Hikrobot Co., Ltd.

ID2000X Series Industrial Code Reader

User Manual

HIKROBOT

Legal Information

About this Document

This Document includes instructions for using and managing the Product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in the Document is subject to change, without notice, due to firmware updates or other reasons. Please find the latest version in the company website (***https://en.hikrobotics.com/***). Unless otherwise agreed, Hangzhou Hikrobot Co., Ltd. or its affiliates (hereinafter referred to as "Hikrobot") makes no warranties, express or implied. Please use the Document with the guidance and assistance of professionals trained in supporting the Product.

Acknowledgment of Intellectual Property Rights

- Hikrobot owns the copyrights and/or patents related to the technology embodied in the Products described in this Document, which may include licenses obtained from third parties. Any part of the Document, including text, pictures, graphics, etc., belongs to Hikrobot. No part of this Document may be excerpted, copied, translated, or modified in whole or in part by any means without written permission.
- ***HIKROBOT*** and other Hikrobot's trademarks and logos are the properties of Hikrobot in various jurisdictions. Other trademarks and logos mentioned are the properties of their respective owners.

LEGAL DISCLAIMER

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THIS MANUAL AND THE PRODUCT DESCRIBED, WITH ITS HARDWARE, SOFTWARE AND FIRMWARE, ARE PROVIDED "AS IS" AND "WITH ALL FAULTS AND ERRORS". HIKROBOT MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY, SATISFACTORY QUALITY, OR FITNESS FOR A PARTICULAR PURPOSE. THE USE OF THE PRODUCT BY YOU IS AT YOUR OWN RISK. IN NO EVENT WILL HIKROBOT BE LIABLE TO YOU FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, OR INDIRECT DAMAGES, INCLUDING, AMONG OTHERS, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, OR LOSS OF DATA, CORRUPTION OF SYSTEMS, OR LOSS OF DOCUMENTATION, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), PRODUCT LIABILITY, OR OTHERWISE, IN CONNECTION WITH THE USE OF THE PRODUCT, EVEN IF HIKROBOT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR LOSS.

YOU ACKNOWLEDGE THAT THE NATURE OF INTERNET PROVIDES FOR INHERENT SECURITY RISKS, AND HIKROBOT SHALL NOT TAKE ANY RESPONSIBILITIES FOR ABNORMAL OPERATION, PRIVACY LEAKAGE OR OTHER DAMAGES RESULTING FROM CYBER-ATTACK, HACKER ATTACK, VIRUS INFECTION, OR OTHER INTERNET SECURITY RISKS; HOWEVER, HIKROBOT WILL PROVIDE TIMELY TECHNICAL SUPPORT IF REQUIRED.

YOU AGREE TO USE THIS PRODUCT IN COMPLIANCE WITH ALL APPLICABLE LAWS, AND

YOU ARE SOLELY RESPONSIBLE FOR ENSURING THAT YOUR USE CONFORMS TO THE APPLICABLE LAW. ESPECIALLY, YOU ARE RESPONSIBLE, FOR USING THIS PRODUCT IN A MANNER THAT DOES NOT INFRINGE ON THE RIGHTS OF THIRD PARTIES, INCLUDING WITHOUT LIMITATION, RIGHTS OF PUBLICITY, INTELLECTUAL PROPERTY RIGHTS, OR DATA PROTECTION AND OTHER PRIVACY RIGHTS. YOU SHALL NOT USE THIS PRODUCT FOR ANY PROHIBITED END-USES, INCLUDING THE DEVELOPMENT OR PRODUCTION OF WEAPONS OF MASS DESTRUCTION, THE DEVELOPMENT OR PRODUCTION OF CHEMICAL OR BIOLOGICAL WEAPONS, ANY ACTIVITIES IN THE CONTEXT RELATED TO ANY NUCLEAR EXPLOSIVE OR UNSAFE NUCLEAR FUEL-CYCLE, OR IN SUPPORT OF HUMAN RIGHTS ABUSES.

THE PERFORMANCE DATA IN THIS PUBLICATION IS BASED ON HIKROBOT'S INTERNAL RESEARCH/EVALUATION. ACTUAL DATA MAY VARY DEPENDING ON SPECIFIC CONFIGURATIONS AND OPERATING CONDITIONS AND HIKROBOT SHALL NOT BEAR THE CONSEQUENCES ARISING THEREFROM.

IN THE EVENT OF ANY CONFLICTS BETWEEN THIS MANUAL AND THE APPLICABLE LAW, THE LATTER PREVAILS.

Regulatory Information

Note

These clauses apply only to the products bearing the corresponding mark or information.

EU Conformity Statement

This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the Directive 2014/30/EU(EMCD),Directive 2001/95/EC(GPSD) and Directive 2011/65/EU(RoHS).

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

Regulation (EU) 2023/1542(Battery Regulation): This product contains a battery and it is in conformity with the Regulation (EU) 2023/1542. The battery cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), or lead (Pb). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info.

KC Mark Certification

Class A: The device is advised to note that as a seller or a business user (Class A) Devices and intended for use outside the Home area.

A급 기기: 이 기기는 업무용(A급) 전자파적합기기로써 판매자 또는 사용자는 이 점을 주의하시기바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

Symbol Conventions

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

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 ID2000X Series Industrial Code Reader.

Contact Information

Hangzhou Hikrobot Co., Ltd.
E-mail: global.support@hikrobotics.com
Website: ***https://en.hikrobotics.com/***

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

- Do not install the device if it is found that the device and accessories are damaged, rusted, water ingress, model mismatch, missing parts, etc., when unpacking.
- Avoid storage and transportation in places such as water splashing and rain, direct sunlight, strong electric fields, strong magnetic fields, and strong vibrations.
- Avoid dropping, smashing or vigorously vibrating the device and its components.
- 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.
- Place the device in a place out of direct sunlight and ventilation, away from heat sources such as heaters and radiators.
- In the use of the device, you must be in strict compliance with the electrical safety regulations of the nation and region.
- Use the power adapter provided by the official manufacturer. The power adapter must meet the Limited Power Source (LPS) requirements. For specific requirements, please refer to the device's technical specifications.
- It is strictly forbidden to wire, maintain, and disassemble the device is powered on. Otherwise, there is a danger of electric shock.
- Make sure that the device is installed in good condition, the wiring is firm, and the power

supply meets the requirements before powering on the device.
- For a device with a power switch, please use the switch to power on and off. It is strictly forbidden to plug and unplug the power cord.
- Looking directly at the device may cause harm to the eyes. Protective measures like wearing protective glasses should be taken in the process of installation, maintenance and debugging.
- 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.
- It is strictly forbidden to touch any terminal of the device when operating it. Otherwise there is a danger of electric shock.
- It is strictly forbidden for non-professional technicians to detect signals during device operation, otherwise it may cause personal injury or device damage.
- It is strictly forbidden to maintain the device that is powered on, otherwise there is a danger of electric shock.
- Avoid aiming the image sensor at strong light in direct mode or reflection mode, such as laser beams, otherwise the image sensor will be damaged.
- Keep clean of the device's image acquisition window. It is recommended to use cleaning water (not the alcohol-based corrosive solutions) to wipe off the dust. When the device is not in use, please add a dust cover to protect the image acquisition window.
- 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.
- Check the surface of the device and accessories for damage, rust, bumps, etc. when unpacking.
- Check whether the quantity and information of the device and accessories are complete after 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.
- It is strictly prohibited to transport the device in combination with items that may affect or damage the device.
- 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.
- Do not contact the device with strong acids, alkalis, oils, greases or organic solutions

such as thinners.
- Do not expose the device directly to flashlights, high-frequency switch lighting devices, or to sunlight, which may affect the performance.
- Do not impose pressure on the cable end of the device, such as forced bending, pulling, etc.

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 Laser Precaution

The laser safety class of some devices belongs to laser 2.

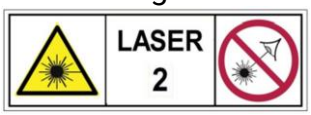


Figure 1-1 Class 2 Laser Product

Caution

- Do not use optical instruments (such as telescopes, magnifier) to observe the laser beam.
- Do not look directly at the laser module window to avoid irreversible damage to your eyes.

Chapter 2 Overview

2.1 Introduction

With functions of image acquisition, code recognition and output, the ID2000X series industrial code reader can read different types of 1D codes and 2D codes. It adopts compact design and is small in size. The device is applicable to consumer electronics, PCB, automotive parts, lithium battery, photovoltaic industry, and other industries.
The device uses sensors and optical elements to obtain images of the measured object, and achieves code parsing via the built-in deep learning code reading algorithm. It also supports outputting the detection results through different communication modes.

2.2 Key Features

- Adopts high-robustness algorithm to accurately identify difficult codes, such as stained code, skewed code, low-contrast code, and code on laser-marked metal surfaces.
- Integrates digital WDR image processing algorithm, and combines with 4-channel light source control and multiple optical accessories for enhancing code clarity.
- Adopts modular design, rotatable cable, separated cable, and multi-surface mounting interfaces for flexible mounting.
- Supports multi-channel isolated I/O and multiple industrial protocols for automatic system integration.
- Compatible with IDMVS client software V5.0.0 and later, it can achieve functions such as auto focusing and one-click tuning for fast debugging.

Note

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

Chapter 3 Appearance

Note

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

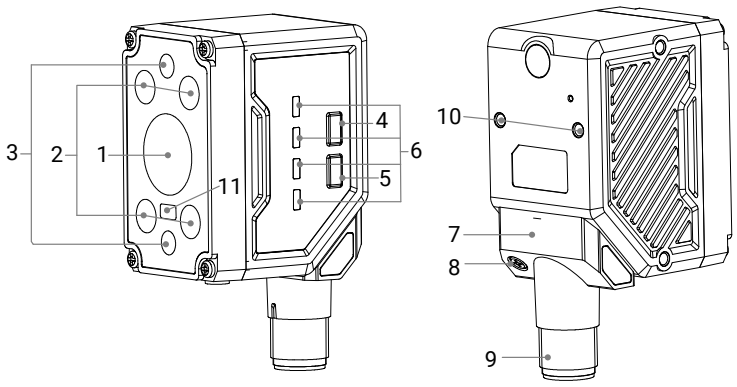


Figure 3-1 Appearance

Table 3-1 Component Description

No.	Name	Description
1	Image Sensor	It is used to acquire images.
2	Light Source	It refers to 4 red LED lights providing light for improving code reading effect. **Note** The default color of LED lights is red. White, blue, IR, ultraviolet, and two-color (red/blue) are optional.
3	Aiming System	There are two green LED lights used to show the field of view and aim targets.
4	Trigger Button (TRIG)	It is used to trigger the device. When the device is in trigger mode, press the button and the device triggers once.
5	Smart Tune Button (TUNE)	• Hold the button for 3 seconds and release. The device starts smart tune. • Hold the button for 3 seconds again and release during smart tune process. The adjustment will be cancelled.
6	Indicator	It refers to 4 indicators for observing the device's status. Refer to section ***Indicator*** for details.

No.	Name	Description
7	Right Angle Rotation Structure	It is used to rotate the device's cables.
8	Screw	It is used to fix the rotation structure.
9	Power and I/O Connector	It refers to 17-pin M12 connector for providing power, data communication, I/O, and serial port signal. Refer to section ***17-Pin M12 Connector*** for details. **Note** Network interface cable and USB interface cable are not the same. Please select the appropriate type based on your device type.
10	Screw Hole	It is used to fix the device, and you should use M3 screws. **Note** The side screw holes and rear screw holes are the same.
11	ToF	It is used to detect the position of targets, and realize focus and image parameter adjustment. **Note** Only the ID2000X series devices with liquid lens support this function.

Chapter 4 Connector and Indicator

4.1 17-Pin M12 Connector

The device has a 17-pin M12 connector to provide power, I/O, and serial port signal. Read the following content to get pin definitions of this connector.

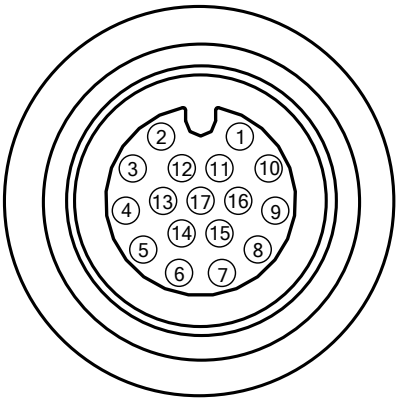


Figure 4-1 17-Pin M12 Connector

Table 4-1 Pin Definition of Cable with Network Interface

No.	Signal	Description	Cable Color		Cable	Pin Name
1	POWER_IN	Direct current power supply positive	Red		Pin 8 of 8-pin terminal	--
2	OUT_COM	Output signal ground	Brown		Pin 6 of 8-pin terminal	--
4	RS232_TX	RS-232 serial port output	Red/Blue		DB9 female serial port	--
5	RS232_RX	RS-232 serial port input	Gray/Pink		DB9 female serial port	--
6	RX-	Fast Ethernet signal RX-	White/Orange		RJ45 network interface	--
7	TX+	Fast Ethernet signal TX+	Green		RJ45 network interface	--
8	GPIO2	Opto-isolated output	Blue/White		Pin 4 of 8-pin terminal	Pin 3 output
9	IN_COM	Input signal ground	Blue		Pin 3 of 8-pin	--

No.	Signal	Description	Cable Color		Cable	Pin Name
					terminal	
10	GPIO3	Opto-isolated output	Brown/White		Pin 5 of 8-pin terminal	Pin 4 output
11	GND	Direct current power supply negative	Black		Pin 7 of 8-pin terminal	--
14	RX+	Fast Ethernet signal RX+	Orange		RJ45 network interface	--
15	TX-	Fast Ethernet signal TX-	White/Green		RJ45 network interface	--
16	GPIO0	Opto-isolated input	Gray		Pin 1 of 8-pin terminal	Pin 0 input
17	GPIO1	Opto-isolated input	White		Pin 2 of 8-pin terminal	Pin 1 input

Table 4-2 Pin Definition of Cable with USB Interface

No.	Signal	Description	Cable Color		Cable	Pin Name
1	POWER_IN	Direct current power supply positive	Red		Pin 8 of 8-pin terminal	--
2	OUT_COM	Output signal ground	Brown		Pin 6 of 8-pin terminal	--
3	USB_DM	USB DM signal	Purple/White		USB	--
4	RS232_TX	RS-232 serial port output	Red/Blue		DB9 female serial port	--
5	RS232_RX	RS-232 serial port input	Gray/Pink		DB9 female serial port	--
8	GPIO2	Opto-isolated output	Blue/White		Pin 4 of 8-pin terminal	Pin 3 output
9	IN_COM	Input signal ground	Blue		Pin 3 of 8-pin terminal	--
10	GPIO3	Opto-isolated output	Brown/White		Pin 5 of 8-pin terminal	Pin 4 output
11	GND	Direct current power supply negative	Black		• Pin 7 of 8-pin terminal (black cable)	--

No.	Signal	Description	Cable Color		Cable	Pin Name
					• USB	
12	USB_DP	USB DP signal	Pink		USB	--
16	GPIO0	Opto-isolated input	Gray		Pin 1 of 8-pin terminal	Pin 0 input
17	GPIO1	Opto-isolated input	White		Pin 2 of 8-pin terminal	Pin 1 input

Note

- You should refer to the tables above and the label attached to the power and I/O cable to wire the device.
- The open line of 8-pin terminal of cable with network interface is reserved. Do not use the open line for wiring.
- The cable colors mentioned above are applicable to the cables of 17-pin M12 to 8-pin terminal, RJ45, and DB9 serial port and 17-pin M12 to 8-pin terminal, USB, and DB9 serial port 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.

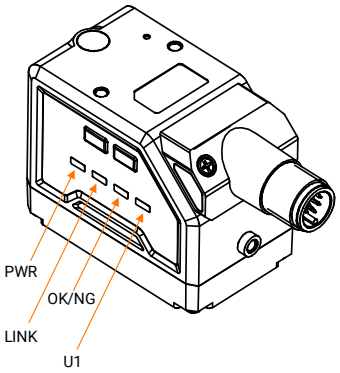


Figure 4-2 Device Indicator

Table 4-3 Indicator Description

Device Status	Description
PWR (Power Indicator)	Solid Green: Power supply is normal.
	Flashing Red: The indicator flashes once when the device is powered on.
	Unlit: Device is powered off.

Device Status	Description
LINK (Network Indicator)	Flashing Green: Network connection is normal, and the flashing speed is related to data transmission speed.
	Unlit: Network is disconnected. **Note** For the device with USB interface, the LINK indicator is normally off.
OK/NG (Result Indicator)	Flashing Green: Code reading is succeeded.
	Flashing Red: Code reading failed.
	Unlit: The indicator is unlit by default.
U1 (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 Profinet enabling status, and system operation is selected by default. **Note** The color of U1 indicator can be set as red or green, and is green by default. It cannot be set during device operation.

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

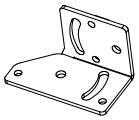
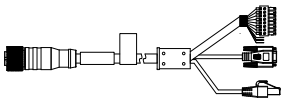
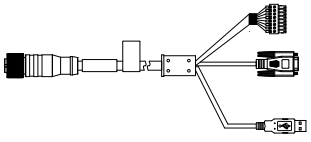
No.	Name	Image	Quantity	Description
1	Installation Bracket		1	It is used to fix the device.

Table 5-2 Optional Accessories

No.	Name	Image	Quantity	Description
1	Cable with Network Interface		1	(Required) For the network-type device, the cable of 17-pin M12 to 8-pin terminal, RJ45, and DB9 serial port should be purchased separately.
2	Cable with USB Interface		1	(Required) For the USB-type device, the cable of 17-pin M12 to 8-pin terminal, USB, and DB9 serial port should be purchased separately.
3	Power Adapter		1	(Required) You should select a suitable power adapter or switch power supply according to the device power supply and consumption in the specification.
4	Lens Cap		1	The lens cap can be replaced with other lens cap according to actual demands, such as transparent or polarization lens cap.
5	Light Board		1	The light board can be replaced with white/blue/IR/ultraviolet/two-color (red/blue) light board according to actual demands.

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.

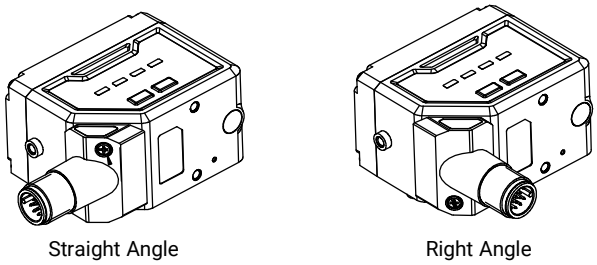


Figure 5-1 Adjust Right Angle Rotation Structure

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.

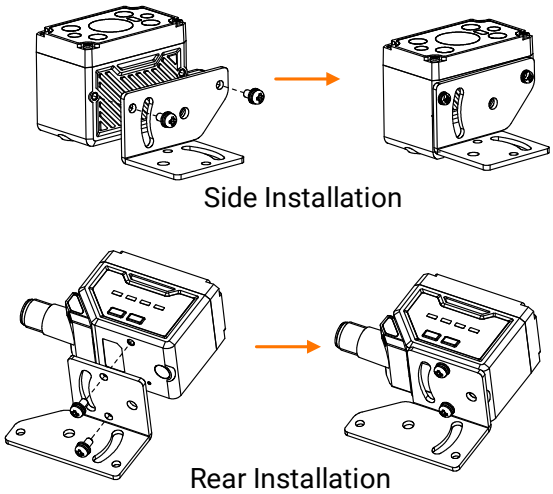


Figure 5-2 Fix Installation Bracket

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 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.

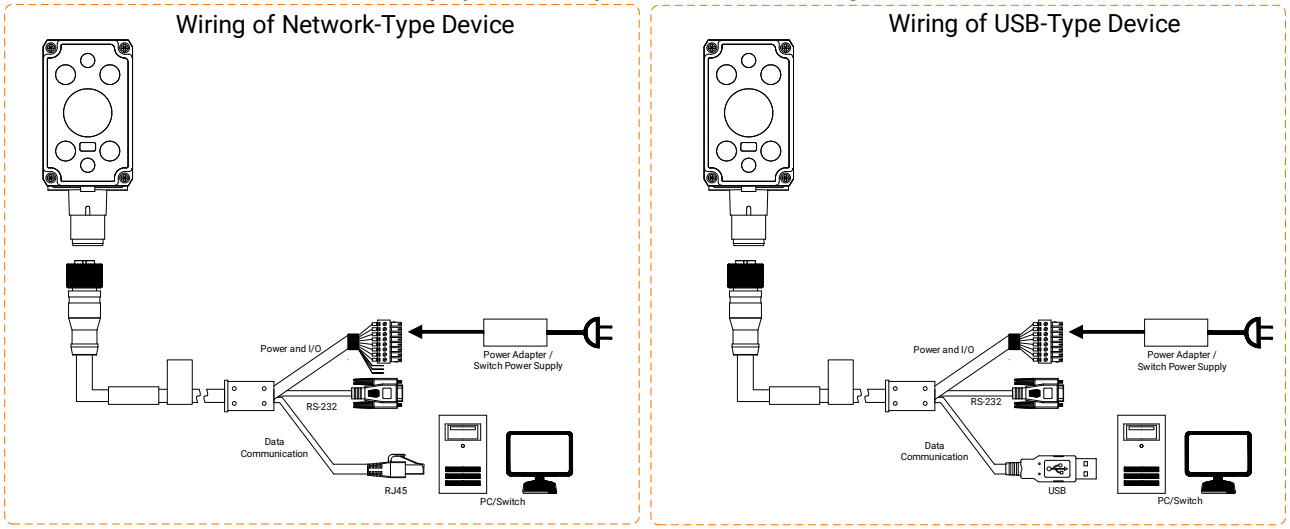


Figure 5-3 Device Connection

Steps

1. Use the 17-pin M12 connector cable to connect to the device.

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 or USB interface of the cable to the PC.
3. Select a suitable power adapter to connect to the 8-pin terminal of the power and I/O cable for power supply.

Note

- For the network-type and USB-type devices, power supply can be achieved via the 8-pin terminal connecting to power adapter or switch power supply.
- Refer to section ***17-Pin M12 Connector*** for specific cable color of open lines.

Chapter 6 I/O Electrical Feature and Wiring

This section introduces the I/O electrical features and wiring methods of the device. The device has 2 opto-isolated input signals (Line 0/1) and 2 opto-isolated output signals (Line 3/4).

6.1 Input Signal

The internal circuit, electrical feature, and logic level of opto-isolated input signal are as follows.

Note

- Make sure that the input voltage is from 4 VDC to 24 VDC.
- The breakdown voltage is 30 VDC. Keep voltage stable.

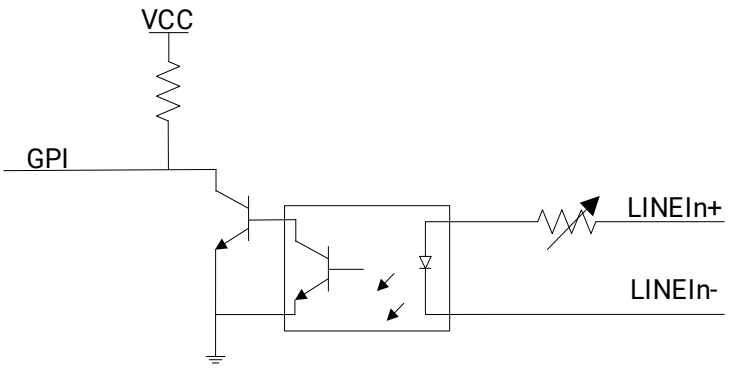


Figure 6-1 Internal Circuit of Input Signal

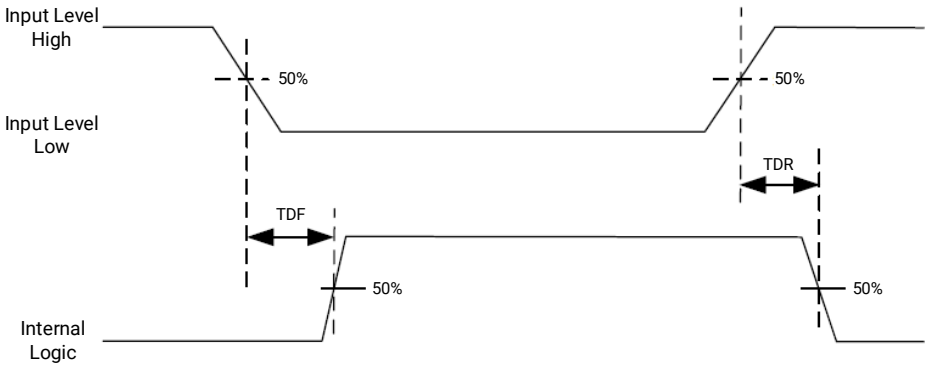


Figure 6-2 Input Logic Level

Table 6-1 Input Electrical Feature

Parameter Name	Value
Input Turn-On Level	4 V ≤ Vth ≤ 24 V
Input Turn-Off Level	0 V ≤ Vth ≤ 2 V
Input Falling Delay (TDF)	≤ 81.6 μs
Input Rising Delay (TDR)	≤ 7 μs
Current Limit	≤ 0.025 A
Frequency	≤ 5 Khz (5 V)

6.2 Output Signal

The internal circuit and electrical feature of the opto-isolated output signal are as follows.

Note

- Make sure that the output voltage is from 5 VDC to 24 VDC.
- The maximum output current is 50 mA.
- Do not directly connect with inductive load (e.g. DC motor, etc.) when outputting.

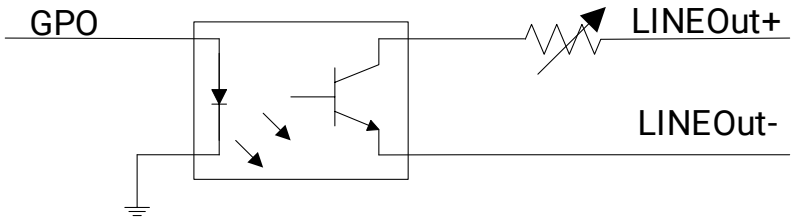


Figure 6-3 Internal Circuit of Output Signal

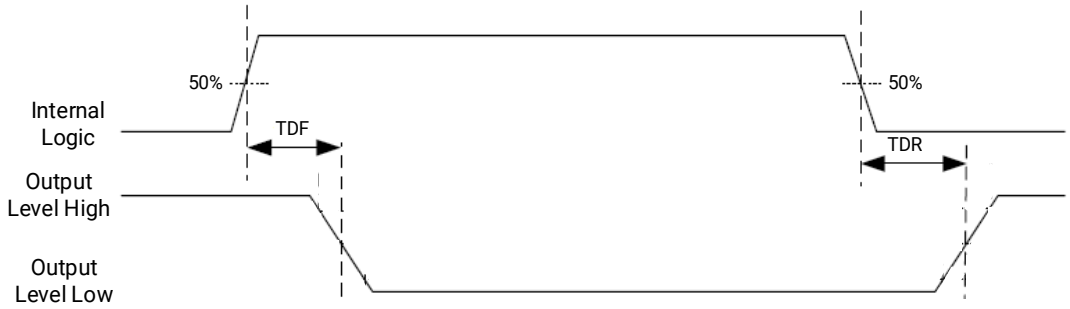


Figure 6-4 Output Logic Level

Note

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

Table 6-2 Output Electrical Feature

Parameter Name	Value
Output Level High	5 V ≤ Vth ≤ 24 V
Output Level Low	≤ 2.7 V
Output Falling Delay (TDF)	≤ 6.3 μs
Output Rising Delay (TDR)	≤ 68 μs
Current Limit	≤ 0.025 A
Frequency	≤ 5 Khz (5 V)

6.3 I/O Wiring

The device can receive input signals from external devices and output signals to external devices. This section introduces how to wire the device's I/O.

Note

- The wiring methods of PNP device and NPN device are the same. When using the device, please pay attention to polarity of the different external devices in the wiring figures below.
- PWR and GND refer to the device's power supply. Make sure the isolation between power supply of the device and power supply / GND of external device.
- The device figures below are for reference only, and the actual one you got should prevail.

Input/output signal wiring may differ by the type of the external device.

Input Wiring

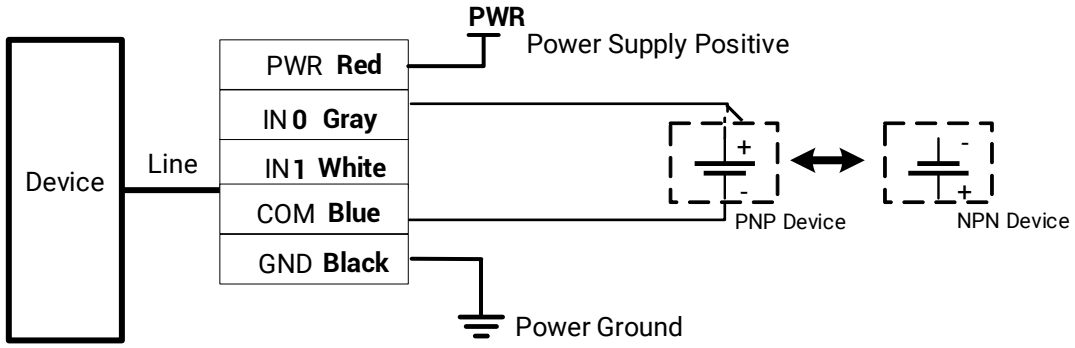


Figure 6-5 Input Wiring

Output Wiring

When the device is connected to the external device (PNP/NPN device) for outputting, a wiring diagram is shown below.

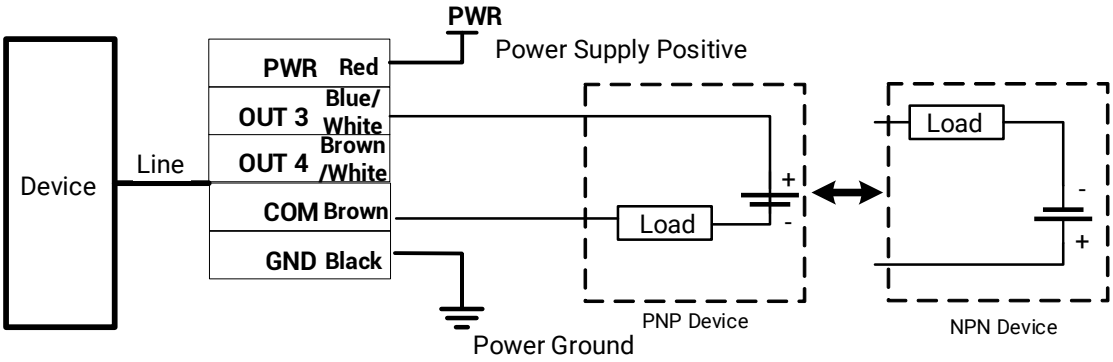


Figure 6-6 Output Wiring

When the device is connected to inductive load (relay or buzzer) for outputting, there are two recommended wiring methods: one is to connect a flyback diode with a reverse voltage exceeding 60 V and a current above 1 A in parallel, and the other is to add a series resistor in the circuit, which meets the power requirements. Refer to the wiring diagram below for details and select one method according to the actual installation conditions.

Figure 6-7 Wiring Methods of Flyback Diode and Series Resistor

6.4 RS-232 Serial Port

The device supports outputting data via RS-232 serial port, and you can set serial port communication via the client software. Refer to section ***Set Serial*** for details.

The cable has a DB9 female serial port. Refer to the figure and table below for pin definitions.

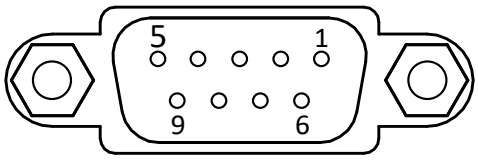


Figure 6-8 DB9 Female Serial Port

Table 6-3 Pin Definitions

Pin No.	Name	Description
2	TX	Transmits data.
3	RX	Receives data.
5	GND	Signal ground.

Chapter 7 Device Debugging

You can execute device debugging and parameter settings via the client software. This section introduces how to install the client software, connect the device to the client software, fast configuration, etc.

7.1 Client Software Installation

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.

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**.

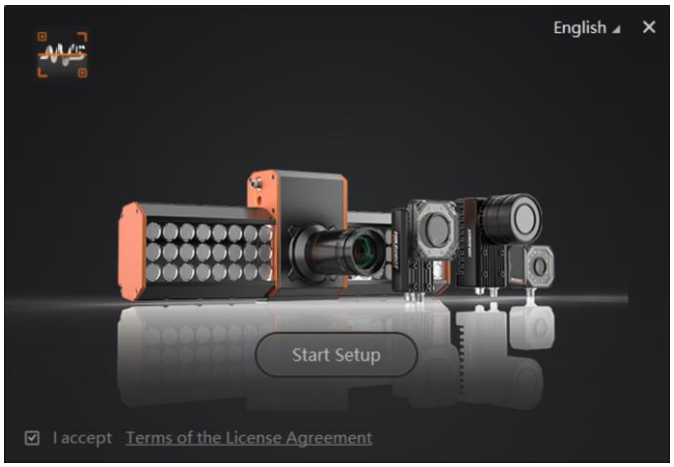


Figure 7-1 Installation Interface

6. Finish the installation according to the interface prompts.

7.2 Device Connection

Device connection is a prerequisite for using the client software to perform code reading and represents the first step after launching the client. This section provides an overview of the necessary preparations and guides you to discover and connect to the device.
The connection process is primarily managed through the **Device List**. If no device is connected, you can open the floating **Device List** in either of the following ways:

- Click ＋ next to **No cameras, click to add** in the upper-left corner.
- Click **Connect Camera** in the left panel.

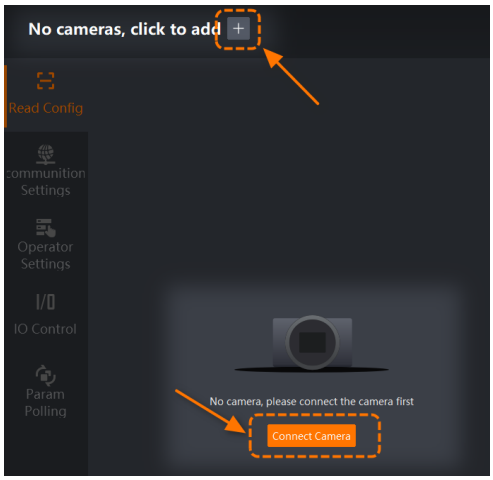


Figure 7-2 Open Device List

Once the **Device List** is open, you can follow the steps below to connect to device and set basic parameters.

Figure 7-3 Operation Flow

7.2.1 Preparations

To ensure a normal connection and proper functioning of the client software, confirm that your system meets the requirements. After that, complete the hardware wiring of the device and perform the necessary environment configuration.

System Requirements

The PC configuration should meet the following requirements.

Minimum Configuration

- OS: 32/64-bit Windows 7/10 or 64-bit Windows 11

- CPU: Intel Pentium IV 2.0 GHz
- RAM: 1 GB
- NIC: Intel Pro1000, I210, or I350 series recommended
- Display resolution: 1366 × 768

Recommended Configuration

- OS: 32/64-bit Windows 7/10 or 64-bit Windows 11
- CPU: Intel Pentium IV 3.0 GHz or higher
- RAM: 4 GB or higher
- NIC: Intel Pro1000, I210, or I350 series recommended
- Display resolution: 1920 × 1080 or higher

Note

- The client software has integrated all necessary drivers, and there is no need to install drivers.
- The client software relies on the system disk for operation. Please ensure sufficient space on the system drive.
- Some antivirus programs may mistakenly identify the client software as a virus. To avoid issues, consider adding the client software to the antivirus whitelist or disabling the antivirus. It is recommended to disable 360 Security Guard if installed.

Hardware Wiring

Before using the device, you need to complete the hardware wiring for power supply, data communication, I/O, and RS-232 serial port connections. Refer to section ***Wire Device*** for details.

Device Environment Configuration

To ensure stable data transmission, you should configure the firewall and PC network settings for network-type devices, or ensure the driver installation for USB-type devices.

- **For network-type devices:** Before using the client software, ensure the PC and the device are on the same LAN subnet and enable jumbo frames on the PC's Ethernet port.
  - Open the NIC Configurator. You can choose any one of the following ways to open it:
    - Go to the IDMVS installation directory and open **NIC_Configurator**. Relative path: .\Applications\Win64\NIC_Configurator.
    - Right-click **GigE** in the device list and select **NIC Properties**.

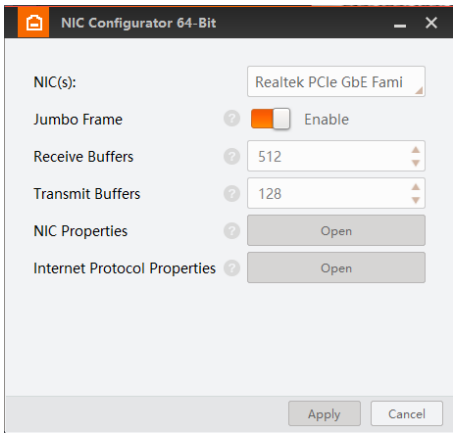


Figure 7-4 NIC Configurator

- Select the target NIC at **NIC(s)**.
- Configure its parameters.

Jumbo Frame

Enable jumbo frame for TCP/IP packets to reduce CPU usage and improve data transmission efficiency, especially when handling large packets and latency is acceptable to the user.

Note

If enabling jumbo frames fails, open **NIC Properties** → **Advanced** and check if the **Jumbo Packet** or **Jumbo Frame** is available. If available, set the value to 9 KB or 9014 Bytes. If not, update the NIC driver or use a different NIC that supports jumbo frames.

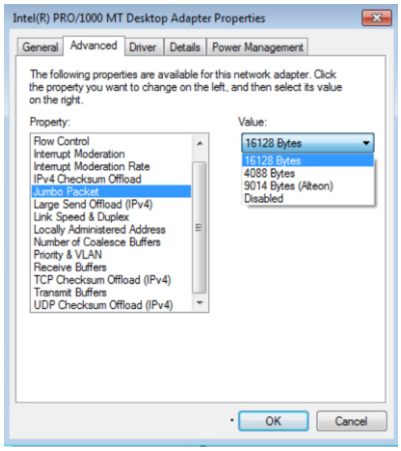


Figure 7-5 Enable Jumbo Packer

Receive Buffers

In cases that the NIC properties meet the requirements, you can adjust the receive buffer size. A larger buffer improves reception performance but consumes more system memory.

Transmit Buffers

In cases that the NIC properties meet the requirements, you can adjust the transmit buffer size. A larger buffer enhances transmission performance but consumes more system memory.

NIC properties

You can view or edit the NIC configuration options. Some options may be locked by the manufacturer and cannot be changed.

NIC Protocol Properties

You can view or modify the PC's IP address.

Note

- To ensure stable device operation, it is recommended to set the PC's network port IP address to a static IP address.
- For device status details, refer to section ***Discover Device***. For IP editing steps, refer to section ***Pre-Connection Configuration***.

- **For USB-type devices**: You should install a USB-to-Ethernet driver before connection.
  - Connect the USB-type devices to the PC via a USB interface.
    The Windows system will automatically detect the new hardware device and install the driver.
  - (Optional) Go to **Control Panel** → **Device Manager** → **Network adapters** to check if the driver has been installed successfully.

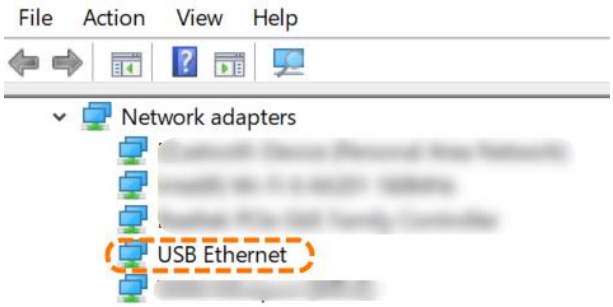


Figure 7-6 Driver Installed Successfully

Note

If the driver installation fails (e.g., displayed RNDIS under **Other devices** or the system does not detect the RNDIS driver), contact technical support to obtain the driver and install it manually.

7.2.2 Device Discovery

After environment preparations, the device can be detected in the **Device List** by using two

methods: Auto/Manual Refresh or Remote Addition. The first method is applicable when the device and the PC are in the same subnet, while the second is used when they are in different subnets but their IP addresses are pingable.

Note

The client software also supports virtual device connection for testing and debugging without physical devices.

Discover Device

This section introduces the following two methods: Auto/Manual Refresh and Remote Addition.

Auto/Manual Refresh

- **Auto Refresh**: When **Device List Auto-Refresh** is enabled under **Settings** → **General**, the client software periodically detects and updates the available devices on the local area network.

  Note

  By default, the client software refreshes automatically every 30 seconds. You may adjust this value as needed.

- **Manual Refresh**: Click on the top of the **Device List** to manually refresh the device.

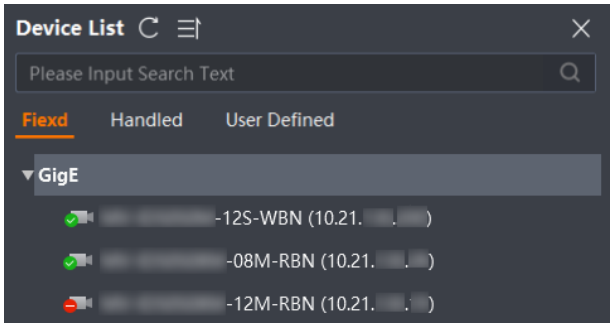


Figure 7-7 Auto Enumeration of Devices

Remote Addition

Remote Addition is useful for centralized remote management in distributed or complex environments, such as production lines at different locations with minimal on-site intervention.

Steps

1. Ensure the device and PC can ping each other on the same network.
2. Right-click **GigE** in the **Device List**, and select **Add Remote Camera**.

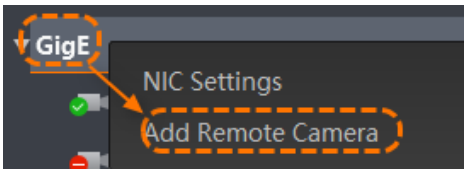


Figure 7-8 Add Remote Camera

3. Select the appropriate network adapter, and enter the device's IP address.
4. Click **OK**.

View Status and Information of Device

After the device is detected, you can check the device status and availability in the **Device List**. Different icons on the left of the device name symbolizes different status.

Table 7-1 Device Status Description

Icon	Status	Description
	Free	The device is ready for connection. Double click it to connect and use.
	Connected	The client software has successfully connected to the device, and you can execute some operations.
	Acquire Image	The client software has connected to the device, and starts to acquire images.
	In Use	The device is in use by another software (including IDMVS client software).
	Unreachable	The device is unreachable on the local area network. You need to adjust its IP address to the same network. For details, refer to section ***Pre-Connection Configuration***.

In addition, select a specific device, and you can view its detailed information.

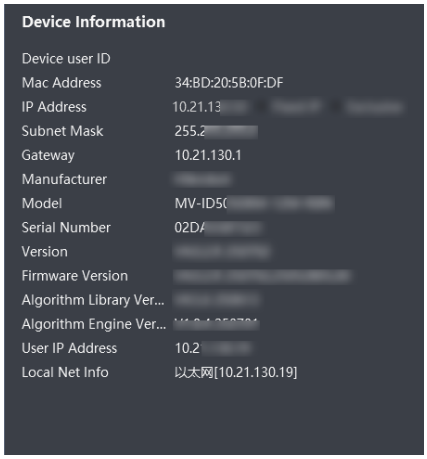


Figure 7-9 Viewing Device Information

Note

You can right-click to copy specific data entries.

7.2.3 Pre-Connection Configuration

If a device is detected in the **Device List** and is not in use, you can modify its IP address or upgrade its firmware as needed.

Modify IP Address

You may need to modify the IP address in the following cases: setting the device to a static IP address or resolving network issues to make the device reachable. You can follow the steps below.

Steps

1. Select the device that needs IP address change in the **Device List**.
2. Right-click the device and select **Modify IP** to enter the IP configuration interface.
3. Choose the desired IP configuration type: Static IP, DHCP (Dynamic Host Configuration IP) or LLA (Link-Local Address).

Figure 7-10 Modify IP Address

4. Click **OK** to apply the changes.

Note

- The client software supports advanced network configuration for connected devices. In addition to IP modification, it allows you to set a fixed IP address and IP address anti-occupation (Exclusive) in **IP Address** of the Device Information. The fixed IP address function ensures long-term stable connectivity by assigning permanent addresses to devices, while the IP address anti-occupation function effectively prevents communication interruptions caused by unauthorized devices attempting to occupy assigned IP addresses. For details, refer to section ***Post-Connection Configuration***.

- If you need to configure the IP addresses of multiple devices, go to **Tools** → **IP Configurator** in the menu bar.

Firmware Upgrade

To ensure optimal performance and access to the latest functions, you can regularly upgrade device's firmware. Contact our technical support for the latest firmware. The client software supports two upgrade methods: UDP firmware upgrade and TCP firmware upgrade.

Table 7-2 Comparison of UDP and TCP Firmware Upgrades

Items	UDP Firmware Upgrade	TCP Firmware Upgrade
Precondition	Device should be available.	Device should be connected.
UI Path	• Right-click the device name in the **Device List** and select **Firmware Upgrade**. • Click **Tools** → **Firmware Updater** in the Menu Bar.	• Right-click the device name in the **Device List** and select **Firmware Upgrade**. • Click **Tools** → **Firmware Updater** in the Menu Bar.
Support	Supported by all devices.	Only supported by some device models (refer to the interface for availability).
Features	Supports firmware upgrading without device connection, and batch upgrading.	Enhanced upgrade speed, and also supports batch upgrading.

You can follow the steps below to upgrade UDP firmware.

Steps

Note

- 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 restart automatically after the firmware is upgraded.

1. Select the target device in the **Device List**.
2. Right-click the device, and select **Firmware Upgrade**.
3. Click 🗁 and select a .dav firmware file matching with the target device model.

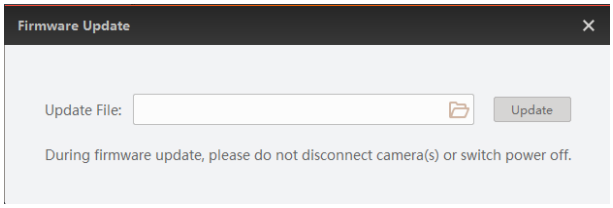


Figure 7-11 UDP Firmware Upgrade

4. Click **Upgrade**.
Upon completion, a success notification will appear, and the device will automatically restart.

Note

If you select the wrong model during the process, the firmware upgrade fails and does not overwrite the original firmware. In such cases of upgrade failure or abnormal termination, the device will automatically restart.

7.2.4 Device Connecting

Once a device is discovered in the **Device List**, you can connect it for further operations.

Connect to Device

There are two ways for connection.

- Double-click the device name.
- Click next to the device name.

Note

You also can click next to the device name to disconnect.

Check and Switch Devices

After connecting, the client software's main interface will display. The upper-left device information provides the following details.

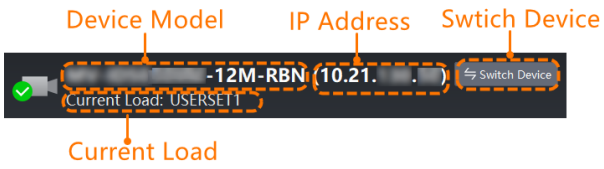


Figure 7-12 Device Information

- **Device Model**: You can double-click it to open the floating device list, and then refer to the steps above to connect to other devices.

Note

If you rename the user ID in the ***Post-Connection Configuration***, the user ID will be displayed in the device information bar instead of the device model.

- **Current Load**: It shows the current parameter group, including default and custom settings. You can configure startup parameter loading via **Param Save** in the Quick Access Toolbar or switch parameter groups manually.

7.2.5 Post-Connection Configuration

After connecting to the device, you can configure basic functions, device control, static IP assignment, and IP anti-occupancy function by right-clicking the device name in the device list.

Basic Functions

You can right-click the device name in the **Device List** or the device information in the upper-left corner of the main window to perform the following operations.

Start/Stop Acquisition

You can start or stop image acquisition, and can press F2 to execute this function. The shortcut can be set in **Settings** → **Shortcut** in the menu bar.

Rename User ID

You can set a device user's ID (up to 15 English characters). The user ID will be displayed in the **Device List** or the device information in the upper-left corner of the main window.

File Access

You can import or export the following device parameters.

Note

You can also use **File Access** in the Menu Bar to import device parameters in a batch.

User Set

You can import or export user parameters.

- Import: After importing, all user parameter sets, including quantity, name, and specific parameters, will be changed according to imported files.
- Export: After exporting, a configuration file in .mfa format (with internal system user parameters) will be generated and be exported to the selected path. The default naming rule for the .mfa file is: device model_SerialNumber_User Set.mfa.

Multi ROI

You can import or export algorithm ROI data.

- Import: You can import configuration files to edit algorithm ROI parameters in a batch, improving the efficiency of parameter configuration.
- Export: After exporting, a configuration file in .mfa format (with internal algorithm ROI data) will be generated and be exported to the selected path. The default naming rule for the .mfa file is: device model_SerialNumber_Multi ROI.mfa.

SECBIN

You can import encrypted files in .bin format. Contact technical support for more details.

License Notice

You can export open-source software licenses as a .txt file.

Save GenICam XML

You can save the current device GenICam configuration as an XML file.

Firmware Update

You can upgrade connected device's TCP firmware.

Note

- TCP firmware upgrade can be achieve via TCP packets. For a comparison between TCP and UDP upgrades, refer to section ***Pre-Connection Configuration***.
- It is unnecessary to edit the TCP **Update Port**, and you can use the default value.

Steps

1. Click and select a .dav firmware file matching with the target device model.
2. Click **Update**.

Device Restart

You can execute a soft restart of the device. For batch restarting, use the IP Configurator for one-click restarting.

Note

You can also press and hold the TRIG button and TUNE button for more than 10 seconds at the same time to restart the device.

Device Control

For the connected devices, you can enable **Auto Work** and **Timing** in the **Device Control**.

Figure 7-13 Device Control

Auto Work

When this parameter is enabled, the device will automatically start working upon power-up if it is not connected to the client software.

Note

If the device is connect to the client software, you should manually enable this function.

Timing

You can perform manual timing or NTP timing.

Note

Some connected devices support automatic time synchronization with the PC time.

- **Manual Timing**: After related parameters are configured, the device can either be set to the input time or synchronized with the current PC time.

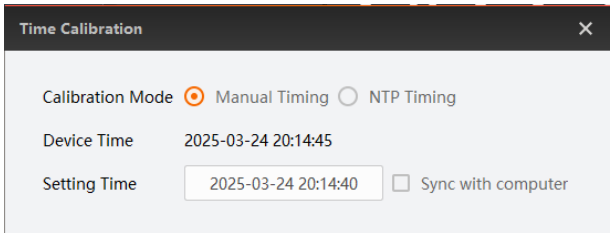


Figure 7-14 Manual Timing

Device Time

It displays the current time of the device.

Setting Time

You can manually set time here. If you check **Sync with computer**, the PC time will be synchronized to the device. Both **Device Time** and **Setting Time** will be updated.

Note

Only some devices support manual timing.

- **NTP Timing**: After the device establishes network connectivity with an NTP server, its time will be regularly synchronized according to the configured interval.

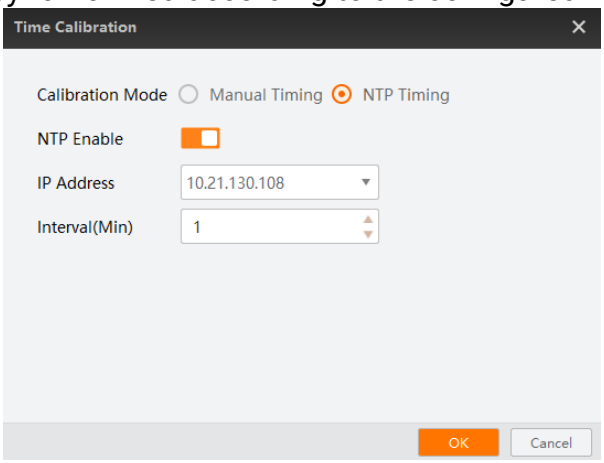


Figure 7-15 NTP Timing

NTP Enable

When this parameter is enabled, the device time will be corrected according to the parameters you configure.

IP Address

You can set the IP address of the NTP server.

Interval (Hour/Minute)

You can set the NTP time interval. The parameter unit (hour/minute) may differ by device model.

IP Address Configuration

The client software allows you to set a fixed IP address and IP anti-occupation (Exclusive) in **IP Address** → **Device Information**.

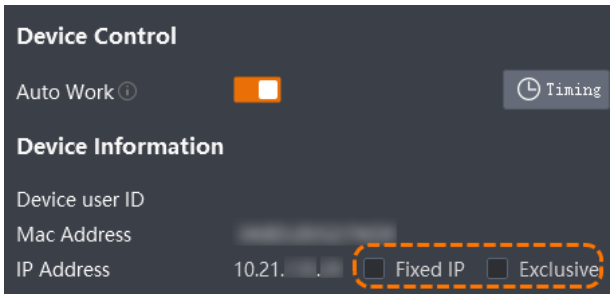


Figure 7-16 Fixed IP and Exclusive

Fixed IP

This parameter is disabled by default. You can adjust the static IP address of the device. If it is enabled, the device IP address is fixed, and you cannot change the static IP address, or switch between dynamic IP address and static IP address.

Exclusive

When this parameter is enabled, other applications on the PC cannot occupy or connect to the device.

7.2.6 Device Group

The client software supports grouping devices detected in the device list. In complex code reading scenarios with multiple devices, you can group them based on usage scenarios or tasks for centralized coordination and control.

Note

- For coordination among multiple devices, you can enable multicast mode or main-sub networking function.
- The devices can be grouped before or after connection.

Steps

1. You can click **User Defined** in the **Device List**, and right click **GigE** → **Add Group**.
2. (Optional) Right click **New Group**. You can rename or delete the new group if needed.
3. You can switch to specific tabs (e.g., Fixed/Handled), and right click the device. Hover

over **Move To Group** and select a group name to move the device.

Note

Grouped devices can only be viewed under the tab of **User Defined**.

4. (Optional) Under the tab of **User Defined**, you can right click a device, and select **Remove From Group**. The removed devices will be moved to the original tab.

Note

If there are multiple groups, you can choose **Switch Group**.

7.3 Quick Start Guide

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 7-17 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**.

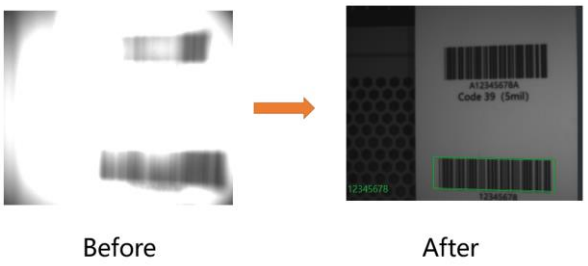


Figure 7-18 Auto Focus Effect

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.

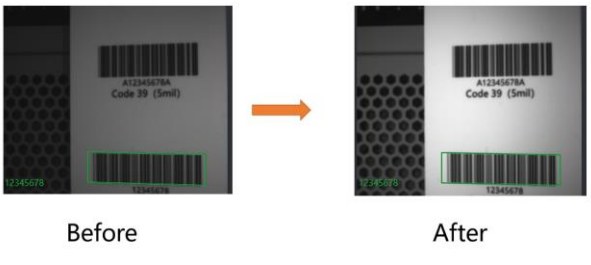


Figure 7-19 Self Adapt Effect

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.

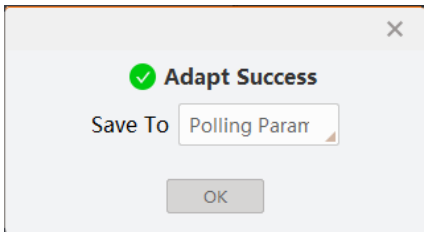


Figure 7-20 Save to Polling Param

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 7-21 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.

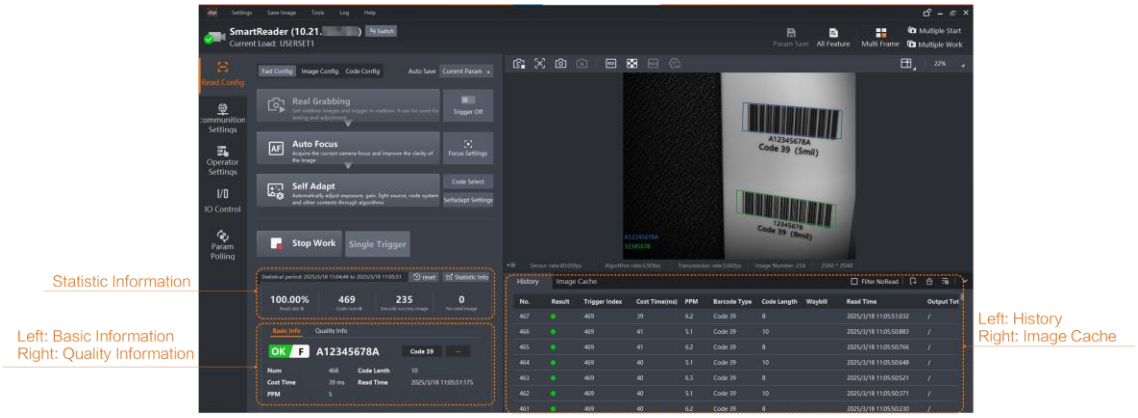


Figure 7-22 View Decoding Information

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 8 Device 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, and 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.

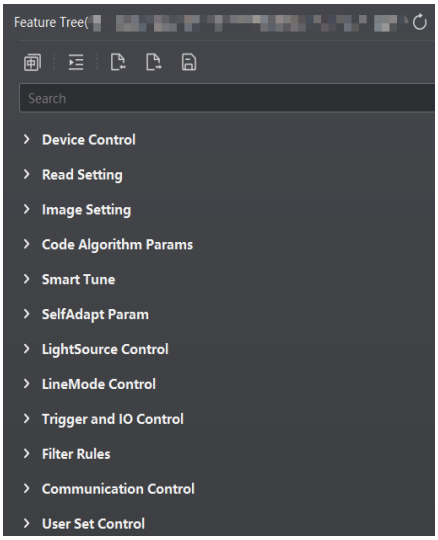


Figure 8-2 Feature Free

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.
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.
Code Algorithm Params	It allows you to set algorithm 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.

Name	Description
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.
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.

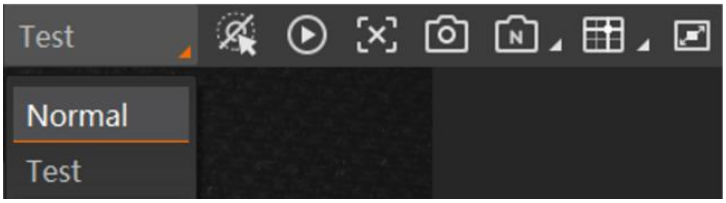


Figure 8-3 Select Running Mode

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.

Note

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

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(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.
Contrast Strength Enable	After this function is enabled, you can set **Contrast Strength** to adjust contrast between bright and dark areas in the image, enhancing image clarity or improving code recognition effect. **Note** The **Digital WDR Enable** and **Contrast Strength Enable** cannot be enabled at the same time.
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.

Name	Description
	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** and **Contrast Strength Enable** cannot be enabled at the same time.

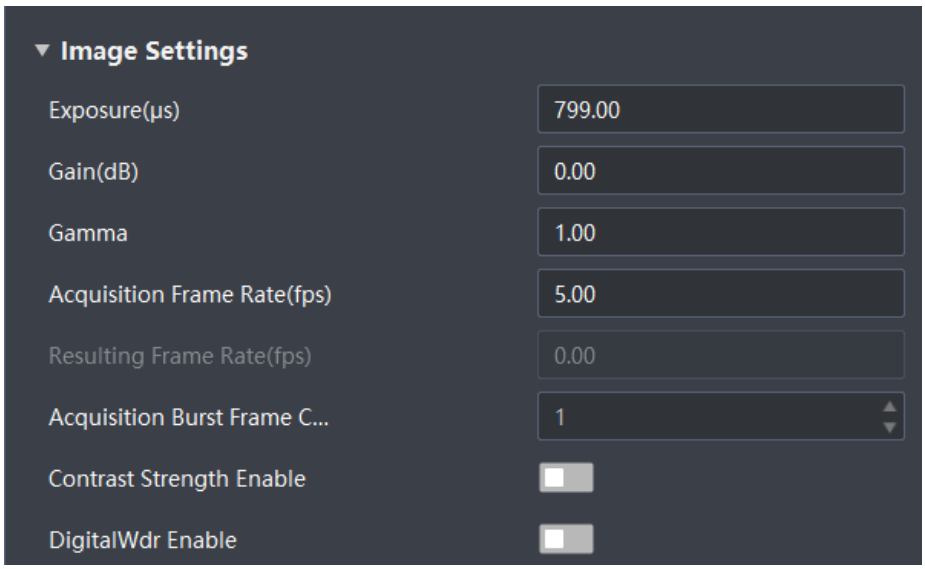


Figure 8-4 Set Image Parameters

Note

The value range of exposure time and gain, and the maximum value of acquisition frame rate are related to the device model. Refer to the device's specifications for specific 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

Exposure Mode	Description
	mode.
Continuous	The device adjusts the exposure time continuously according to the image brightness.

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** or **Partial** 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.

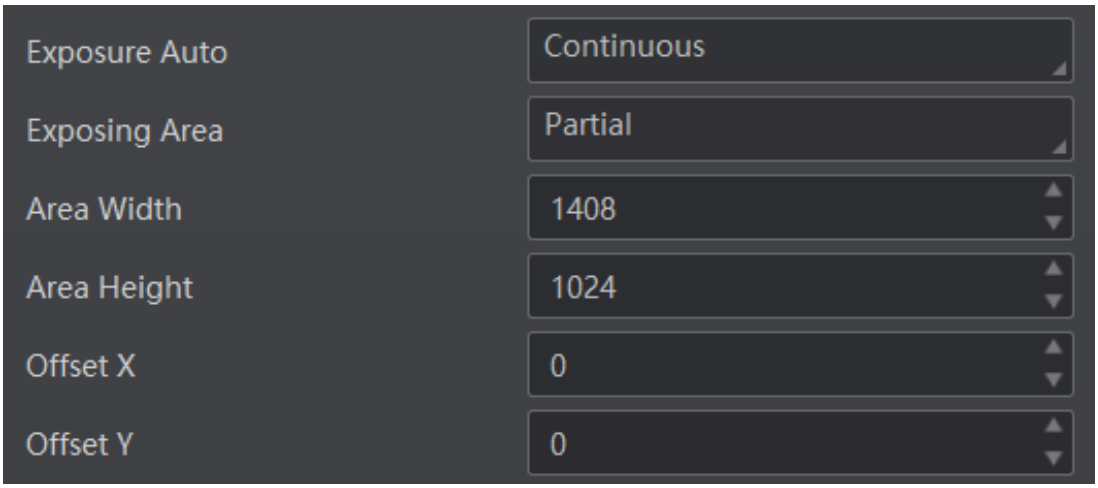


Figure 8-5 Once or Continuous Exposure

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.

Gain Mode	Description
	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.

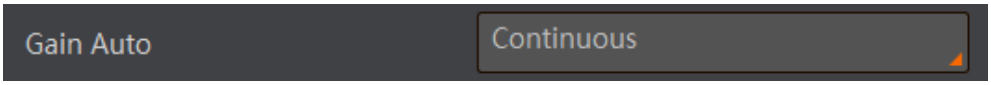


Figure 8-6 Once or Continuous Gain

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

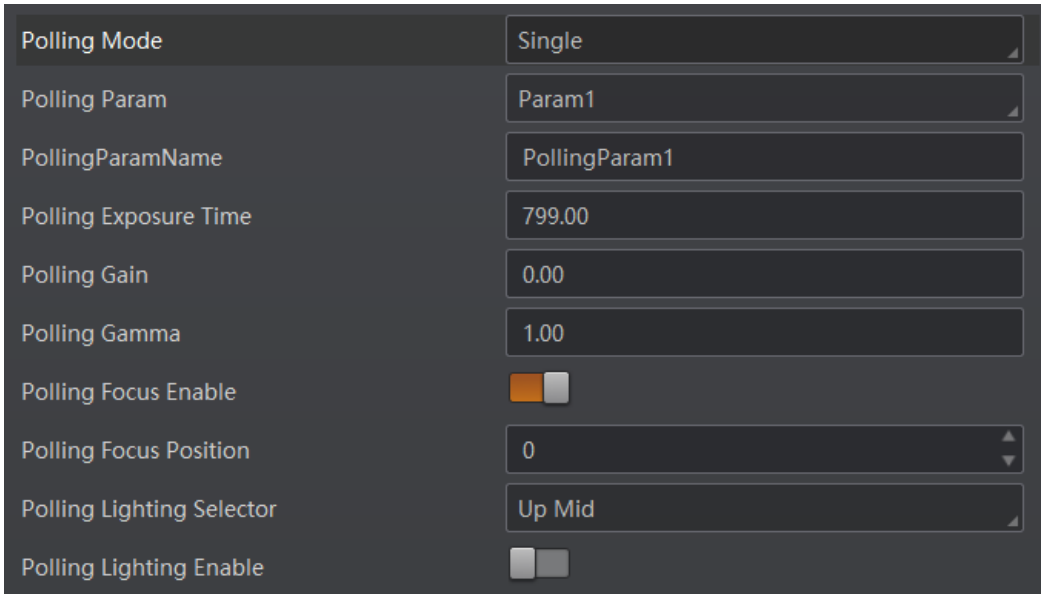


Figure 8-7 Single Mode

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-left, up-right, down-left, and down-right.
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.

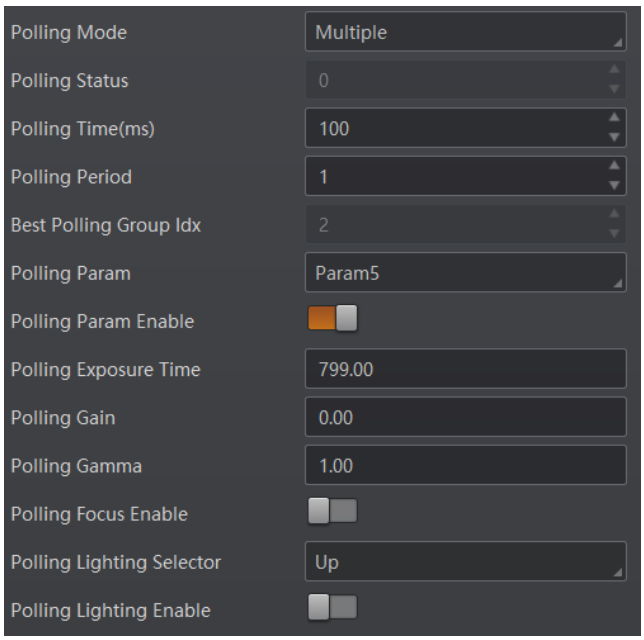


Figure 8-8 Multiple Mode

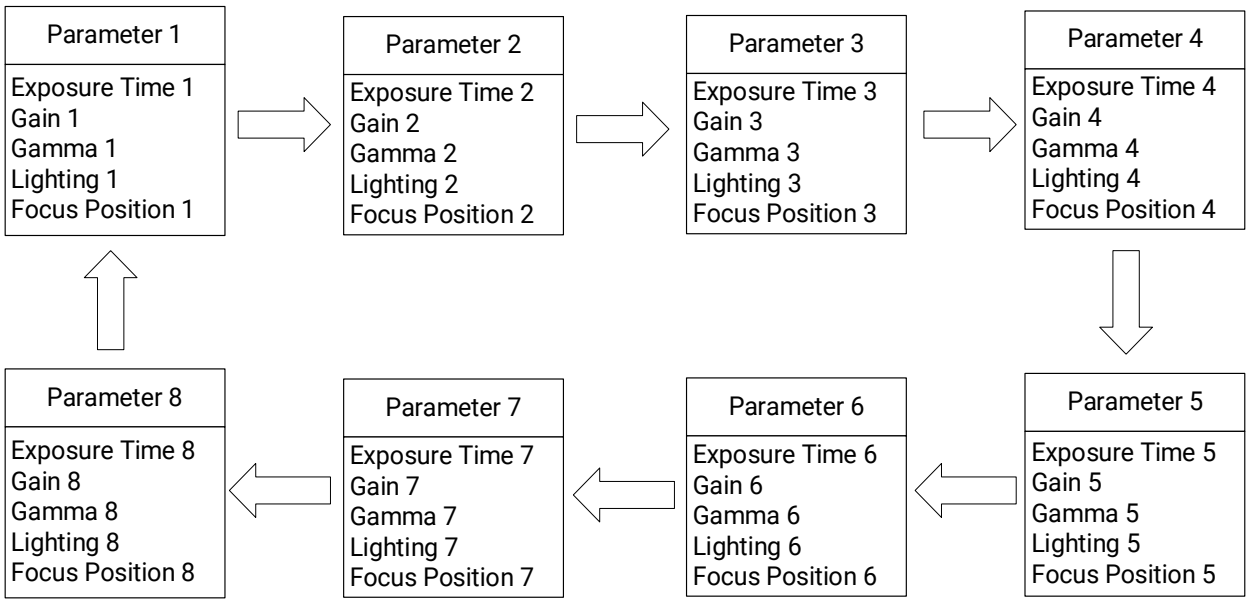


Figure 8-9 Polling Diagram

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.
4. (Optional) Set brightness of light source in **LightSource Control**. The value ranges from 1 (minimum)·to 20 (maximum).

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**.

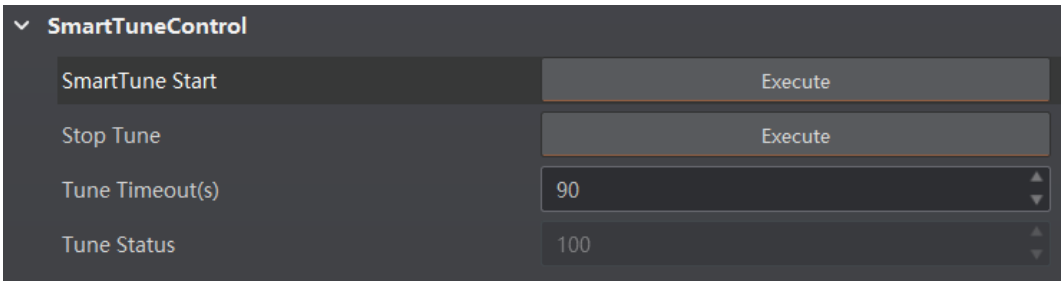


Figure 8-10 Smart Tune Control

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.

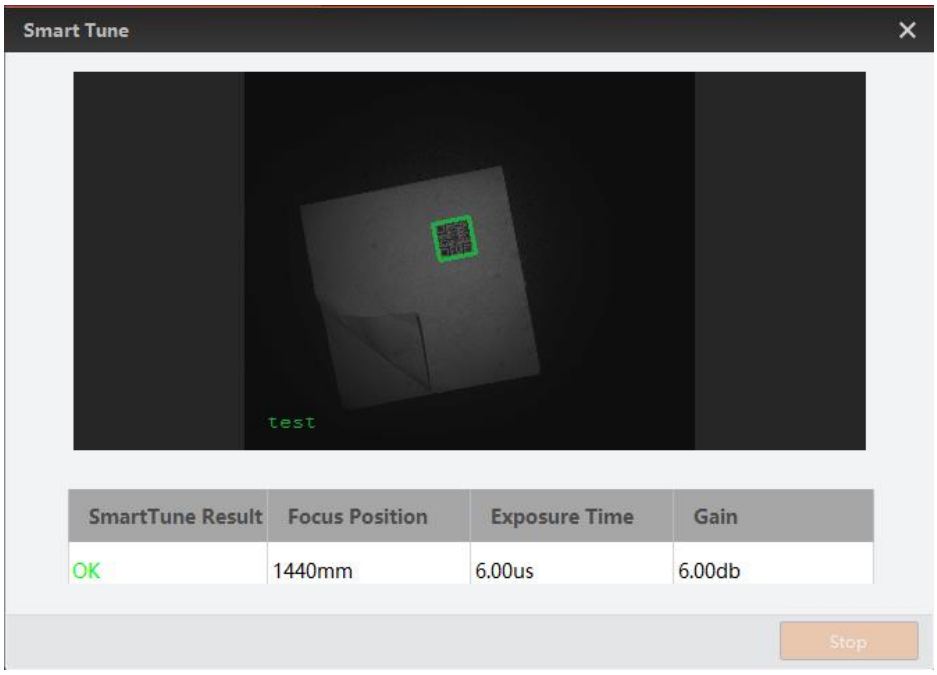


Figure 8-11 Smart Tune Start

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**.

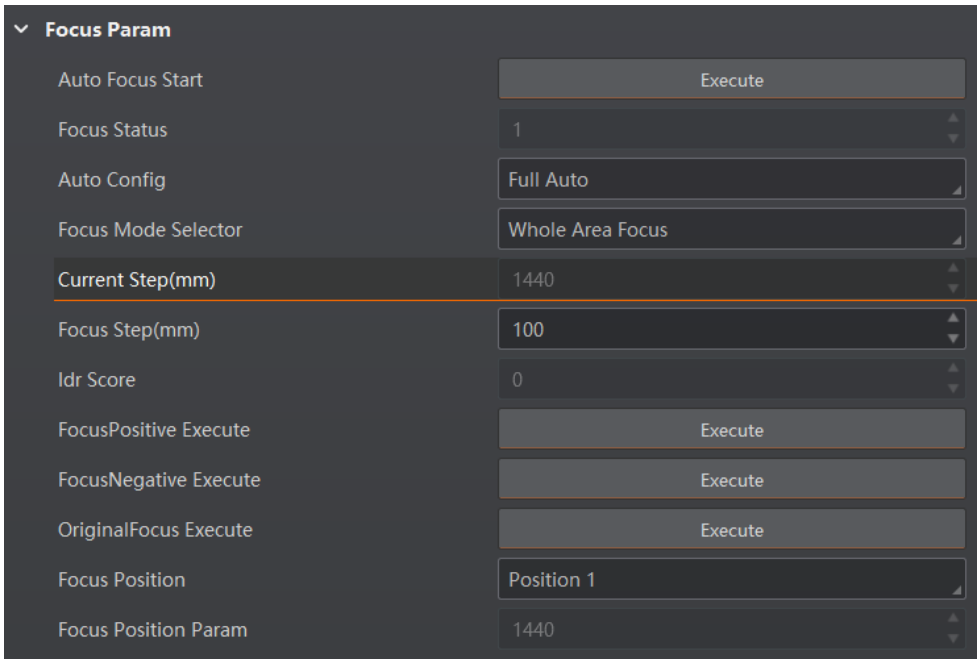


Figure 8-12 Global Focus

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**.

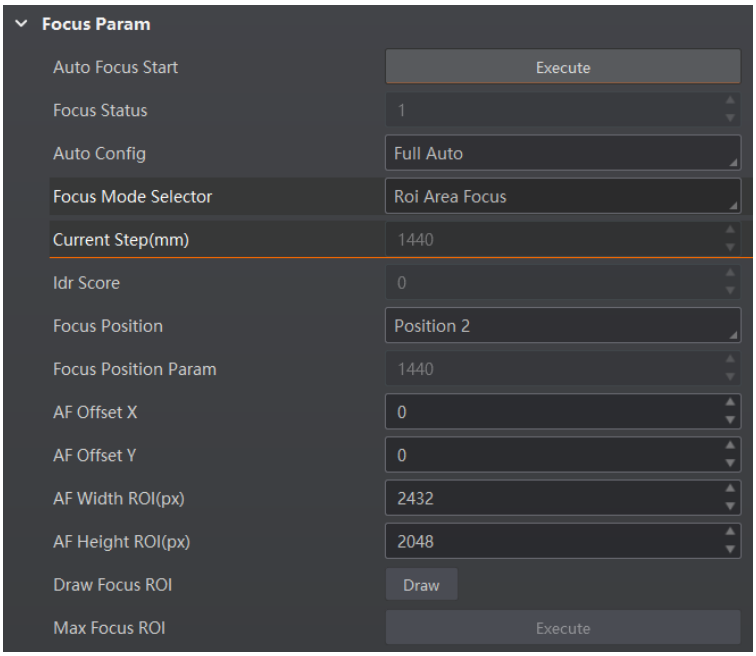


Figure 8-13 ROI Focus

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.

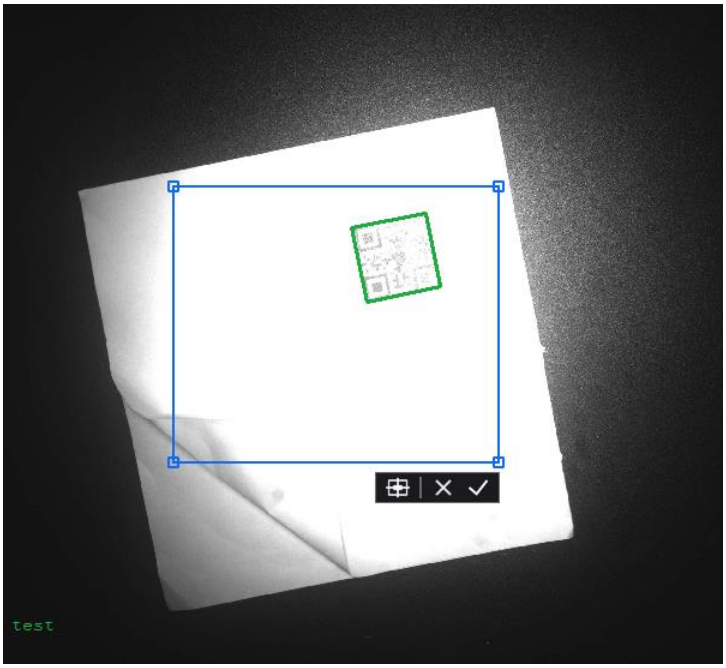


Figure 8-14 Draw Focus ROI Area

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 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.

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

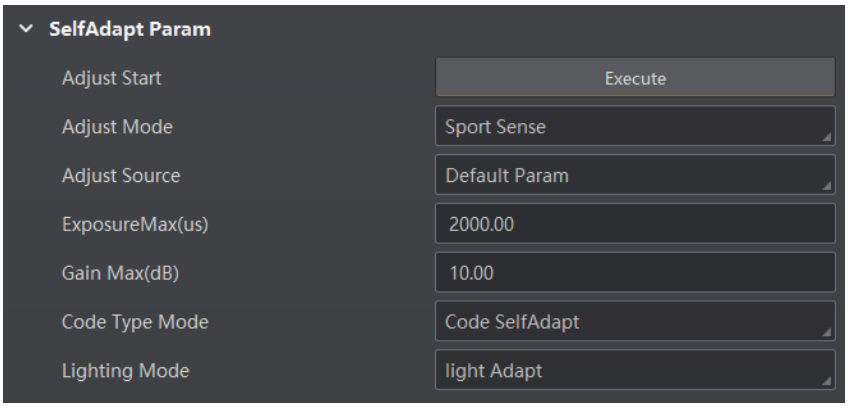


Figure 8-15 Select Adjust Source

- **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**.

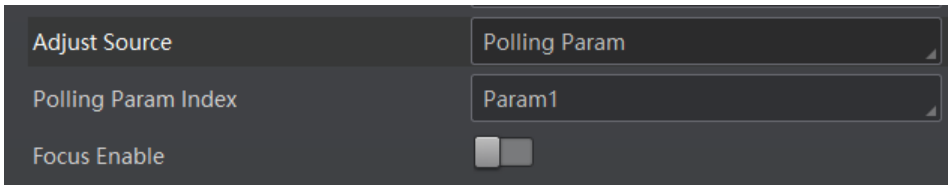


Figure 8-16 Polling Parameter

4. (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.

5. (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.

6. (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.

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

8.3.9 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.

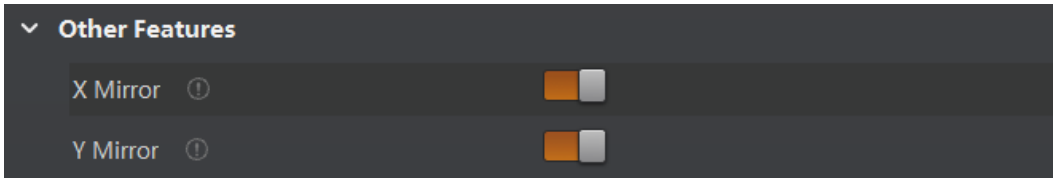


Figure 8-17 Set Mirror X and Mirror Y

8.3.10 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.

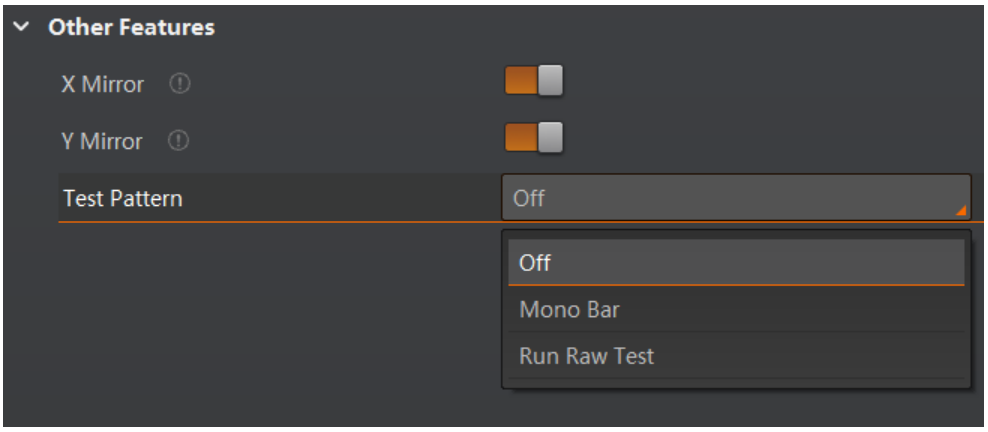


Figure 8-18 Set Test Pattern

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.

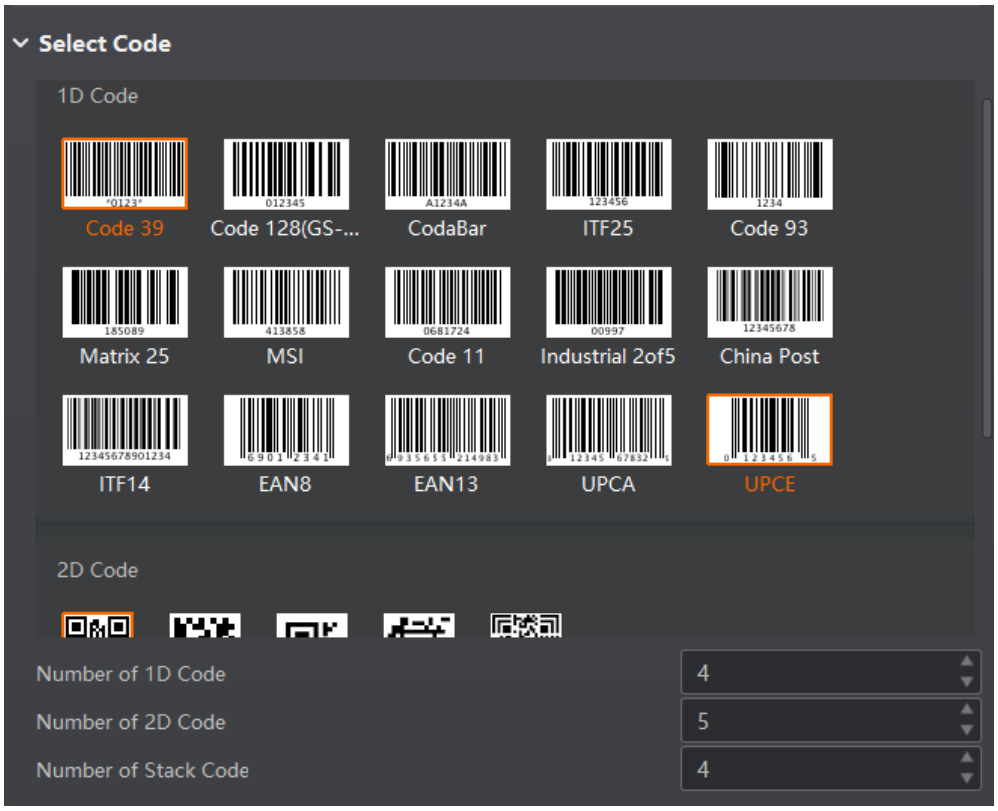


Figure 8-19 Add Codes

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.

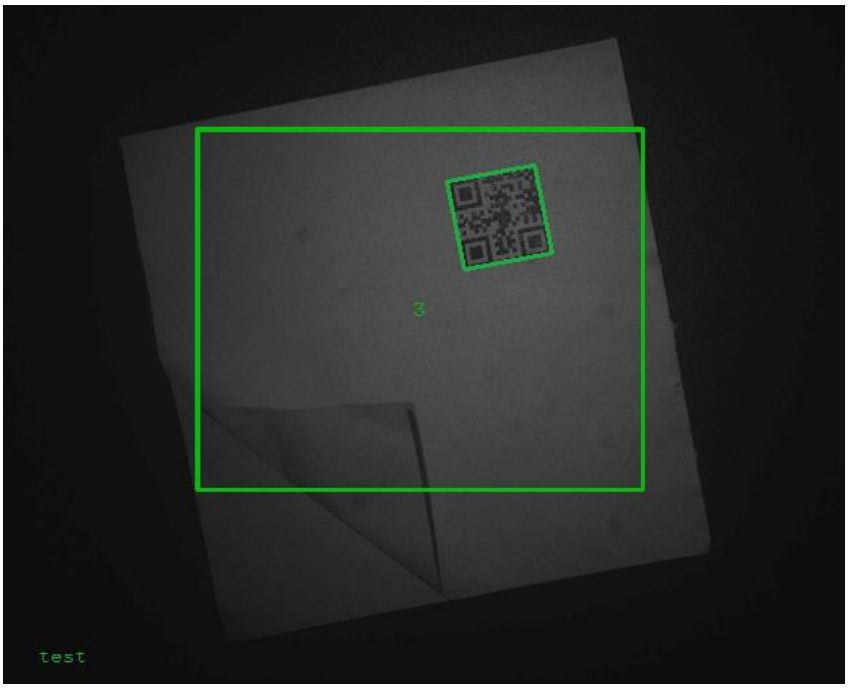


Figure 8-20 Draw ROI

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.

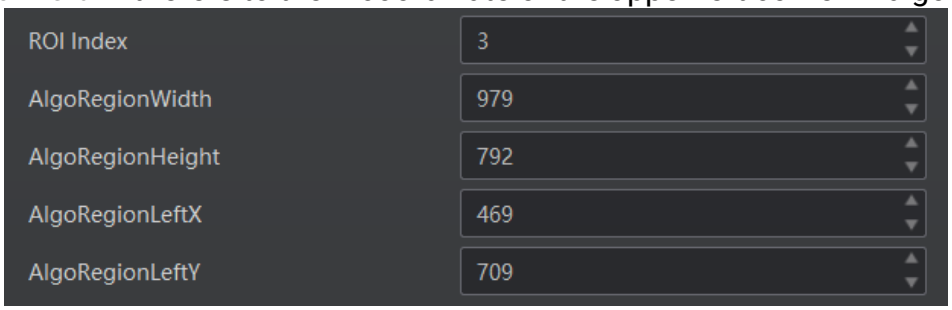


Figure 8-21 ROI Parameters

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.

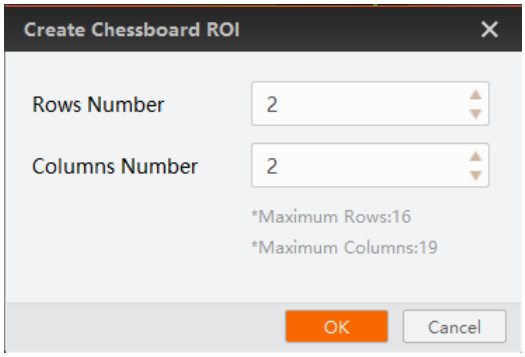


Figure 8-22 Create Chessboard ROI

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.

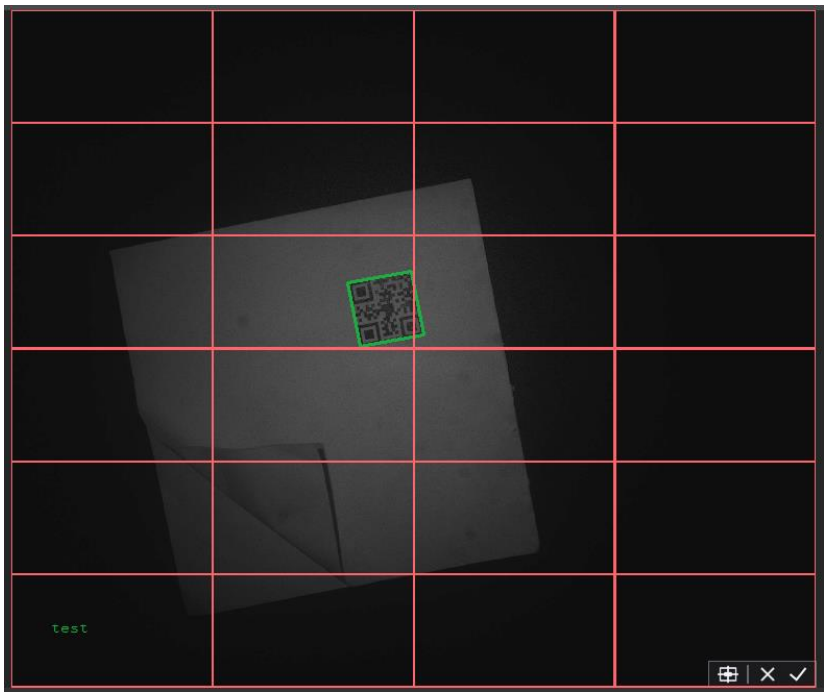


Figure 8-23 Draw ROI via Chessboard

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**.

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, Code 128, ITF25, EAN8, EAN13, UPCA, and ITF14.

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 Code 39, Code 128, ITF25, EAN8, EAN13, UPCA, and ITF14.

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.
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.

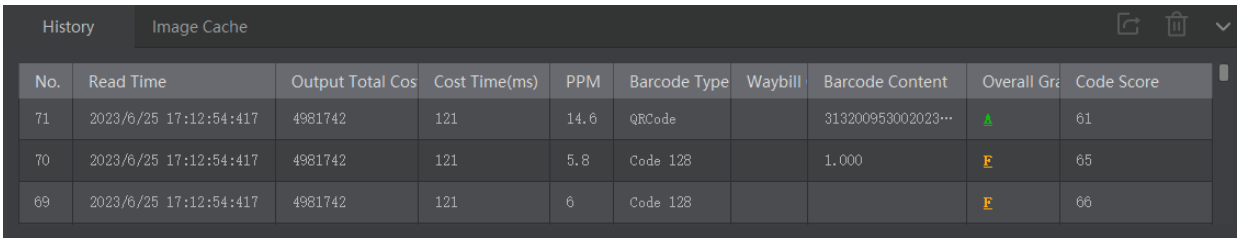


Figure 8-24 Overall Code Quality

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 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**.

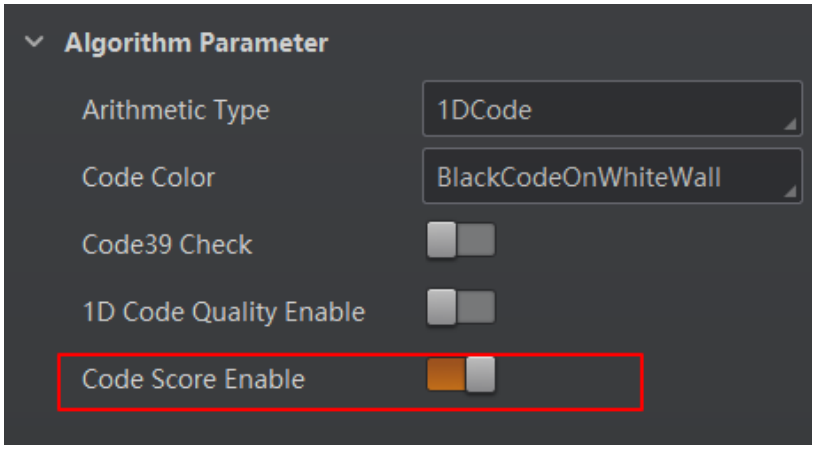


Figure 8-25 Enable Code Score Enable

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

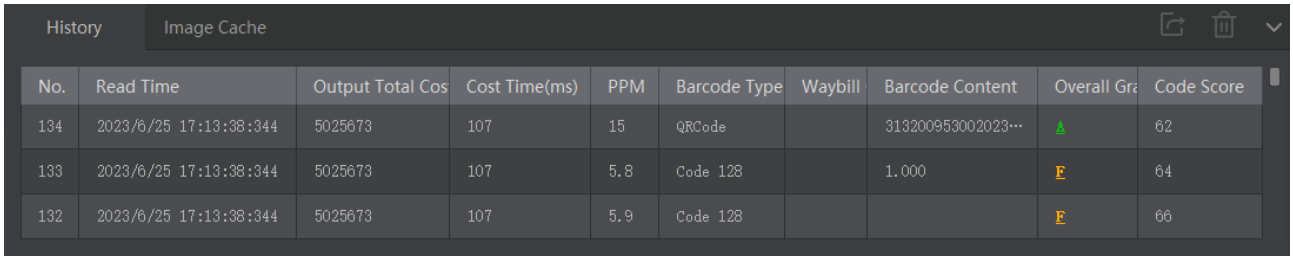


Figure 8-26 Code Score

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 can click **I/O Control Settings** → **Input** → **Trigger Mode**, and select **Off** as **Trigger Mode**.
Go to **Feature Tree** → **Trigger and IO Control** and you can enable **Code Trigger Enable**, and set **Code Trigger Pixel Threshold** and **Code Trigger Unrespond Time**.

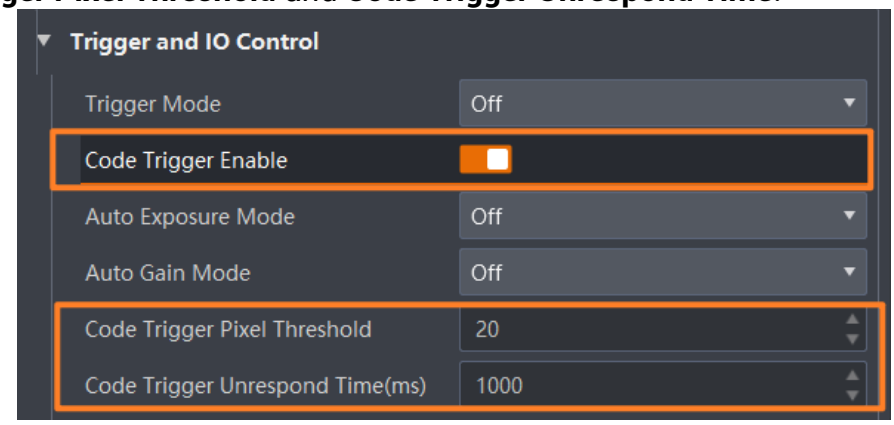


Figure 8-27 Set Code Trigger

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.

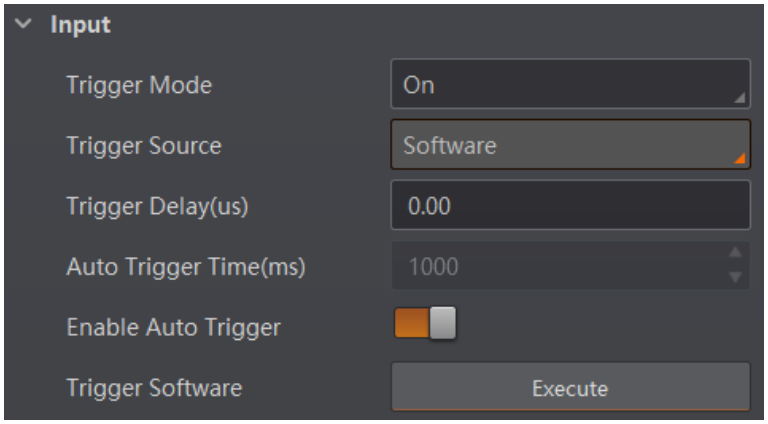


Figure 8-28 Set and Execute Software Trigger Mode

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**.

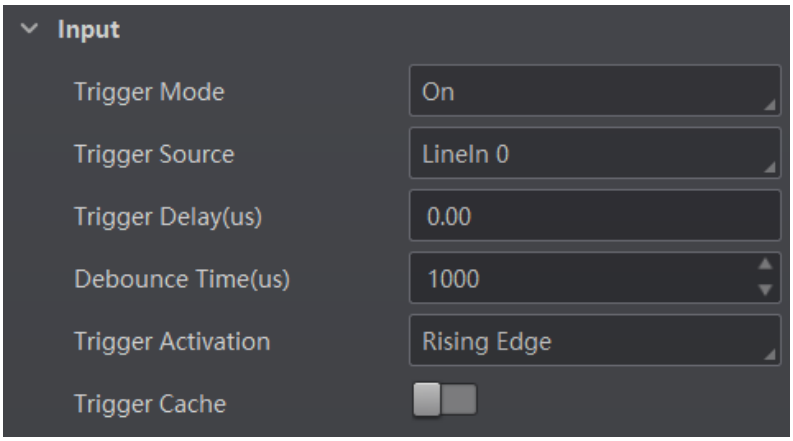


Figure 8-29 Set and Execute Hardware Trigger Mode

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.

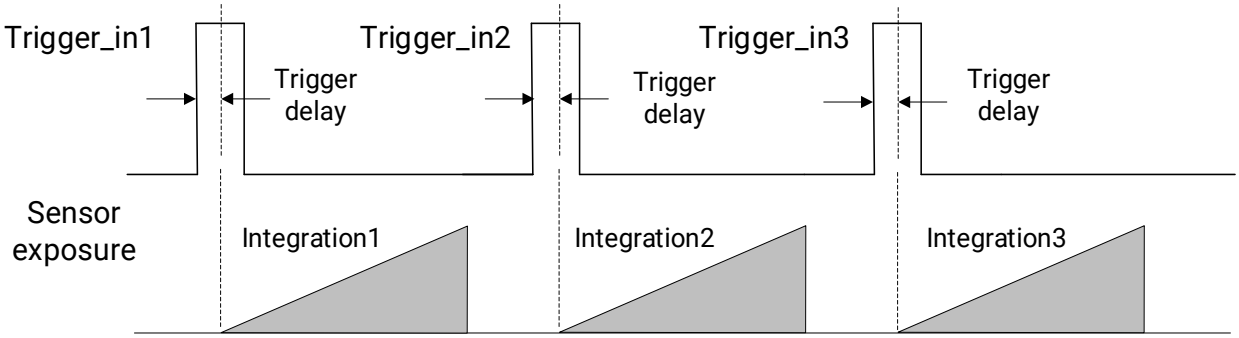


Figure 8-30 Sequence Diagram of Trigger Delay

- **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.

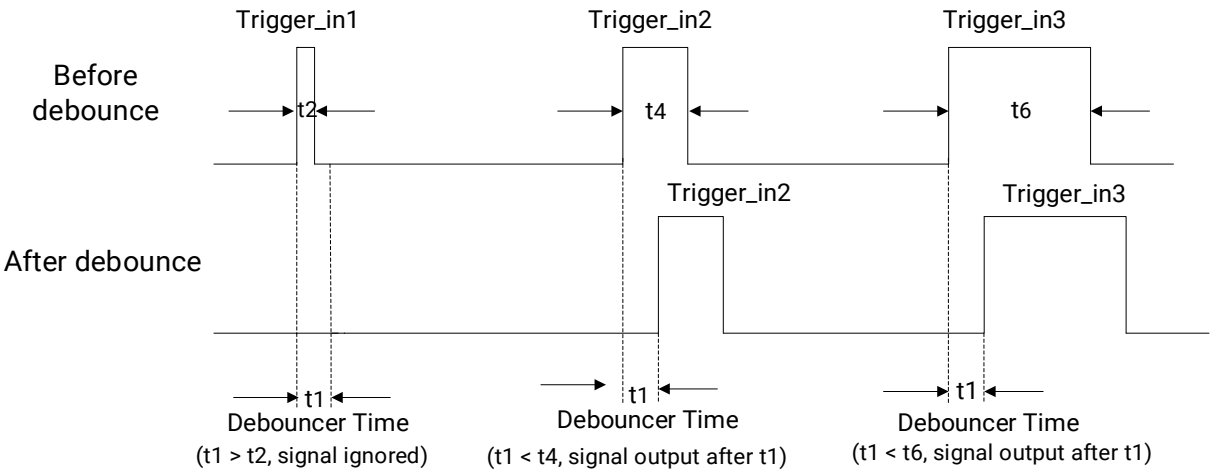


Figure 8-31 Sequence Diagram of Trigger Debounce

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 0/1** as **Trigger Source**.
4. Set **Trigger Delay**, **Count Number**, **Count Source**, and **Trigger Activation**

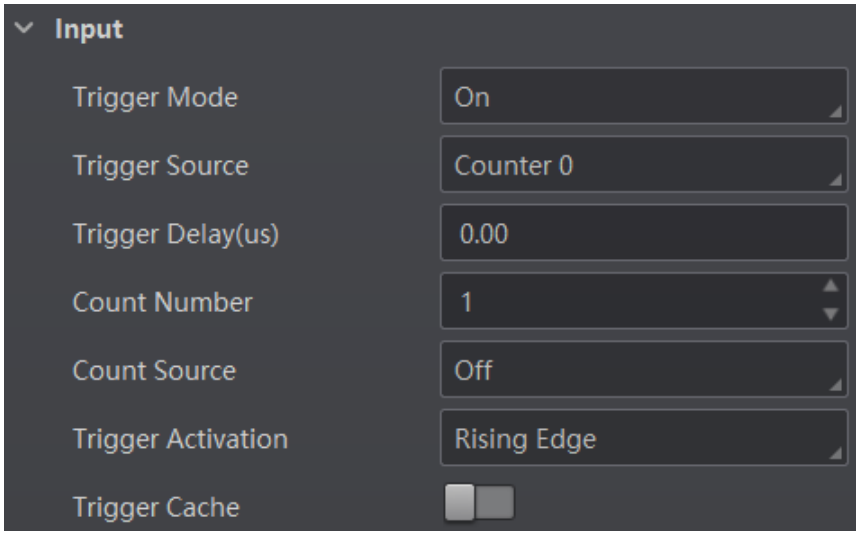


Figure 8-32 Set and Execute Counter Trigger Mode

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.

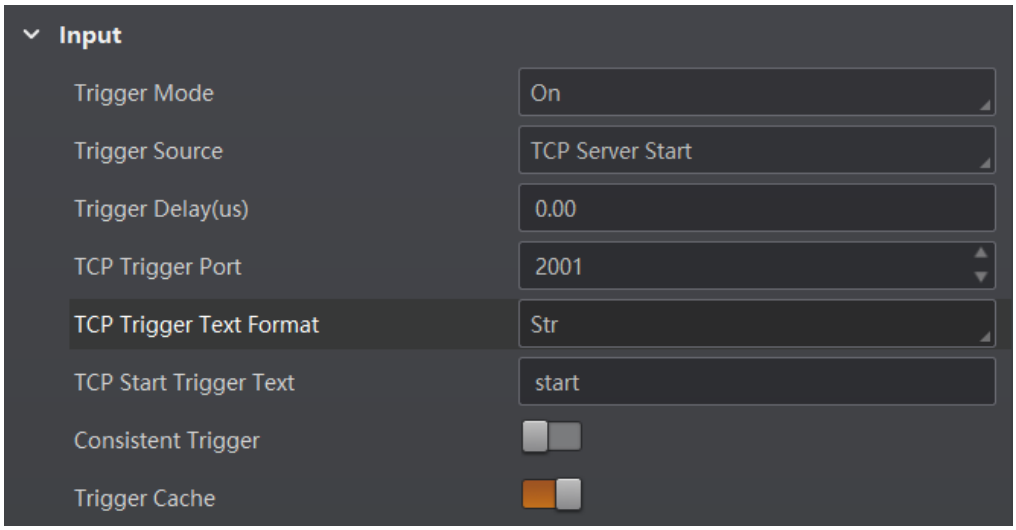


Figure 8-33 Set and Execute TCP Trigger Mode

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.

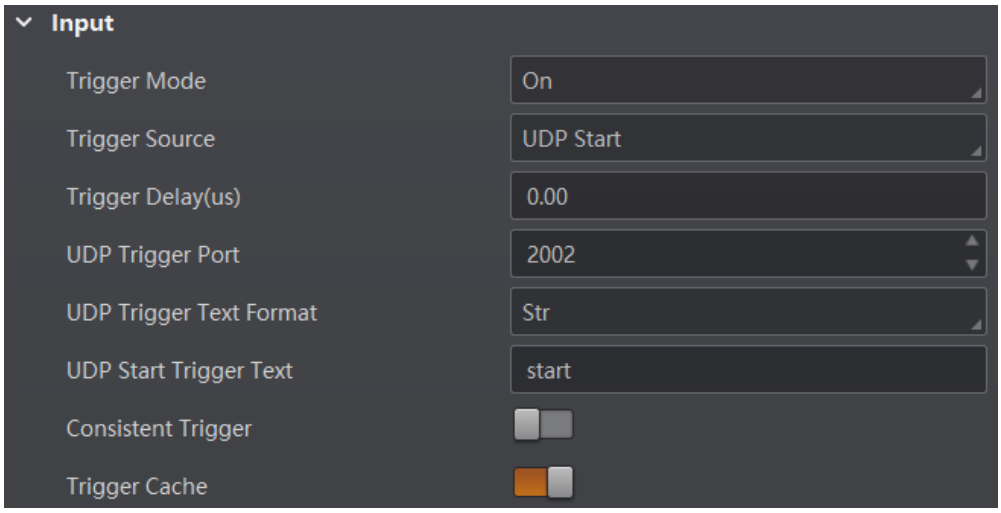


Figure 8-34 Set and Execute UDP Trigger Mode

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.

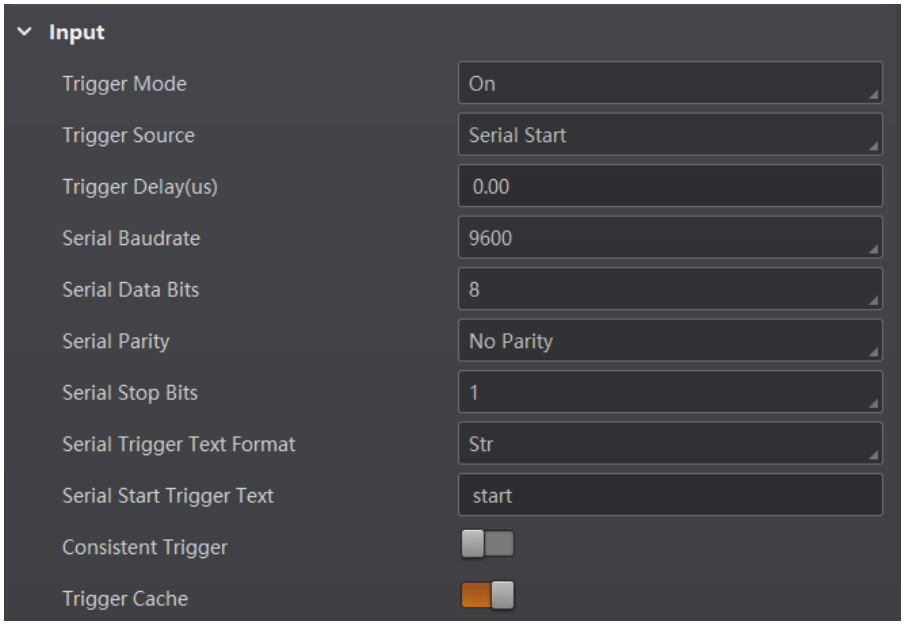


Figure 8-35 Set and Execute Serial Port Trigger Mode

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.

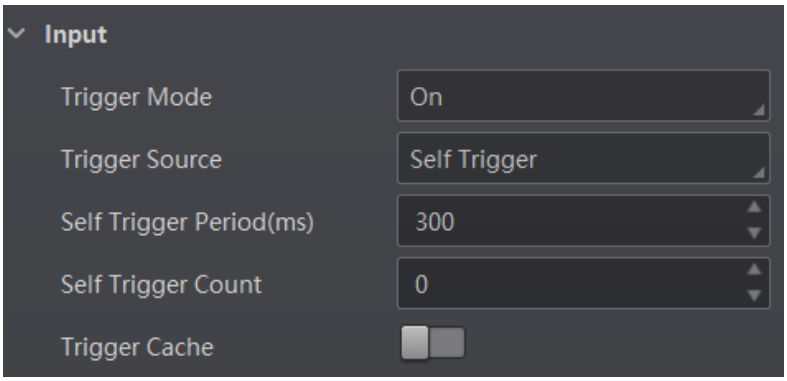


Figure 8-36 Set and Execute Self Trigger Mode

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.

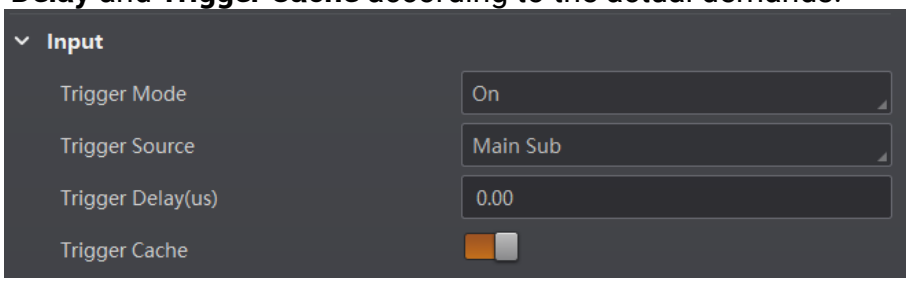


Figure 8-37 Set and Execute Main Sub Mode

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.

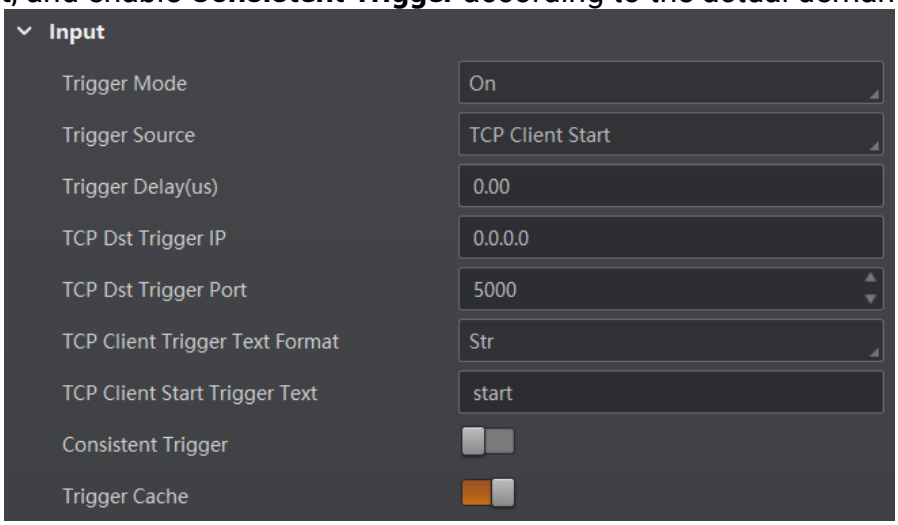


Figure 8-38 Set and Execute TCP Client Start Mode

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.

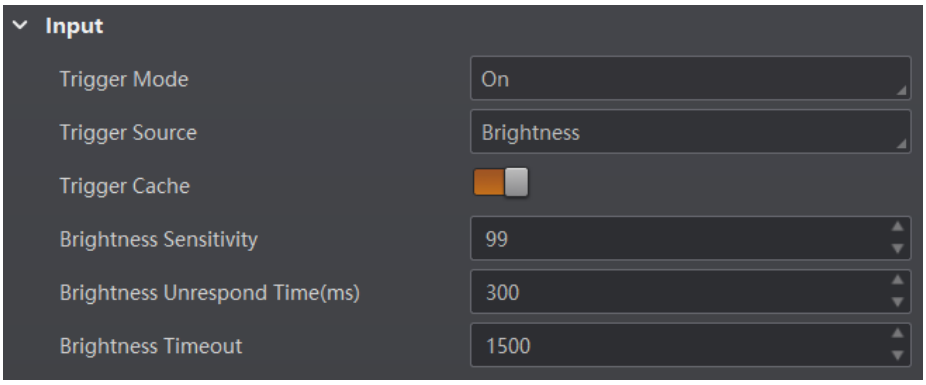


Figure 8-39 Set and Execute Brightness Mode

Set and Execute ToF Mode

The code reader is triggered to acquire images and read code based on the distance changes detected by the ToF sensor.

Note

This function is available for the device with ToF sensor.

Steps

1. Click **I/O Control Settings** → **Input** → **Trigger Mode**.
2. Select **On** as **Trigger Mode**.
3. Select **TOF** as **Trigger Source**.
4. Set **TOF Trigger Sensitivity** and **TOF Trigger Threshold**.

- **TOF Trigger Sensitivity**: It sets the minimum distance change value. When the changes of the distance between the sensor and the object reaches or exceeds the set value, the code reader is triggered to acquire images and read code.
- **TOF Trigger Threshold**: It sets the maximum effective triggering distance of the ToF sensor. When the target code is within this range and the changes of the distance reaches the set threshold, the code reader is triggered to acquire images and read code.

Figure 8-40 Set and Execute ToF Mode

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.

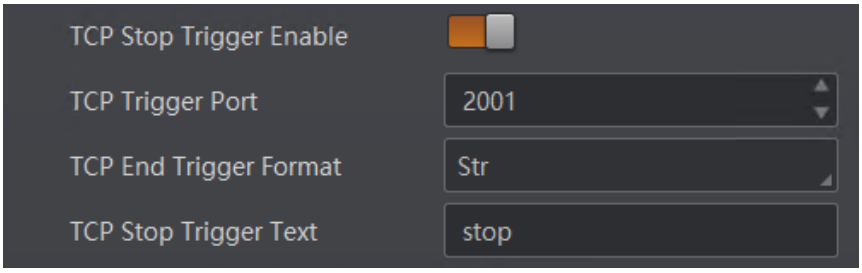


Figure 8-41 Stop Trigger via TCP Server

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.

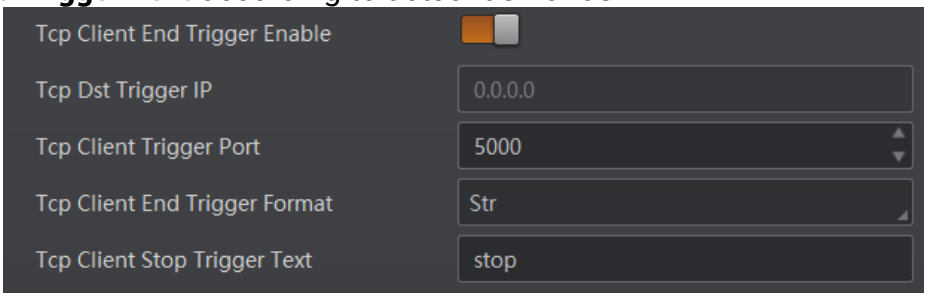


Figure 8-42 Stop Trigger via TCP Client

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.

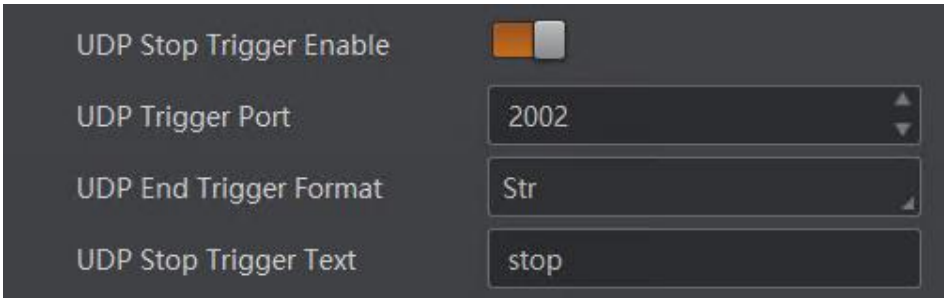


Figure 8-43 Stop Trigger via UDP

Stop Trigger via IO

Stopping trigger via IO 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** and **Software Trigger End** as **IO Stop Trigger Selector**.
4. (Optional) Set trigger polarity if **LineIn 0/1** 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**.

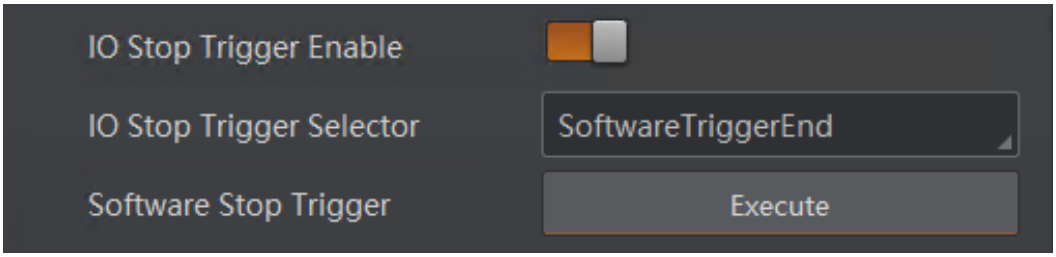


Figure 8-44 Stop Trigger via IO

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.

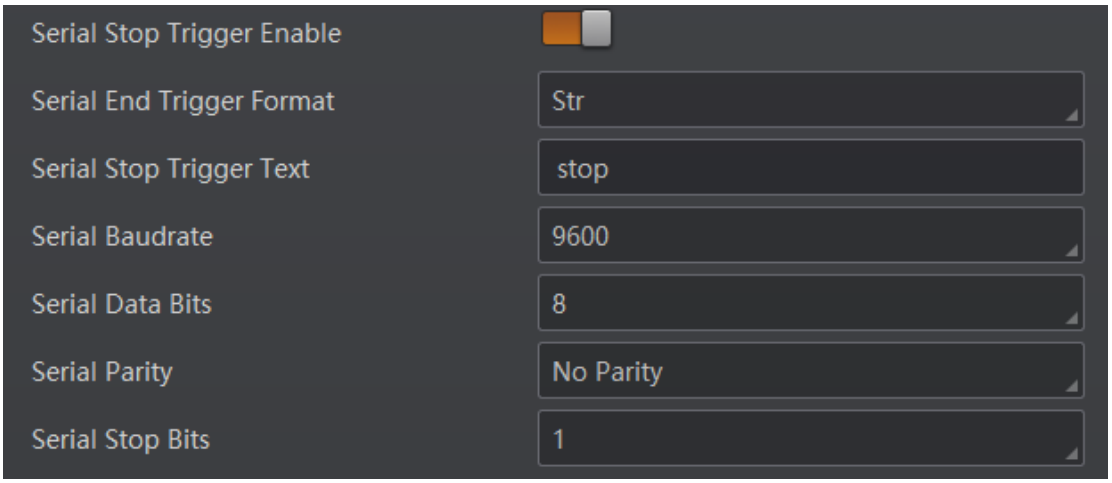


Figure 8-45 Stop Trigger via Serial Port

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.

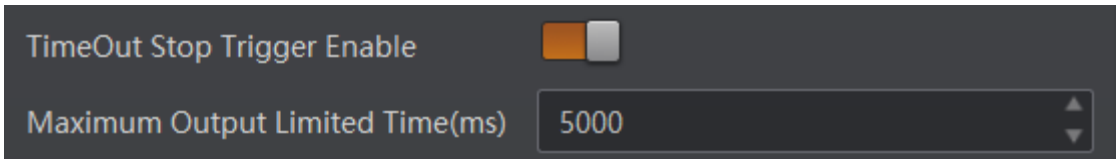


Figure 8-46 Stop Trigger via Timeout Duration

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 8-47 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.

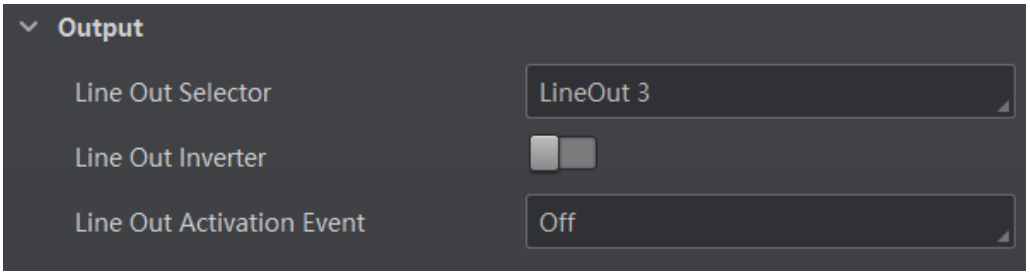


Figure 8-48 Select Output Signal

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.

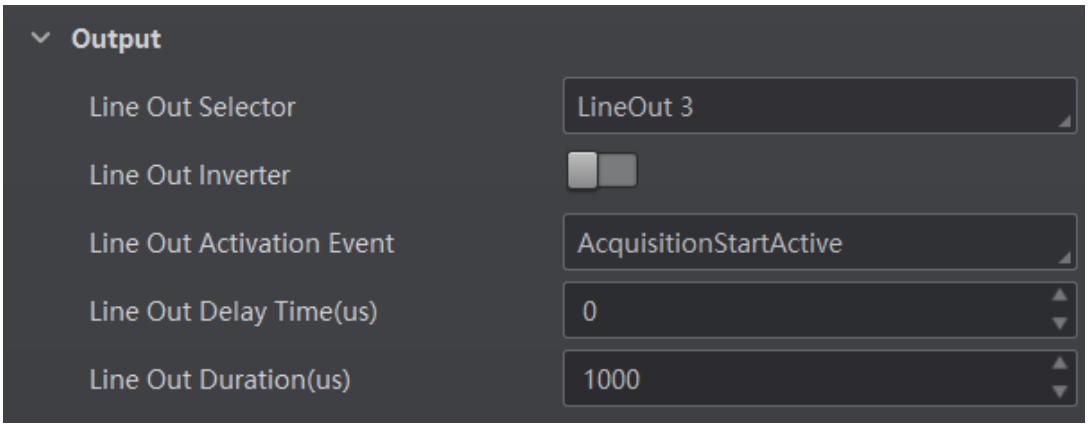


Figure 8-49 Select Acquisition Start Active

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.

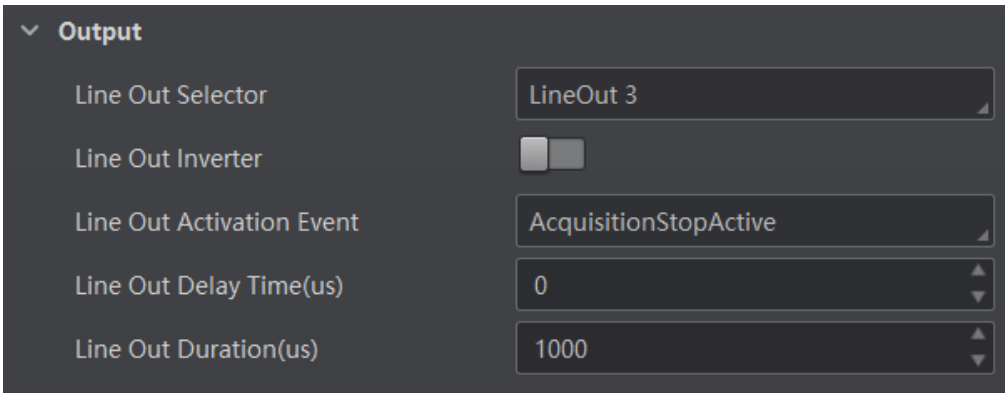


Figure 8-50 Select Acquisition Stop Active

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.

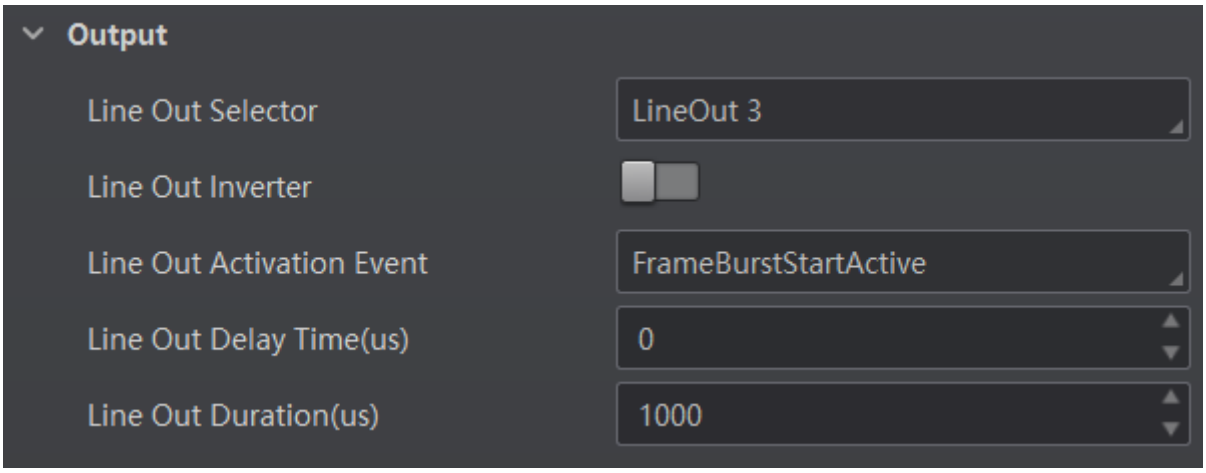


Figure 8-51 Select Frame Burst Start Active

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.

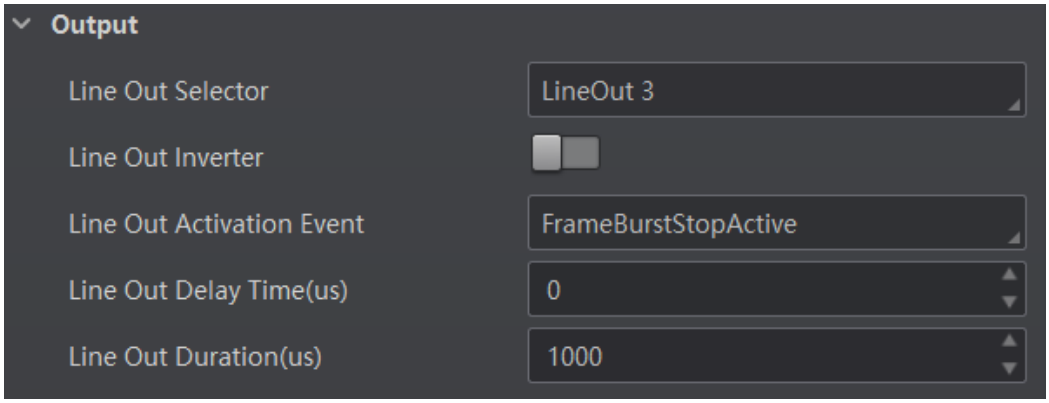


Figure 8-52 Select Frame Burst Stop Active

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.

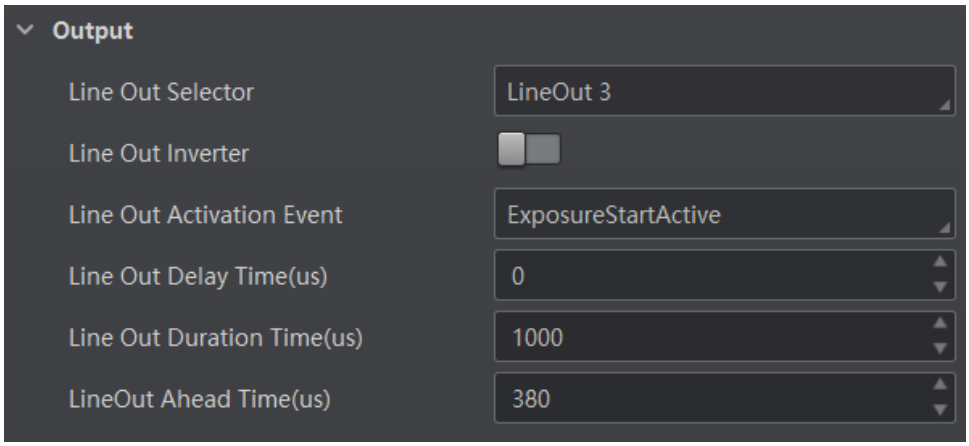


Figure 8-53 Select Exposure Start Active

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.

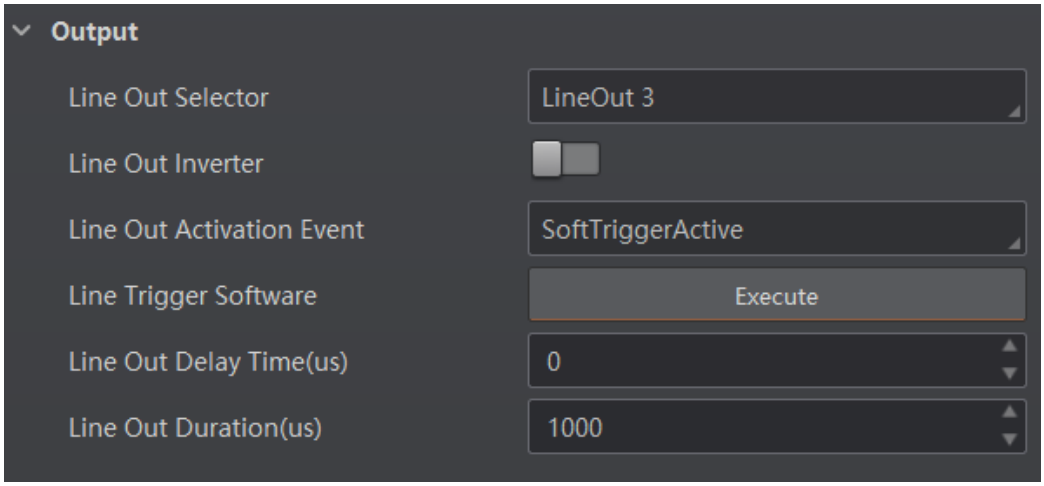


Figure 8-54 Select Soft Trigger Active

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.

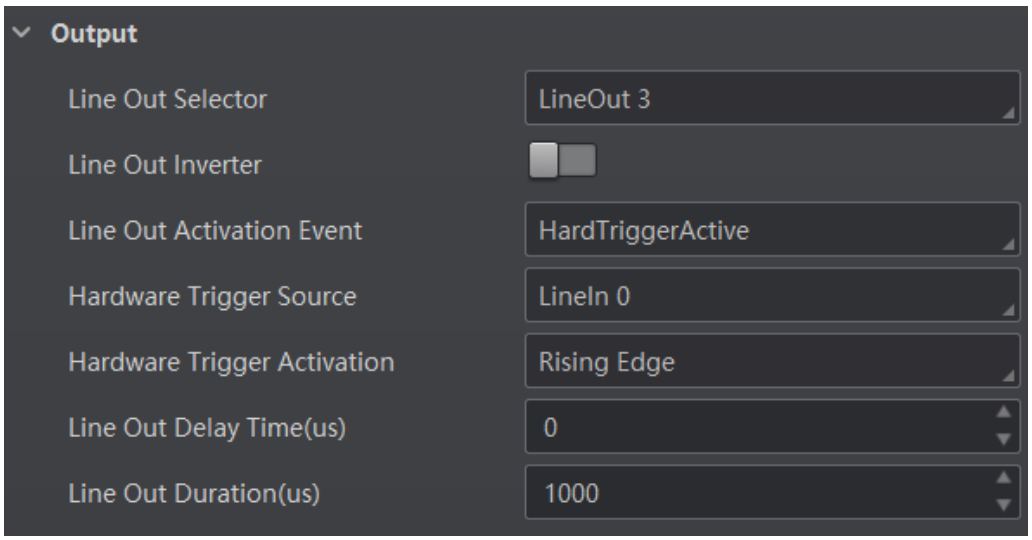


Figure 8-55 Select Hard Trigger Active

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.

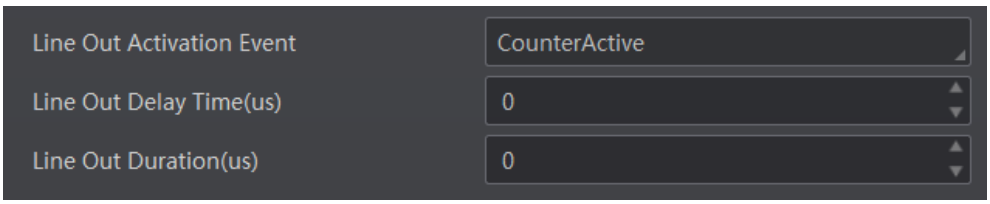


Figure 8-56 Select Counter Active

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.

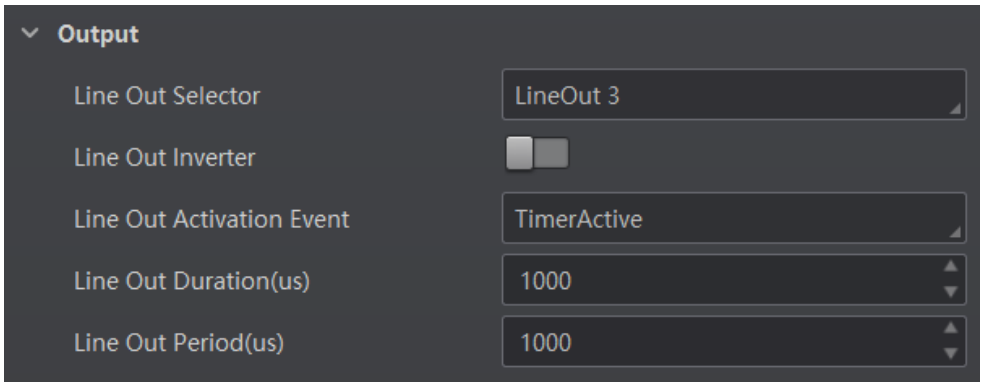


Figure 8-57 Select Timer Active

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.

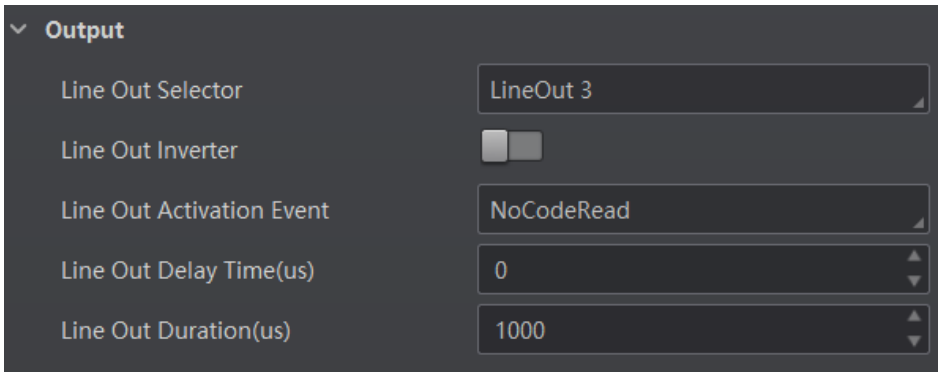


Figure 8-58 Select No Code Read

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.

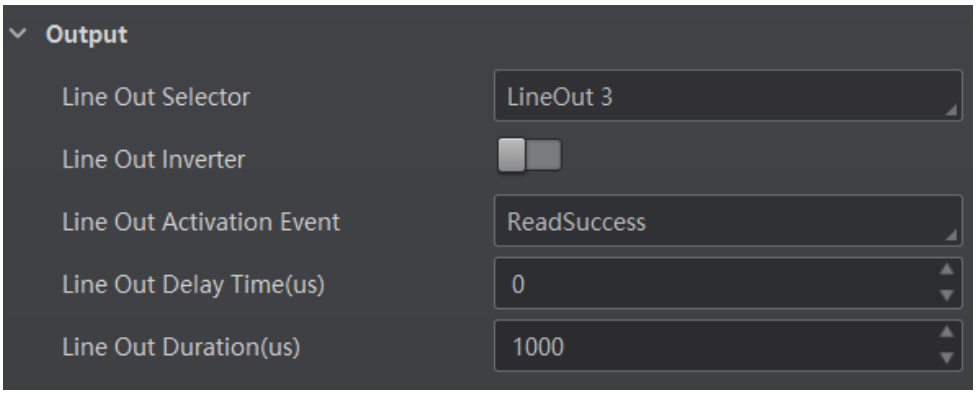


Figure 8-59 Select Read Success

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.

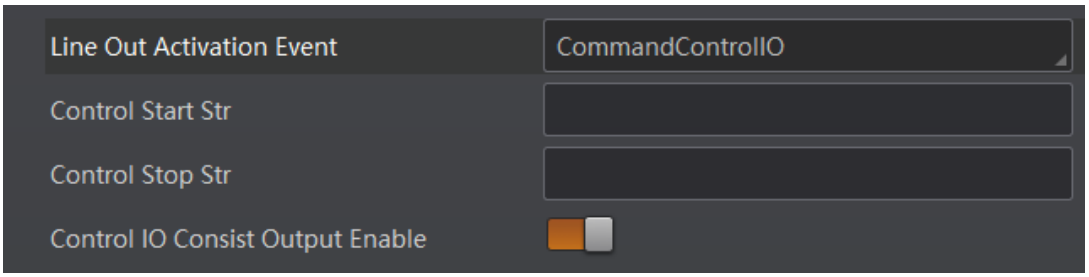


Figure 8-60 Select Command Control IO

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.

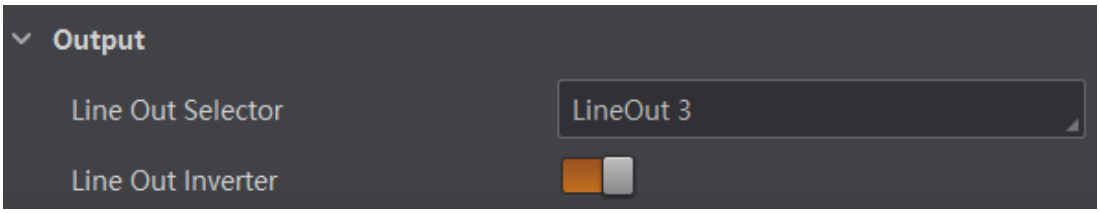


Figure 8-61 Enable Line Out Inverter

8.6.4 Set Buzzer

The device with liquid lens supports buzzer settings.

- **Buzzer Enable**: If it is enabled, you can set buzzer parameters.
- **Buzzer Duration(ms)**: It sets the output duration of the buzzer, and the unit is ms.
- **Buzzer Frequency(hz)**: It sets output frequency of the buzzer, and the unit is hz.

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
Output Result Buffer	If it is enabled, when the TCP server is abnormal, the device will cache the images. When the server returns to normal, the device will send the cached images to the server. You can configure **Output Result Buffer Number** to determine the number of the images that the device will cache.
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.

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. **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.
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.

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 Communication Protocol

Parameter	Description
MELSEC Protocol Enable	If enabled, the code reader will output data via MELSEC protocol.
MELSEC Destination IP Address	It refers to the IP address of the Programmable Logic Controller (PLC) connected to the code reader.
MELSEC Destination Port	It refers to the port No. of the MELSEC protocol channel on the PLC.
MELSEC Data Base Address	It refers to the address of the data base of the PLC for receiving the data outputted by the code reader. The default value is 0.
MELSEC State Base Address	It refers to the address of the state base of the PLC, which is used for sending trigger signal to the code reader and receiving trigger result and code reading results from the code reader. The default value is 0.
MELSEC Network Number	It refers to the MELSEC protocol network No. to communicate with.
MELSEC PLC Number	It refers to the No. of the PLC to be connected to the code reader.
MELSEC Module I/O Number	It refers to the No. of the target module.
MELSEC Module Station Number	It refers to the No. of the target module station.
MELSEC Timeout	It refers to the maximum waiting time for PLC response.

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.

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 2 by default.
ModBus Status Space	It sets status space and it is “input_register” by default.
ModBus Status Offset	It sets status offset and it is 0 by default.
ModBus Status Size (Word)	It is 2 by default.
ModBus Result Space	It set result space and it is “holding_register” by default.
ModBus Result Offset	It is 4 by default.
ModBus Result Byte Swap	If it is enabled, the client software will swap ModBus results.

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 Communication Mode	Select UDP or TCP as the communication mode.
Fins Server IP	It sets the server IP of Fins.
Fins Server Port	It is 9600 by default.
Fins Data Format	Select 16 bit or 32 bit as the data format.
Fins Control Poll Interval (ms)	It sets how often to 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 Status Space	It sets storage space of the status area.
Fins Status Offset	It sets the start offset address 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.

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.

- **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.
- **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.
- **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.
- **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.

Note

The parameters, such as **Instant Output Mode Enable**, **Min. Output Time**, are only available when the running mode is set to Normal mode and the trigger mode is enabled.

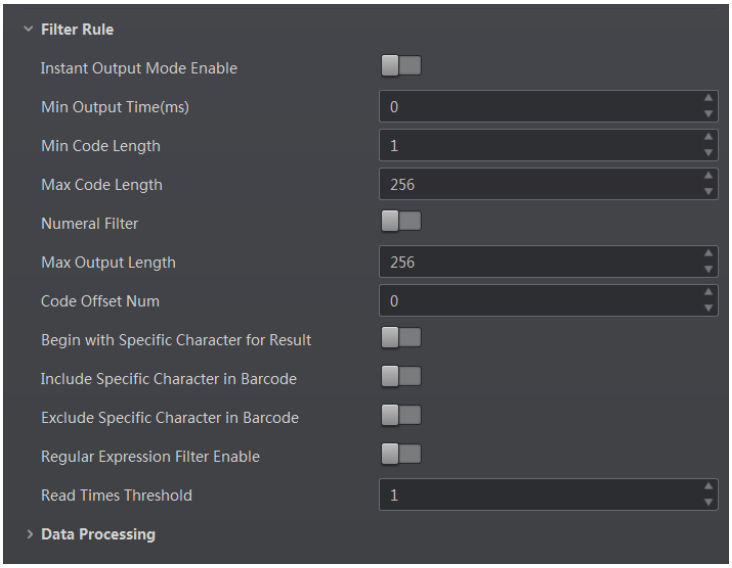


Figure 8-62 Normal Filter Mode

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.

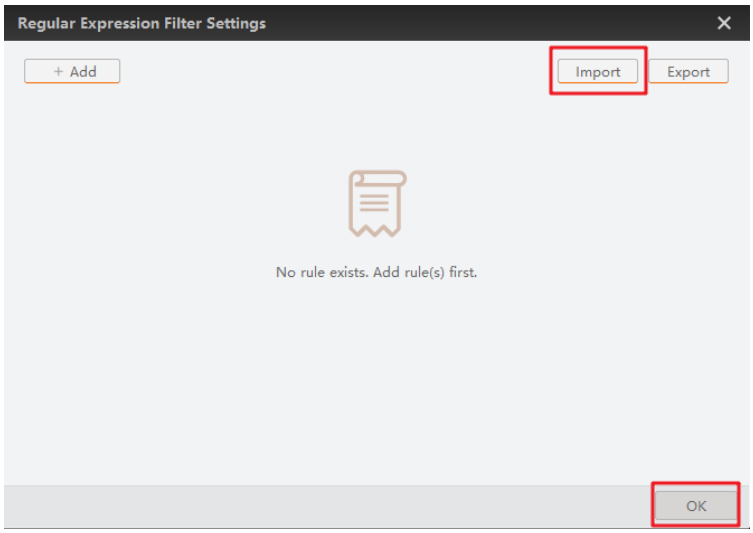


Figure 8-63 Regular Expression Filter Settings

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

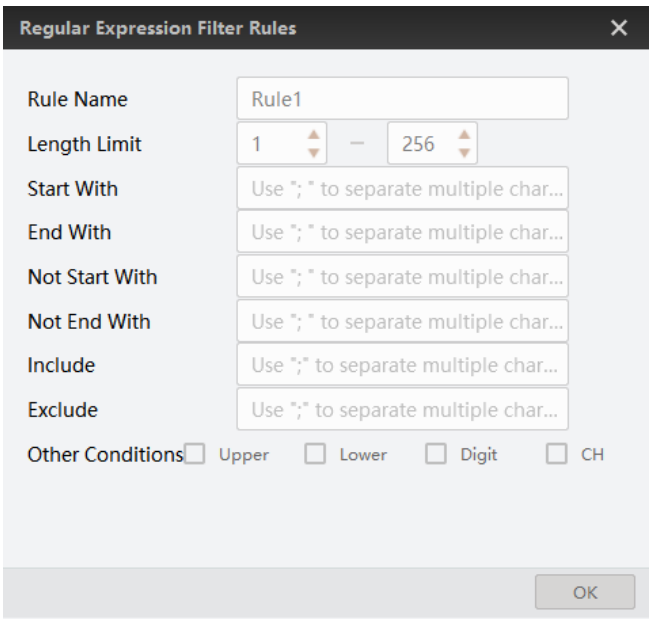


Figure 8-64 Enter Customized Regular Expression Filter Rules

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.

Parameter	Description
	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** 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.

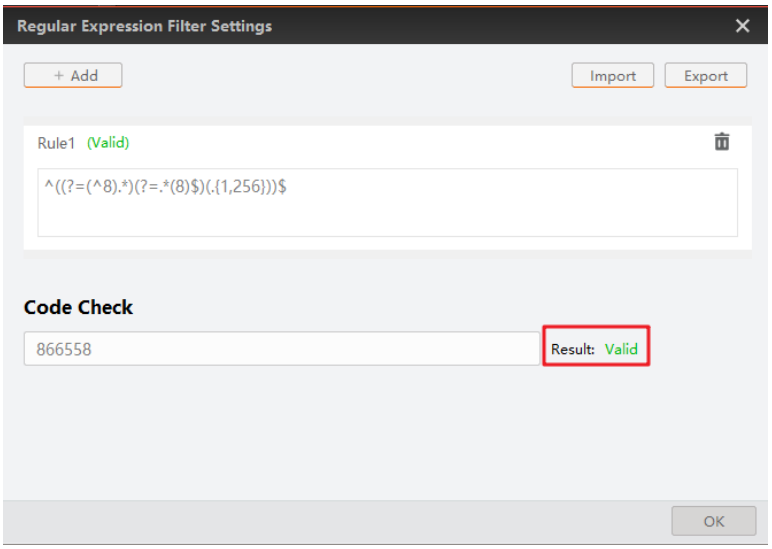


Figure 8-65 Code Check

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.

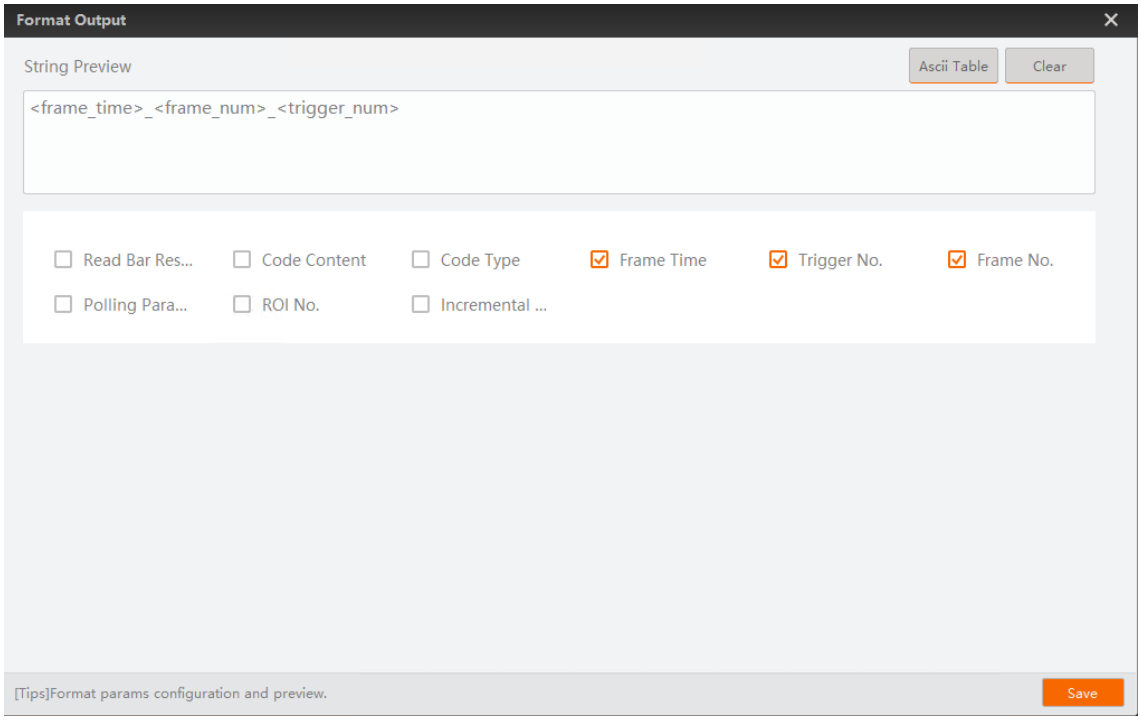


Figure 8-66 Format Output

- **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 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 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.
- **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.

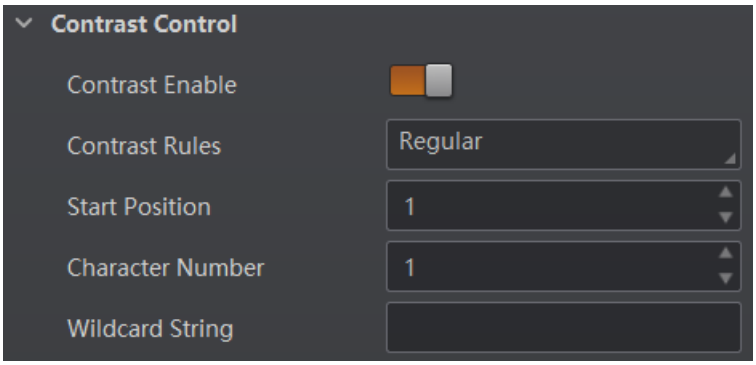


Figure 8-67 Regular Contrast

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.
3. Set **Digital Number** that means the comparison quantity.
4. 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.

5. (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).

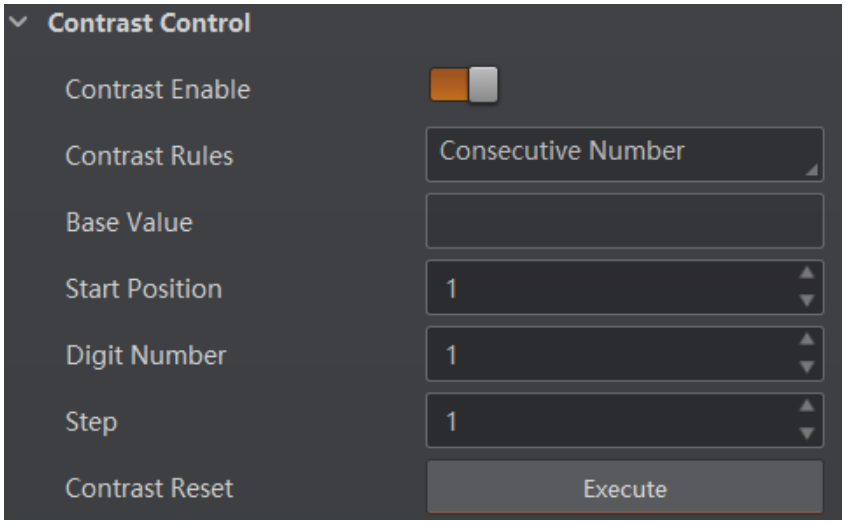


Figure 8-68 Consecutive Number Contrast

8.10 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 8-22 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.

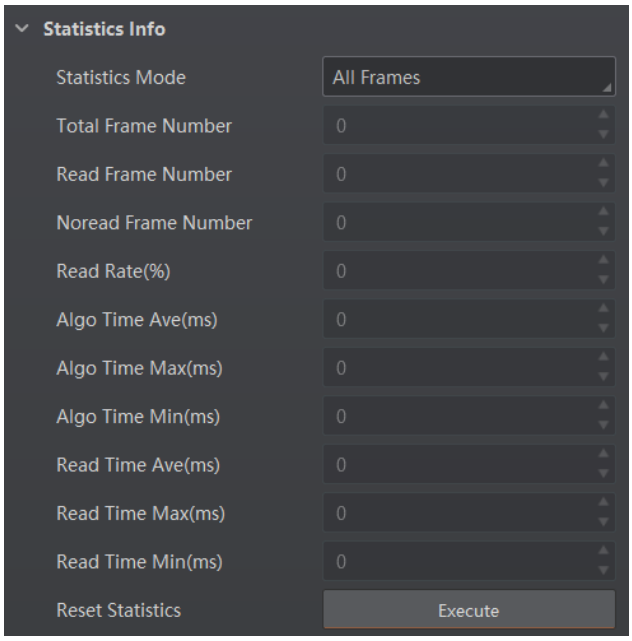


Figure 8-69 Statistics Information

8.11 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 8-70 Event Report

Chapter 9 FAQ (Frequently Asked Question)

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

Table 9-1 Question 1

Possible Cause	Solution
The device is powered off.	Check the device's power connection (observe whether the PWR indicator is solid green) to make sure the device is powered up normally.
Network exception occurs.	Check the network connection (the LNK indicator is flashing green if the network exception occurs) to make sure the device can be connected to the network normally, and make sure that the PC and the device are in the same network segment.

9.2 Why the image is very dark?

Table 9-2 Question 2

Possible Cause	Solution
Insufficient brightness of light source.	Increase the brightness of light source appropriately, or change to a brighter one.
Too small value of exposure and gain.	Increase exposure and gain appropriately.

9.3 Why the image's frame rate is very low in the live view?

Table 9-3 Question 3

Possible Cause	Solution
Network circuitry speed is not 100 Mbps.	Check whether the network transit speed is 100 Mbps or not.

9.4 Why there is no image in the live view?

Table 9-4 Question 4

Possible Cause	Solution
Enabled trigger mode, but there is no trigger signal.	Sent the trigger signal to the device, or disable the trigger mode.
Network circuitry speed is not 100 Mbps.	Check whether the network circuitry speed is 100 Mbps or not.

Chapter 10 Revision History

Table 10-1 Revision History

Version No.	Date	Revision Details
V1.0.2	Mar. 26, 2026	● Edit Section ***I/O Wiring***.
V1.0.1	Oct. 10, 2025	● Edit Section ***Post-Connection Configuration***. ● Edit Section ***Set Image***. ● Edit Section ***Set Algorithm Parameter***. ● Edit Section ***Set Code Quality Evaluation***. ● Edit Section ***Enable Internal Trigger Mode***. ● Add Section ***Set and Execute ToF Mode***. ● Add Section ***Set Buzzer***.
V1.0.0	Aug. 12, 2025	Original version.

Appendix A ASCII Table

Note

The device with USB interface only supports the red color character only regarding setting prefix and suffix characters.

Table A-1 ASCII Table

Character	Value	Character	Value	Character	Value	Character	Value
NUL	0	(SPACE)	20	@	40	`	60
SOH	1	!	21	A	41	a	61
STX	2	"	22	B	42	b	62
ETX	3	#	23	C	43	c	63
EOT	4	$	24	D	44	d	64
ENQ	5	%	25	E	45	e	65
ACK	6	&	26	F	46	f	66
BEL	7	'	27	G	47	g	67
BS	8	(	28	H	48	h	68
HT	9	)	29	I	49	i	69
LF/NL	0a	*	2a	J	4a	j	6a
VT	0b	+	2b	K	4b	k	6b
FF/NP	0c	,	2c	L	4c	l	6c
CR	0d	-	2d	M	4d	m	6d
SO	0e	.	2e	N	4e	n	6e
SI	0f	/	2f	O	4f	o	6f
DLE	10	0	30	P	50	p	70
DC1/XON	11	1	31	Q	51	q	71
DC2	12	2	32	R	52	r	72
DC3/XOFF	13	3	33	S	53	s	73
DC4	14	4	34	T	54	t	74
NAK	15	5	35	U	55	u	75
SYN	16	6	36	V	56	v	76

Character	Value	Character	Value	Character	Value	Character	Value
ETB	17	7	37	W	57	w	77
CAN	18	8	38	X	58	x	78
EM	19	9	39	Y	59	y	79
SUB	1A	:	3A	Z	5A	z	7A
ESC	1B	;	3B	[	5B	{	7B
FS	1C	<	3C	\	5C	|	7C
GS	1D	=	3D	]	5D	}	7D
RS	1E	>	3E	^	5E	~	7E
US	1F	?	3F	_	5F	DEL	7F

HIKROBOT

SHAPE OUR FUTURE INTELLIGENTLY

Hikrobot Co., Ltd.

Tel: 400-989-7998

Website: https://en.hikrobotics.com/

UD46053B