines, internal components, etc.) and metal brackets on site are properly grounded.
- During the installation and use of the device, high voltage leakage must be avoided.
- Use a figure-eight bundle method if the device cable is too long.
- When connecting the device and metal accessories, they must be connected firmly to maintain good conductivity.
- Use a shielded network cable to connect to the device. If you use a self-made network cable, make sure that the shielding shell at the aviation head is well connected to the aluminum foil or metal braid of the shielding cable.

1.4 Light Source Prevention

- This device has a retinal blue light hazard that belongs to the class II hazard. Do not observe the light source during the operation.
  - The safety distance of the light source is 1 m.
  - Protective measures like wearing safety goggles are required when installing, maintaining and debugging the device.

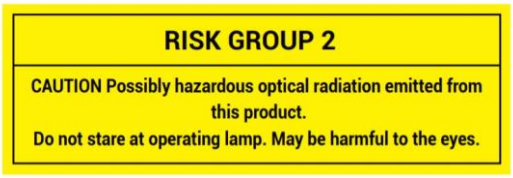


Figure 1-1 Blue Light Hazard

- 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.

Chapter 2 Overview

2.1 Introduction

The ID5000X series industrial code reader can read different types of codes. It adopts deep learning algorithm to process images with good robustness, and can recognize various complex codes. The device has a built-in screen to view the statistical data and adjust parameters without accessing to the client. It also supports board selection of accessories, such as multi-color light source or wafer light source, for improving code-reading ability and scene adaptability.

2.2 Key Features

- Adopts built-in deep learning algorithm to read codes with good robustness.
- Adopts a built-in screen to view the statistical data and adjust parameters via pressing the button.
- Adopts multiple indicators to show device status from different sides.
- Rotatable cable design for flexible mounting.
- Adopts controllable light source design to provide diversified light according to workpiece material.
- Adopts I/O interfaces for input and output signals.
- Supports high-precision sensors to get the installation position.
- Supports broad selection of accessories, such as multi-color light source or wafer light source, for improving code-reading ability and scene adaptability.
- Supports HDR function to provide high-contrast image.

Note

- The specific functions may differ by device models.
- Refer to the device's datasheet for specific parameters.

Chapter 3 Appearance

Note

Appearance here is for reference only. Refer to the device's datasheet for detailed dimension information.

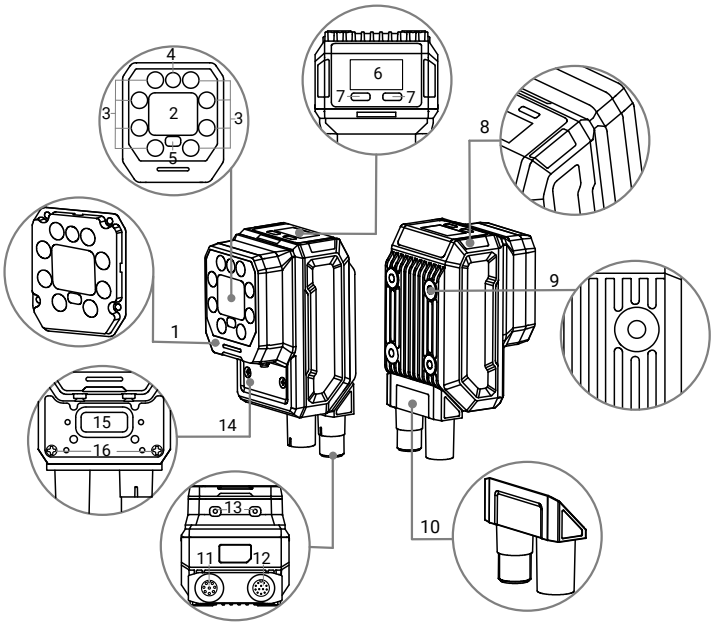


Figure 3-1 Appearance of M12-Mount Device with Light Source and Mechanical Focusing

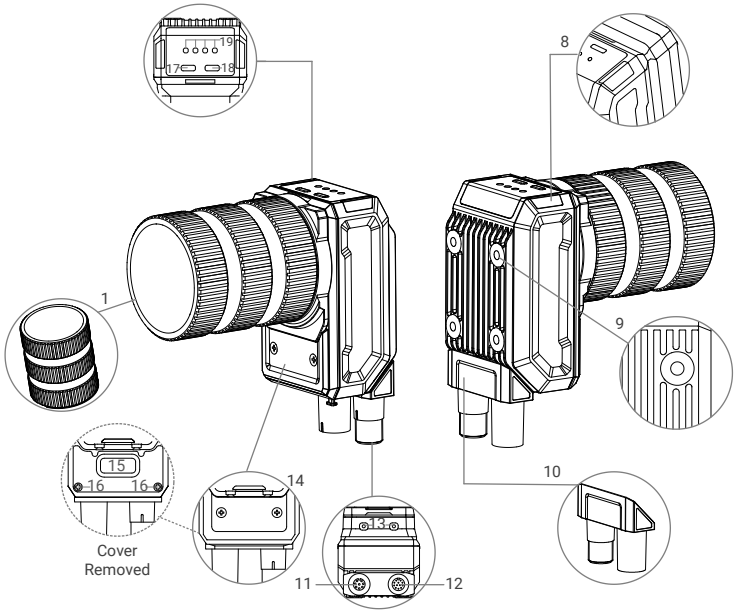


Figure 3-2 Appearance of C-Mount Device Without Light Source and Lens

Table 3-1 Component Description

No.	Name	Description
1	Lens Cap	• For M12-mount device, it refers to half-polarization lens cap by default, and can be replaced with other lens cap. Transparent and polarization lens caps are optional. • For C-mount device, only transparent lens cap is supported.
2	Acquisition Module	It is used to acquire images.
3	Light Source	• For M12-mount device, it refers to 8 red LED lights providing light for improving code reading effect. **Note** The default color of LED lamps is red. White, blue, and IR are optional. • For C-mount device without light source, you can connect the external light source.
4	Aiming System	For M12-mount device, it is orange LED light used to show the field of view and aim targets.
5	TOF	For M12-mount device, it is used to detect the position of targets, and realize focus and image parameter adjustment.
6	Screen	For M12-mount device, it is used to view the statistical data and adjust parameters via pressing the button.
7	Button	You can press the button on the screen to switch menu or confirm the information. Only M12-mount device supports.
8	Indicator	It is a 360° visible indicator for observing the device's status. Refer to section for ***Indicator*** details.
9	Screw Hole (Back Side)	It is used to fix the device, and you should use M4 screws.
10	Right Angle Rotation Structure	It is used to rotate the device's cables.
11	Power and I/O Connector	It provides power, I/O, and serial port signal. Refer to section ***12-Pin M12 Connector*** for details.
12	Network Interface	It is fast Ethernet for transmitting data.
13	Screw Hole (Bottom Side)	It is used to connect to the light source, protective cover, and other accessories, and you should use M2 screws.
14	Extended Connector Cover	Unscrew the two screws on the cover to remove the unit, and then you can see the extended light connector.
15	Extended Light Connector	It is used to connect to the flash light source, multi-color light source, or wafer light source. Remove the front cover before

No.	Name	Description
		connection.
16	Screw Hole (For Securing Light)	It is used to secure the extended light, and you should use M2.5 screws.
17	Trigger Button	For C-mount device, it is used to trigger the device. When the device is in trigger mode, press the button and the device triggers once.
18	Smart Tune Button	For C-mount device, you can press this button to execute auto parameter adjustment.
19	Indicators on Top	For C-mount device, they refer to PWR indicator, LNK indicator, and U1/U2 indicator for observing the device's status. ● PWP Indicator: It refers to the power indicator, and it is solid green when the power supply is normal. ● LNK Indicator: It refers to the network indicator, and it is flashing in yellow when the network connection is normal. ● U1/U2 Indicator: It refers to the user-defined indicator. You can select an event, and observe the indicator to check whether the function is normal or not. The events include code reading succeeded, finding me, system operation, trigger status, Pin 3 output, Pin 4 output, and Pin 5 output. The colors of U1 and U2 indicators are green.

Chapter 4 Connector and Indicator

4.1 12-Pin M12 Connector

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

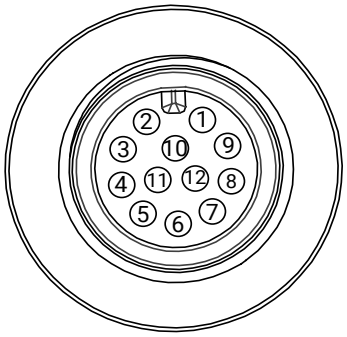


Figure 4-1 12-Pin M12 Connector

Table 4-1 Pin Definitions

No.	Signal	I/O Signal Source	Description	Cable Color		Pin Diameter
1	DC-PWR	--	Direct current power supply positive	White		26
2	GND	--	Power supply ground	Brown		26
3	OPTO_OUT3	Output signal line of pin 3	I/O isolated output 3	Green		26
4	OPTO_OUT4	Output signal line of pin 4	I/O isolated output 4	Yellow		26
5	OPTO_OUT5	Output signal line of pin 5	I/O isolated output 5	Gray		26
6	OUT_COM	Output signal ground of pin 3/4/5	Output common port	Pink		26
7	OPTO_IN0	Input signal line of pin 0	I/O isolated input 0	Blue		26
8	OPTO_IN1	Input signal line of pin 1	I/O isolated input 1	Red		26
9	OPTO_IN2	Input signal line of pin 2	I/O isolated input 2	Black		26
10	IN_COM	Input signal ground of pin 0/1/2	Input common port	Purple		26
11	RS-232_R	--	RS-232 input	Gray/Pink		26

No.	Signal	I/O Signal Source	Description	Cable Color		Pin Diameter
12	RS-232_T	--	RS-232 output	Red/Blue		26

Note

- You should refer to the table above and the label attached to the supplied power and I/O cable to wire the device.
- The cable colors mentioned above are applicable to the 12-pin M12 to open I/O cable sold by our company. If other cables are used, please refer to the actual one.

4.2 Indicator

You can observe the device's indictor to check whether the device operates normally or not.

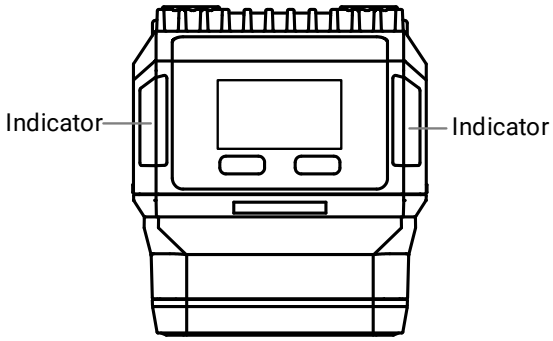


Figure 4-2 Device Indicator

Table 4-2 Indicator Description

Indicator Status		Device Status
	Flashing Green	Successful Code Reading (Not Streaming)
		Successful Code Reading
		Successful Code Reading (Parameter Adjustment)
	Flashing Red	Failed Code Reading (Not Streaming)
		Failed Code Reading
		Failed Code Reading (Parameter Adjustment)
--	Unlit	Not Streaming
		Streaming
		Parameter Adjustment Ended
		Power Off or Network Exception

Chapter 5 Installation

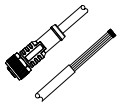
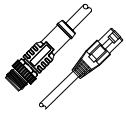
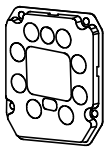
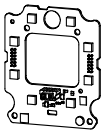
5.1 Installation Preparation

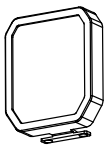
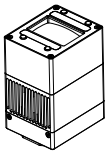
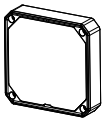
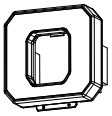
You need to prepare following accessories before installation. The included accessories are in the device's package, and you can purchase optional accessories according to actual demands.

Table 5-1 Included Accessories

No.	Name	Image	Quantity	Description
1	Installation Bracket		1	It is used to fix the device.

Table 5-2 Optional Accessories

No.	Name	Image	Quantity	Description
1	Power and I/O Cable		1	(Required) It refers to the 12-pin M12 to open I/O cable.
2	M12 Network Cable		1	(Required) It refers to the 8-pin M12 to RJ45 network cable.
3	Power Adapter		1	(Required) You should select suitable power adapter or switch power supply according to the device power supply and consumption in the specification.
4	Lens		1	It refers to the C-mount lens, and is required for C-mount device.
5	Lens Cap		1	For M12-mount device, the lens cap can be replaced with other lens cap according to actual demands, such as transparent or polarization lens cap.
6	Light Board		1	For M12-mount device, the light board can be replaced with white/blue/IR light board according to actual demands.

No.	Name	Image	Quantity	Description
7	ESD Protective Cover		1	For M12-mount device, it is used to achieve ESD protection.
8	Wafer Light Source		1	It meets the requirements of wafer scene.
9	Multi-Color Light Source		1	It provides multiple colors, such as white, red, blue, and green, to meet the requirements of different backgrounds for code reading.
10	Flash Light Source		1	It meets the requirements of scene with far distance, wide field of view, or high reflectivity.

5.2 Install Device

Before You Start

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

Steps

1. Select a suitable installation location according to the device's field of view.

Note

Refer to the device's specifications for detection range.

2. Adjust the device's right angle rotation structure according to the installation location.

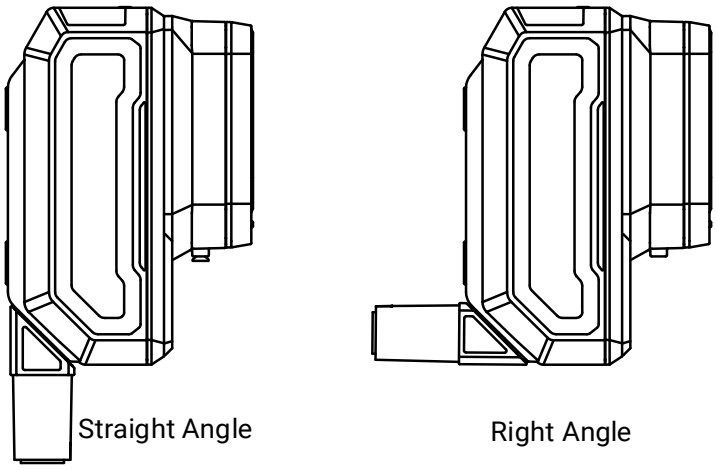


Figure 5-1 Adjust Right Angle Rotation Structure

Note

Refer to the device's specifications for the dimension of the right angle rotation structure.

3. Use M3 screws to fix the installation bracket to the device, as shown below.

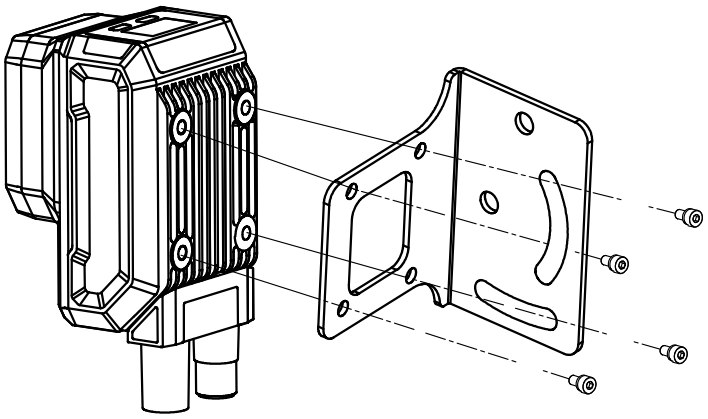


Figure 5-2 Fix Installation Bracket

4. Install the device to the installation location.

5.3 Wire Device

After installing the device, you should use the power and I/O cable, M12 network cable, and power adapter to wire and power the device.

Before You Start

- Make sure that the device in the package is in good condition and all assembly parts are included.
- Make sure that all related equipment is powered off during the installation.
- When connecting the device to the cable, confirm whether it is a motion cable and pay attention to the following points during use.

- The installation of the cable should avoid excessive bending and tension, especially at the connector. The motion cable should be secured in a manner that prevents mechanical stress or sharp bends at the connection.
- The non-motion cable should not be used in scenarios that may cause damage, such as bending, dragging, or twisting.
- The use of motion cable should comply with the cable specifications, including but not limited to bending radius, movement speed, and service life.

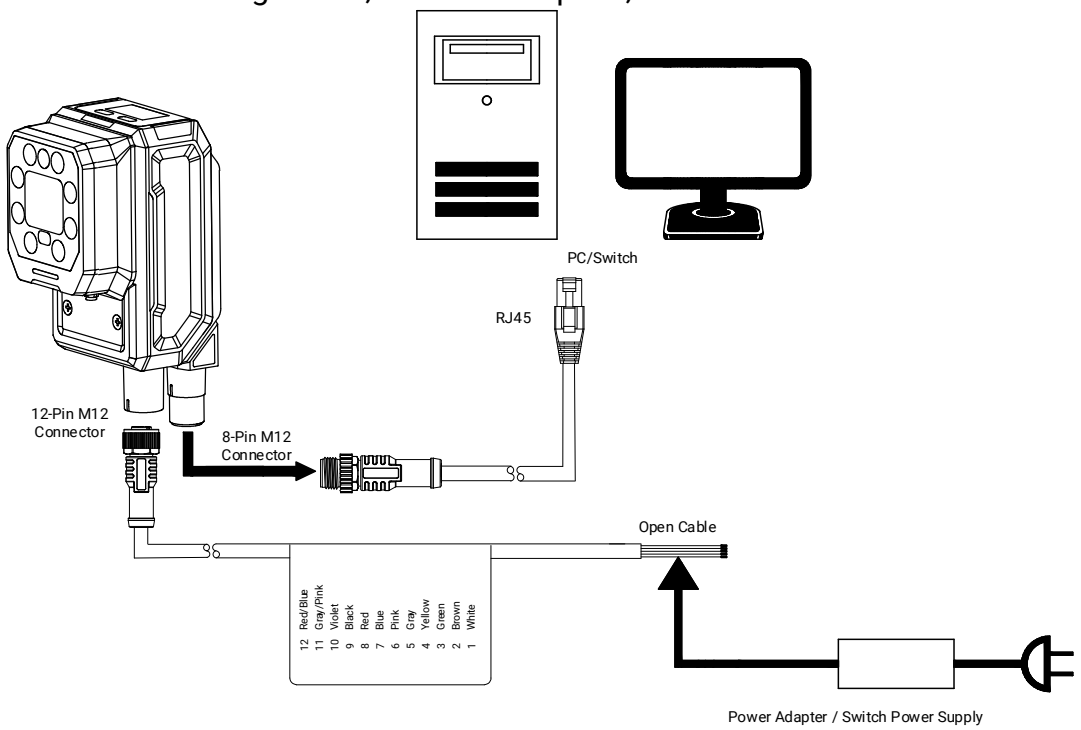


Figure 5-3 Device Connection

Steps

1. Use the supplied 8-pin M12 network cable to connect the device's network interface.

Note

The connector has screw thread, and it is recommended to tighten the connector before using the device to reduce looseness due to the vibration on-site.

2. Insert the RJ45 port of the supplied M12 network cable to the PC.
3. Use the supplied power and I/O cable to connect the device's 12-pin connector.

Note

The connector has screw thread, and it is recommended to tighten the connector before using the device to reduce looseness due to the vibration on-site.

4. Select suitable power adapter to connect the open cables of the supplied power and I/O cable for power supply.

Note

- The device's indicator is in blue color after the device is powered on.
- Refer to the section ***12-Pin M12 Connector*** for specific cable color of open lines.

Chapter 6 Quick Start Guide

6.1 Configure via Screen

For M12-mount device, you can press the button to view the statistical data and adjust parameters on the screen.

Figure 6-1 Device Screen

The picture below shows the settings on the screen.

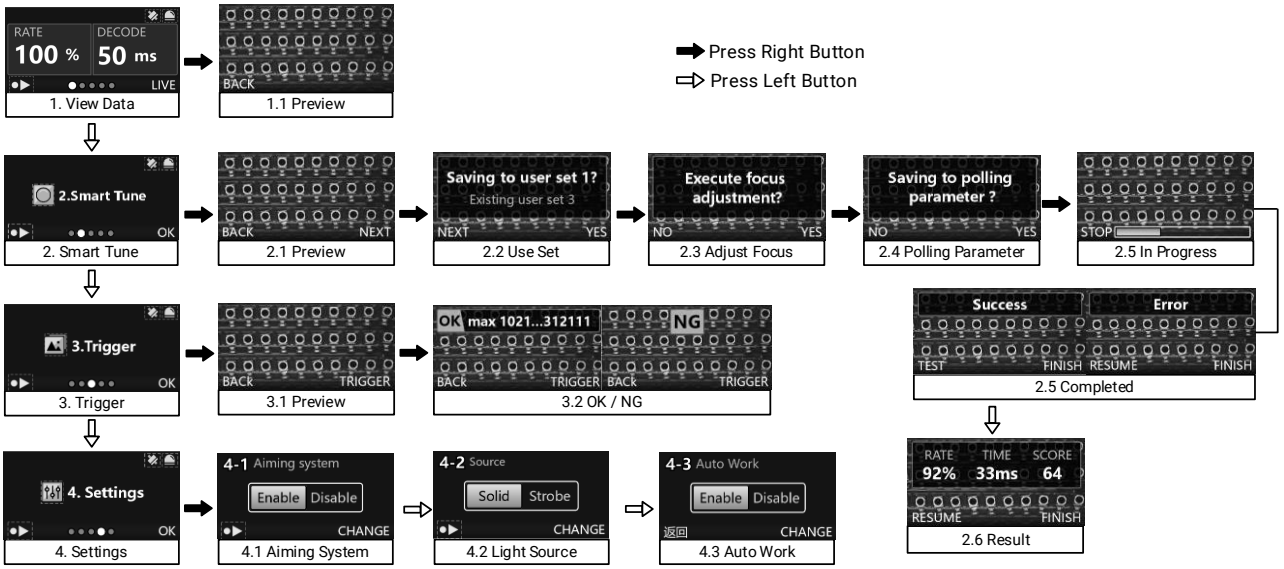


Figure 6-2 Settings on Screen

Note

Refer to section *Screen Settings* for details.

6.2 Configure via Client Software

6.2.1 Install Client Software

IDMVS is a client software for device configuration and remote operations.

Steps

Note

- The client software is compatible with 32/64-bit Windows 7/10, 64-bit Windows 11, and 32/64-bit Linux operating systems. Here we take Windows as an example.
- You can get the client software installation package from ***https://en.hikrobotics.com/***. It is recommended to use the client software with version of V5.0.0 and later.
- The graphic user interface may differ by different versions of client software you use.
- The client integrates the required drivers for the device, so there is no need to download and install other drivers.

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 6-3 Installation Interface

6. Finish the installation according to the interface prompts.

6.2.2 Set PC Environment

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

Note

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

Steps

1. Go to PC network settings: **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.
- Select **Use the following IP address** to set an IP address for the PC manually.
3. Make sure that the PC and the device are in the same network segment.

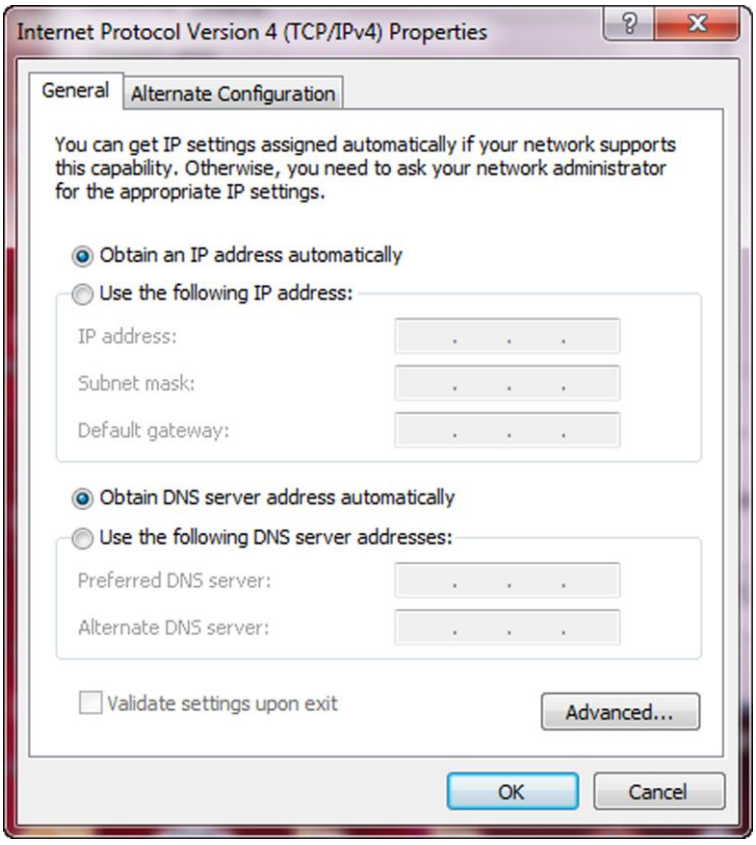


Figure 6-4 Set PC Network

6.2.3 Set Device Network and Connect to Client Software

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 to find the device.
3. Click the device to be connected, and click **Modify IP**.
4. Set the IP address of the device in the same network segment with the PC, and click **OK**.

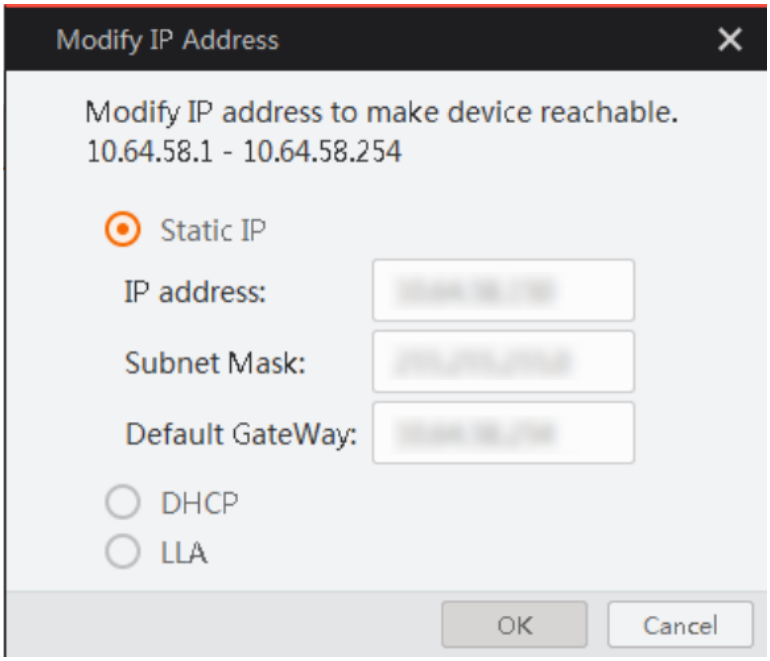


Figure 6-5 Modify IP Address

5. Double click the device in device list or click to connect it to the client software.

6.2.4 Quick Start Guide

In IDMVS client software V5.0.0 and later, the **Read Config** module supports a quick code reading and fine-tuning process, helping you capture clear and complete codes.

Before You Start

- Connect to the device and enter the main window. The **Fast Config** tab under **Read Config** is displayed by default.
- Set the location for auto saving of fine-tuning parameters. You can select the current parameter or a specific polling parameter. For polling parameter, you can enter **Param Polling** on the left-side bar to view the each polling parameter.

Note

Polling parameters 1 to 8 are displayed by default. You can add new polling parameters in **Param Polling**, and up to 16 polling parameters can be added.

The flow of quick start guide is shown as below.

Figure 6-6 Flow of Quick Start Guide

Steps

1. (Optional) Click **Real Grabbing** to adjust the test object to the proper position within the field of view.

Note

In trigger scenarios, you should enable **Trigger On** located on the right side of **Real Grabbing**; and in non-trigger scenarios, disable the **Trigger On**.

2. Click **Auto Focus**, and the device will automatically adjust to the optimal focus position.

Note

- If multiple planes are detected, the plane with the maximum readable codes will be selected as the focal plane.
- For further fine-tuning of focus parameters, you can click **Focus Settings**.

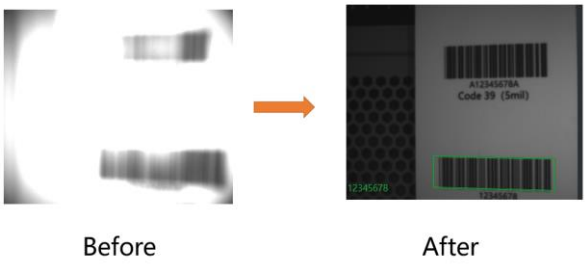


Figure 6-7 Auto Focus Effect

3. Click **Self Adapt**, and the device will automatically adjust the parameters, such as exposure, gain, light source, symbology, and code quantity.

Note

- During the self-adapt process, the client software supports incremental addition of symbologies. It only adds new symbologies, and will not remove pre-configured one.
- During the self-adapt process, Pharmacode is not compatible with 1D codes. If Pharmacode is enabled, the client software will not execute self-adapt tune on any 1D codes. If any 1D code is enabled, the client software will not execute self-adapt tune on Pharmacode.
- If further adjustment of self-adapt parameters and light source parameters is required, you can click **Selfadapt Settings** on the right. If the desired code still cannot be read, you can click **Code Select** to select more symbologies or adjust the number of codes.

- When setting the number of codes, if the default parameters are used, the client software will execute self-adapt on 1D codes, 2D codes, and stacked codes based on the actual number of detected codes.

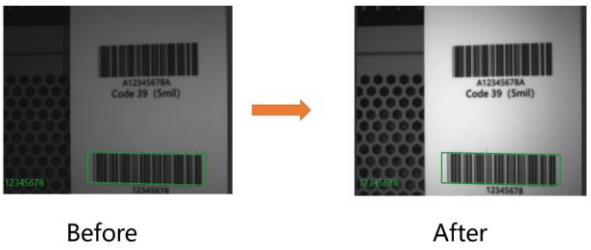


Figure 6-8 Self Adapt Effect

After successful self-adapt adjustment, the parameters will automatically be saved, and you can select the polling parameter to save. After saving, enter **Param Polling** on the left-side bar to view the each polling parameter.

- If the parameter auto-saving location is **Polling ParamN**, the fine-tuned parameters can only be saved to this polling parameter.
- If the parameter auto-saving location is **Current Param**, the fine-tuned parameters can be saved to **Polling ParamN** under the current user parameters.

Note

Polling parameters 1 to 8 are displayed by default. You can add new polling parameters in **Param Polling**, and up to 16 polling parameters can be added.

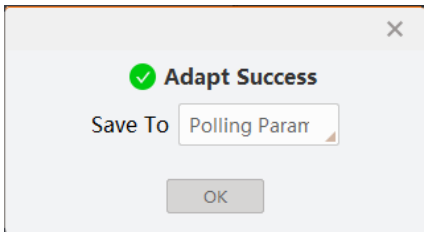


Figure 6-9 Save to Polling Param

4. Click **Start Work** or **Single Trigger** to start a single streaming.

Note

- If there are requirements for communication protocols, I/O, formatted output, etc., you can switch to the corresponding module through the left-side navigation bar to configure parameters.
- When trigger is off, you can filter duplicate codes based on time. When trigger is on, the device supports filtering duplicate codes within a single trigger signal.

5. You can view the real-time image and execute ROI drawing in the image preview panel

on the right side. The image preview panel is divided into the following parts.

Figure 6-10 Image Preview Panel

- **Preview Panel Toolbar**: It mainly includes image capture tools, ROI tools, and auxiliary tools.
- **Image Display Area**: You can preview the images captured by the device here. If multiple devices are used, the image capture effects can be previewed via setting **Multi Frame**.
- **Image Capture Data Bar**: Select the image capture data to be displayed at the bottom of the image preview panel via in the lower left corner, including sensor rate, algorithm rate, transmission rate, image number, resolution, serial number, etc.

6. View history and statistical data.

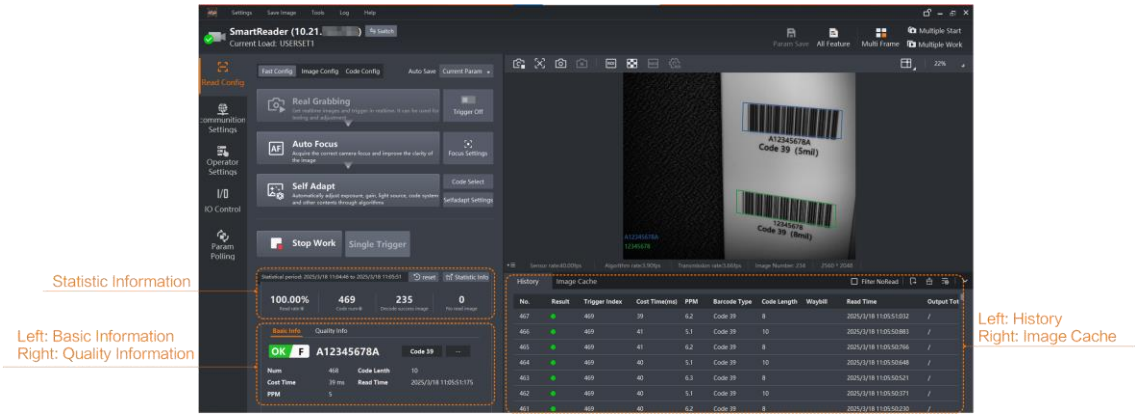


Figure 6-11 View Decoding Information

7. After settings, you should click to save parameters to user parameter sets. Otherwise, the settings will be lost after device restart.
8. After settings and preview, if you want to save the images, there are three ways for saving.

- **Client Image Storage**: Save the device images to the local PC through the client software.
- **Camera Image Storage**: Save images to storage medium inside the device.
- **FTP Image Storage**: Set up the local PC as an FTP server and the device as an FTP client, transferring the device images or decoding results to the local PC through the FTP service.

Chapter 7 Screen Settings

Note

Only M12-mount device has a screen.

7.1 Screen Introduction

After the device is connected, you can view the code data and set some parameters on the screen.

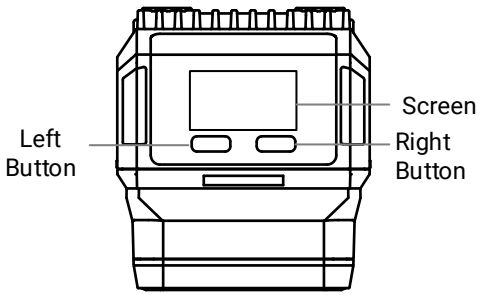


Figure 7-1 Device Screen

- Screen: Displays code data and parameter settings.
- Button: Switch and confirm the parameters. When you press and hold any button for up to 5 seconds, the data on the current screen will be automatically cleared.

Note

- When no operation is executed after 3 minutes, the screen will be automatically locked.
- After the device is connected, a message “PC connection…” will prompt on the screen.

Figure 7-2 PC Connection

7.2 Function Introduction

7.2.1 View Data

You can view code reading rate and decoding time cost on the screen.

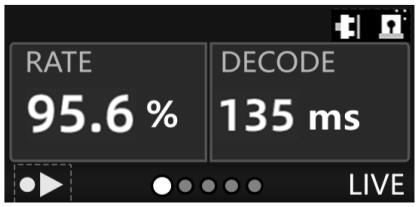


Figure 7-3 Code Data

Note

- Press the right button to show the live view.
- The icon on the upper-right corner means successful network connection, and the icon means successful power connection.

7.2.2 Smart Tune

The smart tune function allows you to adjust the device's focus position and other image parameters by one-key operation

Steps

1. Press the left button to switch to the **Smart Tune**.

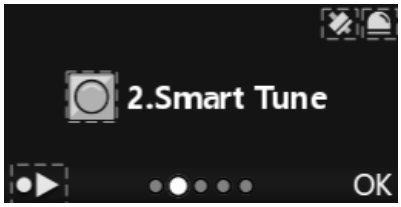


Figure 7-4 Smart Tune

2. Press the right button to select **OK**.
3. (Optional) Press the button to select the user set.

Note

User set 1/2/3/4 are available.

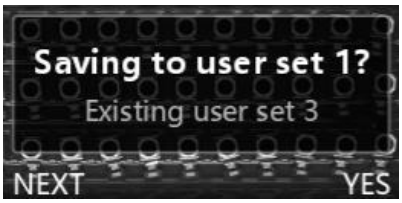


Figure 7-5 User Set

4. (Optional) Press the button to adjust focus.

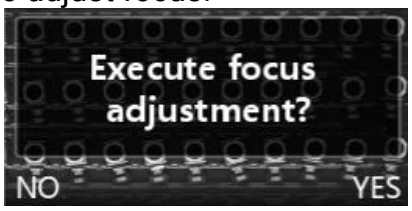


Figure 7-6 Focus Adjustment

5. (Optional) Press the button to save polling parameter.

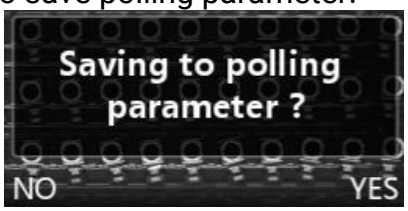


Figure 7-7 Polling Parameter

6. The device will execute the smart tune and the message will prompt.

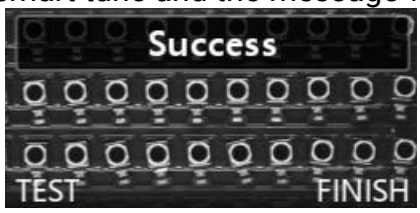


Figure 7-8 Success

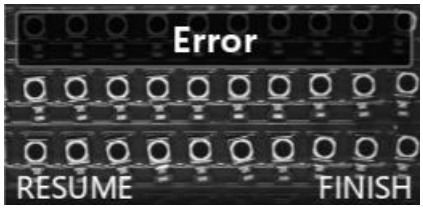


Figure 7-9 Error

7. (Optional) After the smart tune is succeeded, you can press the left button TEST to view

the result, such as code reading rate, time cost, and score.

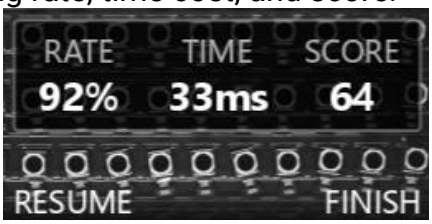


Figure 7-10 Result

7.2.3 Trigger

You can trigger the device for debugging and view the result (OK means succeeded and NG means failed).

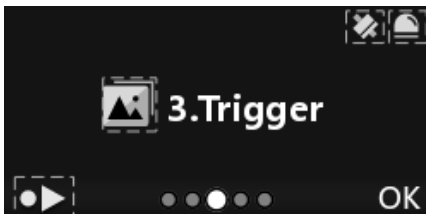


Figure 7-11 Trigger

7.2.4 Parameter Settings

You can set some key parameters, such as aiming system, light source, and auto work.

- Aiming system: Enable or disable the aiming system.
- Light source: Select Solid or Strobe mode.
- Auto work: Enable or disable the auto work. After the parameter is enabled, the device will work automatically even if the IDMVS is closed.

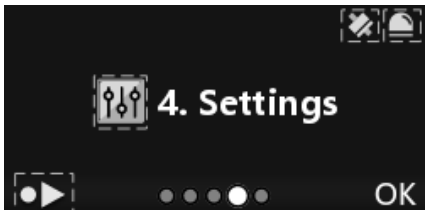


Figure 7-12 Settings

7.2.5 System Information

You can view system information including firmware version, algorithm version, serial

number, ID, and other information.

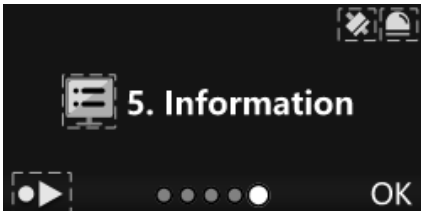


Figure 7-13 Information

Chapter 8 Client Software Settings

Note

The device now supports IDMVS client software V5.0.0 and above, which features significant changes in UI. For detailed information on the new client software, please refer to the latest version of ***IDMVS Client Software User Manual***. The following descriptions are still based on the older version of client software.

Figure 8-1 IDMVS Client Software User Manual

8.1 Feature Tree Introduction

After the device is connected to the client software, you can right click the device in **Device Connection**, and click **Feature Tree**.

Note

The parameters of the feature tree may differ by device models and firmware versions.

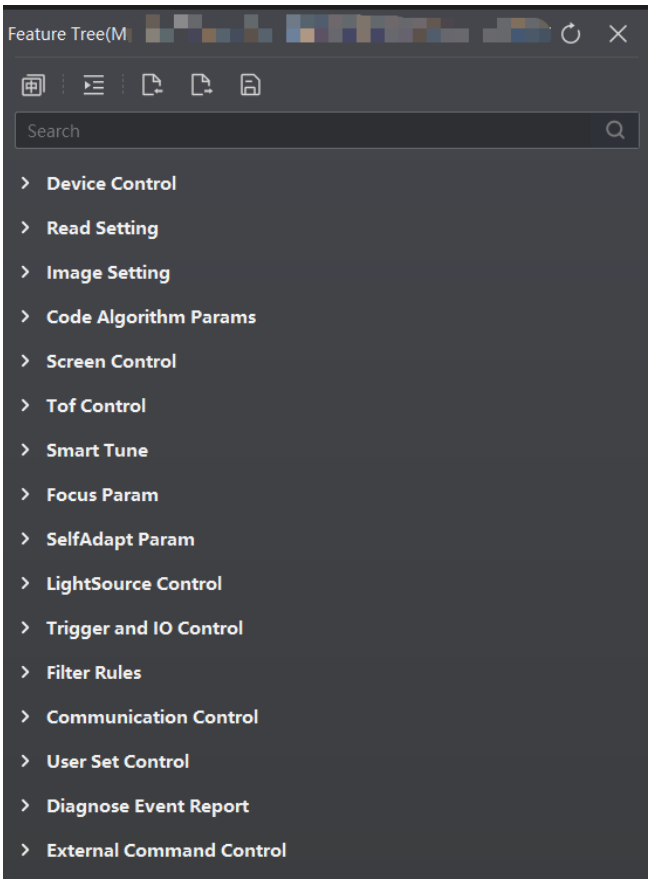
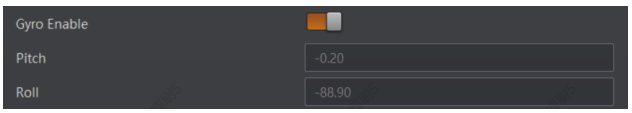


Figure 8-2 Feature Free

Table 8-1 Feature Tree Description

Name	Description
Device Control	It allows you to view the device's information, edit its name, and reset the device. **Note** When the device is equipped with multiple high-precision sensors, you can enable **Gyro Enable** in **Device Control** to set pitch and roll of the device for quickly copying the mounting position.  **Figure 8-3 Gyro Enable**
Read Setting	It allows you to set the device's running mode and select code types.
Image Setting	It allows you to set frame rate, exposure, gain, and Gamma, etc.

Name	Description
Code Algorithm Params	It allows you to set algorithm parameters.
Screen Control	It allows you to set screen-related parameters, including adjusting brightness, switching language, and setting home page.
Tof Control	It allows you to set ToF-related parameters.
Smart Tune	It allows you to execute smart tune.
Focus Param	It allows you to adjust focus for improving image quality.
SelfAdapt Param	It allows you to quickly adjust some parameters, such as exposure and gain.
LightSource Control	It allows you to set the light source's parameters.
Trigger and IO Control	It allows you to set parameters of input and output.
Filter Rules	It allows you to set the filter rule of codes.
Contrast Control	It allows you to compare the data that the device reads with preset data and output contrast result. **Note** It is available only when the running mode is Normal.
Communication Control	It allows you to set parameters related to different communication protocols.
Result Setting Control	It allows you to set parameters of output contents. **Note** It is available only when the running mode is Normal.
MultiCamera Control	It allows you to set parameters of multi-camera to let them operate in a collaborative way. **Note** It is available only when the running mode is Normal.
Statistics Info	It allows you to count data related to code reading. **Note** It is available only when the running mode is Normal.
User Set Control	It allows you to save and load configured user set.
Diagnose Event Report	It allows you to monitor memory and CPU usage rate, and let you know when there is a crash, higher CPU usage rate, insufficient memory, etc.

Name	Description
External Command Control	It allows you to set communication parameters between the device and external devices.

8.2 Running Mode Settings

After connecting the device, go to the left corner of live view window, and select the running mode.

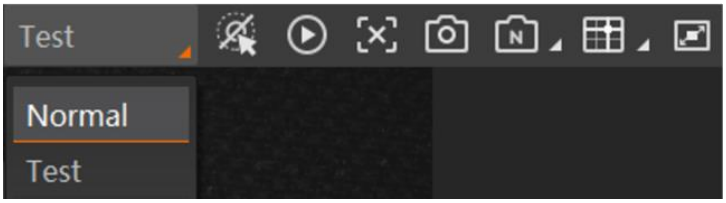


Figure 8-4 Select Running Mode

Table 8-2 Running Mode Description

Device Mode	Description
Test Mode	It is used during device debugging. The device outputs images that are acquired in real time, and displays code information.
Normal Mode	It is used during device normal operation. After reading code in image, the device outputs image and code information.

Note

- Stopping the real-time acquisition is required before selecting the running mode.
- If you need raw data only, go to **Device Control** to set Raw Mode.

8.3 Image Quality Settings

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

8.3.1 Set Image

You can set parameters like exposure time, gain, Gamma, acquisition frame rate, acquisition burst frame count, etc. in **Image Settings** area.

Note

- For specific parameter range like exposure time, gain and acquisition frame rate, refer to

the device's specification for details.
- Specific parameters of this function may differ by device models.

Table 8-3 Set Image Parameters

Name	Description
Exposure Time(μs)	You can increase exposure time to improve image brightness. **Note** Increasing exposure time may reduce acquisition frame rate, and impact image quality.
Gain(dB)	You can increase gain to improve image brightness. **Note** Increasing gain will create more image noises, and impact image quality.
Gamma	Gamma allows you to adjust the image contrast. It is recommended to reduce Gamma to increase brightness in dark background.
Acquisition Frame Rate(fps)	Acquisition frame rate refers to the image quantity that is acquired by the device per second. **Note** This function may differ by device model.
Acquisition Burst Frame Count	Acquisition burst frame count refers to the output image quantity when the device is triggered once.
WDR Enable	After the digital WDR function is enabled, the system uses multi-frame synthesis or local enhancement algorithms to balance the details in the bright and low-light areas of the image and improve the code reader's adaptability in high-contrast scenarios. **Note** The **WDR Enable** can be set in **Feature Tree → Image Setting**.
Digital WDR Enable	After the digital WDR function is enabled, the system optimizes the dynamic range of a single-frame image through algorithms, making it suitable for backlighting and high-contrast scenarios and improving code recognition rate. You can adjust digital WDR intensity parameter to control the intensity and processing range of the dynamic range expansion. The higher the value, the greater the impact on the bright and dark areas. **Note** The **Digital WDR Enable** can be set in **Feature Tree → Image**

Name	Description
	Setting.

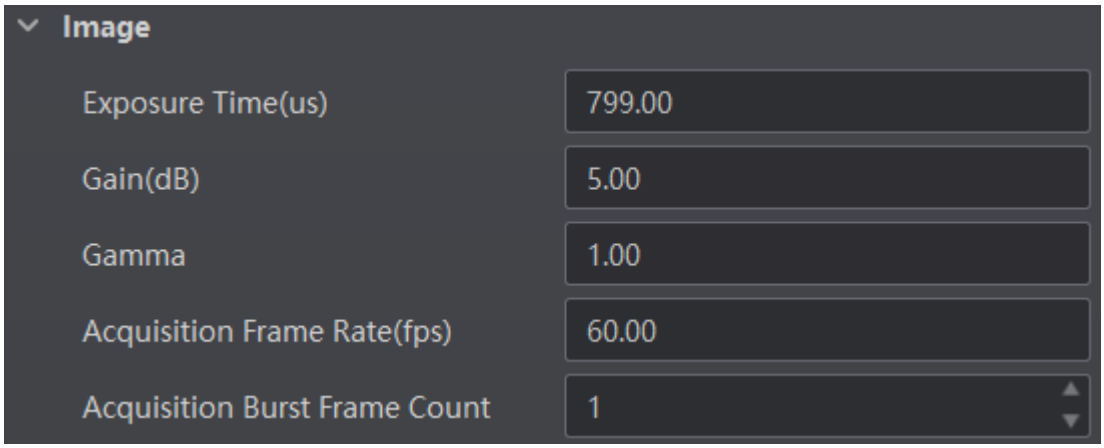


Figure 8-5 Set Image Parameters

8.3.2 Set Exposure

The device supports three types of exposure modes, including off, once, and continuous. Refer to the table below for details.

Table 8-4 Exposure Mode

Exposure Mode	Description
Off	The device exposures according to the value configured by the user in **Exposure Time(μs)**.
Once	The device adjusts the exposure time automatically according to the image brightness. After adjusting once, the device will switch to off mode.
Continuous	The device adjusts the exposure time continuously according to the image brightness. **Note** This mode is set by default for the device with liquid lens.

Steps

1. Right click the device in **Device Connection**, and click **Feature Tree**.
2. Go to **Image Setting**, and select **Once** or **Continuous** as **Exposure Auto** according to actual demands.
3. Select **Global**, **Partial**, or **Code** as **Exposing Area** according to actual demands.
4. (Optional) Set specific exposure area if **Partial** is selected.

- Area Width: It refers to the horizontal resolution in partial exposure area.
- Area Height: It refers to the vertical resolution in partial exposure area.

- Offset X: It refers to the horizontal coordinate of the upper-left corner in partial exposure area.
- Offset Y: It refers to the vertical coordinate of the upper-left corner in partial exposure area.

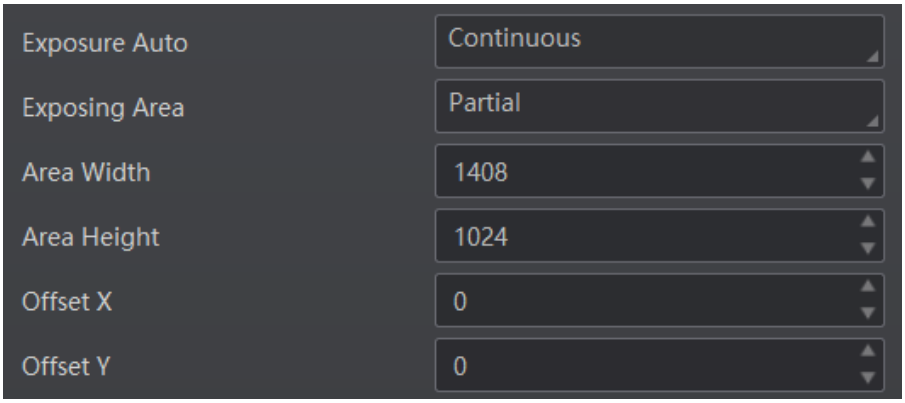


Figure 8-6 Once or Continuous Exposure

8.3.3 Set Gain

The device supports three types of gain modes, including off, once, and continuous. Refer to the table below for details.

Table 8-5 Gain Mode

Gain Mode	Description
Off	The device adjust gain according to the value configured by the user in **Gain(dB)**.
Once	The device adjusts gain automatically according to the image brightness. After adjusting once, the device will switch to off mode.
Continuous	The device adjusts gain continuously according to the image brightness. **Note** This mode is set by default for the device with auto focusing.

Steps

1. Right click the device in **Device Connection**, and click **Feature Tree**.
2. Go to **Image Setting**, and select **Once** or **Continuous** as **Gain Auto** according to actual demands.

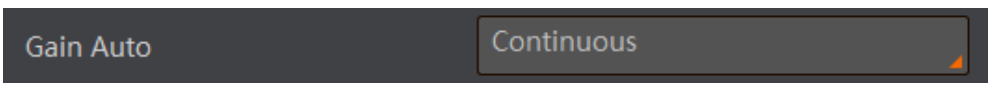


Figure 8-7 Once or Continuous Gain

8.3.4 Set Polling

The polling function allows the device to acquire images based on the parameters you set, including exposure time, gain, Gamma, and light source. Currently, 2 types of polling modes are available, including single mode and multiple mode.

Note

- Stopping the real-time acquisition is required before setting the polling function.
- It is recommended to use the polling function under the normal running mode, and the test mode is used for debugging only.
- Make sure the trigger mode is opened before setting the polling function.
- After the polling function is enabled, the device acquires images with its max. frame rate. Once the polling disabled, the frame rate you set in **Acquisition Frame Rate** takes effect.
- The polling function and specific parameters may differ by device models.

Single Mode

Steps

1. Right click the device in **Device Connection**, and click **Feature Tree**.
2. Go to **Image Setting** → **Polling Mode**, and select **Single** as **Polling Mode**.
3. Select one parameter (e.g. **Param1**) from **Polling Param**.

Note

Up to 8 sets of parameter can be selected from **Polling Param**.

4. Set parameters related to the polling like **Polling Exposure Time**, **Polling Gain**, **Polling Gamma**, etc. according to actual demands.

Table 8-6 Parameters of Single Mode Polling

Parameter	Description
Polling Exposure Time	It sets the exposure time of polling, and the unit is μs.
Polling Gain	It set the polling gain, and the unit is dB.
Polling Gamma	It sets the polling Gamma value. ● If the value is between 0 and 1, the image brightness increases and dark area becomes brighter. ● If the value is between 1 and 4, the image brightness decreases and dark area becomes darker.
Polling Focus Enable	After enabling this parameter, you can set polling focus position.
Polling Focus Position	It sets the polling focus position.
Polling Lighting Selector	It selects lamps on different directions, including up/down and mid.

Parameter	Description
Polling Lighting Enable	After enabling this parameter, the light source will turn on.

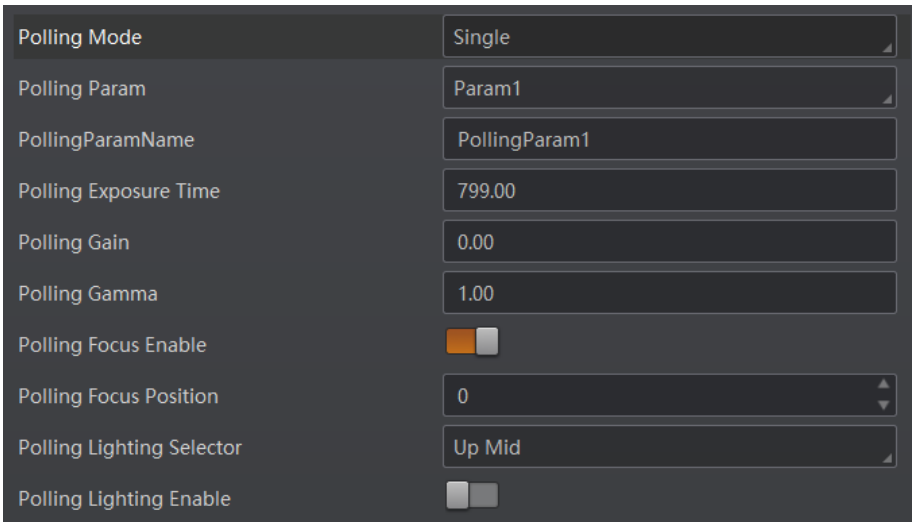


Figure 8-8 Single Mode

Multiple Mode

Note

- In multiple mode, the device supports trigger parameters like software trigger, external trigger, etc., does not support stopping polling via the external trigger.
- The rule for multiple-mode polling is that the polling is started from the polling parameter with Best Polling Group Idx, and then execute other polling parameters you selected in turn. For example, if the Param3 is the Best Polling Group Idx and Param1, Param2, Param4 and Param5 are enabled, the polling order is Param3 > Param1 > Param2 > Param4 > Param5.

Steps

1. Right click the device in **Device Connection**, and click **Feature Tree**.
2. Go to **Image Setting** → **Polling Mode**, and select **Multiple** as **Polling Enable**.
3. Set **Polling Time** and **Polling Period** according to actual demands.
- **Polling Time** is used to determine whether the polling is finished or not, and it ranges from 100 to 2147482.
- **Polling Period** is whole period from Param1 to Param8, and it ranges from 1 to 5000.
4. Select 2 to 8 sets of parameters (e.g. **Param1** and **Param2**) from **Polling Param**, and enable **Polling Param Enable** to let them take effect.
5. Set parameters related to the polling like **Polling Exposure Time**, **Polling Gain**, **Polling Gamma**, etc. according to actual demands.

Table 8-7 Parameters of Multiple Mode Polling

Parameter	Description
Polling Exposure Time	It sets the exposure time of polling, and the unit is μs.
Polling Gain	It set the polling gain, and the unit is dB.
Polling Gamma	It sets the polling Gamma value. ● If the value is between 0 and 1, the image brightness increases and dark area becomes brighter. ● If the value is between 1 and 4, the image brightness decreases and dark area becomes darker.
Polling Focus Enable	After enabling this parameter, you can set polling focus position.
Polling Focus Position	It sets the polling focus position.
Polling Lighting Selector	It selects lamps on different directions, including up/down and mid.
Polling Lighting Enable	After enabling this parameter, the light source will turn on.

6. Repeat Step 5 to set other parameters from **Polling Param**.
7. (Optional) View **Polling Status** and **Best Polling Group Idx.**

- **Polling Status**: It displays the current polling status. 0 stands for polling ended, and 1 stands for polling started.
- **Best Polling Group Idx**: It is used to display the polling parameter number when the device recognizes codes after enabling polling. If the polling is disabled or polling parameters are edited, it displays 1 by default.

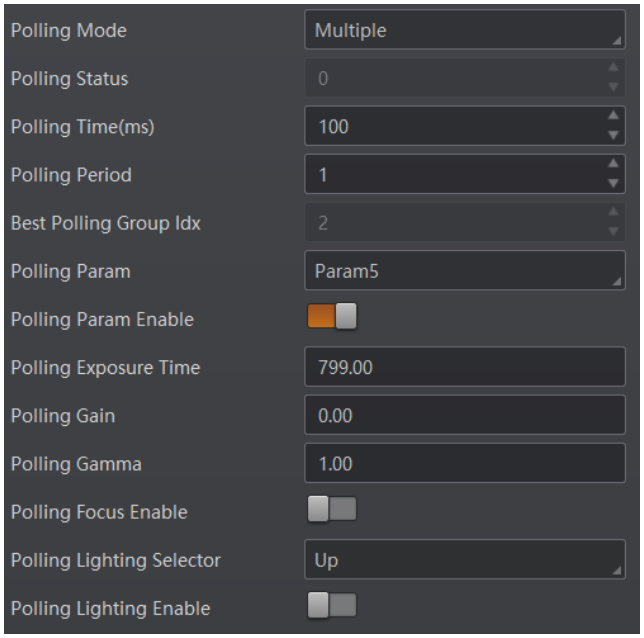


Figure 8-9 Multiple Mode

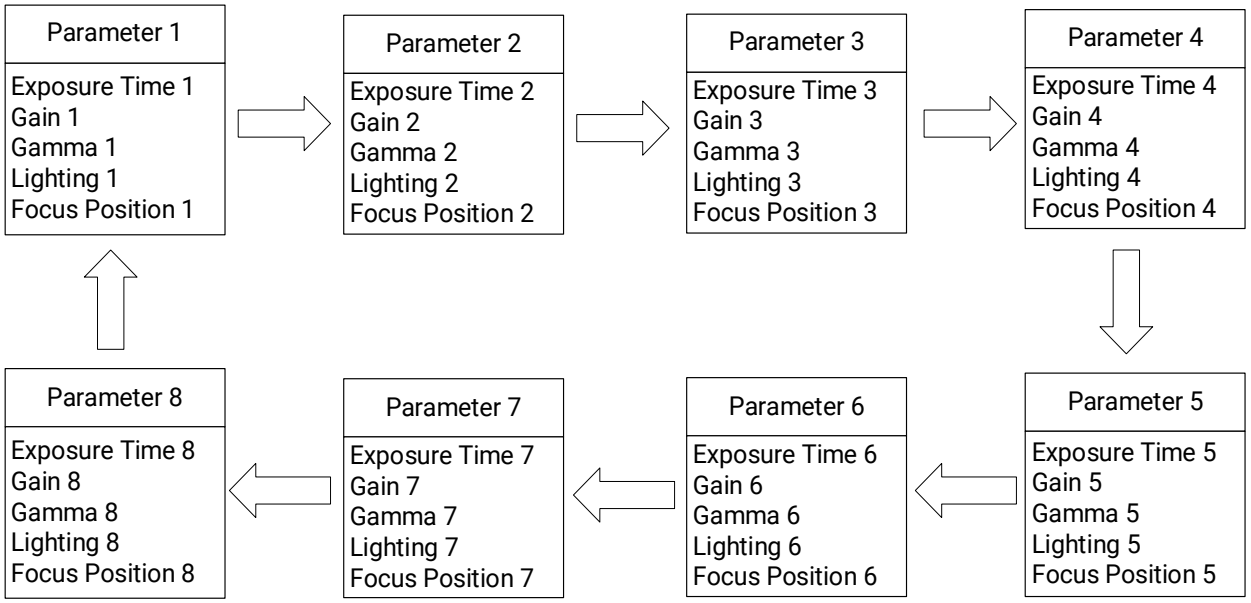


Figure 8-10 Polling Diagram

8.3.5 Set Light Source

Light source control allows you to enable the device's aiming system and light source, and set related parameters according to actual demands.

Steps

1. Go to **Image Settings** → **Light**, and select **AimingLight Enable**.
- **Off** means that the aiming light is turned off.
- **Strobe** means that the aiming light is turned on if the device is acquiring images and the aiming light is turned off if the device is not acquiring images.
- **Strobe Long** means that the aiming light is turned on when the device is powered on.

2. Click lamps on the light source illustration to turn on or turn off lamps on different directions.

Note

Click **All On** or **All Off** to turn on or turn off all lamps.

3. Select **Lighting Mode** according to actual demands.
- **Strobe** means the light flashes at a specific interval.
- **Long** means the light is solid.

Figure 8-11 Set Light Source

8.3.6 Set Smart Tune

The smart tune function allows you to adjust the device's focus position, exposure, and gain, etc. by one-key operation, and supports self-adaptive adjustment.

Before You Start

Make sure that the device is not in trigger mode, and its running mode is test.

Steps

1. Go to **Image Settings** → **SmartTuneControl**.

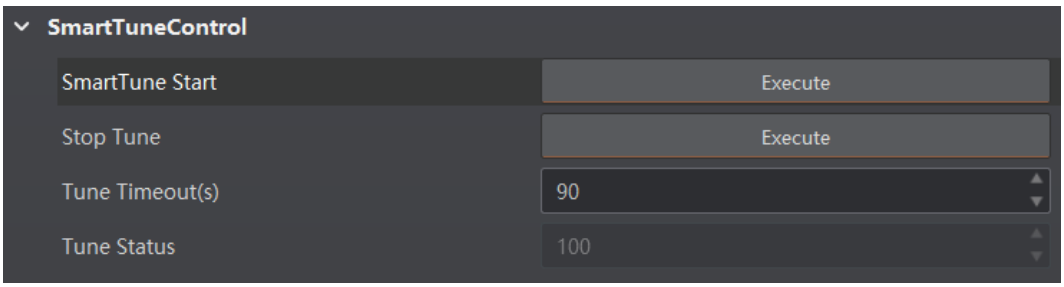


Figure 8-12 Smart Tune Control

2. (Optional) Set **Tune Timeout.** If the self-adaptive adjustment exceeds configured value, and it will stop automatically.
3. Click **Execute** in **SmartTune Start** to let the device start smart tune, and a window of smart tune will be displayed for you to view the effect.

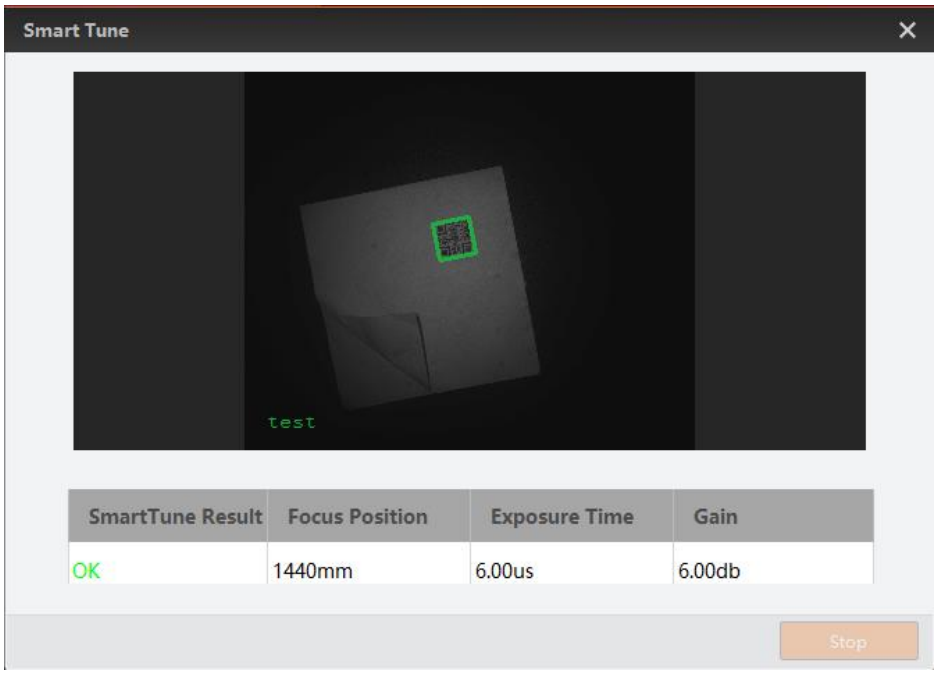


Figure 8-13 Smart Tune Start

4. (Optional) View smart tune process via **Tune Status**.
5. (Optional) Click **Execute** in **Stop Tune** to stop smart tune process.

8.3.7 Set Auto Focus

The device supports the auto focus function according to the code position in the field of view. Currently, two types of auto focus are supported, including global focus and ROI focus.

Note

Make sure that the device's running mode is test before performing focus, and switch to the normal running mode after the focus is completed.

Global Focus

The global focus allows you to adjust lens focus in a global field of view just by once.

Steps

1. Go to **Image Settings** → **Focus Param** → **Focus Mode Selector**, and select **Whole Area Focus**.

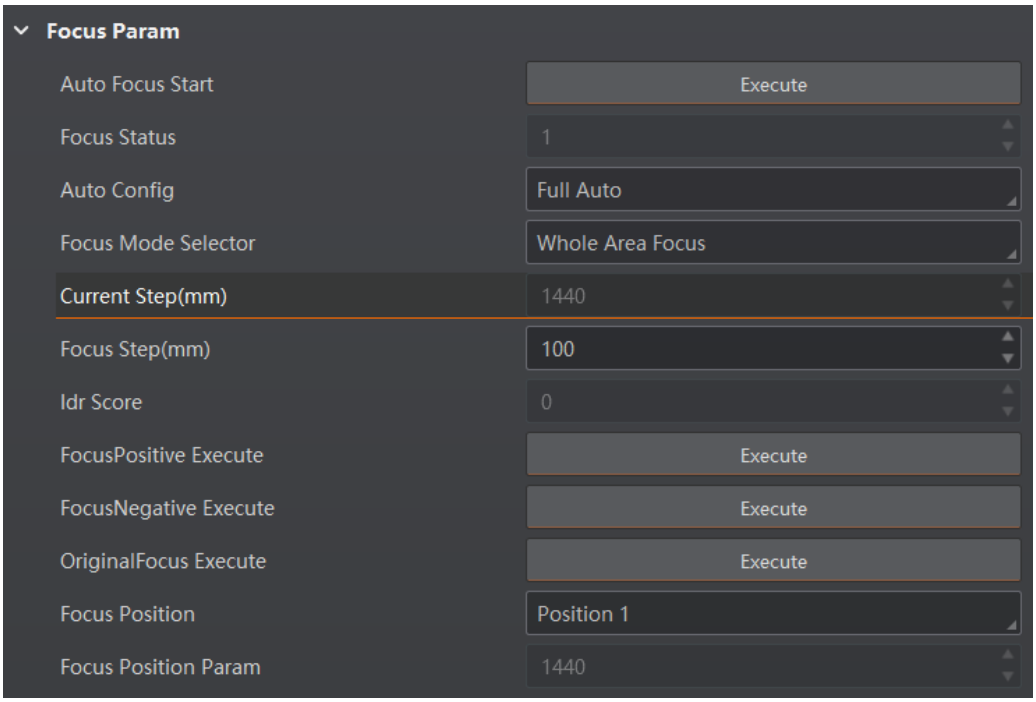


Figure 8-14 Global Focus

2. Click in the live view window, and click it again to stop acquisition and make sure there is an image in the window.
3. Select the focus mode in **Auto Config**:

- **Full Auto**: In this mode, the device will automatically change parameters like focus position, exposure, gain, Gamma and light source when adjusting focus.
- **Motor Only**: In this mode, the device will change focus position only when adjusting focus.
- **Auto and Restore**: In this mode, the device will automatically change parameters like focus position, exposure, gain, Gamma and light source when adjusting focus, and keep focus position and restore other parameters after completing focus adjustment.

4. Click **Execute** in **Auto Focus Start**, and the device starts to adjust focus automatically.

Note

Focus-related parameters cannot be configured during auto focus process. After the auto focus is finished, parameters can be configured again.

5. (Optional) Select the position parameter from **Focus Position**.
6. (Optional) View the score in **Idr Score** after the auto focus is finished.

ROI Focus

The ROI focus allows you to adjust lens focus in the ROI by drawing specific area.

Note

The ROI focus is applicable to the scenario where multiple codes with different depth of fields are existed.

Steps

1. Go to **Image Settings** → **Focus Param** → **Focus Mode Selector**, and select **ROI Area Focus**.

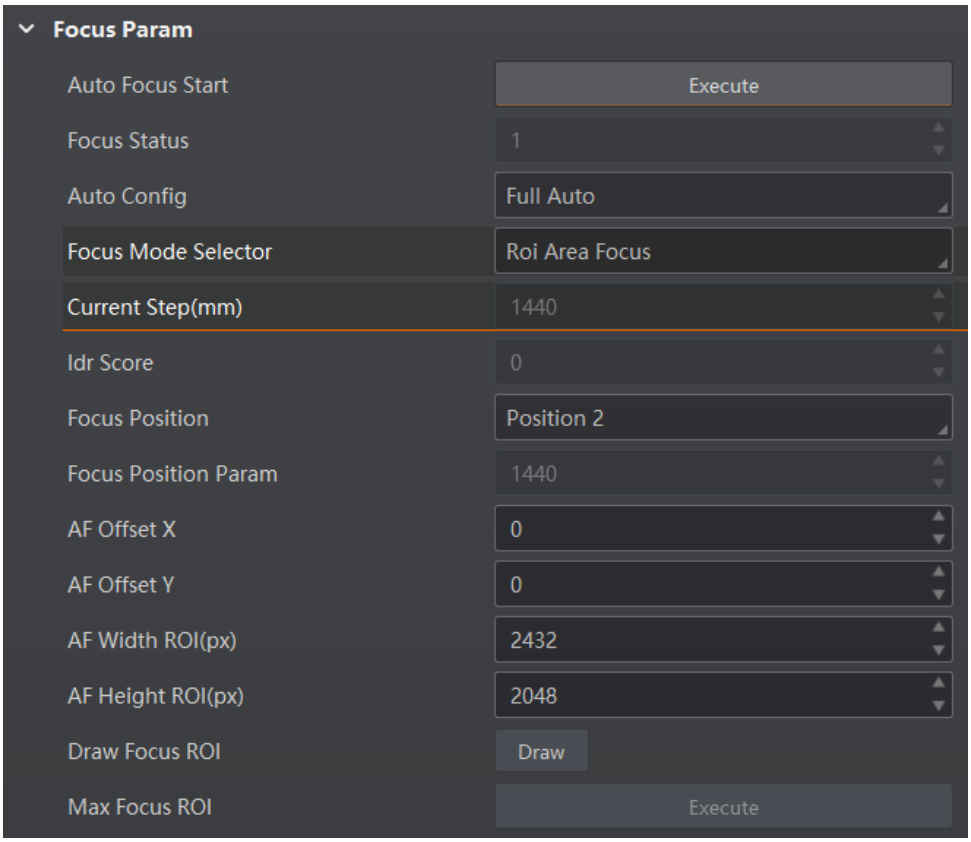


Figure 8-15 ROI Focus

2. Click  in the live view window, and click it again to stop acquisition and make sure there is an image in the window.
3. Click **Draw** in **Draw Focus ROI**, and draw ROI by dragging the mouse in live view window.

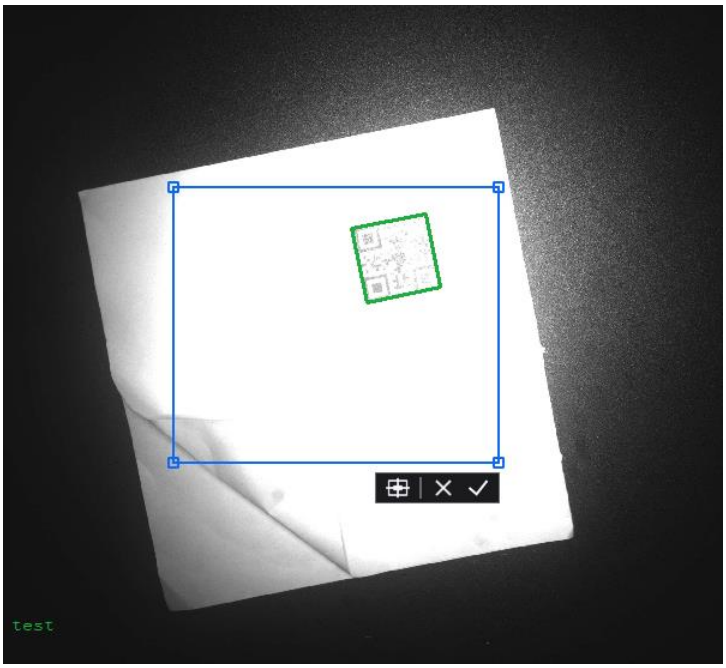


Figure 8-16 Draw Focus ROI Area

4. (Optional) Set the following parameters to adjust ROI size and position.
- **AF Offset X**: It is X coordinate of the upper-left corner in ROI where you execute auto focus.
- **AF Offset Y**: It is Y coordinate of the upper-left corner in ROI where you execute auto focus.
- **AF Width ROI(px)**: It refers to the width in ROI where you execute auto focus.
- **AF Height ROI(px)**: It refers to the height in ROI where you execute auto focus.

5. (Optional) Click **Execute** in **Max. Focus ROI** to have a global focus.
6. (Optional) Repeat Step 3 if you want to set multiple ROIs.
7. Refer to Step 3 to Step 6 in global focus to set auto focus.

8.3.8 Set Fast Focus

The device with ToF function is able to achieve fast focus and is suitable for the scene with the focus speed requirement. In the mobile scene, the device can adjust focus in real time according to the depth of field of the object.

Note

Device with liquid lens can achieve focusing without delay by adjusting the liquid shape through voltage, and achieve fast zooming combined with ToF function.

Steps

1. Right click the device in **Device Connection**, and click **Feature Tree**.
2. Go to **Tof Control**, and enable **Tof Enable** and **Fast Focus Enable**.
3. (Optional) Set **Tof Tolerance** and **Tof Measuring Range** according to the actual demands.
- **Tof Tolerance**: When ToF changing range exceeds the configured value, the device will stop adjusting focus.

- **Tof Measuring Range**: When ToF distance exceeds the configured value, the device will stop adjusting focus.

4. View current ToF distance via **Tof Distance**.

Figure 8-17 Set Fast Focus

8.3.9 Set Self-Adaptive Adjustment

The function of self-adaptive adjustment can automatically adjust exposure, gain, code type, light source, and other parameters to have a better code reading effect.

Steps

1. Go to **Image Settings** → **SelfAdapt Param**.
2. Select **Adjust Mode**.

- **Static Sense**: If you select this mode, exposure will be adjusted in priority. The acquired picture will have a smaller gain and noise, which makes a higher picture quality. It is suitable for objects with a slow moving speed.
- **Sport Sense**: If you select this mode, gain will be adjusted in priority. There may be more noise on the picture. It is suitable for objects with a fast moving speed.

2. Select **Adjust Source** according to actual demands.

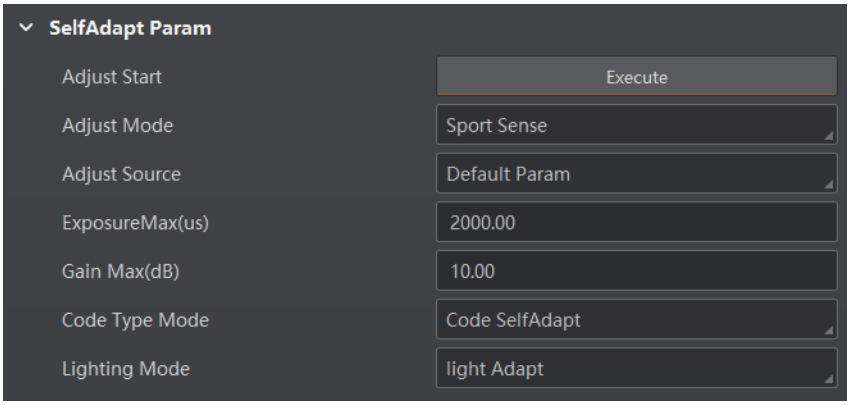


Figure 8-18 Select Adjust Source

- **Default Param**: It adjusts the default parameters.
- **Polling Param**: It adjusts parameters configured in polling. After **Polling Param** is selected

as **Adjust Source**, you should select a polling parameter group from **Polling Param Index** and enable or disable **Focus Enable**.

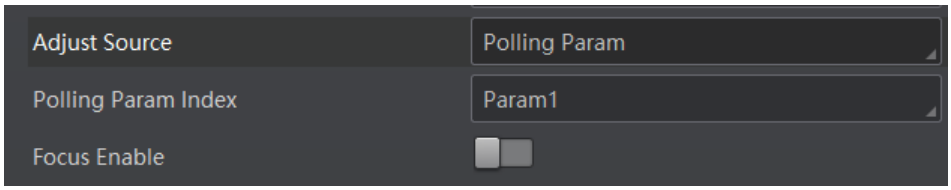


Figure 8-19 Polling Parameter

3. (Optional) Set **Exposure Max** or **Gain Max** according to actual demands.
- **Exposure Max**: It is enabled in Sport Sense, and it sets the max. exposure during the self-adaptive adjustment.
- **Gain Max**: It is enabled in Static Sense, and it sets the max. gain during the self-adaptive adjustment.

4. (Optional) Set self-adaptive code type in **Code Type Mode**.
- **Code SelfAdapt**: All code types added in field of view will be self-adaptive.
- **1D Code**: 1D code types added in field of view will be self-adaptive.
- **2D Code:** 2D code types added in field of view will be self-adaptive.
- **Stack Code:** Stacked code types added in field of view will be self-adaptive.

5. (Optional) Set light source parameters in **Lighting Mode**.
- **Light Adapt**: The client software will select the best one from all lighting options during the self-adaptive adjustment.
- **All Light Enable**: All light sources will be turned on during self-adaptive adjustment process.
- **All Light Disable**: All light sources will be turned off during self-adaptive adjustment process.
- **Current Light Adapt**: The client software will use the current configured light source.

6. Click **Execute** in **Adjust Start**. The device will automatically acquire images and perform self-adaptive adjustment, and stop acquisition after adjustment is completed.

8.3.10 Set Mirror X and Mirror Y

The device supports the mirror X and mirror Y functions.
Go to **Image Settings** → **Other Features** to set **Mirror X** and **Mirror Y** according to actual demands.
Mirror X: If the parameter is enabled, the image will be reversed in a horizontal way.
Mirror Y: If the parameter is enabled, the image will be reversed in a vertical way.

Note
The **Mirror X** and **Mirror Y** are enabled by default, and it may differ by device models.

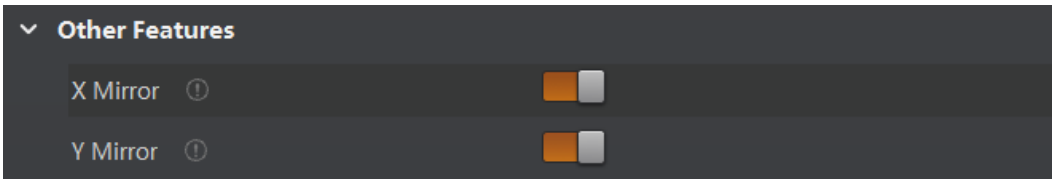


Figure 8-20 Set Mirror X and Mirror Y

8.3.11 Set Test Pattern

Test pattern helps troubleshooting image problems and images in the test pattern are only for test. When exceptions occur in images acquired by the device in real time, you can check if images in the test pattern have similar problems to determine the cause of an exception.

Note

- The test pattern is available in the test or raw running mode.
- Specific parameters of this function may differ by device models.

Go to **Image Settings** → **Other Features**, and set **Test Pattern** according to actual demands.

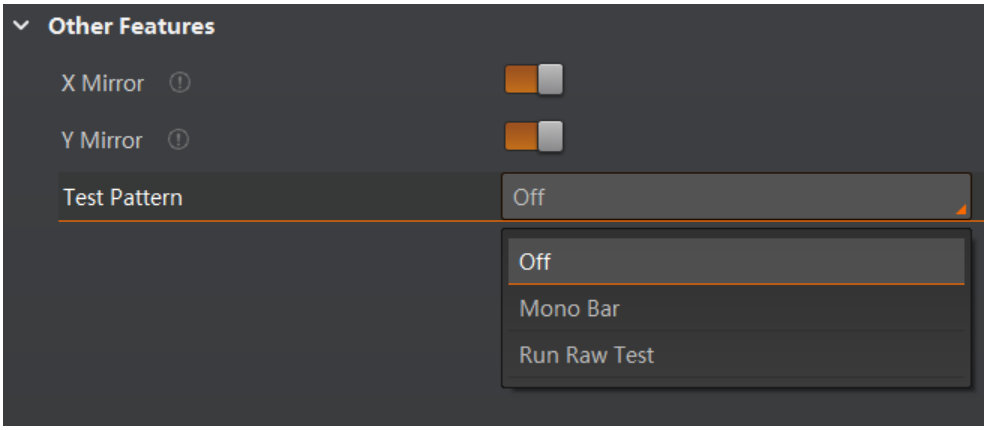


Figure 8-21 Set Test Pattern

8.4 Code Algorithm Settings

The code reader supports reading multiple types of 1D code, 2D code, and stacked codes, and you can add and set code parameters via the client software.

8.4.1 Add Code

Adding code before you set code parameters via the client software. In **Algorithm Settings**, you can add different types of codes according to actual demands.
In **Algorithm Settings**, you can select types of codes to be read, and set the **Number of 1D**

Code, **Number of 2D Code**, or **Number of Stack Code** according to actual demands.

Note

- For different models of the device, the specific parameters may differ, and the actual device you purchased shall prevail.
- The number of selected symbologies and codes may affect the code recognition time. More symbologies or more codes selected may consume more time to recognize codes in the image. Please select code according to the actual demands.
- The code reader may output actual code quantity when the actual code quantity is less than the code quantity set in the client software.

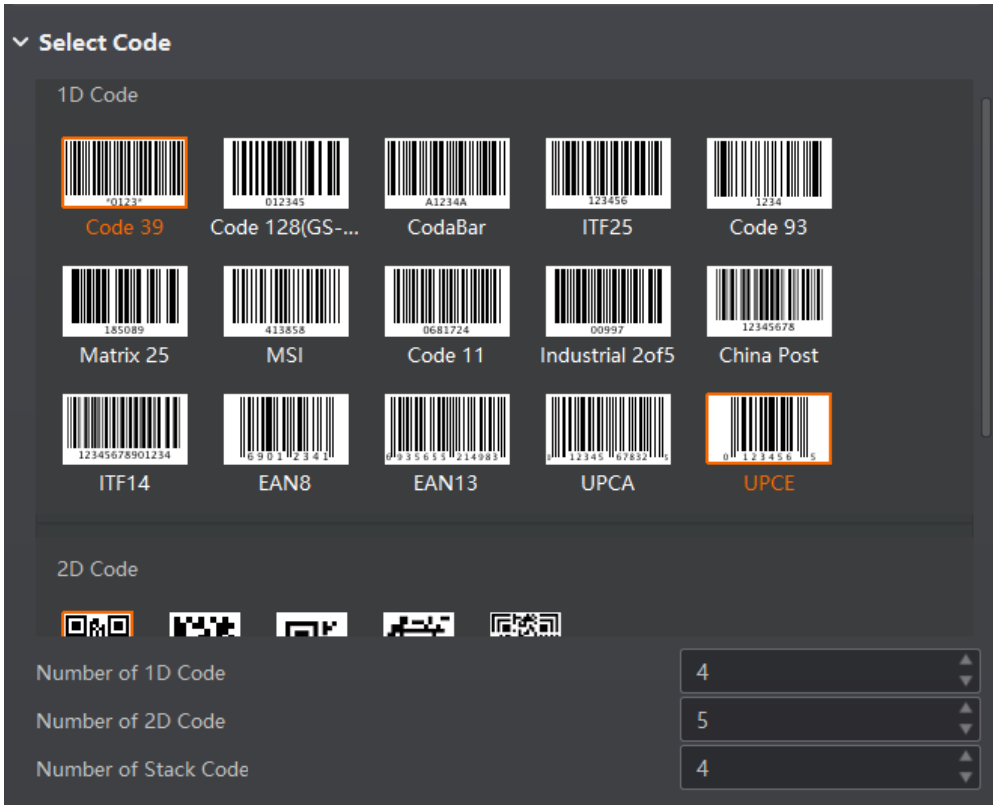


Figure 8-22 Add Codes

8.4.2 Set Code Reading ROI

Algorithm ROI (Region of Interest) allows the device to execute algorithms and read codes on the specific area you selected, improving code reading efficiency.
Currently, multiple ROIs can be configured, and the device outputs codes according to the ROI No. (e.g. Region 1, Region 2, and Region 3…) in turn. The client software supports drawing single group of ROI and drawing ROI via chessboard.

Note

- If no code is recognized in the algorithm ROI, the device will output “noread”.

- Before drawing ROIs, make sure that there is an image in the live view window after stopping preview.
- If no algorithm ROI is enabled, and the full screen is the algorithm ROI by default.
- This function may differ by device models.

Draw Single Group of ROI

Steps

1. Go to **Algorithm Settings**, and find **Algorithm ROI**.
2. Click **Draw** in **Draw ROI** to draw the ROI in the live view window.

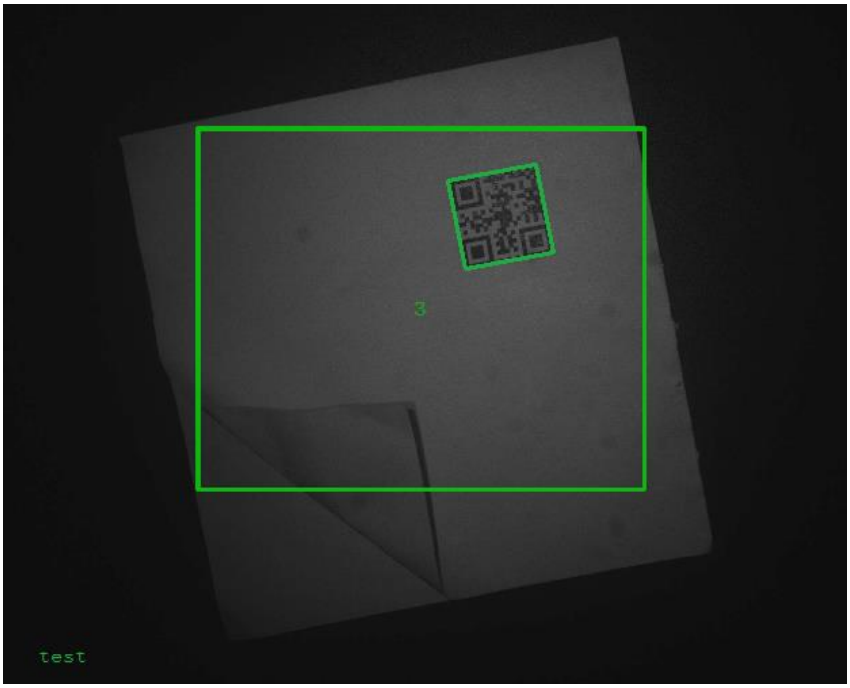


Figure 8-23 Draw ROI

3. (Optional) Repeat the above step to draw multiple ROIs according to actual demands.

Note

The client software only parse codes in the ROI you drawn.

4. (Optional) Set other ROI-related parameters according to the actual demands.
- **ROI Index**: It indicates different ROIs and ranges from 0 to 149 corresponds 1 to 150 ROIs.
- **AlgoRegionWidth**: It refers to the width in algorithm ROI.
- **AlgoRegionHeight**: It refers to the height in algorithm ROI.
- **AlgoRegionLeftX**: It refers to the X coordinate of the upper-left corner in algorithm ROI.
- **AlgoRegionLeftY**: It refers to the Y coordinate of the upper-left corner in algorithm ROI.

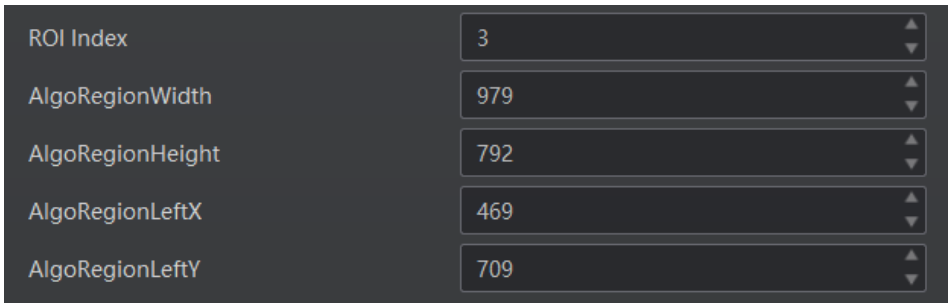


Figure 8-24 ROI Parameters

5. (Optional) Click **Execute** in **Restore Max. Algorithm ROI** to restore the ROI to the full screen.
6. (Optional) Click **Execute** in **Clear All ROI** to delete all ROIs.
7. (Optional) Right-click the ROI and click **Delete** to delete the selected ROI.
8. (Optional) After you enable the **ROI Link IO Enable** in **Feature Tree** → **Trigger and IO Control**, and when the code is not read in any ROI, the linked output device will output a message.

Draw ROI via Chessboard

Steps

1. Go to **Algorithm Settings**, and find **Algorithm ROI**.
2. Click **Execute** in **Chessboard ROI**, set parameters, and click **OK** after setting.

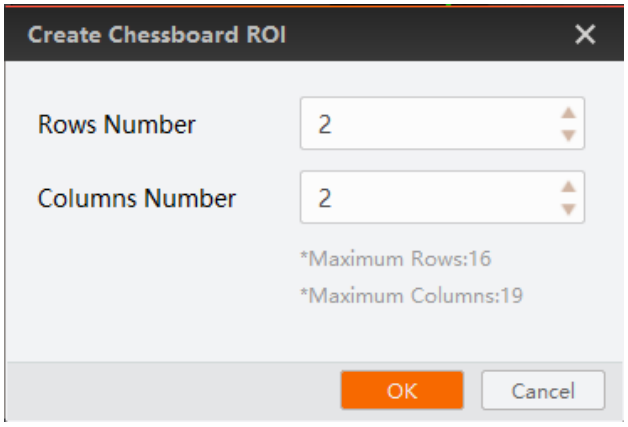


Figure 8-25 Create Chessboard ROI

3. (Optional) Click  to restore the ROI to full screen, and click  to clear all ROIs.
4. Click  after creating ROI, and the red frame becomes green as shown below.

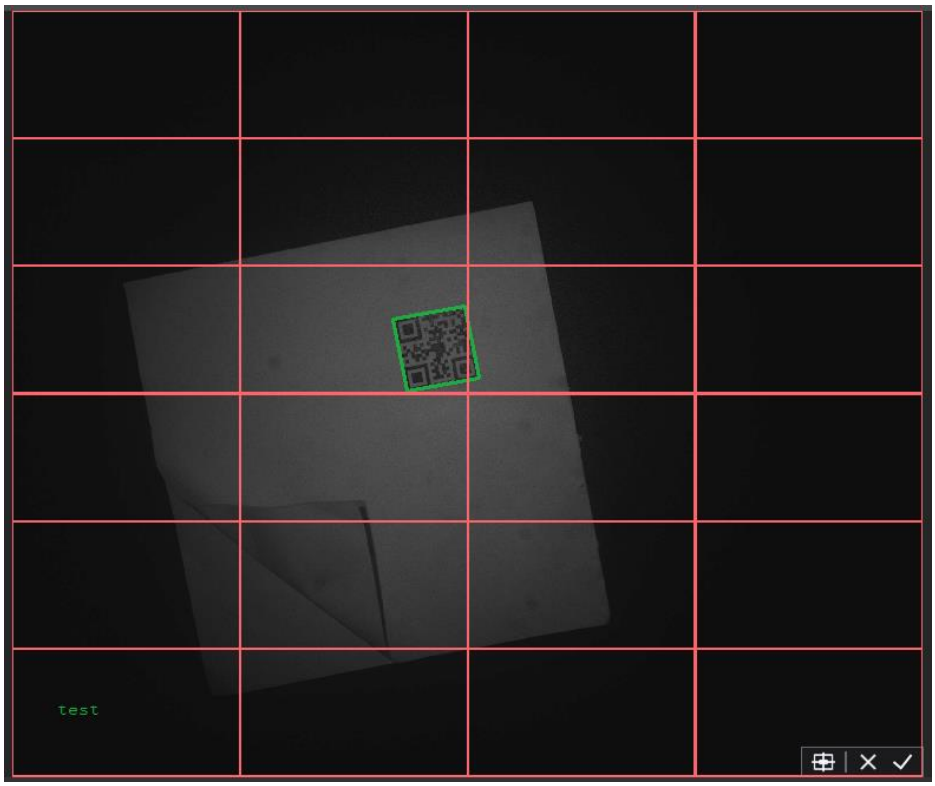


Figure 8-26 Draw ROI via Chessboard

5. Repeat other optional steps mentioned in drawing single group of ROI.

Note

The figures above are for reference only. Refer to the actual conditions.

8.4.3 Set Algorithm Parameter

In **Algorithm Parameter**, select **1DCode**, **2DCode** or **StackCode** as **Arithmetic Type**, and then you can set the related parameters.

Note

- You should have selected at least one type of 1D code, 2D code or stacked code.
- For different models of the device, the specific parameters may differ, and the actual device you purchased shall prevail.

Set 1D Code

Waiting Time

Waiting time refers to the maximum running time of algorithm, and its unit is ms. The code reader will stop parsing the images and return results if the time is exceeded the waiting time configured. When the value is set as 0, the actual running time of algorithm

will prevail.

Code Color

It defines the readable code color. **WhiteCodeOnBlackWall** means that the client software can recognize the white code with black background. **BlackCodeOnWhiteWall** means that the client software can recognize the black code with white background. **Adaptive** means that the device can recognize both types of codes mentioned above. However, the reading time will be longer compared with the above two modes.

Code 39 Check

Enable this parameter if Code 39 uses the parity bit.

Note

You need to select **Code 39** in **Select Code**.

ITF 25 Check

Enable this parameter if ITF 25 uses the parity bit.

Note

You need to select **ITF 25** in **Select Code**.

Code Quality Enable

If it is enabled, the client software will judge the quality of 1D code and output overall grade. Currently, this parameter is only applicable to Code 39 and Code 128.

Code Score Enable

If it is enabled, the client software will evaluate the code reading environment for 1D code and output code score.

Set 2D Code

Waiting Time

Waiting time refers to the maximum running time of algorithm, and its unit is ms. The code reader will stop parsing the images and return results if the time is exceeded the waiting time configured. When the value is set as 0, the actual running time of algorithm will prevail.

QR Distortion Correction

If the QR code or DM code is distorted, you can enable this parameter to improve code recognition rate. The parameter is disabled by default.

DM Code Type

It includes **All**, **ECC140**, and **ECC200**.

2D Code Quality Enable

If it is enabled, the client software will judge the quality of 2D code and output overall grade. Currently, this parameter is only applicable to DM code and QR code.

Code Score Enable

If it is enabled, the client software will evaluate the code reading environment for 2D code and output code score.

Set Stacked Code

Waiting Time

Waiting time refers to the maximum running time of algorithm, and its unit is ms. The code reader will stop parsing the images and return results if the time is exceeded the waiting time configured. When the value is set as 0, the actual running time of algorithm will prevail.

Code Score Enable

If it is enabled, the client software will evaluate the code reading environment for stacked code and output code score.

8.4.4 Set Code Quality Evaluation

The code quality evaluation function judges the quality of codes and outputs overall grade. Currently, only 1D code and 2D code support code quality evaluation.

Note

- The function of code quality evaluation may differ by device models.
- In test running mode, this function is enabled by default. In normal mode, you need to enable it manually.
- This function is also supported for multiple codes in the field of view.

Set 1D Code Quality Evaluation

The 1D code quality evaluation function uses the ISO15416 standard to judge the quality of codes and output overall grade. Currently, this function is only applicable to Code39, Code128, ITF14, ITF25, EAN8, EAN13, and UPCA.

Steps

1. Go to **Algorithm Settings** → **Algorithm Parameter**, and select **1DCode** as **Arithmetic Type**.
2. Enable **Code Quality Enable**.
3. Enable different quality evaluation standards according to actual demands.

Table 8-8 1D Code Quality Evaluation Standards

Parameter	Description
Decodability	It evaluates whether the code has enough basic information to be decoded.

Parameter	Description
Symbol Contrast	It evaluates the difference between the max. brightness value and the min. brightness value of the code area.
Modulation	It evaluates the degree of change in terms of brightness.
Edge Determination	It evaluates how well the number of edges read by the code matches the configured number of edges.
Minimum Reflectance	It evaluates the ratio of the min. brightness value to the max. brightness value.
Minimum Edge Contrast	It evaluates the min. value of the reflectivity difference of the strip connecting the spaces.
Decode Enable	It evaluates whether the code recognition is successful or not.
Defects	It evaluates codes or spaces for defects or dirt.

4. Set the evaluation value for A/B/C/D grade according to actual demands.

Note

- If the actual code reading value of the device is greater than the grade A evaluation value, the evaluation standard is grade A.
- If the actual code reading value is between grade A and grade B, the evaluation standard is grade B.
- If the actual code reading value is between grade B and grade C, the evaluation standard is grade C.
- If the actual code reading value is between grade C and grade D, the evaluation standard is grade D.
- If the actual code reading value is lower than the D grade, the evaluation standard is F grade.
- The client software selects the worst grade among all the evaluation standards as the grade judgment result of the code. The A grade means that the code quality is best, and F grade means that code quality is worst.

5. (Optional) Set **1D Quality Max Num** to configure the number of codes to be evaluated. If the actual number of codes exceeds the configured value, the later codes will not be evaluated.
6. (Optional) Go to **Feature Tree** → **Code Algorithm Params**, and select **1D Rating Standard**.

Note

For example, if **1D Rating Standard** is **C**, and then the client software will output codes with A/B/C grade and codes with D/F will be filtered.

7. Click to start acquisition, and the client software will display the overall code quality in the history record area.

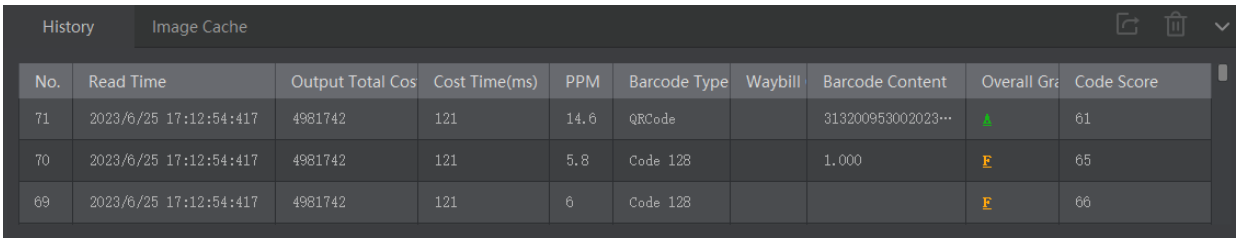


Figure 8-27 Overall Code Quality

Set 2D Code Quality Evaluation

The 2D quality evaluation function uses the ISO15415 standard to judge the quality of codes and output overall grade.

Note

- The specific parameters may differ by device models and firmware versions.
- Make sure that the device's running mode is normal, and QR Code or Data Matrix is selected.

Steps

1. Go to **Algorithm Settings**, and select **2DCode** as **Arithmetic Type**.
2. Enable **2D Code Quality Enable**.
3. Set the **2D Rating Standard** and enable **Quality Filter Enable**. The codes whose grades are lower than the set standard will be filtered and the codes whose grades are equal to or higher than the set standard will be output.
4. (Optional) In the **Quality2DMaxNum**, set the maximum number of codes to be evaluated. If the actual amount of codes exceeds the configured, the excess will not be evaluated.
5. Set the ISO edition and verification edition.
   - **Iso Edition:** Select the rating standard from ISO 15415 and ISO 29158. ISO 15415 is suitable for continuous code; ISO 29158 is suitable for dot code.
   - **Verify Edition:** Set the rating mode as standard mode.
6. Select the evaluation criteria based on your actual demands. If enabled, the rating standard is used to evaluate the code quality.

Table 8-9 2D Code Quality Evaluation Standards

Parameter	Description
TDCRDecode	It evaluates whether the code recognition is successful or not.
TDCRSymbolContrast	It evaluates the difference between the max. brightness value and the min. brightness value of

Parameter	Description
	the code area.
TDCRModulation	It evaluates the degree of change in terms of brightness.
TDCRFixedPatternDamage	It evaluates the damage of code formats.
TDCRAxialNonuniformity	It evaluates the distortion degree of the code's vertical and horizontal sizes.
TDCRUnusedErrorCorrection	It evaluates the code for grid damage which might reduce the error correction capability of the code.
TDCRGridNonuniformity	It evaluates the distortion of the grids in the code.
TDCRPrintGrowth	It evaluates whether the size of each unit of the code is uniform
TDCRReflectanceMargin	It evaluates how well each unit of the code is correctly distinguished as light or dark in comparison to the global threshold.

7. Set the evaluation value for A/B/C/D grade according to actual demands.
   - If the actual code reading value is greater than the grade A evaluation value, the evaluation standard is grade A.
   - If the actual code reading value is between grade A and grade B, the evaluation standard is grade B.
   - If the actual code reading value is between grade B and grade C, the evaluation standard is grade C.
   - If the actual code reading value is between grade C and grade D, the evaluation standard is grade D.
   - If the actual code reading value is lower than the grade D evaluation value, the evaluation standard is grade F.
   - The client software selects the worst grade among all the evaluation standards as the grade judgment result of the code. The A grade means that the code quality is best, and F grade means that code quality is worst.

8.4.5 Set Code Score

The code score function evaluates the code-reading environment for codes and outputs code score.

Note

- The function of code score may differ by device models.
- In test mode, this function is enabled by default. In normal mode, you need to enable it manually.

- The code score is determined by two factors including image quality and print quality of codes. The range of code score is between 0 and 100, and the higher the score, and easier the code can be read.

Steps

1. Go to **Algorithm Settings**, and enable **Code Score Enable**.

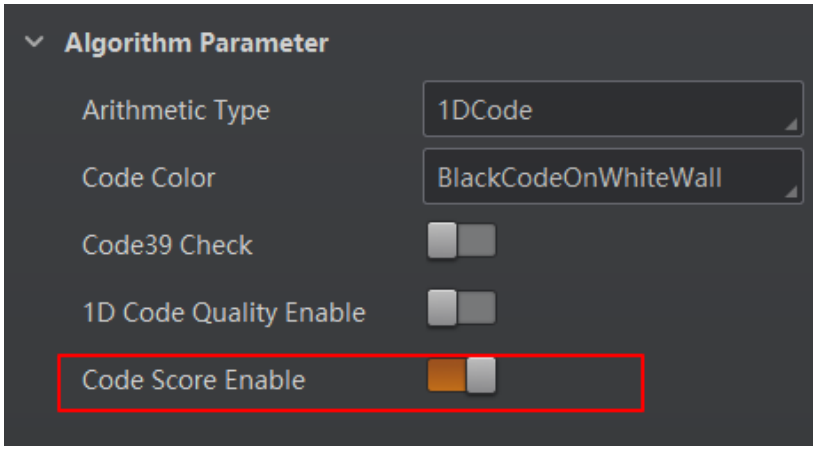


Figure 8-28 Enable Code Score Enable

2. Click to start acquisition, and the client software will display specific code score in the history record area.

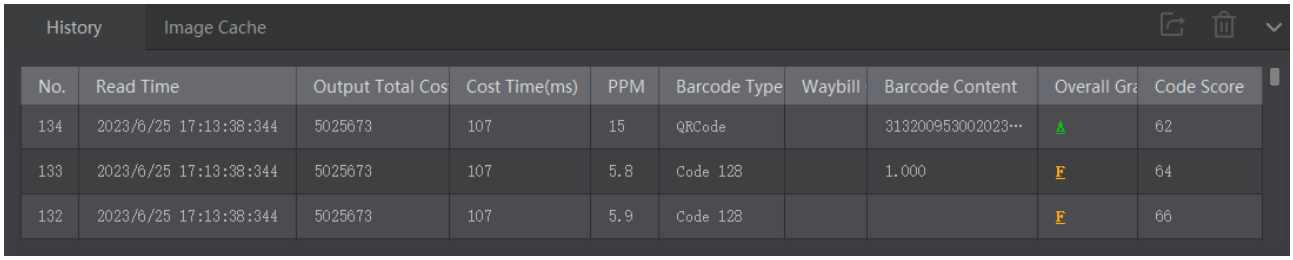


Figure 8-29 Code Score

3. (Optional) If the code score is low, go to **Image Settings**, and adjust parameters such as exposure time, gain, Gamma, and light source.

Note

If the code score is still low after adjusting, the code may have poor printing quality.

8.5 Signal Input Settings

The input settings allow you to configure the trigger-related parameters. You can enable trigger mode to let the acquisition of image data occur only when the trigger source is

generated.

8.5.1 Set Trigger Mode

The device has 2 types of trigger mode: Internal trigger mode and external trigger mode.

- **Internal Trigger Mode**: The device acquires images via its internal signals.
- **External Trigger Mode**: The device acquires images via external signals like software signal and hardware signal. The trigger source of external trigger mode includes software, TCP, UDP, etc.

8.5.2 Enable Internal Trigger Mode

In internal trigger mode, the device acquires images via its internal signals. You have 2 methods to enable the internal trigger mode:

- Click **I/O Control Settings** → **Input** → **Trigger Mode**, and select **Off** as **Trigger Mode**.
- In the live view page, click  to enable the internal trigger mode.

8.5.3 Enable External Trigger Mode

In external trigger mode, the device acquires images via external signals like software signal and hardware signal. You have 2 methods to enable the external trigger mode:

- Click **I/O Control Settings** → **Input** → **Trigger Mode**, and select **On** as **Trigger Mode**.
- In the live view page, click  to enable the external trigger mode.

Set and Execute Software Trigger Mode

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

Steps

1. Go to **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **Software** as **Trigger Source**.
4. Click **Execute** in **Trigger Software** to send trigger commands.
5. (Optional) Enter **Auto Trigger Time**, and enable **Enable Auto Trigger** to let the client software automatically send trigger signal to device according to the interval you set.

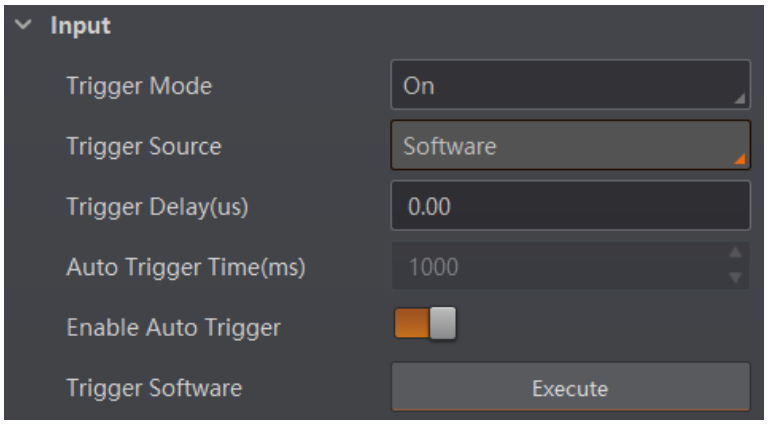


Figure 8-30 Set and Execute Software Trigger Mode

Set and Execute Hardware Trigger Mode

Steps

1. Go to **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select the specific line as **Trigger Source** according to the actual demands.
4. Set **Debounce Time** and **Trigger Activation** according to the actual demands.

Note

- When selecting **Rising Edge** or **Falling Edge** as **Trigger Activation**, you can set **Trigger Delay**.
- When selecting **Level High** or **Level Low** as **Trigger Activation**, you can set **Start Delay Time** and **End Delay Time**.

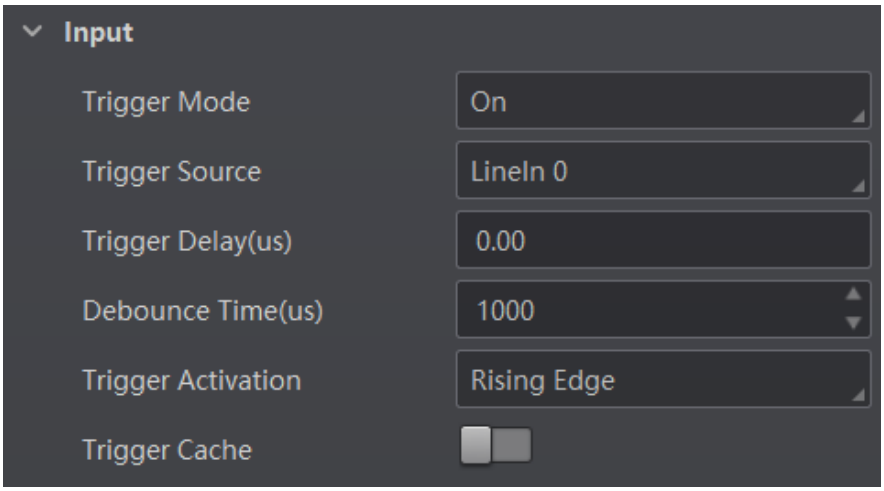


Figure 8-31 Set and Execute Hardware Trigger Mode

Note

- **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. It is 0 by default and the unit is μs. The sequence diagram of trigger delay is shown below.

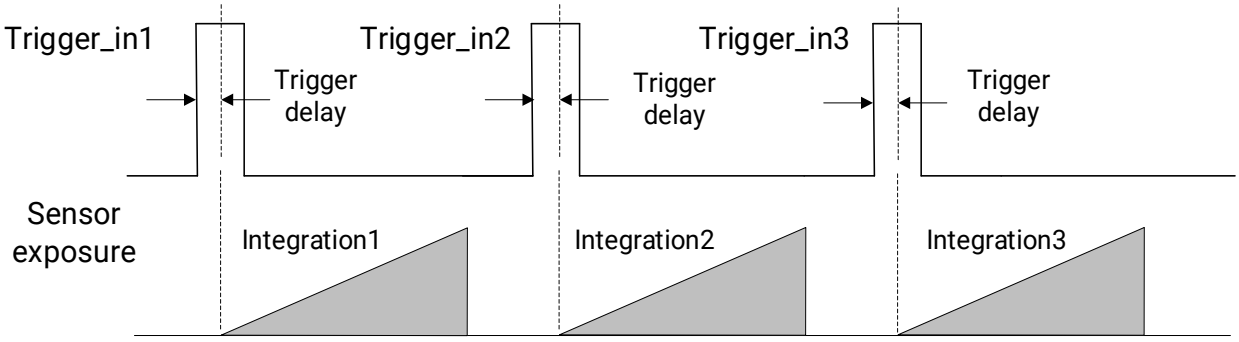


Figure 8-32 Sequence Diagram of Trigger Delay

- **Trigger debounce**: The trigger debounce function allows the device to filter out unwanted short external trigger signal that is input to the device. The sequence diagram of trigger delay is shown below.

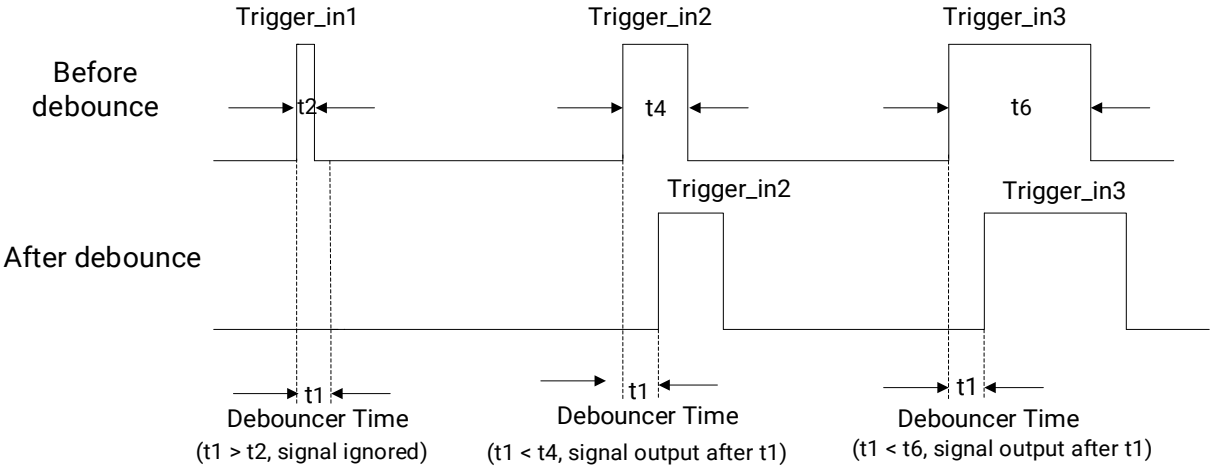


Figure 8-33 Sequence Diagram of Trigger Debounce

Set and Execute Counter Trigger Mode

Counter specifies that the trigger source will be generated after the set number of valid signals appears. For example, if you set the **Count Number** to **3**, the trigger source will be generated after 3 signals appear.

Steps

1. Go to **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.

3. Select **Counter 0** as **Trigger Source**.
4. Set **Trigger Delay**, **Count Number**, **Count Source**, and **Trigger Activation**

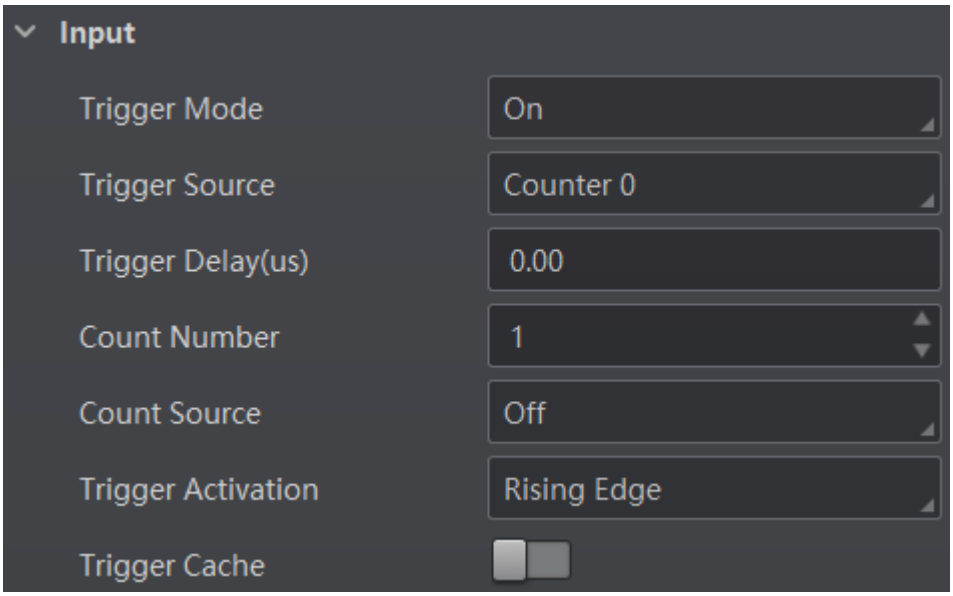


Figure 8-34 Set and Execute Counter Trigger Mode

Set and Execute TCP Trigger Mode

TCP start specifies the TCP server as the source for the trigger signal. When the server receives the specified string text, the trigger signal will be output.

Steps

1. Go to **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **TCP Start** as **Trigger Source**.
4. Set **Trigger Delay**, **TCP Trigger Port**, **TCP Trigger Text Format**, and **TCP Start Trigger Text**, and enable **Consistent Trigger** according to the actual demands.

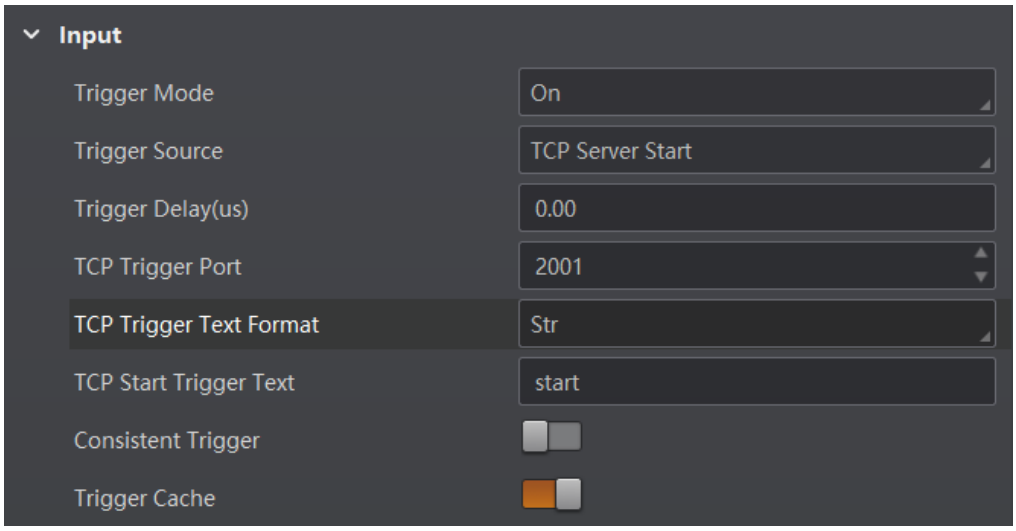


Figure 8-35 Set and Execute TCP Trigger Mode

Set and Execute UDP Trigger Mode

UDP start specifies the UDP server as the source for the trigger signal. When the server receives the specified string text, the trigger signal will be output.

Steps

1. Go to **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **UDP Start** as **Trigger Source**.
4. Set **Trigger Delay**, **UDP Trigger Port**, **UDP Trigger Text Format**, and **UDP Start Trigger Text**, and enable **Consistent Trigger** according to the actual demands.

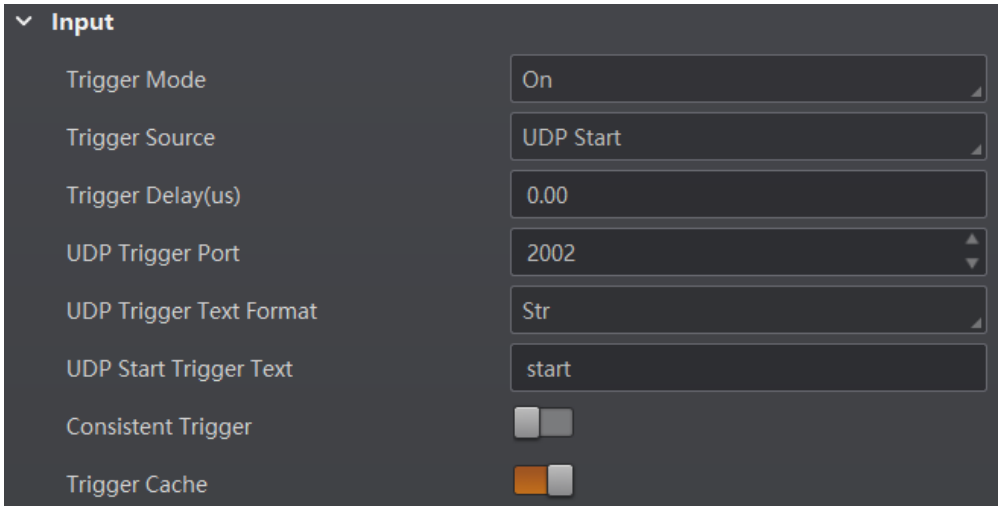


Figure 8-36 Set and Execute UDP Trigger Mode

Set and Execute Serial Port Trigger Mode

Serial start specifies the serial port as the source for the trigger signal. When the serial port receives the specified string text, the trigger signal will be output.

Steps

1. Go to **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **Serial Start** as **Trigger Source**.
4. Set **Trigger Delay**, **Serial Baudrate**, **Serial Data Bits**, **Serial Parity**, **Serial Stop Bits**, **Serial Trigger Text Format**, and **Serial Start Trigger Text**, and enable **Consistent Trigger** according to the actual demands.

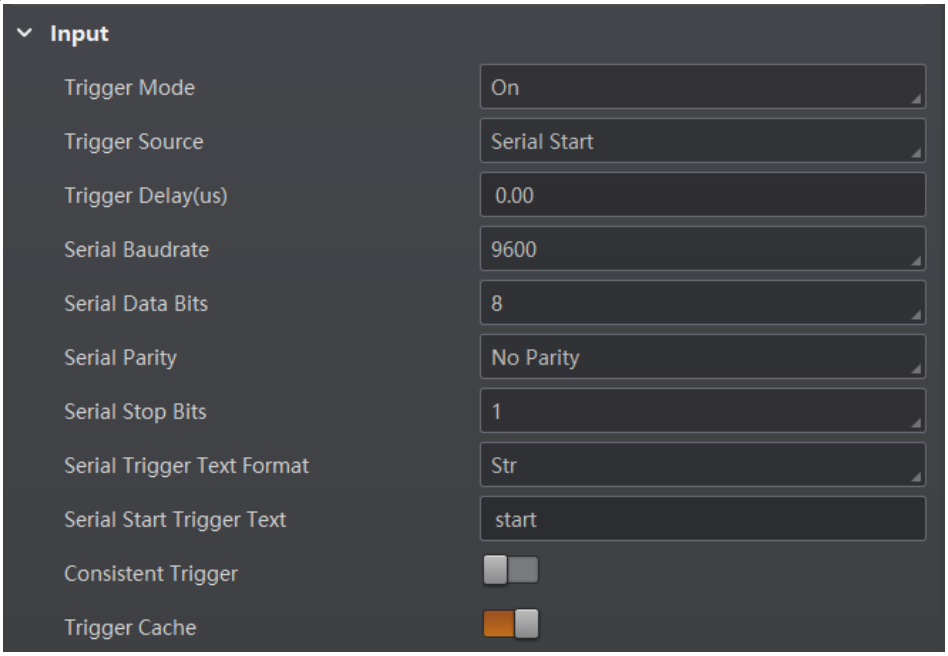


Figure 8-37 Set and Execute Serial Port Trigger Mode

Set and Execute Self Trigger Mode

Self trigger allows you to trigger the device according to the trigger period you configured.

Steps

1. Click **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **Self Trigger** as **Trigger Source**.
4. Set **Self Trigger Period** and **Self Trigger Count** according to the actual demands.

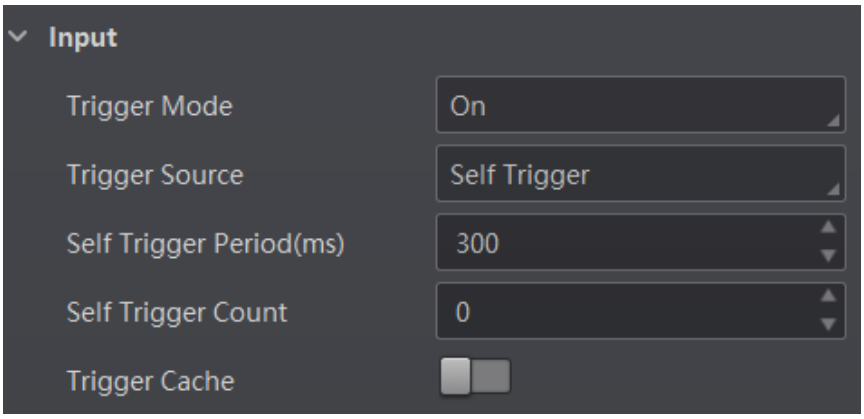


Figure 8-38 Set and Execute Self Trigger Mode

Note

- If the self-trigger count is set to 0, and it means that it can be triggered indefinitely until the execution of self-trigger stops.
- The self-trigger time shall be set to be greater than the reciprocal of the actual frame rate.

Set and Execute Main Sub Mode

When the main code reader is triggered, the trigger signals will be sent to the sub code readers.

Steps

1. Click **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **Main Sub** as **Trigger Source**.
4. Set **Trigger Delay** and **Trigger Cache** according to the actual demands.

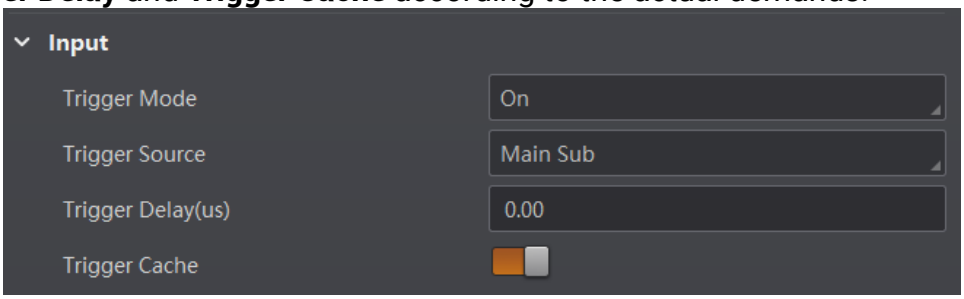


Figure 8-39 Set and Execute Main Sub Mode

Set and Execute TCP Client Start Mode

The external device sends TCP commands as the TCP client to the code reader to acquire images.

Steps

1. Click **I/O Control Settings** → **Input** → **Trigger Mode**.

2. Select **On** as **Trigger Mode**.
3. Select **TCP Client Start** as **Trigger Source**.
4. Set **TCP Dst Trigger IP/Port**, **TCP Client Trigger Text Format**, and **TCP Client Start Trigger Text**, and enable **Consistent Trigger** according to the actual demands.

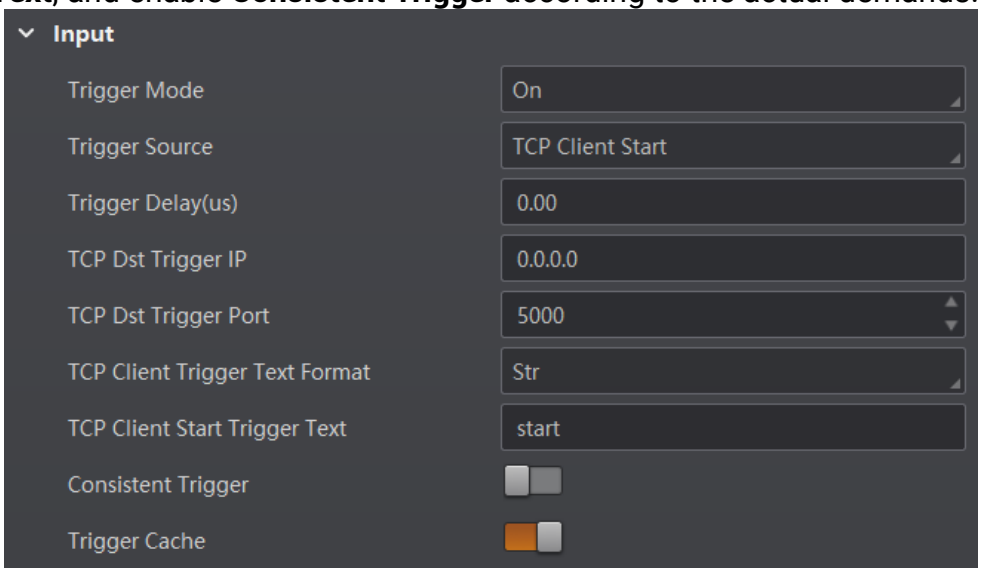


Figure 8-40 Set and Execute TCP Client Start Mode

Set and Execute Brightness Mode

When the brightness of the field of view changes, the code reader is triggered to acquire images and output code information automatically. The code reader monitors the change of image brightness value in real time and starts code reading when the change exceeds the configured sensitivity threshold.

Steps

1. Click **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **Brightness** as **Trigger Source**.
4. Set **Brightness Sensitivity**, **Brightness Unrespond Time**, and **Brightness Timeout**, according to the actual demands.

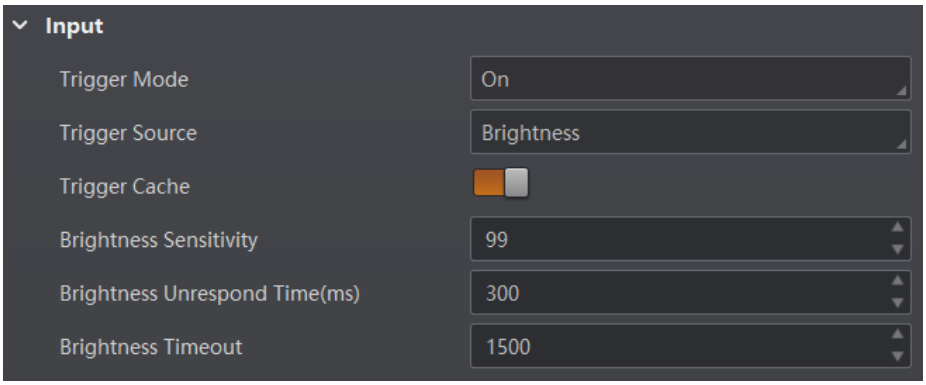


Figure 8-41 Set and Execute Brightness Mode

Set and Execute TOF Mode

When the changes of the distance between the code reader and the object exceeds the set threshold, the code reader is triggered to acquire images.

Note

This function is used for fast focus. Refer to section ***Set Fast Focus*** for details.

Steps

1. Click **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **TOF** as **Trigger Source**.
4. Enable **Trigger Cache** according to the actual demands.

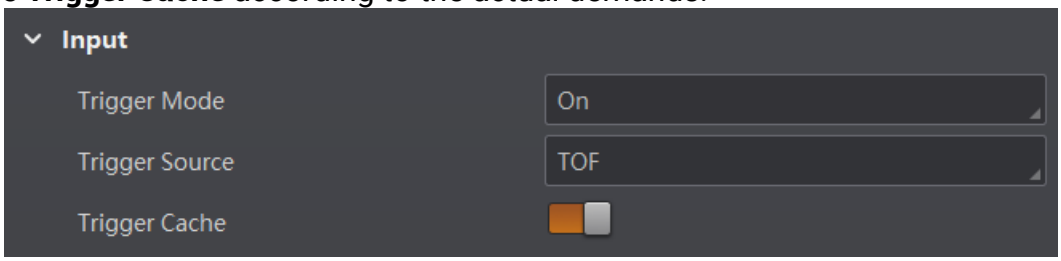


Figure 8-42 Set and Execute TOF Mode

Note

Refer to the ***IDMVS Client Software User Manual*** for the details of all input parameters.

8.5.4 Stop Trigger

The device supports stopping trigger via TCP server, TCP client, UDP, IO, and serial port. You can also set code reading timeout duration or max. code amount to be read to stop trigger. After a trigger is stopped, the device will not respond to the trigger again.

Note

For specific trigger stopping methods, refer to the actual device you got.

Stop Trigger via TCP Sever

When the TCP server receives the specified string text, the trigger will be stopped.

Steps

1. Go to **I/O Control Settings** → **Stop Trigger**.
2. Enable **TCP Stop Trigger Enable**.
3. Set following parameters according to actual demands.

- **TCP Trigger Port**: It is 2001 by default.

- **TCP End Trigger Format**: You can select the text format from the drop-down list, including **Str** and **Hex**.
- **TCP Stop Trigger Text**: It sets the stop trigger text, and it is **stop** by default.

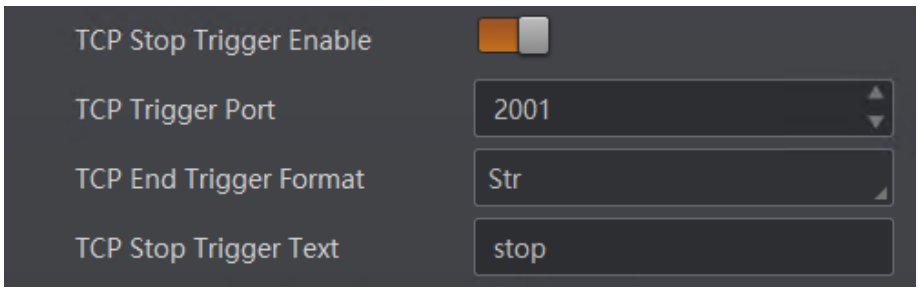


Figure 8-43 Stop Trigger via TCP Server

Stop Trigger via TCP Client

When the TCP client receives the specified string text, the trigger will be stopped.

Steps

1. Go to **I/O Control Settings** → **Stop Trigger**.
2. Enable **TCP Client End Trigger Enable**.
3. Set **Tcp Dst Trigger IP**, **Tcp Client Trigger Port**, **Tcp Client End Trigger Format**, and **Tcp Client Stop Trigger Text** according to actual demands.

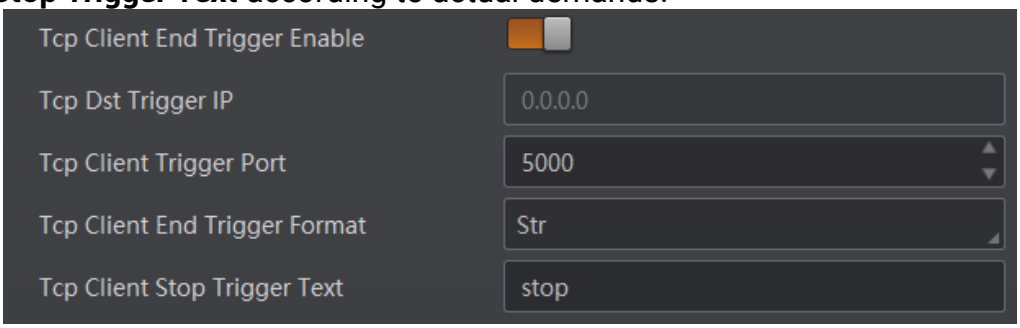


Figure 8-44 Stop Trigger via TCP Client

Stop Trigger via UDP

When the UDP receives the specified string text, the trigger will be stopped.

Steps

1. Go to **I/O Control Settings** → **Stop Trigger**.
2. Enable **UDP Stop Trigger Enable**.
3. Set following parameters according to actual demands.

- **UDP Trigger Port**: It is 2002 by default.
- **UDP End Trigger Format**: You can select the text format from the drop-down list, including **Str** and **Hex**.
- **UDP Stop Trigger Text**: It sets the stop trigger text, and it is **stop** by default.

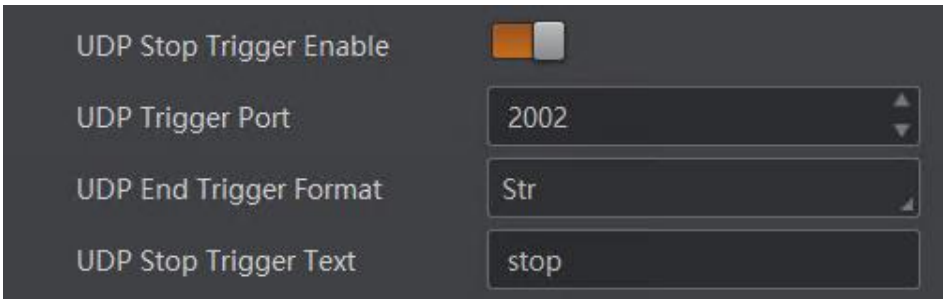


Figure 8-45 Stop Trigger via UDP

Stop Trigger via I/O

Stopping trigger via I/O allows you to select hardware or software trigger source to stop the device from acquiring images.

Steps

1. Go to **I/O Control Settings** → **Stop Trigger**.
2. Enable **IO Stop Trigger Enable**.
3. Select sources from **LineIn 0/1/2** and **Software Trigger End** as **IO Stop Trigger Selector**.
4. (Optional) Set trigger polarity if **LineIn 0/1/2** is selected as **IO Stop Trigger Selector**.
5. (Optional) Click **Execute** in **Software Stop Trigger** to stop trigger if **SoftwareTriggerEnd** is selected as **IO Stop Trigger Selector**.

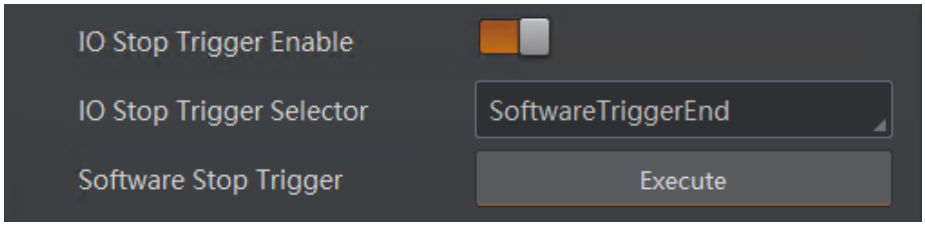


Figure 8-46 Stop Trigger via IO

Stop Trigger via Serial Port

When the specified serial port receives the specified string text, the trigger will be stopped.

Steps

1. Go to **I/O Control Settings** → **Stop Trigger**.
2. Enable **Serial Stop Trigger Enable**.
3. Set following parameters according to actual demands.

- **Serial End Trigger Format**: You can select the text format from the drop-down list, including **Str** and **Hex**.
- **Serial Stop Trigger Text**: It sets the trigger text of serial port stop, and it is **stop** by default.
- **Serial Baudrate**: It sets the baud rate of the serial port, and it is 9600 by default.
- **Serial Data Bits**: It sets the data bits of the serial port, and it is 8 by default.
- **Serial Parity**: It sets the parity of the serial port, and it is **No Parity** by default.

- **Serial Stop Bits**: It sets the stop bits of the serial port, and it is 1 by default.

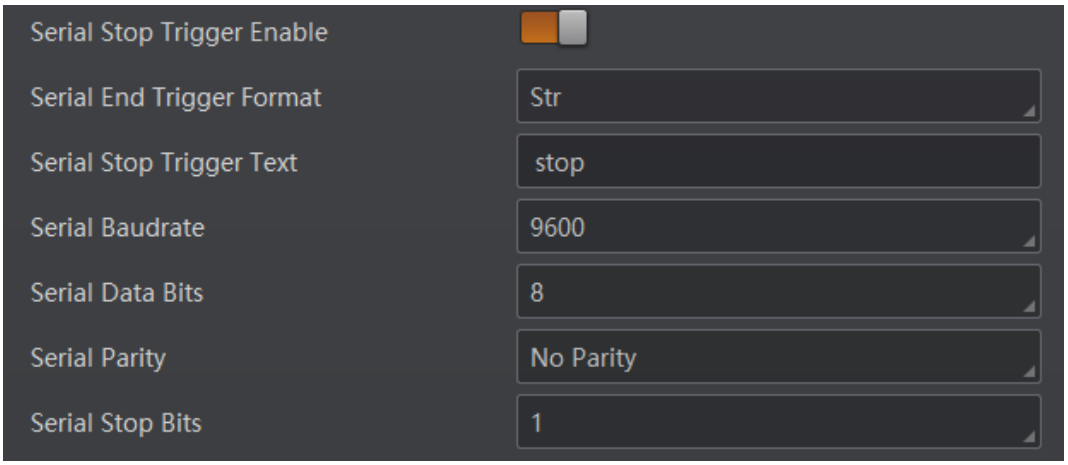


Figure 8-47 Stop Trigger via Serial Port

Stop Trigger via Timeout Duration

Note

TimeOut Stop Trigger Enable is only available when the device running mode is set to Normal and the Trigger Mode is On.

When the trigger time reaches the specified maximum value (ms), the trigger will be stopped. You can enable **TimeOut Stop Trigger Enable**, and set **Maximum Output Limited Time** according to actual demands.

Note

The range of **Maximum Output Limited Time** is between 0 ms and 10000 ms.

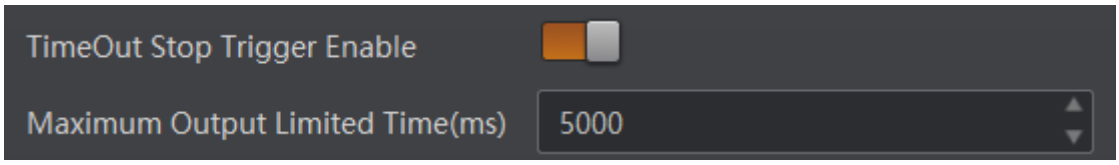


Figure 8-48 Stop Trigger via Timeout Duration

Stop Trigger via Code Number

Note

CodeNum Stop Trigger Enable is only available when the device running mode is set to Normal and the Trigger Mode is On.

This function means that the code quantity output by the device is restricted to the settings

you configured here.
You can enable **CodeNum Stop Trigger Enable**, and set **CodeNum Stop Trigger Min** and **CodeNum Stop Trigger Max** according to actual demands.

Note

- If the output code quantity is smaller than configured **CodeNum Stop Trigger Min**, and the device will output codes continuously.
- If the output code quantity is smaller than configured **CodeNum Stop Trigger Max**, and the device will stop outputting codes.
- If the output code quantity is between configured **CodeNum Stop Trigger Min** and **CodeNum Stop Trigger Max**, and the device will read and output codes according to trigger signals.
- If **CodeNum Stop Trigger Min** is same with **CodeNum Stop Trigger Max**, and the device will stop outputting codes when the number of output codes reaches the configured number.

Figure 8-49 Stop Trigger via Code Number

8.6 Signal Output Settings

8.6.1 Select Output Signal

The device's output signal can control external devices like PLC, flashing light, etc. Click **I/O Control Settings** → **Output** → **Line Out Selector** to select output signals.

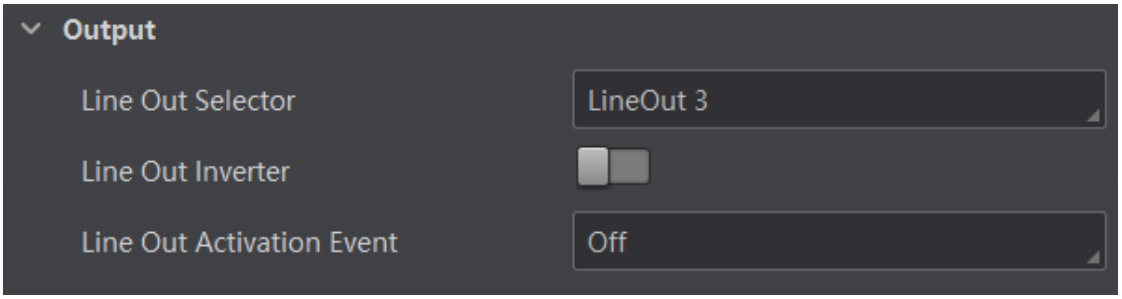


Figure 8-50 Select Output Signal

8.6.2 Set Event Source

Note

The specific event sources may differ by device models and firmware versions.

The device supports outputting different trigger signals according to the event source you select. Click **I/O Control Settings** → **Output** → **Line Out Activation Event** to select event source.
The device supports following event sources: **Off**, **AcquisitionStartActive**, **AcquisitionStopActive**, **FrameBurstStartActive**, **FrameBurstStopActive**, **ExposureStartActive**, **SoftTriggerActive**, **HardTriggerActive**, **CounterActive**, **TimerActive**, **NoCodeRead**, **ReadSuccess**, **LightStrobeLong**, and **CommandControlIO**.

Note

- **Off** refers to no event source.
- You need to set different parameters when selecting various event sources.

Select Acquisition Start Active

If you select **AcquisitionStartActive** as **Line Out Activation Event**, and you can set its output delay time and duration.
- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration**: It sets the time duration of the output signal.

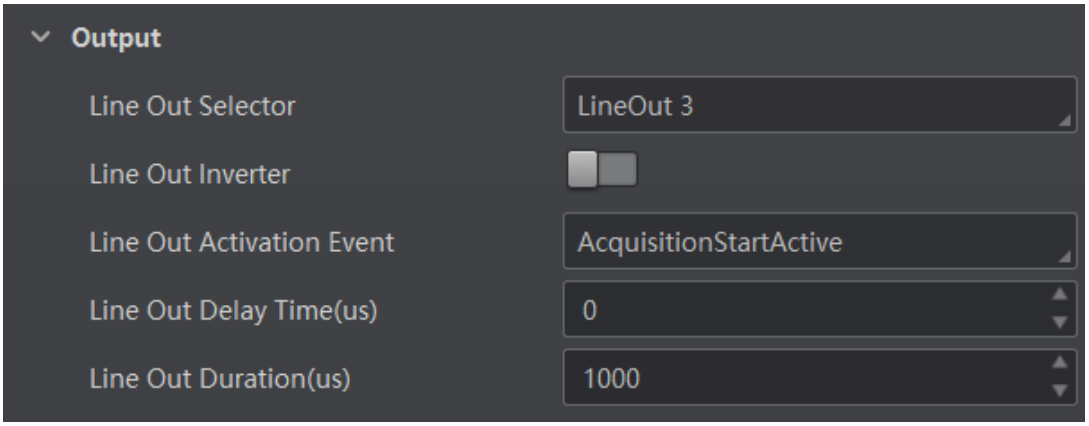


Figure 8-51 Select Acquisition Start Active

Select Acquisition Stop Active

If you select **AcquisitionStopActive** as **Line Out Activation Event**, and you can set its output delay time and duration.
- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration**: It sets the time duration of the output signal.

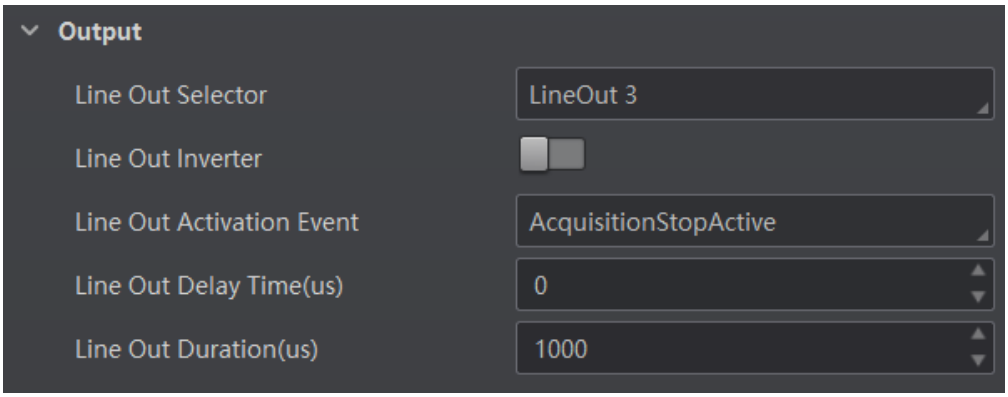


Figure 8-52 Select Acquisition Stop Active

Select Frame Burst Start Active

If you select **FrameBurstStartActive** as **Line Out Activation Event**, and you can set its output delay time and duration.

- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration**: It sets the time duration of the output signal.

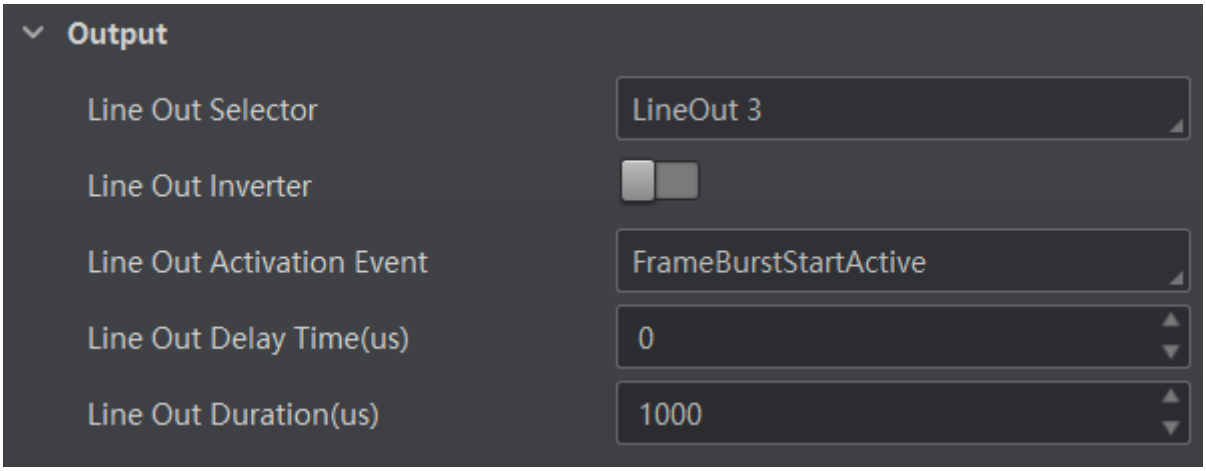


Figure 8-53 Select Frame Burst Start Active

Select Frame Burst Stop Active

If you select **FrameBurstStopActive** as **Line Out Activation Event**, and you can set its output delay time and duration.

- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration**: It sets the time duration of the output signal.

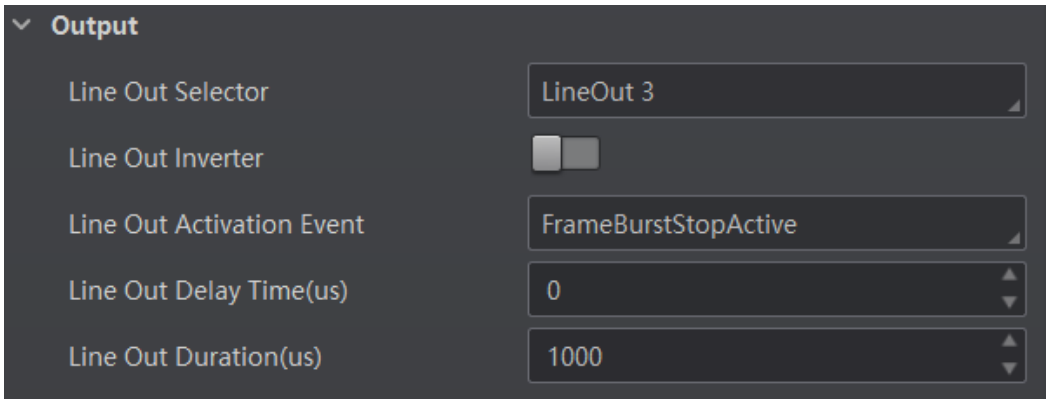


Figure 8-54 Select Frame Burst Stop Active

Select Exposure Start Active

If you select **ExposureStartActive** as **Line Out Activation Event**, and you can set its output delay time, duration and advance time.

- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration Time**: It sets the time duration of the output signal.
- **LineOut Ahead Time**: It sets the advance time of outputting the output signal.

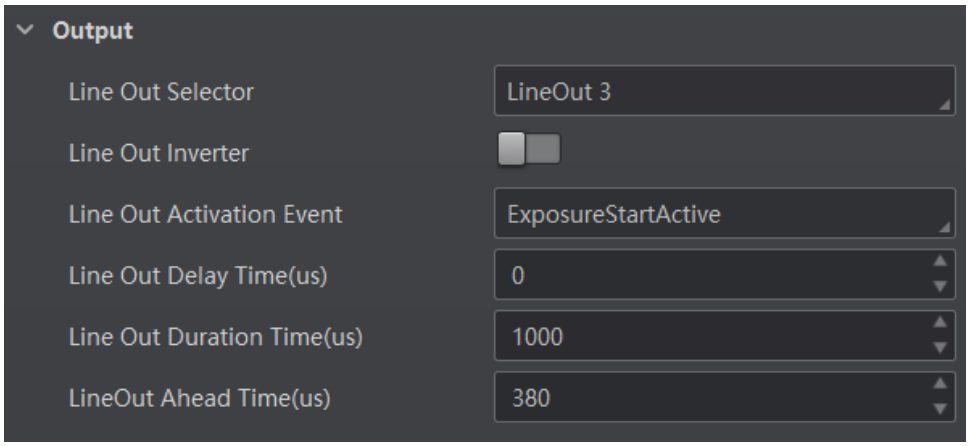


Figure 8-55 Select Exposure Start Active

Select Soft Trigger Active

If you select **SoftTriggerActive** as **Line Out Activation Event**, and you can set its output delay time, duration, and execute outputting signal manually.

- **Line Trigger Software**: Click **Execute** in **Line Trigger Software** to output the signal manually.
- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration**: It sets the time duration of the output signal.

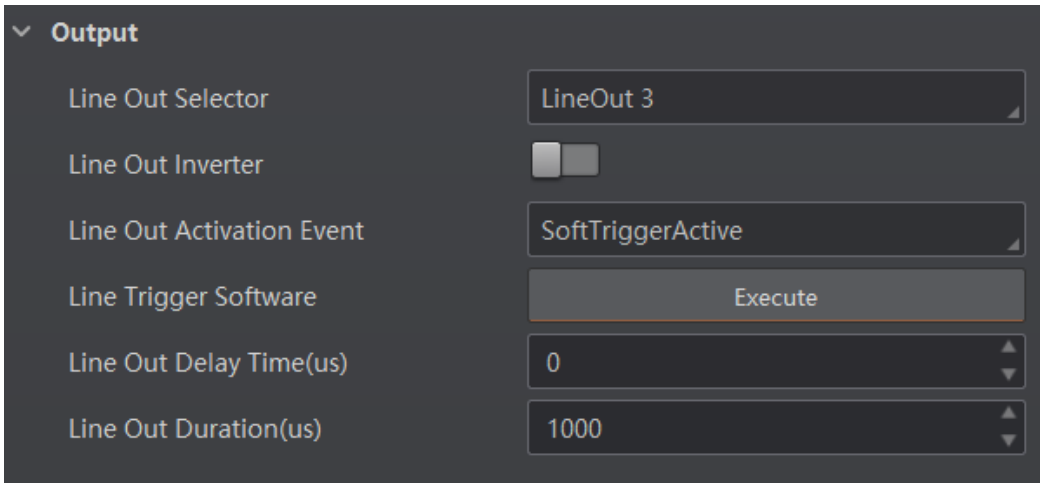


Figure 8-56 Select Soft Trigger Active

Select Hard Trigger Active

If you select **HardTriggerActive** as **Line Out Activation Event**, and you can set its output delay time, duration, trigger source, and trigger activation.

- **Hardware Trigger Source**: It sets the hardware trigger source.
- **Hardware Trigger Activation**: It sets the trigger activation of input signal, including **Rising Edge** and **Falling Edge**.
- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration**: It sets the time duration of the output signal.

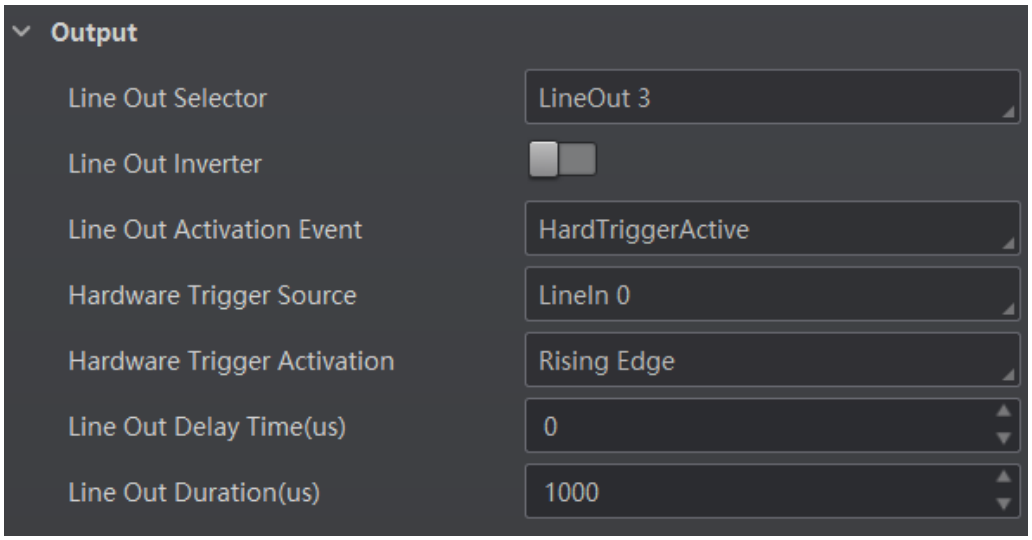


Figure 8-57 Select Hard Trigger Active

Select Counter Active

If you select **CounterActive** as **Line Out Activation Event**, and you can set its output delay

time and duration.

- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration**: It sets the time duration of the output signal.

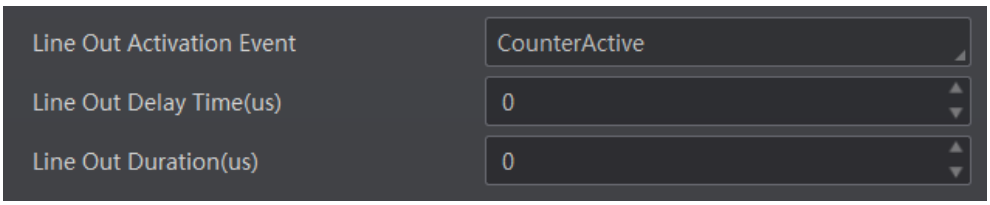


Figure 8-58 Select Counter Active

Select Timer Active

If you select **TimerActive** as **Line Out Activation Event**, and you can set its output duration and period.

- **Line Out Duration**: It sets the time duration of the output signal.
- **Line Out Period**: It sets the time period of the output signal.

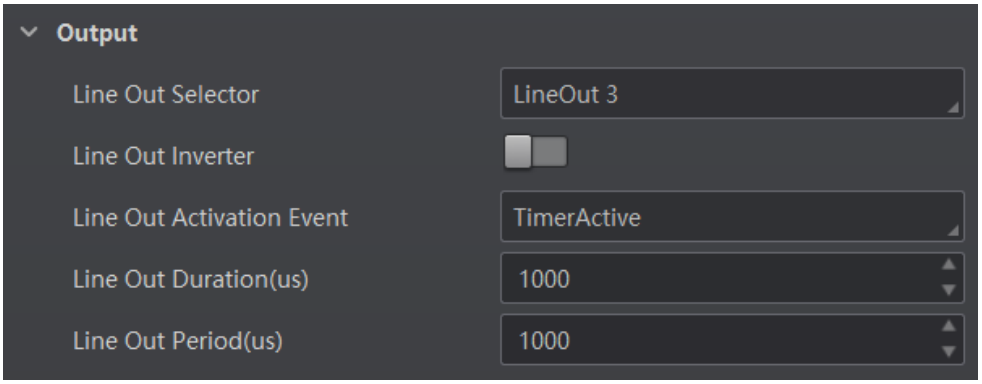


Figure 8-59 Select Timer Active

Select No Code Read

If you select **NoCodeRead** as **Line Out Activation Event**, and you can set its output delay time and duration.

- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration**: It sets the time duration of the output signal.

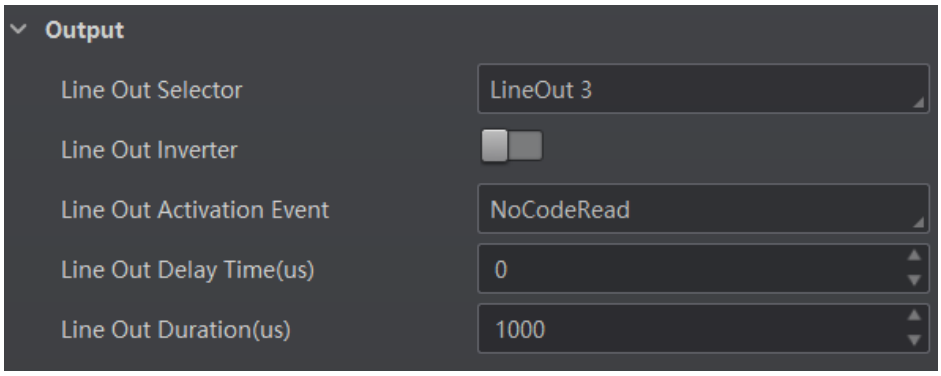


Figure 8-60 Select No Code Read

Select Read Success

If you select **ReadSuccess** as **Line Out Activation Event**, and you can set its output delay time and duration.

- **Line Out Delay Time**: It sets the delay time for outputting the output signal.
- **Line Out Duration**: It sets the time duration of the output signal.

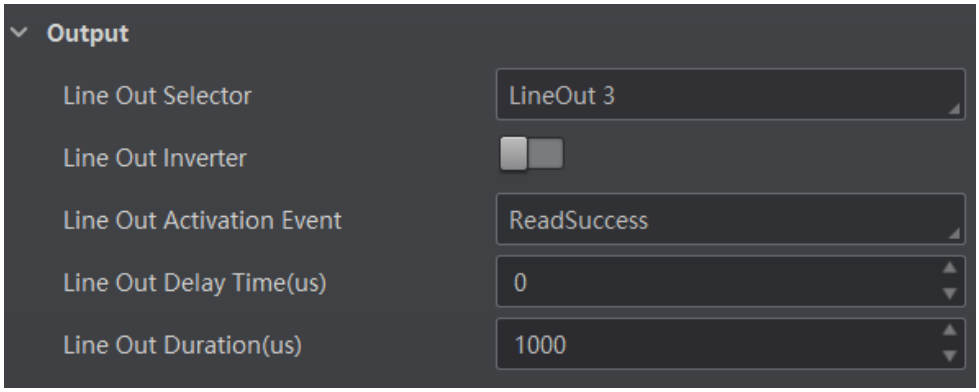


Figure 8-61 Select Read Success

Select Light Strobe Long

If you select **LightStrobeLong** as **Line Out Activation Event**, and you do not need to set any parameters.

Select Command Control IO

If you select **CommandControlIO** as **Line Out Activation Event**, and you do not need to set any parameters.

- **Control Start Str**: It sets the start string of command control.
- **Control Stop Str**: It sets the stop string of command control.
- **Control IO Consist Output Enable**: When it is enabled, the client starts output when receiving the start string and ends output only when receiving the stop string.

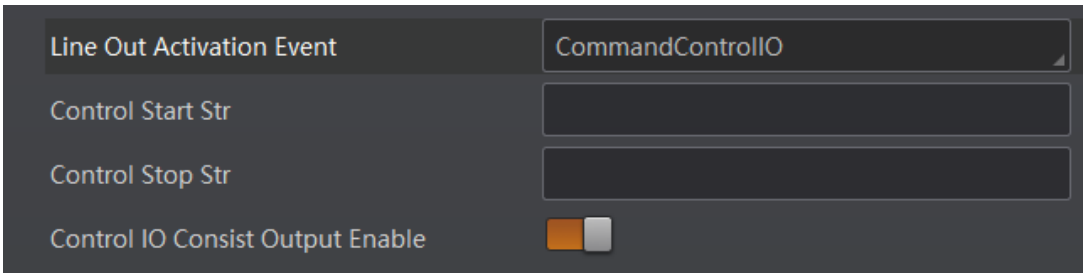


Figure 8-62 Select Command Control IO

8.6.3 Enable Line Inverter

The line inverter function allows the device to invert the electrical signal level of an I/O signal, and meet requirements of different devices for high or low electrical signal level.
You can go to **I/O Control Settings** → **Output**, and enable **Line Out Inverter**.

Note

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

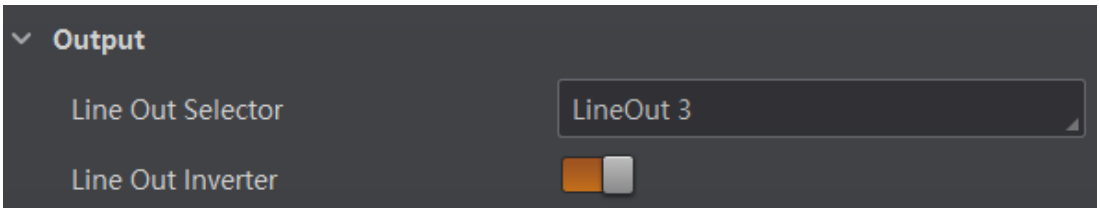


Figure 8-63 Enable Line Out Inverter

8.7 Communication Settings

The communication protocol is used to transmit and output code reading result and image. The communication protocol is related to the device modes. With various device modes, the device supports different communication protocols and corresponding parameters.

- If the device's running mode is **Test** or **Raw**, it only supports **SmartSDK** protocol and no parameter settings are required.
- If the device's running mode is **Normal**, it supports **SmartSDK**, **TCP Client**, **Serial**, **FTP**, **TCP Server**, **Profinet**, **Melsec/SLMP**, **EthernetIp**, **ModBus**, **UDP**, and **Fins** communication protocols, and you need to set corresponding parameters.

Note

- The supported communication protocols may differ by device models.
- The specific parameters of communication protocols may differ by device models.

8.7.1 Set SmartSDK

If you select **SmartSDK** as the communication protocol, you can configure the following parameters.

Table 8-10 SmartSDK Communication Protocol

Parameter	Description
SmartSDK Protocol	If enabled, the device will output data via SmartSDK.
Encode JPEG Flag	The device will compress images in JPG format after enabling it.
Quantity of JPG	It sets the image compression quality, and it ranges from 50 to 99.

8.7.2 Set TCP Client

If you select **TCP Client** as the communication protocol, you can configure the following parameters.

Table 8-11 TCP Client Communication Protocol

Parameter	Description
TCP Protocol	If enabled, the device will output data via the TCP server.
TCP Dst Addr	Enter the IP address of the server that receives data output by the code reader.
TCP Dst Port	Enter the port No. of the server that receives data output by the code reader.
Heartbeat Enable	If enabled, the software will send heartbeat text.
Barcode as Heartbeat	If enabled, you can set heartbeat text and time.
Heartbeat Text	Enter the content of heartbeat text.
Heartbeat Time	Set the duration of the heartbeat.

8.7.3 Set Serial

If you select **Serial** as the communication protocol, you can configure the following parameters.

Table 8-12 Serial Communication Protocol

Parameter	Description
Serial Protocol	If enabled, the code reader will output data via serial port.
Serial Baudrate	The baud rate of the serial port of the PC that receives data.
Serial Data Bits	Data bits of the serial port of the PC that receives data.

Parameter	Description
	Note The hexadecimal trigger is supported only when **Serial Data Bits** is 8.
Serial Parity	Parity bits of the serial port of the PC that receives data.
Serial Stop Bits	Stop bits of the serial port of the PC that receives data.

8.7.4 Set FTP

If you select **FTP** as the communication protocol, you can configure the following parameters.

Table 8-13 FTP Communication Protocol

Parameter	Description
FTP Protocol	If enabled, the code reader will output data via FTP server.
FTP Host Addr	IP address of the FTP host.
FTP Host Port	Port No. of the FTP host.
FTP User Name	User name of the FTP.
FTP User PWD	Password of the FTP.

8.7.5 Set TCP Server

If you select **TCP Server** as the communication protocol, you can configure the following parameters.

Table 8-14 TCP Server Communication Protocol

Parameter	Description
TCP Server Enable	If enabled, the code reader will output data via TCP server.
TCP Server Port	The port No. of the TCP server that receives data output by code reader.
TCP Server Flexible Connect Enable	If enabled, when the connection count reaches the maximum number 8, a new connection is supported and the earliest connection is squeezed out.
TCP Server Heartbeat Enable	If enabled, the client sends a heartbeat packet to the server at a fixed interval to check whether the information transmission channel is working properly.
TCP Server Barcode As Heartbeat	If enabled, the code read by the client can be sent as heartbeat packets.

Parameter	Description
TCP Server Heartbeat Text	Set the beginning and end of the heartbeat data. The value is **heartbeat** by default.
TCP Server Heartbeat Time	Set the interval for sending heartbeat packets, in seconds. If no heartbeat response is received within the configured time, the client will release the code reader.

8.7.6 Set Profinet

If you select **Profinet** as the communication protocol, you can configure the following parameters.

Table 8-15 Profinet Communication Protocol

Parameter	Description
Profinet Enable	If enabled, the device will output data via Profinet protocol.
Profinet Device Name	Enter the name of the code reader, which is used for code reader recognition in Profinet protocol communication.
Profinet Result Module Size	Select from the drop-down list the result module size.
Profinet Result Timeout	Set the maximum waiting time for the result (unit: s).

8.7.7 Set Melsec/SLMP

If you select **Melsec/SLMP** as the communication protocol, you can configure the following parameters.

Table 8-16 Melsec/SLMP Communication Protocol

Parameter	Description
MELSEC Protocol Enable	If enabled, the code reader will output data via MELSEC protocol.
MELSEC Server IP	IP address of the Programmable Logic Controller (PLC) connected to the code reader.
MELSEC Server Port	Port number of the Programmable Logic Controller (PLC) connected to the code reader.
MELSEC Frame Type	Frame type of the MELSEC.
MELSEC Network Number	Network number to communicate with.
MELSEC Node Number	Node number to communicate with.
MELSEC Processer Number	Processor number to communicate with.

Parameter	Description
MELSEC Control Poll Interval	Requested time between successive polls of the control block from the PLC.
MELSEC Control Space	It sets storage space of the control area.
MELSEC Control Offset	It sets the start offset address of the control area.
MELSEC Control Size (Word)	It sets the size of the control area.
MELSEC Status Space	It sets storage space of the status area.
MELSEC Status Offset	It sets the start offset address of the status area.
MELSEC Status Size (Word)	It sets the size of the status area.
MELSEC Result Space	It sets storage space of the result area.
MELSEC Result Offset	It sets the start offset address of the result area.
MELSEC Result Size (World)	It sets the size of the result area.
MELSEC Result Byte Swap	If it is enabled, the client software will swap MELSEC results.
MELSEC Result Timeout	It sets the MELSEC result timeout, and the unit is s.

8.7.8 Set Ethernet/IP

If you select **EthernetIp** as the communication protocol, you can configure the following parameters.

Table 8-17 Ethernet/IP Communication Protocol

Parameter	Description
EthernetIP Enable	If enabled, the code reader will output data via Ethernet/IP protocol.
EthernetIP Input Assembly Size (Word)	It sets input assembly size of the Ethernet/IP protocol.
EthernetIP Output Assembly Size (Word)	It sets output assembly size of the Ethernet/IP protocol.
EthernetIP Result Byte Swap	If enabled, it will swap the results.
EthernetIP Result Timeout (s)	It sets the result timeout of the Ethernet/IP protocol.

8.7.9 Set ModBus

If you select **Modbus** as the communication protocol, you can configure the following parameters.

Table 8-18 ModBus Communication Protocol

ModBus	Description
ModBus Enable	If enabled, the code reader will output data via ModBus protocol.
ModBus Mode	Select a mode from **Server** and **Client**.
ModBus Control Space	The value is "holding_register" by default and not editable.
ModBus Control Offset	Offset of the control address. The default value is 0.
ModBus Control Size (Word)	The value is 1 by default.
ModBus Status Space	It sets status space and it is “holding_register” by default.
ModBus Status Offset	It sets status offset and it is 1 by default.
ModBus Status Size (Word)	It is 1 by default.
ModBus Result Space	It set result space and it is “holding_register” by default.
ModBus Result Offset	It is 2 by default.
ModBus Result Size (Word)	It is 100 by default.
ModBus Result Byte Swap	If it is enabled, the client software will swap ModBus results.
ModBus Result Timeout (s)	It sets the result timeout of the ModBus protocol.

8.7.10 Set UDP

If you select **UDP** as the communication protocol, you can configure the following parameters.

Table 8-19 UDP Communication Protocol

Parameter	Description
UDP Protocol Enable	If enabled, the code reader will output data via User Datagram Protocol (UDP).
UDP Dst Ip	The IP address of the PC receiving the output data.
UDP Dst Port	The port of the PC receiving the output data.

8.7.11 Set Fins

If you select **Fins** as the communication protocol, you can configure the following parameters:

Table 8-20 Fins Communication Protocol

Parameter	Description
Fins Enable	If enabled, the code reader will output data via TCP/UDP FIN.
Fins Server IP	It sets the server IP of Fins.
Fins Server Port	It is 9600 by default.
Fins Control Poll Interval (ms)	It sets how often read data.
Fins Control Space	It sets storage space of the control area.
Fins Control Offset	It sets the start offset address of the control area.
Fins Control Size (Word)	It sets the size of the control area.
Fins Status Space	It sets storage space of the status area.
Fins Status Offset	It sets the start offset address of the status area.
Fins Status Size (Word)	It sets the size of the status area.
Fins Result Space	It sets storage space of the result area.
Fins Result Offset	It sets the start offset address of the result area.
Fins Result Size (Word)	It sets the size of the result area.
Fins Result Byte Swap	If it is enabled, the client software will swap Fins results.
Fins Result Timeout (s)	It sets the Fins result timeout, and the unit is s.

8.8 Data Processing Settings

In **Data Processing**, you can set filter rules for reading codes and other data processing related parameters.

Note

The specific parameters may differ by device models and firmware versions.

8.8.1 Set Filter Rule

You can set rules via **Filter Rule** to filter unwanted codes to improve the reading efficiency.

Normal Filter Mode

If the device's running mode is normal, trigger mode is on, and filter mode is normal, you can set following parameters according to actual demands.

- **Numeral Filter:** If enabled, the device will only parse and read the numeral contents of the codes, and the non-numeral contents will be filtered out.
- **Begin with Specific Character for Result:** enabled, the device will only read the codes which begin with a specific character string.
- **Begins with**: Enter the character string.
- **Include Specific Character in Barcode:** If enabled, the device will only read the codes which include a specific character string.
- **Character**: Enter the character string.
- **Exclude Specific Character in Barcode:** If enabled, the device will only read the codes without a specific character string.
- **Character**: Enter the character string.
- **Instant Output Mode Enable:** If enabled, the device will output code data immediately once a code is read. If not enabled, the code data will be output after the device trigger process ends.

Note

The parameter is only available when the running mode is set to Normal mode and the trigger mode is enabled.

- **Min. Output Time(ms) :** Define the minimum time duration (unit: ms) for data output. The duration starts from trigger time. Note: The parameter is only available when the running mode is set to Normal mode and the trigger mode is enabled.
- **Remove Duplicate By ROI**: If it is enabled, the device will filter information based on drawn ROIs.
- **Max. Code Length:** If the length of a code is longer (in terms of the number of characters) than the configured value, the device will NOT parse the code.
  For example, if you set the value to 9, the device will not parse the codes which contain more than 9 characters.
- **Min. Code Length:** If the length of a code is shorter (in terms of the number of characters) than the configured value, the device will NOT parse the code.
  For example, if you set the value to 6, the device will not parse the codes which contain fewer than 6 characters.
- **Read Times Threshold:** If the reading results of a code is same for the configured times, the code will be regarded as valid and its data will be output. Or the code will be regarded as invalid and its data will not be output.

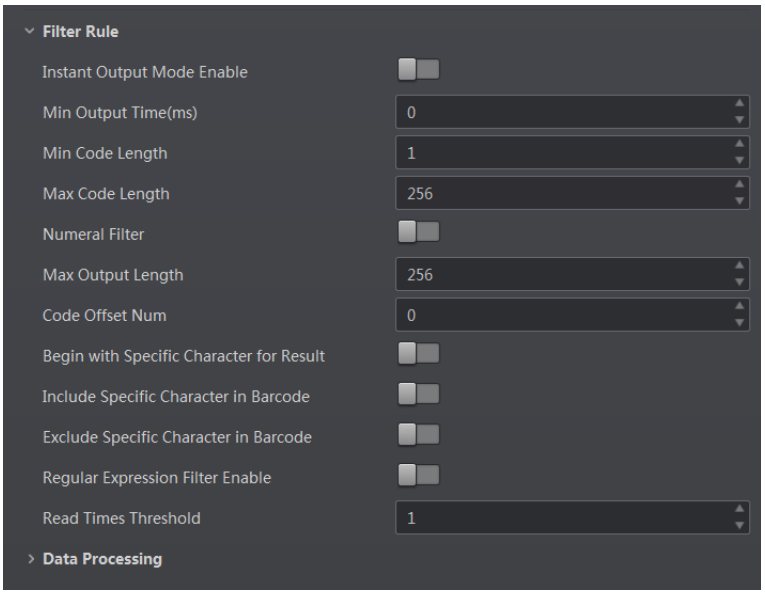


Figure 8-64 Normal Filter Mode

Regular Expression Filter Mode

The device supports filtering codes via the regular expression.

Steps

1. Select **Regular Expression** as the **Filter Mode**, and click **Set** in **Regular Expression Filter** to enter regular expression filter settings window.
2. Import local files or add customized filter rules to set the regular expression.

- Import local files: Click **Import** to import local .xml files, and click **OK** to finish.

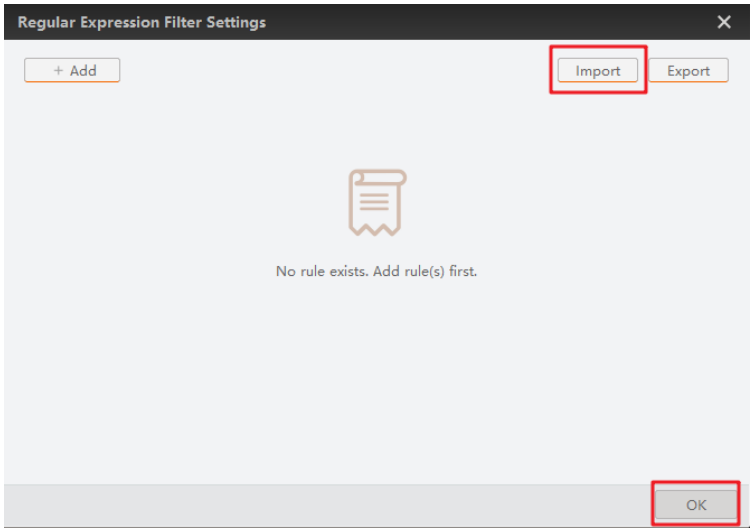


Figure 8-65 Regular Expression Filter Settings

- Add customized filter rule: Click **Add** and set related parameters in the popped-up window, and click **OK** after configuring parameters.

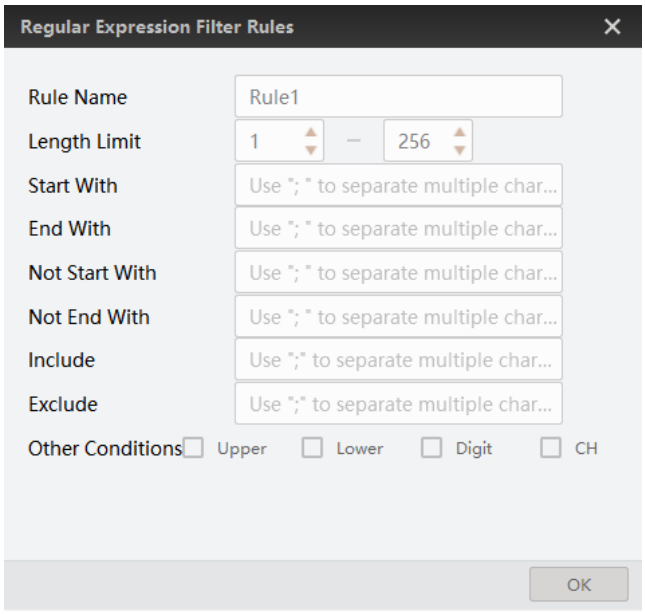


Figure 8-66 Enter Customized Regular Expression Filter Rules

Table 8-21 Filter Rule Parameters

Parameter	Description
Rule Name	The default rule name is Rule 1, and you can edit it according to actual demands.
Length Limit	It sets the length range of the code, and its upper limit is 256.
Start With	It sets the specific start with code. You can use semicolon to separate if there are multiple characters. **Note** If multiple characters are used, code meeting one of these characters is valid.
End With	It sets the specific end with code. You can use semicolon to separate if there are multiple characters. **Note** If multiple characters are used, code meeting one of these characters is valid.
Not Start With	It excludes the specific start with code. You can use semicolon to separate if there are multiple characters. **Note** If multiple characters are used, code meeting one of these characters is valid.
Not End With	It excludes the specific end with code. You can use semicolon to separate if there are multiple characters. **Note**

Parameter	Description
	If multiple characters are used, code meeting one of these characters is valid.
Included	It sets the code with specific content. You can use semicolon to separate if there are multiple characters. **Note** If multiple characters are used, code meeting all these characters is valid.
Excluded	It sets the code without specific content. You can use semicolon to separate if there are multiple characters. Note If multiple characters are used, code meeting all these characters is valid.
Character	Set a filter for a specific character in the code that must start from a certain position. The first digit from left to right represents the 0th position. For example, if you set this parameter to **aa from 2 Bit Start**, the code "1aa23" does not meet the requirement, whereas "12aa3" does.
Other Conditions	You can select uppercase, lowercase, digit or Chinese.

3. After setting filter rule, enter the code in **Code Check** to check if the filter rule is successful.

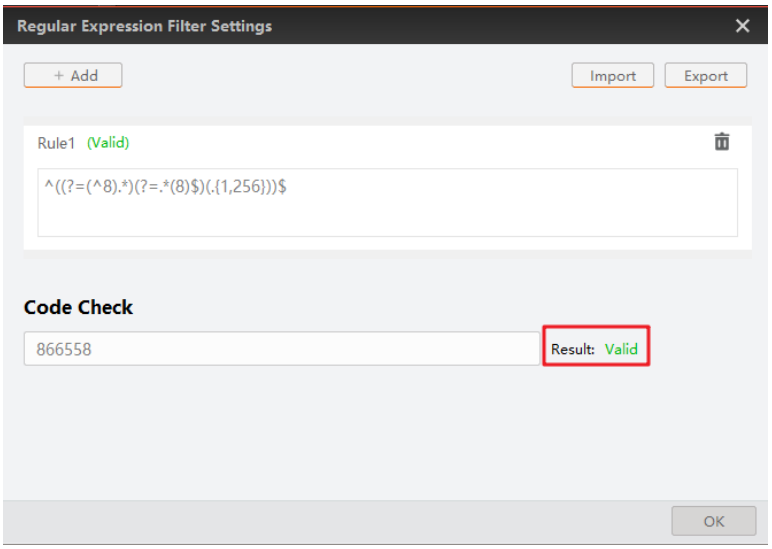


Figure 8-67 Code Check

Note

If the filter rule you configured is correct, the result is valid. Otherwise, it is invalid.

4. (Optional) Click to delete unwanted filter rules.
5. (Optional) Click **Export** to export configured filter rules to local PC.

Note

The filter rule parameters of the regular expression may differ by device models and firmware versions.

8.8.2 Data Processing Settings

You can configure the contents contained in the output code information.

Note

- The actual parameters displayed may vary with different communication protocols. For details about communication settings, refer to section ***Communication Settings***.
- The specific parameters and parameter order may differ by the device's running mode, trigger mode, device models and firmware versions.

SmartSDK

- **Sorting Rules**: Specify the sorting rules of output images. Multiple sorting rules are supported.
- **One By One Enable**: If it is enabled, the device will send one piece of code information each time in accordance with the specified interval. You can set the interval via **One By One Interval** and the default value 100 ms.
- **Local Save Picture Mode**: It includes **Off**, **NoRead**, and **Insufficient Code**. You can select **NoRead** to let the device save images when no code is read. It is available when the running mode is Normal and trigger is opened.

FTP

When the communication protocol is FTP, set the following parameters of data processing:

- **FTP Picture Name Format**: Click **Edit** to select one or multiple items to be contained in the picture name and click **Save**. The selected items will be displayed in the frame below. You can also enter more contents directly in the frame.

Note

Click **Format Output** on the control toolbar to open the Format Output window to set the FTP picture name format quickly.

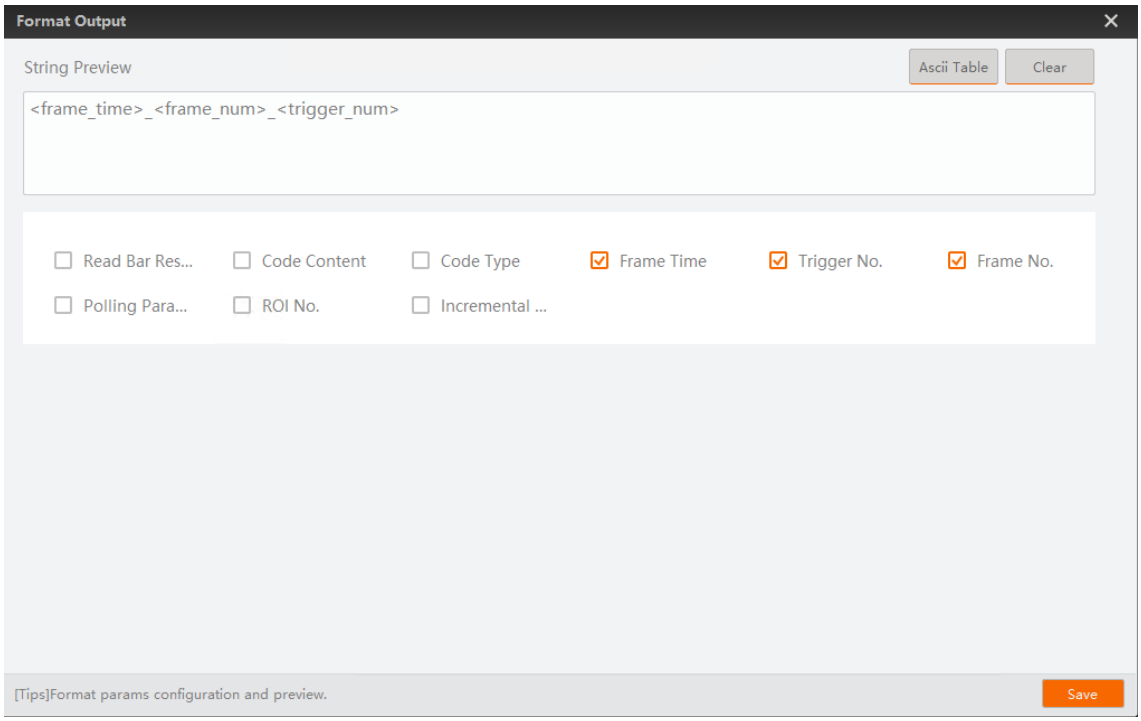


Figure 8-68 Format Output

- **Local Save Picture Mode**: It includes **Off**, **NoRead**, and **Insufficient Code**. You can select **NoRead** to let the device save images when no code is read.
- **Local Picture Type**: Specify the type of pictures saved locally. You can select **JPEG** or **BMP**.
- **Local Override Strategy**: It includes **Off**, **Max Count**, **Loop Max Count**, and **Reserve Space**. **Off** means that disk will not be overridden. **Max Count** means that the device will save image quantity configured in **Local Override Max. Count**, and no more imaged will be saved when the disk is full. **Loop Max Count** means that after the image quantity is reached the number configured in **Local Override Max. Count**, the device will delete the first image and continue to save the latest image. **Reserve Space** means that the device will save images when the disk is safe in terms of storage space. If the available disk space is lower than configured value, and images will be deleted.
- **Local Override Max. Count**: You need to set this parameter when selecting **Max Count** or **Loop Max Count** as **Local Override Strategy**.
- **Local Time Format:** It selects a format type from the drop-down list for the time stamp contained in the file name. Take YYYYMMDD_HHMMSSFFF as an example, (from the left to the right) YYYY represents year, MM represents month, DD represents date, HH represents hour, MM represents minute, SS represents second, and FFF represents millisecond.

- **Local Save Picture Strategy:** It sets the picture saving method. Four methods are available, including recently frame, all frames, range frames and specific frame. If specific frame is selected as **Local Save Picture Strategy**, you need to set **Local Picture Index**.
- **Output Retrans Enable**: Enable to allow data re-transmission. Specify the limit of re-transmission attempts in **Output Retrans Number**.
- **FTP Transmission Conditions**: Set the condition to upload the data output by the device to FTP server.
  - **All**: Always upload the data.
  - **ReadBarcode**: Upload the data only when the code is read by the device.
  - **NoReadBarcode**: Upload the data only when no code is read by the device.
- **FTP Transmission Result Contain**: Select contents to upload to the FTP server.
  - **JustResult**: Only upload the content of the code.
  - **JustPicture**: Only upload the code image.
  - **ResultAndPicture**: Upload both the content of the code and the code image.
- **FTP Time Format**: Select a format type from the drop-down list for the time stamp contained in the file name.

Note

Take YYYYMMDD_HHMMSSFFF as an example, (from the left to the right) YYYY represents year, MM month, DD date, HH hour, MM minute, SS second, FFF millisecond.

- **FTP Save Picture Strategy**: Select from the drop-down list the picture saving strategy from **Recent Frame**, **All Frames**, **Range Frames**, and **Specific Frame** accordingly. If **Specific Frame** is selected, you can specify the frame by entering its index in the box of FTP Picture Index.
- **FTP Picture Index**: Set the picture index.
- **Sorting Rules**: Specify the sorting rules of output images. Multiple sorting rules are supported.
- **One By One Enable**: If it is enabled, the device will send one piece of code information each time in accordance with the specified interval. You can set the interval via **One By One Interval** and the default value 100 ms.

TCP Client / Serial / TCP Server / Profinet / Melsec/SLMP / EthernetIp / Modbus / UDP / FINS

When the communication protocol is TCP Client / Serial / TCP Server / Profinet / MELSEC / EthernetIp / Modbus / UDP / FINS, set the following parameters of data processing.

Note

Here we use "***" to represent the specific protocol name.

- ***** Output Format**: Click **Edit** to select one or multiple items to be contained in the picture name and click **Save**. The selected items will be displayed in the frame below. You can also enter more contents directly in the frame.
- **Local Save Picture Mode**: It includes **Off**, **NoRead**, and **Insufficient Code**. You can select

NoRead to let the device save images when no code is read.

- **Local Picture Type**: Specify the type of pictures saved locally. You can select **JPEG** or **BMP**.
- **Local Override Strategy**: It includes **Off**, **Max Count**, **Loop Max Count**, and **Reserve Space**. **Off** means that disk will not be overridden. **Max Count** means that the device will save image quantity configured in **Local Override Max. Count**, and no more imaged will be saved when the disk is full. **Loop Max Count** means that after the image quantity is reached the number configured in **Local Override Max. Count**, the device will delete the first image and continue to save the latest image. **Reserve Space** means that the device will save images when the disk is safe in terms of storage space. If the available disk space is lower than configured value, and images will be deleted.
- **Local Override Max. Count**: You need to set this parameter when selecting **Max Count** or **Loop Max Count** as **Local Override Strategy**.
- **Local Time Format:** It selects a format type from the drop-down list for the time stamp contained in the file name. Take YYYYMMDD_HHMMSSFFF as an example, (from the left to the right) YYYY represents year, MM represents month, DD represents date, HH represents hour, MM represents minute, SS represents second, and FFF represents millisecond.
- **Local Save Picture Strategy:** It sets the picture saving method. Four methods are available, including recently frame, all frames, range frames and specific frame. If specific frame is selected as **Local Save Picture Strategy**, you need to set **Local Picture Index**.
- ***** Output Noread**: Enable this to set the default output content if no code is read during transmission. Edit the output text in **Output NoRead Text**.
- ***** Output Start Text**: The contents of the start part of the data output. You can set the contents as desired.
- ***** Output Stop Text**: The contents of the end part of the data output. You can set the contents as desired.
- ***** Output Barcode Enter Character Enable**: Whether to show input character in the data.
- ***** Output Barcode Newline Character Enable**: Whether to show new-line character in the data.
- **Sorting Rules**: Specify the sorting rules of output images. Multiple sorting rules are supported.
- **ROI Output Noread Enable**: Enable this to set the default output content if no code is read during transmission. Edit the output text in **Output NoRead Text**.
- **One By One Enable**: If it is enabled, the device will send one piece of code information each time in accordance with the specified interval. You can set the interval via **One By One Interval** and the default value 100 ms.

8.9 Contrast Control Settings

Note

You need to set device's running mode as normal before using this function.

The contrast control function compares the data that the device reads with preset data and outputs contrast result. The result can be used as the event source of trigger signal, including **Contrast Success** and **Contrast Fail**. This function has two ways to contrast, including regular contrast and consecutive number contrast.

Regular Contrast

The regular contrast requires you to set code contents in advance, and the client software will contrast the data that the device reads with preset contents and outputs comparison result.

Steps

1. Go to **Data Processing** → **Contrast Control**., enable **Contrast Enable**, and select **Regular** as **Contrast Rules**.
2. Set **Start Position** that means the stating position of the comparison.
3. Set **Character Number** that means the comparison quantity.
4. Set code contents in **Wildcard String**.

Note

You can use wildcard * and ?. * stands for multiple strings you can use, and ? stands for one string you can use. * can be used once only and ? can be used many times.

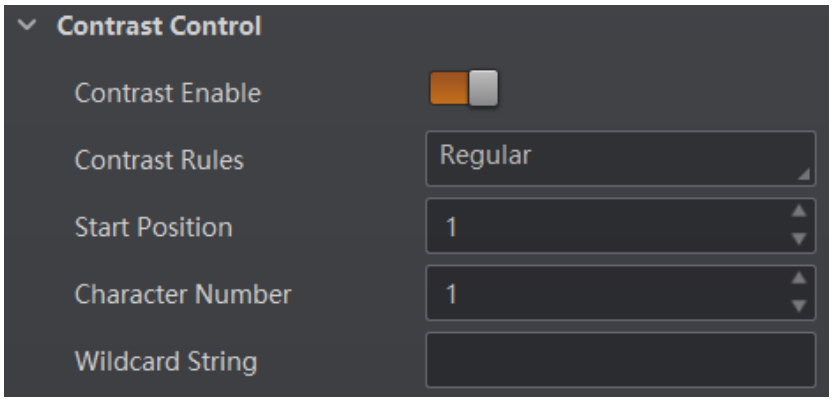


Figure 8-69 Regular Contrast

Consecutive Number Contrast

The consecutive number contrast requires you to set consecutive code rules, and the client software will contrast the data that the device reads with preset rules and outputs contrast result.

Steps

1. Go to **Data Processing** → **Contrast Control**., enable **Contrast Enable**, and select **Consecutive Number** as **Compare Rules**.
2. Set **Start Position** that means the stating position of the comparison.

2. Set **Digital Number** that means the comparison quantity.
3. Set **Step** that means the client software will increase or decrease the preset value after each comparison according the step you set.

Note

- If the preset value after increase or decrease exceeds the digital number you set, and then the preset value will become 0.
- The base value displays the preset value.

4. (Optional) Click **Execute** in **Contrast Reset** to reset comparison. After that, the client software will use the first code it reads as the preset value.

Here we take start position (3), digital number (2) and step (2) as an example to explain the consecutive number comparison:

- If the first code that the device reads is ur96k, and then the preset value is 96. The preset value increases to 98 (96+2).
- If the second code is yr98kjkfd, and comparison succeeds. The preset value increases to 100 (98+2).
- If the third code is kl99fjkd, and comparison fails. The preset value does not increase.
- If the fourth code is kl00djf, and comparison succeeds. The preset value increases to 02 (00+2).

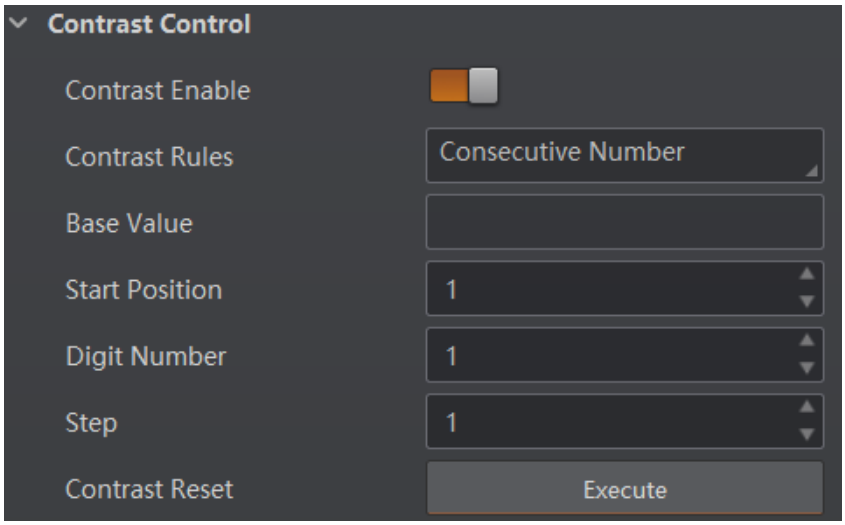


Figure 8-70 Consecutive Number Contrast

8.10 Characters Replace

Note

This section is available for IDMVS V5.0 and later.

The **Characters Replace** function allows you to standardize code output by replacing

specified characters or performing case conversion on the decoded content.

Steps

1. On the Navigation Bar of the IDMVS main window, go to **Operator Settings** → **Data Processing** → **Characters Replace**.

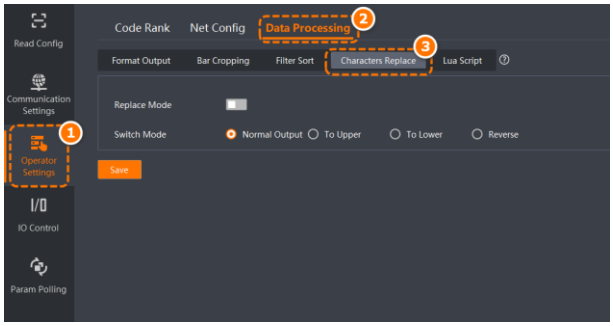


Figure 8-71 Characters Replace

2. On the **Characters Replace** page, you can set rules to replace specific characters in the decoded code content.
   1) Enable **Replace Mode**.
   2) Click **Add** under **Character Set**.
   3) In the **Original Text** and **Replace With** columns of the rule list, enter the character(s) to be replaced and the replaced character(s), respectively.

      You can click next to the input filed and select characters from the **ASCII Table**.
   4) Repeat the above steps to add multiple character replacement rules.

      To delete a rule, select the box next to the rule and click **Delete** to remove it.
3. In the **Switch Mode** section, select a switch mode.
   - **Normal Output**: No case conversion is applied.
   - **To Upper**: Converts all lowercase letters to uppercase.
   - **To Lower**: Converts all uppercase letters to lowercase.
   - **Reverse**: Converts lowercase letters to uppercase and uppercase letters to lowercase.
4. Click **Save** to apply the settings.

Result

If the configured rules and parameters of **Switch Mode** are like the example below, when the original code content is "A12345678A", the final output could be "1bb1".

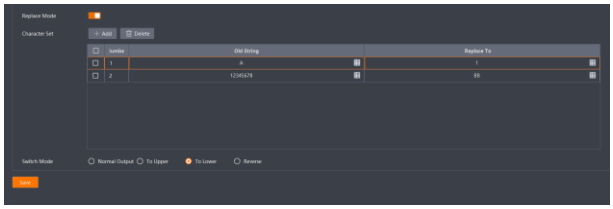


Figure 8-72 Example of Characters Replace

8.11 Multi-Reader Synchronization

Note

This section is available for IDMVS V5.0 and later.

When multiple code readers are simultaneously capturing images for code reading, they can work together through the multicast or main-sub operation mode. This achieves synchronized triggering and efficient data transmission across multiple code readers. Additionally, the multi-frame can be set in IDMVS main interface to preview images from multiple code readers.

Synchronization between code readers set by multicast mode and main-sub operation mode serves different application scenarios. You can select the appropriate mode based on requirements.

Table 8-22 Comparison of Networking Modes

Networking Mode	Primary Purpose	Working Principle	Application Scenario
Multicast	Synchronize trigger numbers	Main and sub code readers are triggered simultaneously. The main sends the trigger number to all sub devices. All code readers transmit their reading results to the decoding platform, which merges the results based on the trigger number and outputs a unified result.	It is applicable for multi-side scanning in logistics scenarios. The decoding platform integrates output from all main and sub code readers to achieve coordination of multi-reader.
Main-Sub Operation	Data integration or transmission of multiple code readers	Main and sub code readers are triggered simultaneously. Sub code readers send reading results to the main and the main integrates and transmits the reading results to the corresponding host or client system.	It is applicable for scenarios with limited communication ports, multi-station setups, or large-area scanning requiring coordinated output.

8.11.1 Main-Sub Configuration

Main-sub network configuration consists of one main code reader and multiple sub code readers, allowing cooperation of multiple code readers. This section takes two code readers as an example to guide you through the configuration process.

In main-sub operation mode, one code reader is set as the main, while others are set as

sub code readers. Sub code readers send their decoded results to the main, and the main merges or forwards the data and sends to the connected host system (PC or PLC). This enables coordination among multiple code readers. The diagrams of independent mode and cooperation mode are as follows.

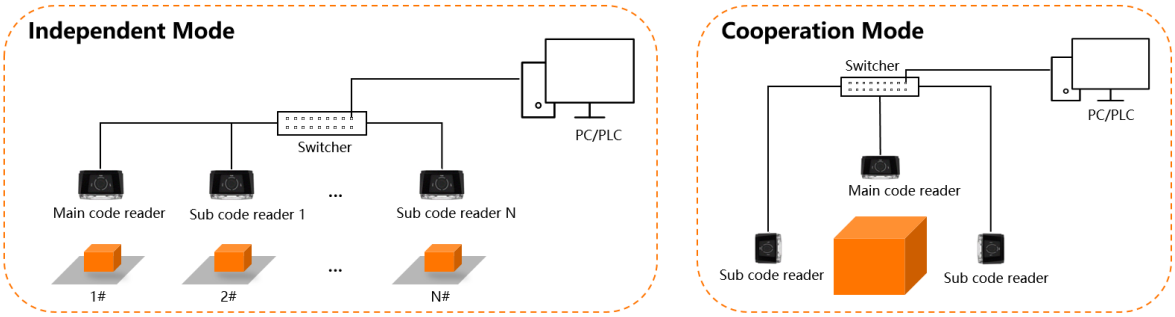


Figure 8-73 Diagram of Working Mode

Table 8-23 Mode Overview

Mode	Description	Use Case	Benefits
Independent	The main only forwards its own and sub devices' data to the host. No data merging is performed.	Each code reader scans code on different positions, and data are received by one host (PC or PLC).	Reduces the number of host-side communication ports. Only one port can forward all data to the host.
Cooperation	The main merges its own and data of sub devices before sending to the host.	It is applicable for large object or object with multiple sides which require multi-angle reading.	Merges duplicate codes, and simplifies host-side integration and processing.

Steps

1. Connect two or more code readers as needed.
2. Go to **Operator Settings** → **Net Config** → **Main Sub Configuration** in the Navigation Bar of the IDMVS main window.

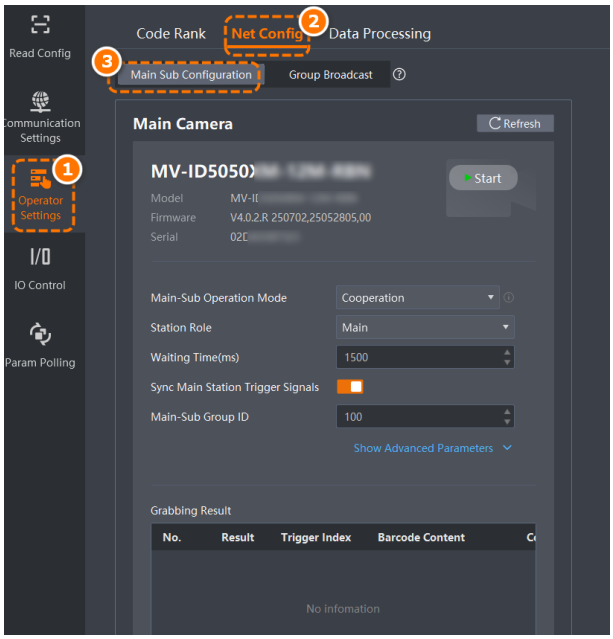


Figure 8-74 Main Sub Configuration

3. Under the **Main Sub Configuration** tab, set the parameters for the main code reader.

Common Parameters

Main-Sub Operation Mode

You can select whether to enable or configure the mode of the current connected code readers. The available modes are as follows.

Note

Hover over behind the mode selection box to view a data flow diagram for each mode.

- **Off**: Main-sub configuration feature is disabled.
- **Independent**: Sub code readers send decoded data to the main, and the main sends its own data and forwards data of sub devices without merging. The data processing of the codes is completed at each device. This is suitable for scenarios involving multiple production lines. By using the main code reader for data forwarding, the occupation of communication ports can be reduced.
- **Cooperation**: The sub code reader sends decoding results to the main for data processing. The main merges the data from both sub and its own stations based on its processing logic, and then outputs a consolidated package. This mode is suitable for scenarios requiring multi-side code integration due to limited coverage.

Note

The code symbologies used by the sub devices should be enabled in the main code reader; otherwise, decoded data may be filtered and lost.

Station Role

Set the role of the current connected code reader as **Main**.

Waiting Time (ms)

Set the max. waiting time for the main to receive sub data after triggering.

Note

- This parameter can be set only when you select **Cooperation** in **Main-Sub Operation Mode**.
- The value of the **Waiting Time** parameter should be greater than the total output processing time of the slowest sub code readers among all.

Sync Main Station Trigger Signals

Set if the main should send its trigger signal to the sub devices. When it is enabled, the trigger source of the sub code readers can be selected as **Cooperation**.

Note

This parameter can be set only when you select **Cooperation** in **Main-Sub Operation Mode**.

Main-Sub Group ID

Set the main-sub network group ID of the connected code readers. Devices with the same group ID are in the same main-sub network, and code readers in different main-sub network groups cannot access each other.

Advanced Parameters

Station Port

It refers to the port No. used for data transmission on the main station.

Sync Main Station ROI

Select whether to synchronize the ROI sequence numbers with the sub code readers. Once it is enabled, the ROI sequence numbers of the sub code readers can inherit the sequence numbers from the main and continue numbering.

Note

This parameter can be set only when you select **Main** in **Station Role**.

Display Sub Station Reading Data

Select whether to display the reading data of the sub station on the main station. Once it is enabled, if the sub code readers reads a code, the code information can be displayed on the main code reader.

Query Sub Station ID

Enter the sub station ID and you can check the following information.

- **Sub Station IP**: It refers to the IP address of the sub code reader.
- **Sub Station Connection Status**: A value of 1 means that the data transmission is normal, otherwise it means that there is no connection.
- **Sub Station Name**: It refers to the user name of the sub code reader.
- **Sub Station Model**: It refers to the model name of the sub code reader.
- **Sub Station Serial Number**: It refers to the serial number of the sub code reader.

Note

When configuring the sub code reader, the main code reader information will also be displayed through parameters similar to the above.

4. Drag the connected code reader from the device list into the dashed box of **Sub Cameras** to quickly complete the main-sub configuration.

Note

- If you need to add multiple sub code readers, repeat this drag-and-drop method for each code reader.
- If a sub code reader does not show in the **Sub Cameras** area after being added, you can switch to that device and make sure its **Main-Sub Operation Mode** parameter is consistent with that of the main code reader.
- It is recommended to use code readers of the same series or model to set up a main-sub network. If mixed usage is necessary, it is advisable to configure the code reader with the lower resolution as the main station.

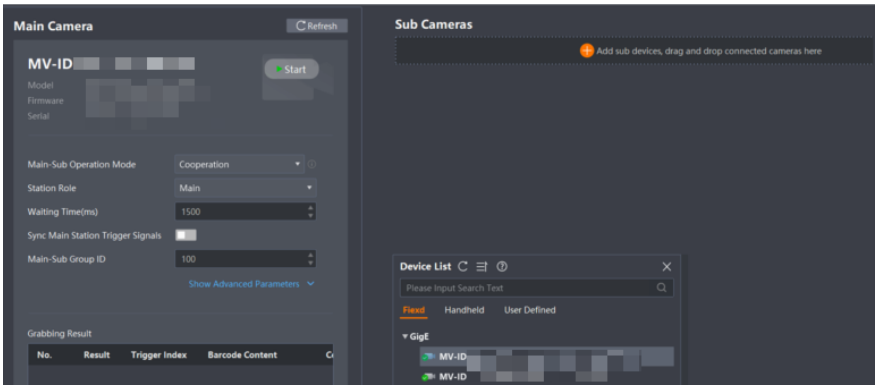


Figure 8-75 Example of Adding Sub Cameras

5. Double-click the sub code reader tab in the **Sub Cameras** area to open the configuration panel. Set the following parameters:

Common Parameters

Main-Sub Operation Mode

Select the same mode as the main code reader.

Station Role

Select **Sub**.

Main-Sub Group ID

Enter the same group ID as the main code reader to ensure they are in the same network.

Station ID

It will be automatically assigned once the connection to the main code reader is established.

Note

This parameter is read-only and cannot be edited.

Main Station IP

It will be automatically displayed once the connection to the main code reader is established.

Note

This parameter is read-only and cannot be edited.

Main Station Connection Status

A value of 1 means that the data transmission is normal, and 0 means that there is no connection.

Note

This parameter is read-only and cannot be edited.

Advanced Parameters

The following parameters are read-only and cannot be edited.

Main Station Name

It refers to the user name of the main code reader.

Main Station Model

It refers to the model name of the main code reader.

Main Station Serial Number

It refers to the serial No. of the main code reader.

6. Configure the main-sub station trigger source according to the actual scenario. For the operation details, refer to section ***Signal Input Settings***.

   To ensure the consistency of all code readers when using the main-sub network, the following two methods can be selected.

   - Configure both main and sub code readers to use the same trigger source, such as LineIn 0/1/2/3. This ensures that all code readers are triggered simultaneously.
   - Set the main code reader to any supported trigger source and configure the sub code readers to "Main Sub" as their trigger source. Both main and sub code readers can be

triggered at the same time.

Note

It is not commended to use "Self Trigger" for the main and sub station. Because it is difficult to ensure consistent triggering between the main and sub devices.

7. Under the page of **Main Sub Configuration** of the Main Camera, you can operate the following configurations.
   - Start/Stop: You can start or stop image acquisition.

     Note

     When the trigger source of the sub code readers is set to "Main Sub", sub devices should be in image acquisition mode to receive and respond to the main station's trigger signal.

   - Check grabbing results: Check the decoding results in the **Grabbing Result** area. This view is consistent with the **History** section in the main window.
   - Remove sub devices: Click  in the sub station area.

What to do next

After the main-sub configuration is finished, you can proceed to configure data processing rules and data output settings. Refer to section ***Data Processing Settings*** and section ***Communication Settings*** for details.

8.11.2 Multicast

A multicast network of multiple code readers includes one main code reader and several sub code readers. The main code reader is used for synchronizing trigger numbers, while all code readers transmit decoding data to the code-reading platform independently.
The primary principle of multicast networking is to configure one of the code readers as the main device and the remaining code readers as sub devices. Both main and sub code readers trigger image acquisition simultaneously. The main code reader synchronizes trigger numbers with other sub code readers, and all code readers transmit decoding data to the code-reading platform. The platform integrates and processes the data based on trigger numbers and outputs integration results. This mode is suitable for logistics multi-side scanning scenarios (typically involving more than three code readers), enabling cooperation working across multiple cameras by integrating all outputs from main and sub code readers through the code reading platform.
You can go to **Operator Settings** → **Net Config** → **Group Broadcast** on the Navigation Bar of the main window to configure the following parameters.

Note

IDMVS does not support simultaneous configuration of multicast and main-sub operation functions.

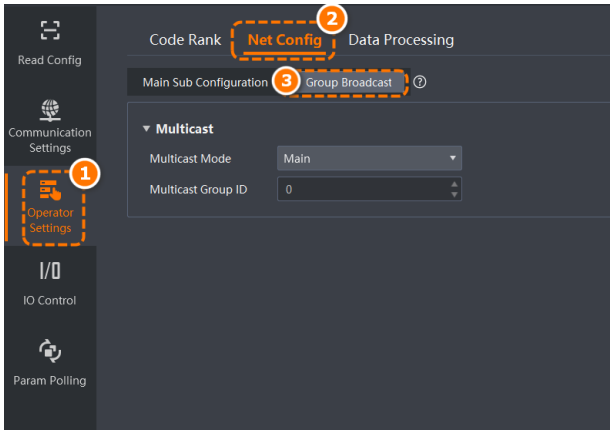


Figure 8-76 Group Broadcast

Multicast Mode

Select whether to enable multicast mode or configure the operating mode of the connected code reader. The supported modes are introduced below.

- **Off**: Disable multicast mode.
- **Main**: Configure the connected code reader as the main code reader, which simultaneously sends trigger numbers to sub code readers.
- **Sub**: Configure the connected code reader as the sub device.

Multicast Group ID

After selecting main or sub in **Multicast Mode**, you can specify the multicast group index of the code reader through this parameter. Devices with the same index belong to the same group.

8.11.3 Multi Frame

The client supports single- or multi-window previews. You can adjust the division based on the number of connected the code readers or other code reading requirements. The client provides three default divisions: 1-Window, 4-Window, and 9-Window. Custom divisions are also available if needed.

Before You Start

Make sure the code reader(s) has been connected.

Steps

1. Click **Multi Frame** on the quick access toolbar, and then select **1-Window**, **4-Window**, **9-Window**, or **Custom** as needed.

Note

If **Custom** is unselected, proceed to Step 3.

2. (Optional) Customize window division.
   1) In the **Custom Division** window, click **Add** in the upper-left corner.

   Note

   Up to 4 custom divisions can be added. You can select and click **Delete** to remove invalid divisions.

   2) Enter a division name and click **OK**.
   3) Select the optimal grid under **Window Division**, with options including **2x2**, **3x3**, and **4x4**.
   4) Adjust the division by clicking **Merge** to merge the adjacent windows or clicking **Split** to split the merged windows.

   Note

   Up to 16 windows are supported.

   5) Click **Save**.
3. Select code reader for preview.
   - In 1-window mode, the selected code reader is displayed by default. To switch windows, drag other connected code readers from the device list to the preview window. The 1-window preview is shown below.

Figure 8-77 1-Window Preview

   - In multi-window division, drag multiple connected code readers from the device list to the preview window. Click ✕ in the upper-right corner to unlink the code reader. A custom 3-window preview is shown below.

Figure 8-78 Multi-Window Preview

4. Click **Read Config** → **Fast Config** → **Real Grabbing** on the left, or click  on the left of the preview toolbar to check image capture.

What to do next

Refer to section ***Quick Start Guide*** for fast debugging of image capture and code reading, and preview real-time images in the preview area.

8.12 Lua Script

Note

- This section is available for IDMVS V5.0 and later.
- Lua Script is available for some device models.

The Lua Script is an embedded scripting language featuring concise syntax, high execution efficiency, and easy integration. IDMVS supports custom configurations for code reader format output and data filtering through Lua scripts.

In the navigation bar of the main interface, select **Operator Settings** → **Data Processing** → **Lua Script** to access the Lua Script page, as shown in the following picture.

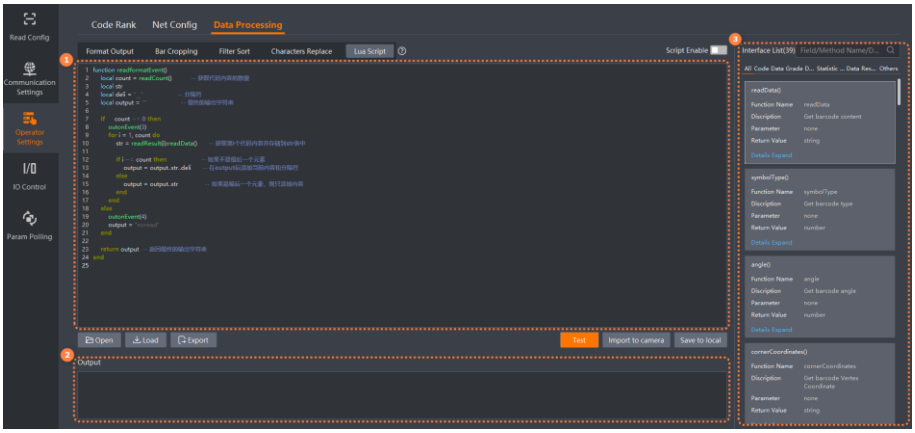


Figure 8-79 Lua Script

The descriptions of each module are in the table below.

Table 8-24 Lua Script Module Description

No.	Module Name	Function Description
1	Script Editing Area	It is used for editing Lua script code. **Note** The script editing area supports real-time syntax notification. Button functions in the script editing area are introduced below: ● **Script Enable**: Select whether to enable the format output function of the Lua Script. Once it is enabled, format output cannot be configured. **Note** When the script contains formatting-related API, it will be enabled automatically. ● **Open**: Open the local script files. ● **Load**: Load script files from the code reader. ● **Export**: Export Lua scripts from the code reader to the selected directory. ● **Test**: Execute the scripts in the script editing area and view the results in the output area. ● **Import to Camera**: Save the scripts in the script editing area to the connected code reader. ● **Save to Local**: Save the scripts in the script editing area as Lua files to the local.
2	Script Output Area	You can view script execution results here. ● If compilation is successful, this area will show ***Verify Success*** with test results. ● If compilation is failed, it will display error details and line numbers.
3	API List	Display supported Lua APIs and related descriptions. **Note** Some APIs provide sample codes. You can check and copy sample codes.

Using the Lua Script requires some cautions and procedures. Refer to the latest version of

IDMVS Client Software User Manual for details.

8.13 Statistics Information

The statistics information in the feature tree helps you to count data related with code reading.

Note

You need to set device's running mode as normal before using this function.

Steps

1. Right click the device in **Device Connection**, and click **Feature Tree**.
2. Go to feature tree, find **Statistics Info.**, and select **Statistics Mode**:
- **All Frames** means the client software will display all data since the device is powered on.
- **Latest Frames** means the client software will display data of the last 10 frames.
3. View related parameters.
4. (Optional) Click **Execute** in **Reset Statistics** to reset statistics information.

Table 8-25 Parameter Description

Parameter Name	Description
Total Frame Number	The total frame quantity.
Read Frame Number	The quantity of frames that have been read codes.
Noread Frame Number	The quantity of frames that have not been read codes.
Read Rate	It refers to the code reading ratio.
Algo Time Ave	The average time of algorithm, and the unit is ms.
Algo Time Max	The max. time of algorithm, and the unit is ms.
Algo Time Min	The min. time of algorithm, and the unit is ms.
Read Time Ave	The average time of code reading, and the unit is ms.
Read Time Max	The max. time of code reading, and the unit is ms.
Read Time Min	The min. time of code reading, and the unit is ms.
Reset Statistics	Click **Execute** to reset statistics information.

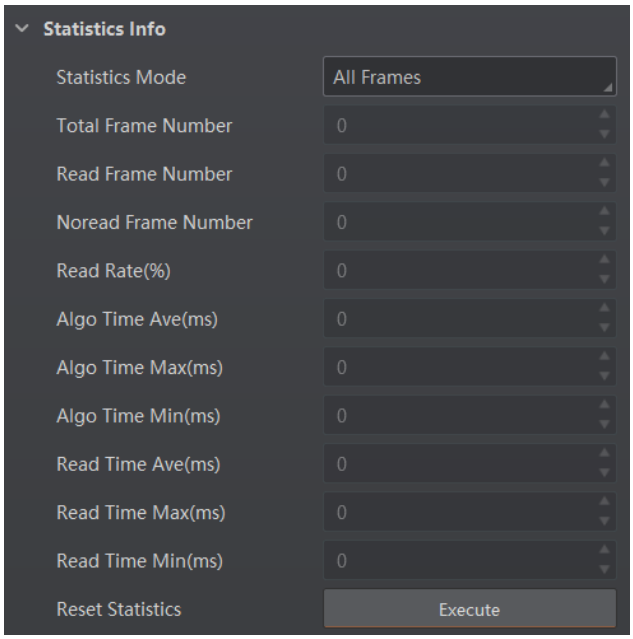


Figure 8-80 Statistics Information

8.14 Diagnose Event Report

The diagnose event report function monitors memory and CPU usage rate, and let you know when there is a crash, higher CPU usage rate, insufficient memory, and other events.

Steps

1. Right click the device in **Device Connection**, and click **Feature Tree**.
2. Go to feature tree, and find **Diagnose Event Report**.
3. View related information.
4. (Optional) Click **Execute** in **Reset Event** to clear all information.

Figure 8-81 Event Report

Chapter 9 Device Maintenance

9.1 Update Firmware

The device supports updating firmware via the client software.

Note

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

Steps

1. Select the device to be updated in the device list, and right click the device.
2. Click **Firmware Update**.
3. Click 🗁 to select update file from local PC, and click **Update** to update firmware.

Note

You can also go to **Tool** → **Firmware Updater** to update firmware.

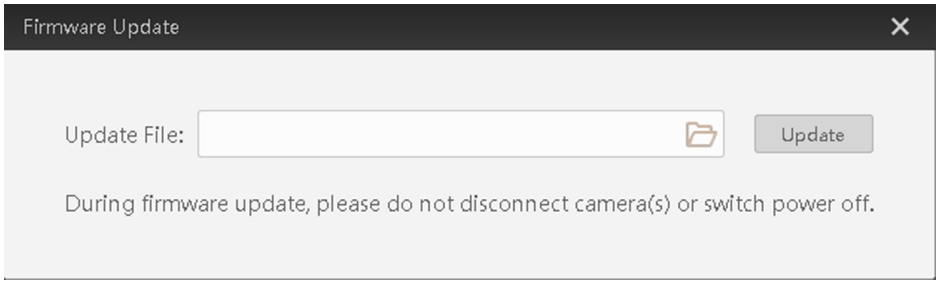


Figure 9-1 Update Firmware

9.2 Restart Device

You can select the device to be restarted in the device list, right click the device, and click

Device Reset.

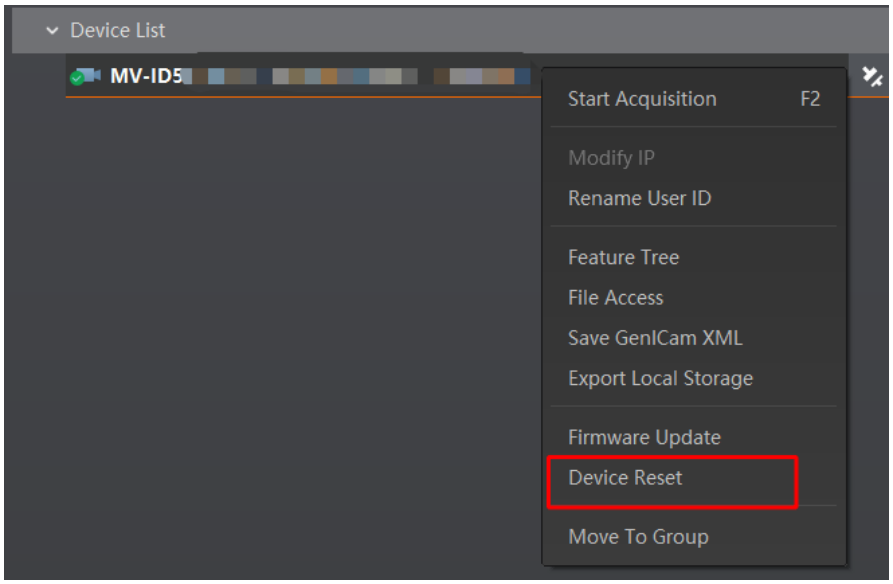


Figure 9-2 Reboot Device

Chapter 10 I/O Electrical Feature and Wiring

The device has three opto-isolated input signals and three opto-isolated output signals.

10.1 Input Signal

The device's LineIn 0/1/2 is opto-isolated input, and their internal circuit is as follows.

Note

- The input voltage ranges from 5 VDC to 30 VDC.
- The breakdown voltage is 36 VDC. Keep voltage stable.

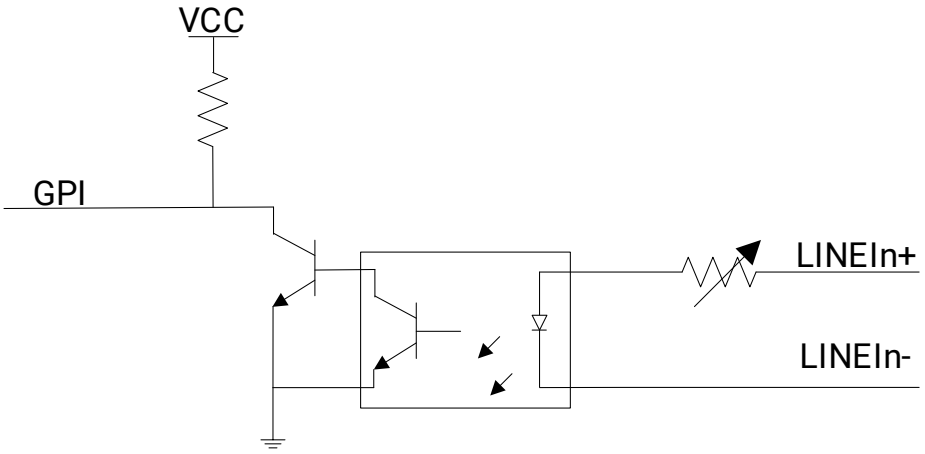


Figure 10-1 Internal Circuit of Input Signal

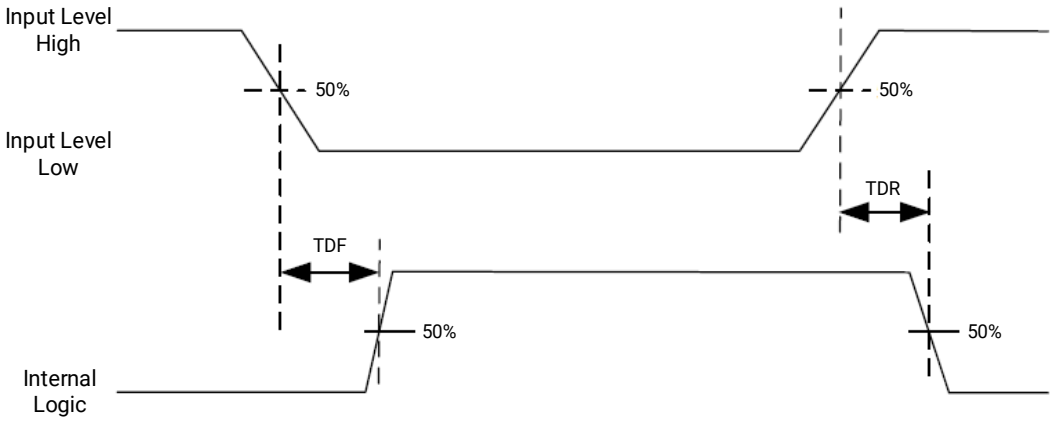


Figure 10-2 Input Logic Level

Table 10-1 Input Electrical Feature

Parameter Name	Parameter Symbol	Value
Input Logic Level Low	VL	1.5 VDC
Input Logic Level High	VH	2 VDC
Input Falling Delay	TDF	81.6 μs
Input Rising Delay	TDR	7 μs

10.2 Output Signal

The device's LineOut 3/4/5 is opto-isolated output, and their internal circuit is as follows.

Note

- The output voltage ranges from 5 VDC to 30 VDC.
- The maximum current is 45 mA.
- Do not directly connect with inductive load (e.g. DC motor, etc.) when outputting.

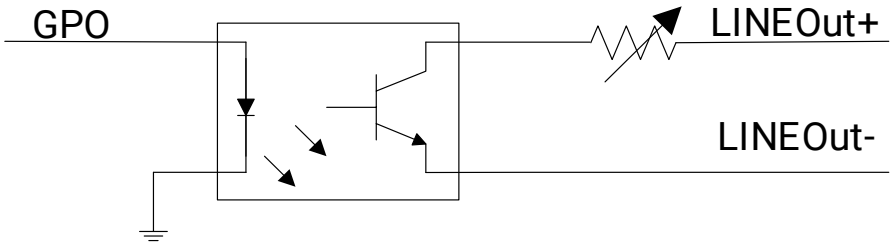


Figure 10-3 Internal Circuit of Output Signal

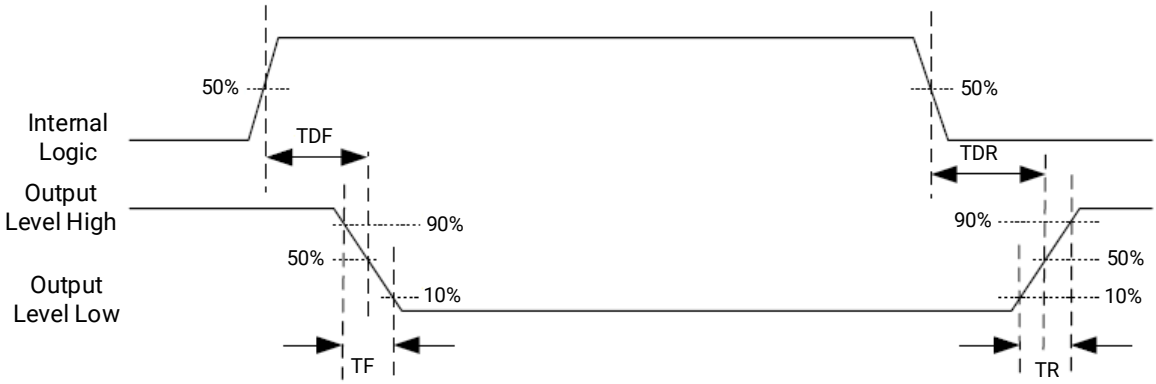


Figure 10-4 Output Logic Level

Note

If the external voltage and resistance change, the corresponding current of output signal and output logic level low may differ.

Table 10-2 Output Electrical Feature

Parameter Name	Parameter Symbol	Value
Output Logic Level Low	VL	730 mV
Output Logic Level High	VH	3.2 VDC
Output Falling Delay	TDF	6.3 μs
Output Rising Delay	TDR	68 μs
Output Falling Time	TF	3 μs
Output Rising Time	TR	60 μs

10.3 Input Signal Wiring

The device can receive external input signal via I/O interface, and here we take LineIn 0 as an example to introduce input signal wiring.

Note

Input signal wiring may differ with different types of external devices.

PNP Device

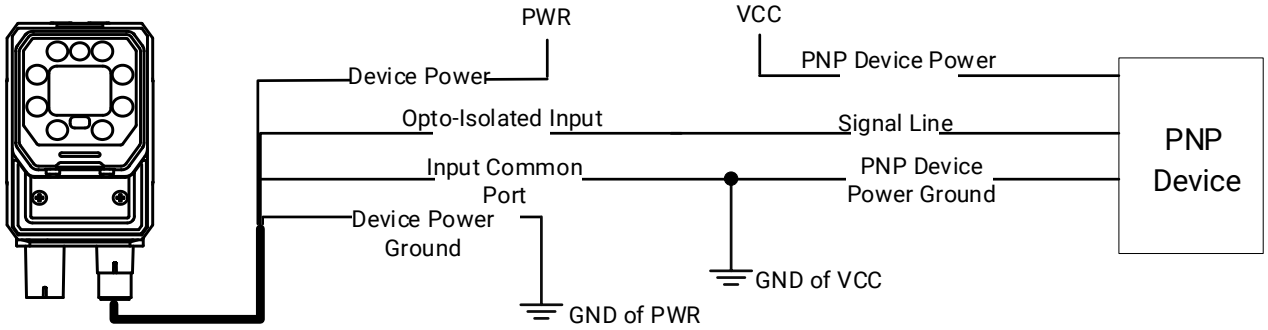


Figure 10-5 Input Signal Connecting to PNP Device

NPN Device

If the VCC of NPN device is 12 VDC or 24 VDC and pull-up resistor is not used, its wiring is as follows.

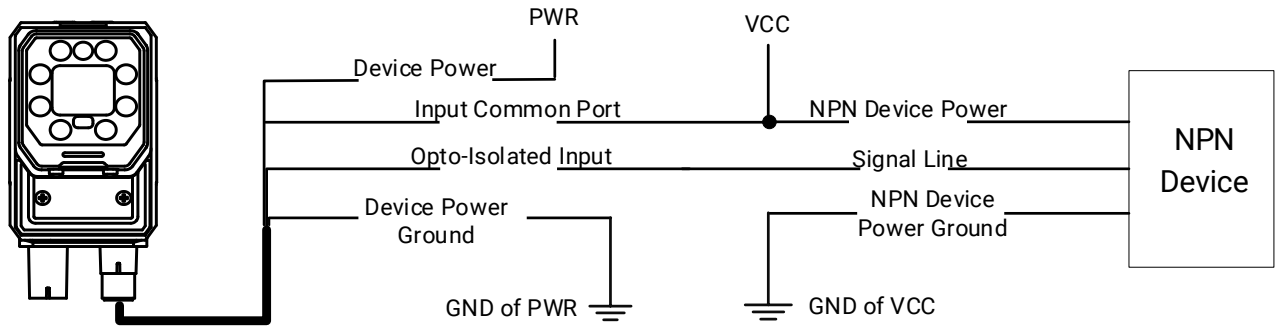


Figure 10-6 Input Signal Connecting to NPN Device Without Pull-Up Resistor

If the VCC of NPN device is 12 VDC or 24 VDC and 1 KΩ pull-up resistor is used, its wiring is as follows.

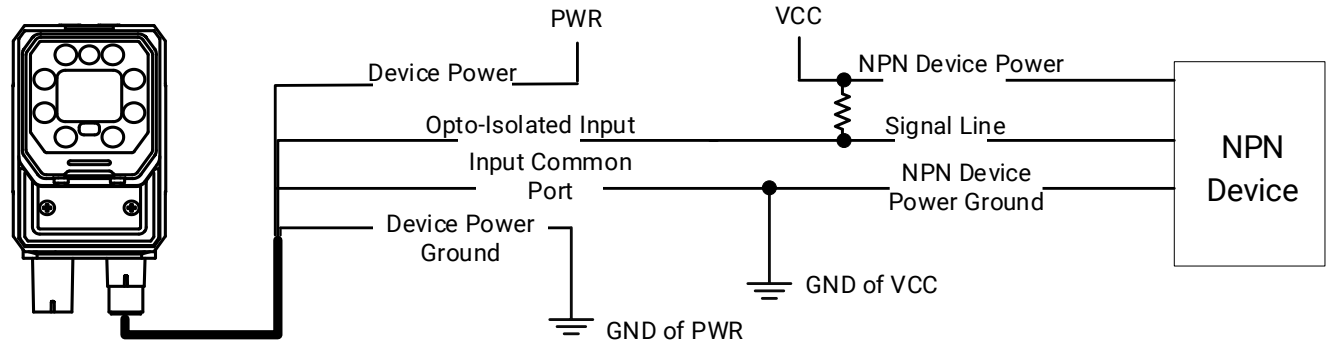


Figure 10-7 Input Signal Connecting to NPN Device with Pull-Up Resistor

10.4 Output Signal Wiring

The device can output signal to external device via I/O interface, and here we take LineIn 3 as an example to introduce output signal wiring.

Note

- Output signal wiring may differ with different types of external devices.
- The voltage of VCC should not higher than that of PWR. Otherwise, the device's output signal may have exception.

PNP Device

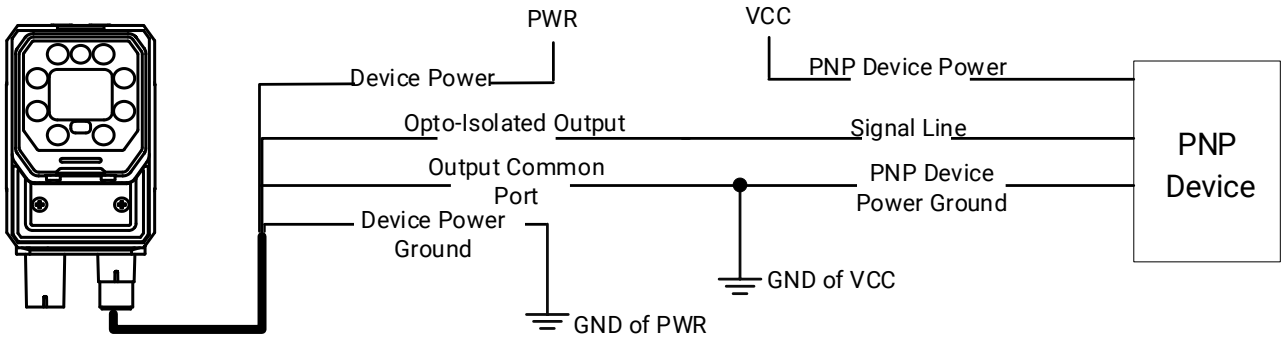


Figure 10-8 Output Signal Connecting to PNP Device

NPN Device

If the VCC of NPN device is 12 VDC or 24 VDC and pull-up resistor is not used, its wiring is as follows.

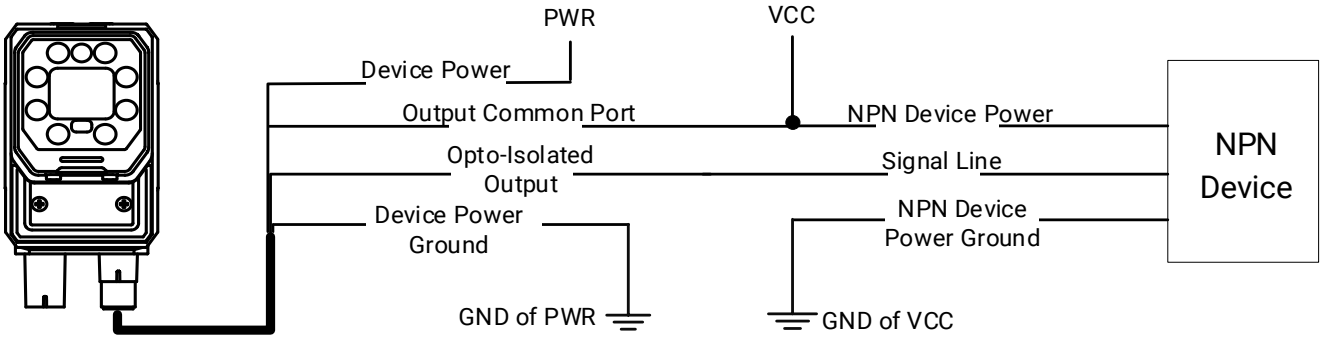


Figure 10-9 Output Signal Connecting to NPN Device Without Pull-Up Resistor

If the VCC of NPN device is 12 VDC or 24 VDC and 1 KΩ pull-up resistor is used, its wiring is as follows.

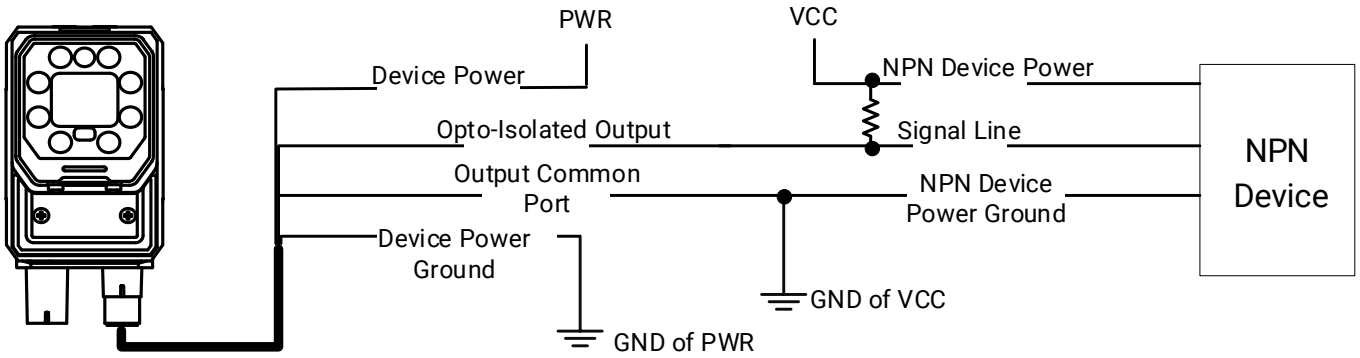


Figure 10-10 Output Signal Connecting to NPN Device with Pull-Up Resistor

10.5 RS-232 Serial Port

The device supports output via RS-232 serial port. The 9-pin male connector and 25-pin male connector are commonly used serial ports, as shown below. You can refer to the table below for the specific pin name and function.

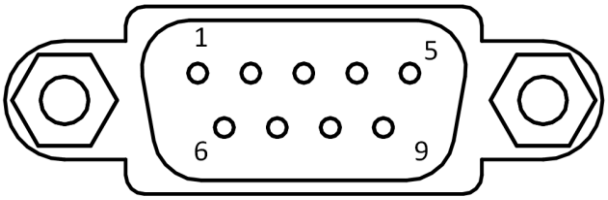


Figure 10-11 9-Pin Connector

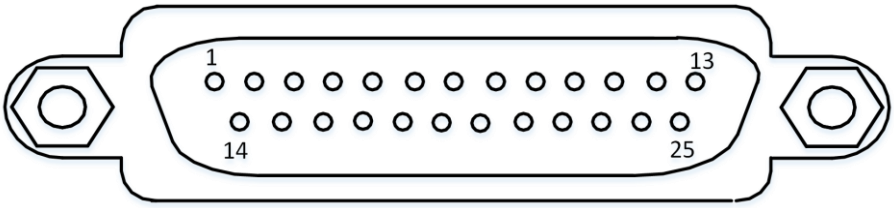


Figure 10-12 25-Pin Interface

Table 10-3 Pin Description

Serial Port Type	Pin No.	Name	Function
9-Pin Interface	2	RX	Receive data
	3	TX	Send data
	5	GND	Signal ground
25-Pin Interface	2	TX	Send data
	3	RX	Receive data
	7	GND	Signal ground

You can refer to the serial port wiring below to connect the device with an external device.

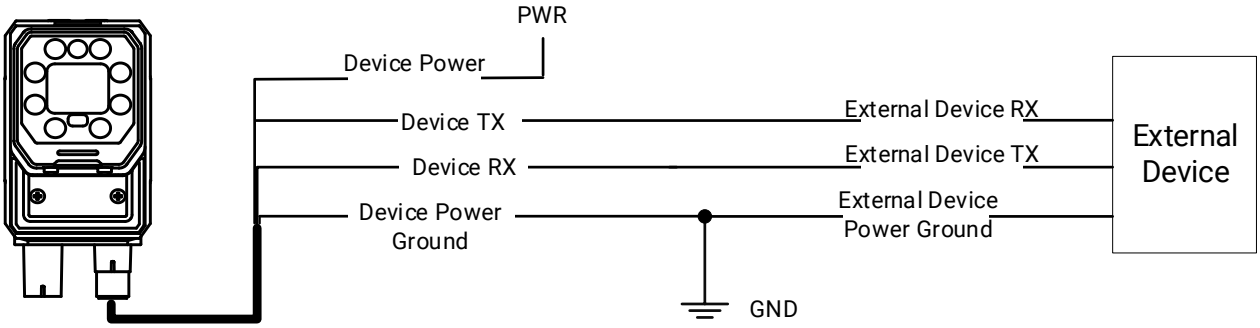


Figure 10-13 RS-232 Serial Port Wiring

Chapter 11 FAQ (Frequently Asked Question)

11.1 Why there is no device listed after I run the IDMVS client software?

Table 11-1 Question 1

Possible Cause	Solution
The device is powered off.	Check the device power connection (observe whether the PWR light is solid blue or not), to make sure the device is powered up normally.
Network exception occurs.	Check the network connection (observe whether the LNK light is solid green or not and ACT light is flashing yellow or not) to make sure the device can be connected to the network normally. PC port and the device are in the same network segment.
The auto enumeration is not enabled.	Go to **Settings** → **General** to enable **Device List Auto-Enumeration**, and set **Standard Protocols And Private Protocol** as the **Device Enumeration Protocols**.
The private protocol is set as the device enumeration protocol.	

11.2 Why the client enumerates a device, but fails to connect it?

Table 11-2 Question 2

Possible Cause	Solution
The device and the client are not in the same network segment.	Use IP Configurator to modify the IP address of the device.
The device has been occupied by another software or program.	Disconnect the device from any other software or program, and then connect it to the client again.

11.3 Why there is no image in the live view?

Table 11-3 Question 3

Possible Cause	Solution
Trigger mode is enabled, but there is no trigger signal.	Disable the trigger mode.
Incorrect device mode settings, and no codes are recognized within the field of view.	Set the device mode as the test mode.
The version of the client does not match with that of the firmware.	Go to **Help** → **About** to check the version of the client.

11.4 Why the image is very dark?

Table 11-4 Question 4

Possible Cause	Solution
Too small adjustment value of exposure and gain, or the lens aperture is not opened enough.	Increase exposure and gain appropriately, or rotate the lens aperture to open largely.

11.5 Why the image quality is very poor during the live view?

Table 11-5 Question 5

Possible Cause	Solution
The network may be Fast Ethernet.	Confirm whether the network transmission speed is 1 Gbps and NIC is the gigabit NIC, etc.
Incorrect jumbo packet settings.	Set jumbo packet value as 9 KB, or 9014 bytes.

11.6 Why codes within the field of view cannot be

recognized?

Table 11-6 Question 6

Possible Cause	Solution
Correct code types are not selected in the **Algorithm Settings**, or incorrect settings in **Filter Rule**.	Go to **Algorithm Settings** and add different types of codes according to actual demands.
	Go to **Data Processing** → **Filter Rule**, and adjust settings in **Filter Rule** according to actual demands.

11.7 Why the recognized codes are incomplete?

Table 11-7 Question 7

Possible Cause	Solution
Number of codes exceeds the limit.	Go to **Algorithm Settings** to reset the number of codes.
Numeral Filter is enabled.	Go to **Data Processing** > **Filter Rule** to disable the **Numeral Filter** function.
The code length is limited.	Go to **Data Processing** > **Filter Rule** to edit the code length.

11.8 Why can only the SmartSDK be selected as the communication protocol in Communication Settings section?

Table 11-8 Question 8

Possible Cause	Solution
The Test mode is set as the running mode.	It might because the device is under Test mode. You can go to the live view window and set the device running mode to Normal mode.

Chapter 12 Revision History

Table 12-1 Revision History

Version No.	Date	Revision Details
V1.2.0	Oct. 27, 2025	● Edit Section ***Appearance***. ● Edit Section ***Installation Preparation***. ● Add Section ***Quick Start Guide***. ● Add Section ***Characters Replace***. ● Add Section ***Multi-Reader Synchronization***. ● Add Section ***Lua Script***.
V1.1.0	Jun. 7, 2025	● Edit Section Appearance. ● Edit Section Set Image.
V1.0.1	Apr. 15, 2025	Add the content related to the device with liquid lens.
V1.0.0	Sep. 25, 2024	Original version.

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