

Hikrobot Co., Ltd.

ID5000 Series Industrial Code Reader

User Manual

HIKROBOT

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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 ID5000 Series Industrial Code Reader.

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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 which 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.

Chapter 2 Overview

2.1 Introduction

With functions of image acquisition, code recognition and output, the ID5000 series industrial code reader can read different types of code. It is applicable to consumer electronics, food and beverage, pharmaceutical, semiconductor, automobile, 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 CMOS global shutter sensor to provide high quality images.
- Adopts built-in deep learning algorithm to read codes with good robustness.
- Provides different lens mounts with optional mechanical autofocus lens to achieve automatic focusing.
- Supports code quality evaluation to detect the printing quality of codes.
- Supports multiple communication protocols, including TCP Client, Serial, FTP, TCP Server, Profinet, Ethernet/IP, MELSEC, and Fins.
- Adopts multi-functional indicators displaying device status.
- Adopts controllable light source design providing diversified light.
- Ingress Protection Rating 67.

Note

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

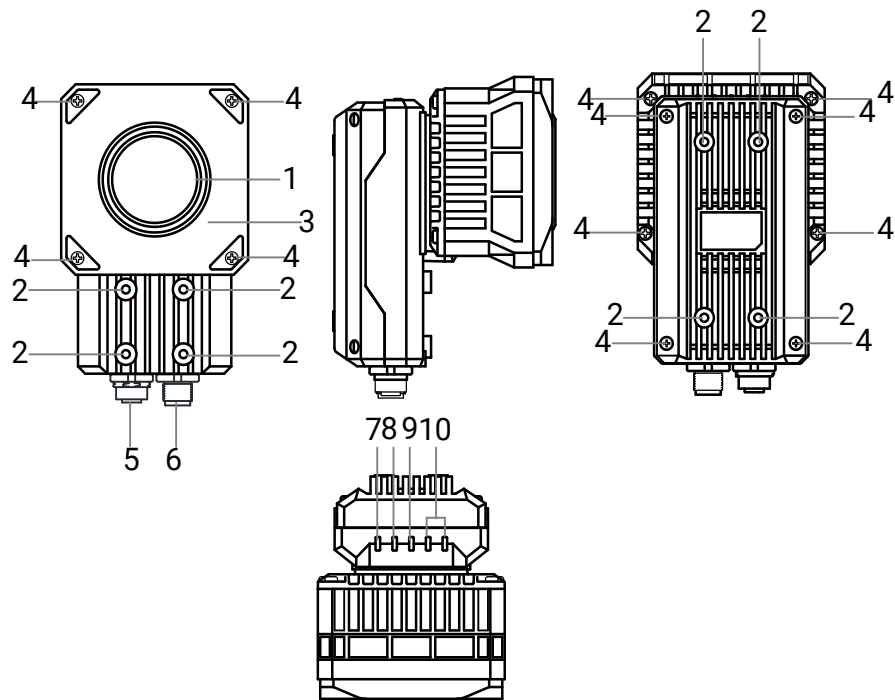


Figure 3-3 Appearance of Device with Light Source but Without Lens

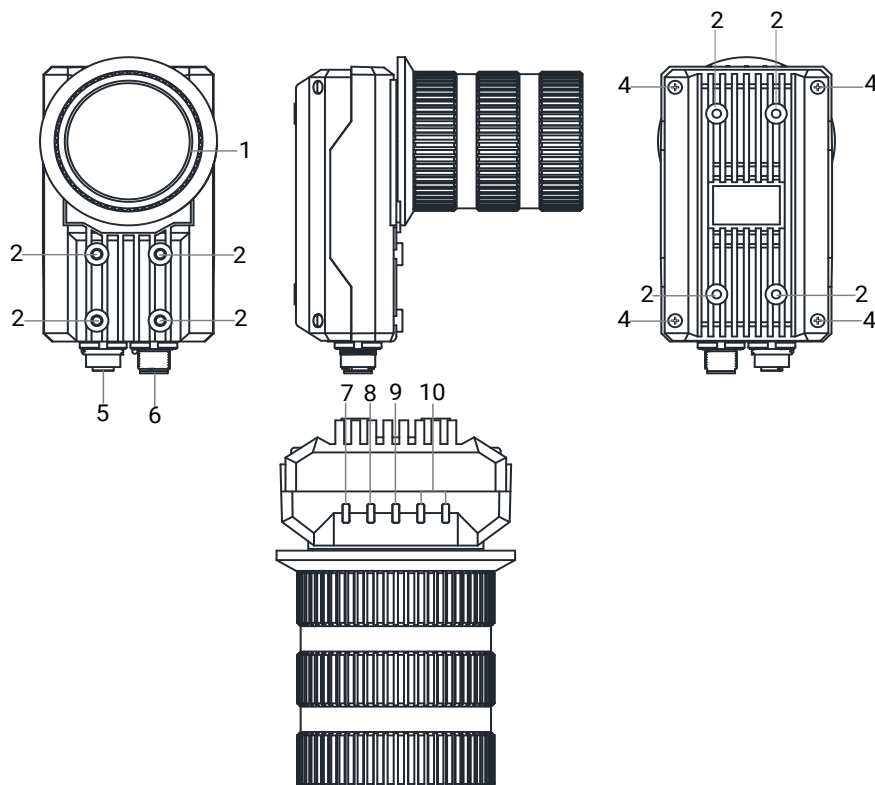


Figure 3-4 Appearance of Device Without Light Source and Lens

Table 3-1 Component Description

No.	Name	Description
1	Lens Cap	It can be replaced with polarized lens cap or transparent lens cap. Refer to the device's specification for details.
2	Screw Hole	There are 4 screw holes on the device, and are used to fix the device to installation position. It is recommended to use the supplied M4 screw.  Note If other screws are used, it is recommended to use the metric M4 screws, and the length of the screws should be less than the size of the sum of the thickness of the mounting plate and the depth of the screw holes.
3	Light Source	It refers to LED lights providing light for improving code reading effect. • For the device with four-channel light source, it has 8 LED lights. • For the device with six-channel light source, it has 14 LED lights, and its standard light source is a half- polarized one, with the upper half providing normal lighting and the lower half delivering polarized lighting.  Note • The default color of LED lights is white. Red, blue, and IR lights are optional. • Some devices without light source use an external light source for lighting.
4	Screw	It is used to fix the device body and lens cap.
5	Gigabit Ethernet Interface	It refers to gigabit Ethernet interface for data transmission. The interface is designed with screw threads for tightening connection between the device and cable, avoiding influence caused by vibration.
6	Power and I/O Connector	It refers to 12-pin M12 connector for providing power, I/O, and serial port signal. Refer to section 12-Pin M12 Connector for details. The connector is designed with screw threads for tightening connection between the device and cable, avoiding influence caused by vibration.
7	PWR Indicator	It is a power indicator. Refer to section Indicator for details.
8	LNK Indicator	It is a network status indicator. Refer to section Indicator for details.
9	ACT Indicator	It is network transmission indicator. The indicator flashing speed is related to data transmission speed. Refer to section Indicator for

No.	Name	Description
		details.
10	U1/U2 Indicator	The device has 2 user-defined indicators, U1 and U2. They are used to indicate whether some functions of the device are normal or not. Refer to section Indicator for details.

Chapter 4 Connector and Indicator

4.1 12-Pin M12 Connector

The device has a 12-pin M12 connector to provide power, I/O, and serial port signal. Read the following content to get pin definitions of this connector.

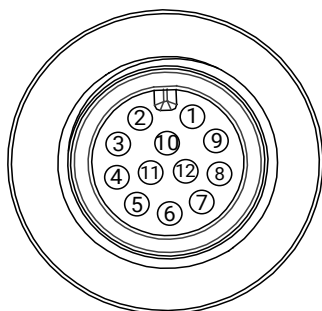


Figure 4-1 12-Pin M12 Connector

Table 4-1 Pin Definition

No.	Signal	I/O Signal Source	Description	Cable Color	
1	DC-PWR	--	Direct current power supply positive	White	
2	GND	--	Power supply ground	Brown	
3	OPTO_OUT3	LineOut3 signal line	I/O-isolated output 3	Green	
4	OPTO_OUT4	LineOut4 signal line	I/O-isolated output 4	Yellow	
5	OPTO_OUT5	LineOut5 signal line	I/O-isolated output 5	Gray	
6	OUT_COM	LineOut3/4/5 signal ground	Common-ended output	Pink	
7	OPTO_IN0	LineIn0 signal line	I/O-isolated input 0	Blue	
8	OPTO_IN1	LineIn1 signal line	I/O-isolated input 1	Red	
9	OPTO_IN2	LineIn2 signal line	I/O-isolated input 2	Black	
10	IN_COM	LineIn0/1/2 signal ground	Common-ended input	Purple	
11	RS-232_R	--	RS-232 serial port input	Gray/Pink	
12	RS-232_T	--	RS-232 serial port output	Red/Blue	

 Note

- You should refer to the tables above and the label attached to the supplied power and I/O cable to wire the device.
 - For some devices before the upgrade, pin 0/1/2 is used for output signal source.
-

4.2 Indicator

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

Table 4-2 Indicator Description

Device Status	PWR Indicator	LNK Indicator	ACT Indicator	U1/U2
Device is powered on.	Solid blue	Solid green	Slow/fast flashing yellow	U1 is unlit, and U2 is slow flashing blue.
Power supply exception.	Unlit			
Network exception.	Solid blue	Unlit		U1 is unlit, and U2 is slow flashing blue.
Device software exception.	Solid blue	Solid green	Flashing yellow	U1 and U2 are unlit.
Device exception.	Solid blue	Solid green	Solid yellow	U1 and U2 are solid blue.

 Note

When the indicator is flashing rapidly, flashing slowly, or flashing very slowly, its unlit interval is 0.2 sec to 0.3 sec, 1 sec, and 2 sec respectively.

Chapter 5 Installation

5.1 Installation Preparation

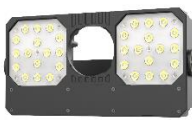
You need to prepare following accessories before installation.



Note

The images below are for reference only.

Table 5-1 Accessories

No.	Name	Image	Quantity	Description
1	Power and I/O Cable		1	It refers to the supplied 12-pin M12 to open I/O cable which is 3 meters.
2	Network Cable		1	It refers to the supplied GigE network cable with aviation connector to RJ45 which is 3 meters.
3	Power Adapter or Switch Power Supply		1	You should select a suitable power adapter or switch power supply according to the device power supply and consumption. You need to purchase separately.
4	Lens		1	It refers to the C-mount lens, and is required for the device without lens. You need to purchase separately.
5	Light Source		1	It is used to provide light during image acquisition. You need to purchase separately.
6	L-Type Installation Bracket		1	It is used to fix the device, and is included in the package.

No.	Name	Image	Quantity	Description
7	Screws		1	

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. Use the M4 screws to fix the installation bracket to the device, as shown below.

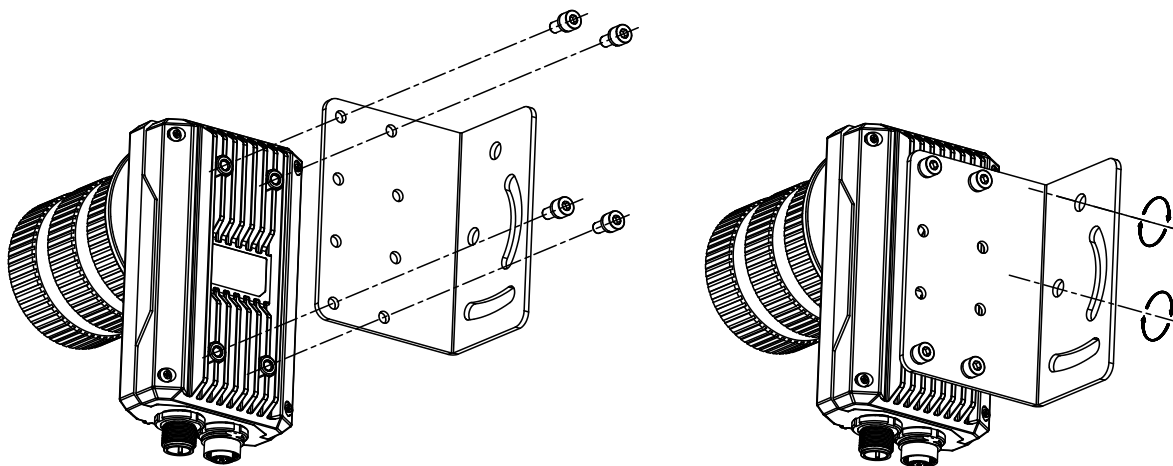


Figure 5-1 Fix Installation Bracket (Method 1)

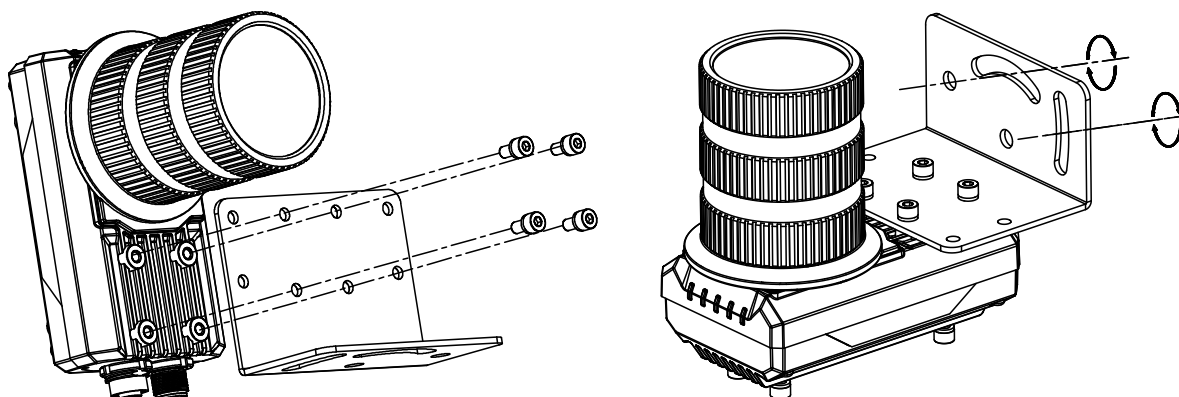


Figure 5-2 Fix Installation Bracket (Method 2)

2. Install the device to the installation location.

3. Use the GigE network cable with RJ45 aviation connector to connect the device to a switch or a network interface card.

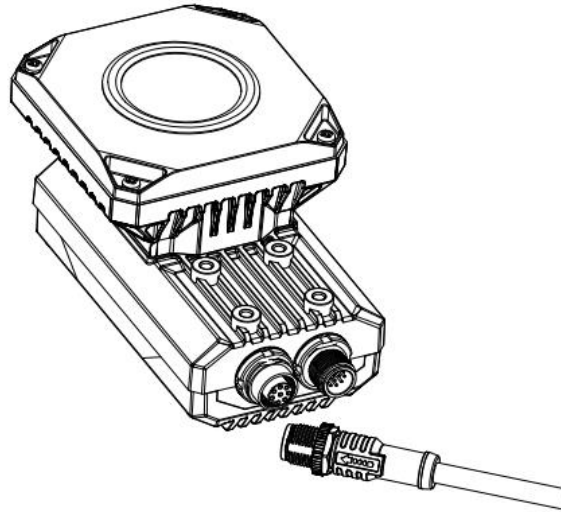


Figure 5-3 Gigabit Ethernet Interface Wiring

4. Use the power and I/O cable to connect the device to a DC switch power supply. Refer to section [12-Pin M12 Connector](#) for details.

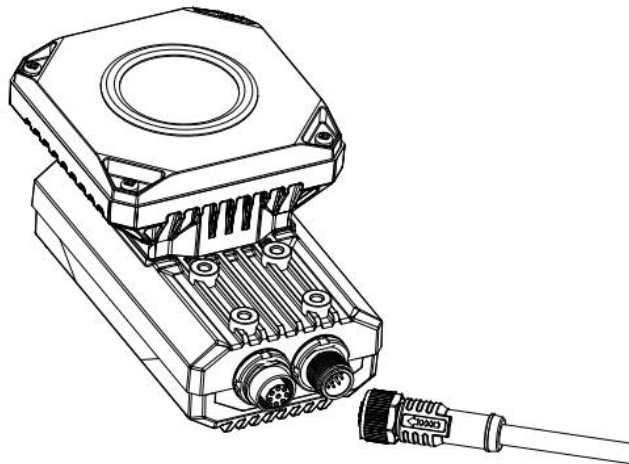


Figure 5-4 Power and I/O Connector Wiring

Chapter 6 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.

6.1 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 and 64-bit Windows 11 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.
 - For the devices with USB interface, only the client software with version of V2.3.0 and above in Windows system is supported.
 - The client software with version of V2.3.0 and above in Windows system has integrated the USB driver. If the driver is not recognized, you can install it.
 - 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**.

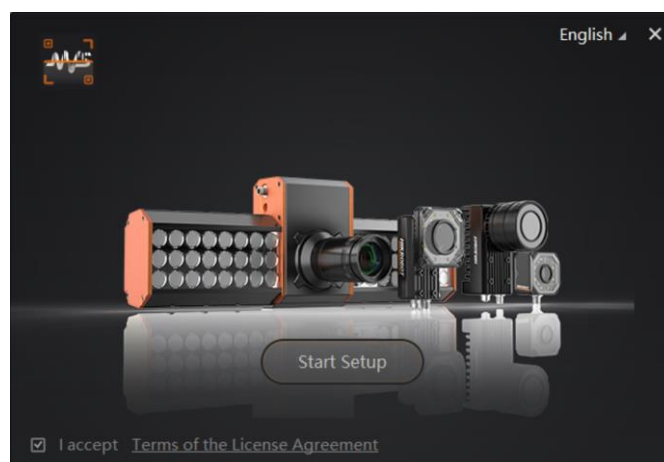


Figure 6-1 Installation Interface

6. Finish the installation according to the interface prompts.

6.2 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.

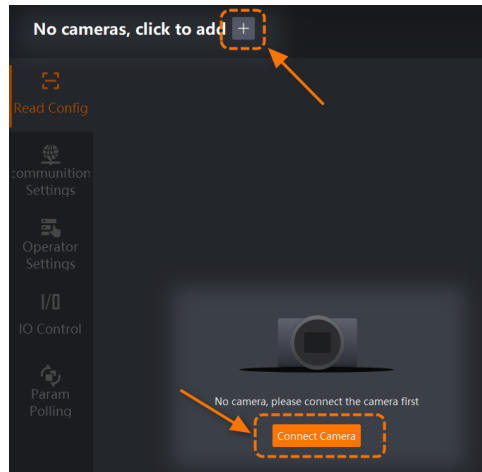


Figure 6-2 Open Device List

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



Figure 6-3 Operation Flow

6.2.1 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 [I/O Electrical Feature and Wiring](#) 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**.

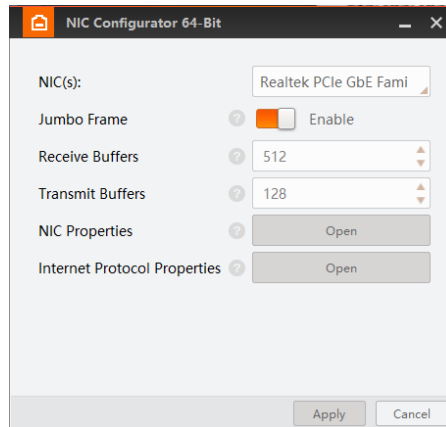


Figure 6-4 NIC Configurator

- 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.

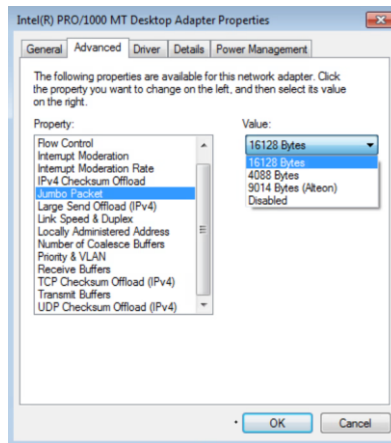


Figure 6-5 Enable Jumbo Packer

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 [Device Discovery](#). 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.

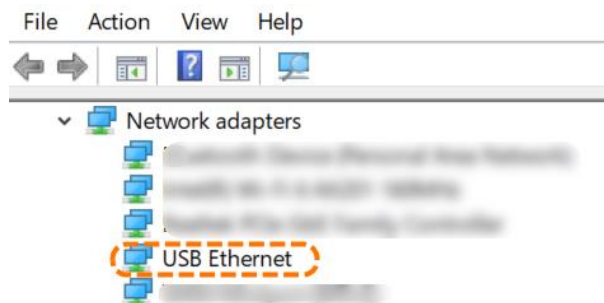


Figure 6-6 Driver Installed Successfully

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.

6.2.2 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.

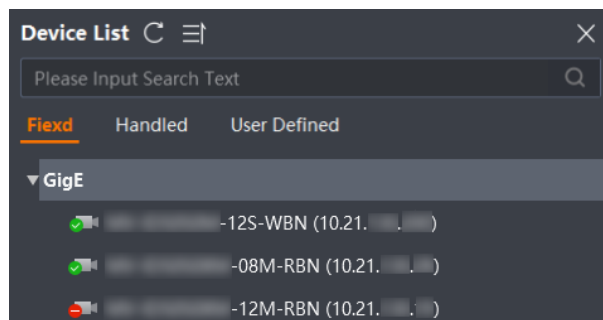


Figure 6-7 Auto Enumeration of Devices

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**.

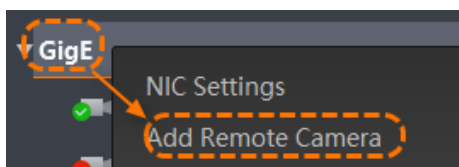


Figure 6-8 Add Remote Camera

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 6-1 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 6-9 Viewing Device Information

 Note

You can right-click to copy specific data entries.

6.2.3 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).

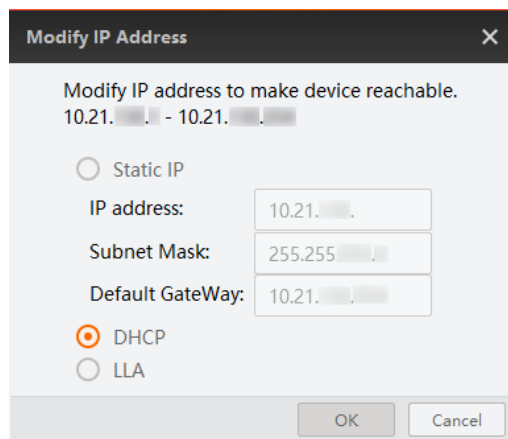


Figure 6-10 Modify IP Address

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 6-2 Comparison of UDP and TCP Firmware Upgrades

Items	UDP Firmware Upgrade	TCP Firmware Upgrade
Precondition	Device should be available.	Device should be connected, and is not in grabbing status.
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. Click Tools → Firmware Updater in the Menu Bar.	Enhanced upgrade speed, and also supports batch upgrading. Click Tools → Firmware Updater in the Menu Bar.

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.

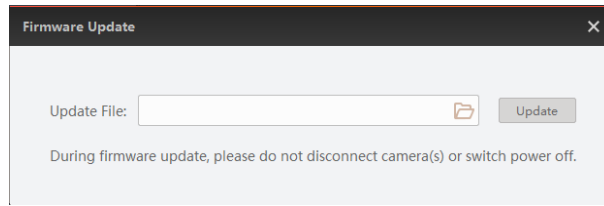


Figure 6-11 UDP Firmware Upgrade

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.

6.2.4 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 6-12 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.

6.2.5 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 achieved 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.

Device Control

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



Figure 6-13 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.

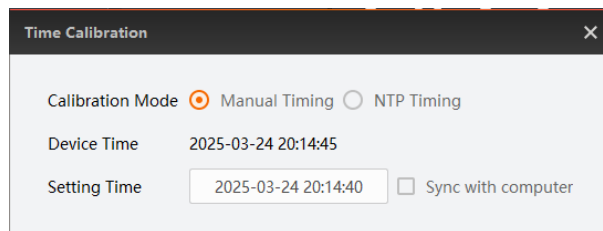


Figure 6-14 Manual Timing

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.

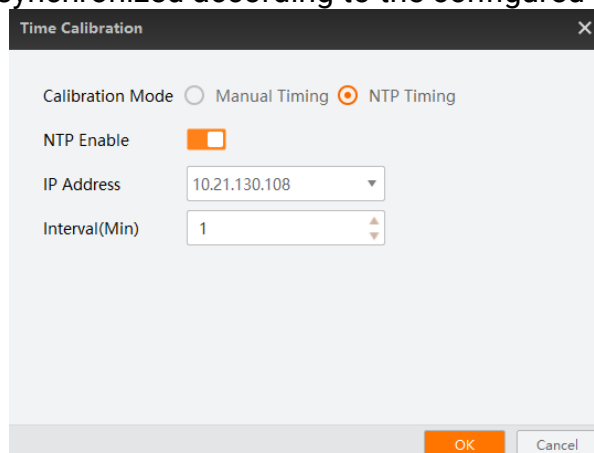


Figure 6-15 NTP Timing

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**.

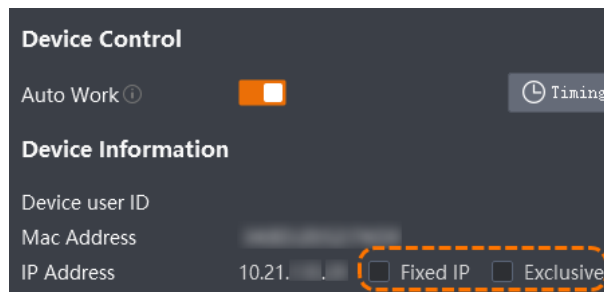


Figure 6-16 Fixed IP and Exclusive

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.

6.2.6 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**.

6.3 Quick Start Guide

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

6.3.1 Configure via Client Software

Before You Start

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

 Note

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

The flow of quick start guide is shown as below.

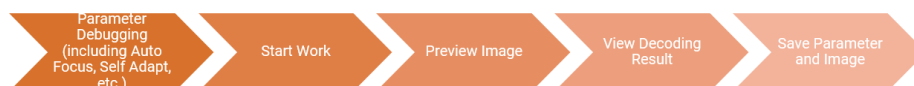


Figure 6-17 Flow of Quick Start Guide

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**.
-

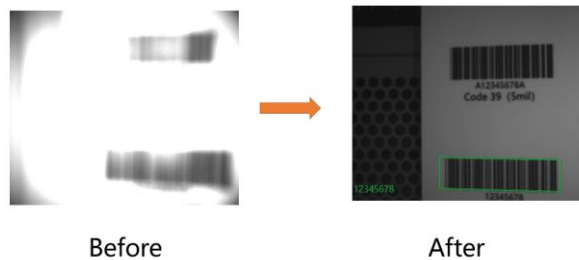


Figure 6-18 Auto Focus Effect

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, the client software will execute self-adapt on 1D codes, 2D codes, and stacked codes based on the actual number of detected codes.
-

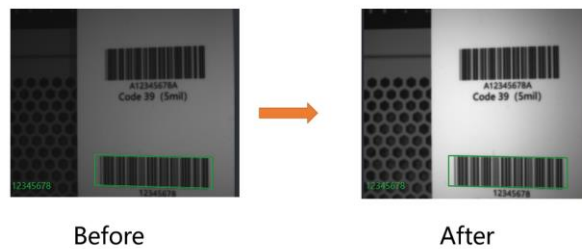


Figure 6-19 Self Adapt Effect

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

Note

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

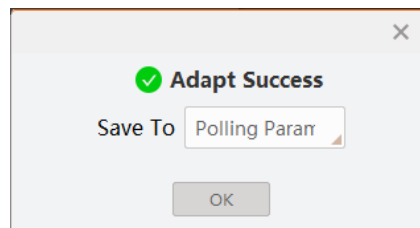


Figure 6-20 Save to Polling Param

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

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.
- In normal mode, the device filters duplicate codes regardless of whether triggering is enabled.
- In test mode, duplicate codes are not filtered when triggering is disabled, or duplicate codes within a single trigger signal are filtered when triggering is enabled.

5. You can view the real-time image and execute ROI drawing in the image preview panel on the right side. The image preview panel is divided into the following parts.



Figure 6-21 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.

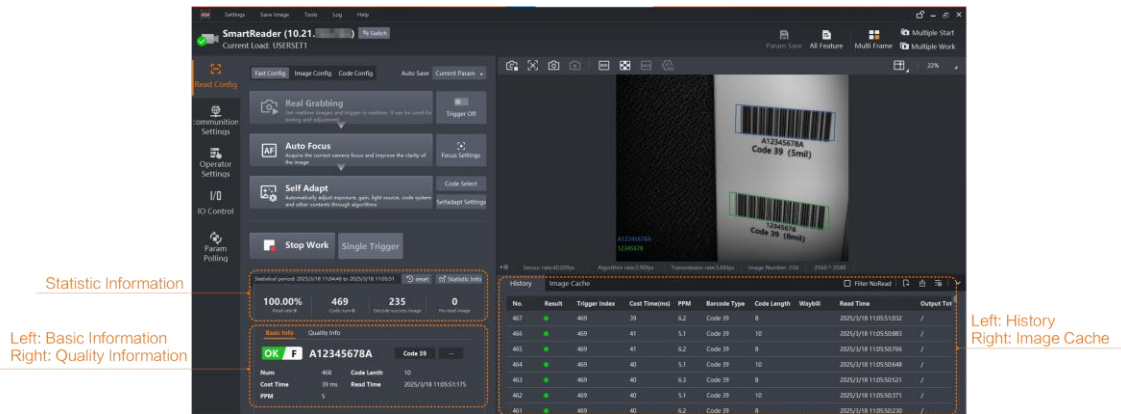


Figure 6-22 View Decoding Information

- After settings, you should click  to save parameters to user parameter sets. Otherwise, the settings will be lost after device restart.
- 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.

6.3.2 Configure via IDMVS WEB

IDMVS WEB is a remote management platform for code readers, supporting information search, device tuning, data statistics, and image viewing through a browser. It is suitable for scenarios requiring remote management of code readers, such as industrial automation, logistics sorting, and quality inspection.

Note

Currently, the code verifier does not support IDMVS WEB.

WEB Settings

Before using IDMVS WEB for the first time, you must enable the Web service and configure the related permissions.

Before You Start

- IDMVS client software (version V5.0.3 or above) is started, and the code reader is connected to the client software.
 - The firmware version of the code reader has been upgraded to V4.0.6 or above.
-

Note

Firmware version V4.0.8 does not support IDMVS WEB.

Steps

1. Enable the Web service.
 - 1) On the IDMVS main interface, click **Web Setting**.
 - 2) In the **Web Setting** window, turn on the **Web Enabled** button, enter a password in the pop-up **Set Password** window, and click **OK**.
-

Note

If you forget your password, click **Forget Password** and follow the prompts in the **Reset Camera Password** window to complete the reset.

2. (Optional) Change the device password.

Click **Setting** on the right of **Change Password**, set a new password in the pop-up **Change Camera Password** window, and click **OK**.

Note

The password length must be 8 to 15 characters, including at least 3 of the following: uppercase letters, lowercase letters, digits, and special characters. Special characters can only include `_!@#%^&*~()+=.`

3. Configure Web permissions.

Click **Setting** on the right of **Permission**, enter the device password, and click **OK**. In the **Web Permission Setting** window, you can enable the related permissions, and click **OK**.

Note

Web permissions include **Preview**, **Debug**, and **Statistics**, which control the **Image Viewer**, **Test & Tuning**, and **Data Statistics** function modules, respectively. All are disabled by default. The disabled function modules will be hidden in the IDMVS WEB interface. Additionally, after modifying permissions, you must log in to IDMVS WEB again for the changes to take effect.

WEB Login

This section introduces how to log in to IDMVS WEB interface via a browser when the hardware and software environment requirements are met.

Before You Start

- Ensure that **Web Enabled** button is turned on. If not, turn it on first. Refer to section [WEB Settings](#) for details.
- Google Chrome 84+, Microsoft Edge 93+, Safari 15+, or a newer version of a supported browser is installed.

Steps

1. Enter the IDMVS WEB login page.

You can use one of the following methods.

- On the **Device List** panel in IDMVS client software, right-click the name of the code reader, and then click **Open Web Client** in the right-click menu.

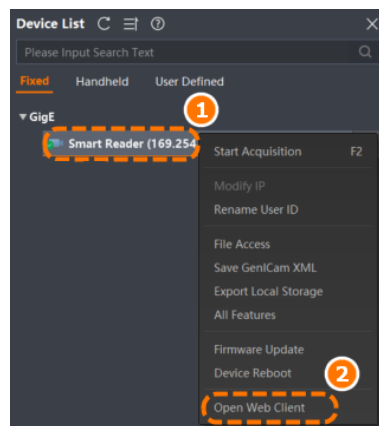


Figure 6-23 Device List Panel Operation Example

- Open a browser, enter the IP address of the code reader in the address bar, and press Enter.

Note

You can double-click the code reader information bar in the main window of IDMVS client software, and then right-click to copy the **IP Address** from the **Device Information** panel.

2. On the login page, enter the account (default: admin) and password, check the software license agreement, and click **Login**.
-

Note

- If you enter wrong password three consecutive times, the account will be locked for 5 minutes. If you forget the password, please reset it in IDMVS client software.
 - The session validity for IDMVS WEB is 30 minutes. You need to log in again after the timeout.
 - The same account can only be logged in from one location at a time. Duplicate logins will be rejected with a prompt showing the other user's IP address.
-

After successful verification, the page will automatically redirect to the main interface of IDMVS WEB.

What to do next

After successfully logging in to IDMVS WEB, you must manually disconnect the code reader in IDMVS client software. Otherwise, the code reader will remain be occupied, making some functions of IDMVS WEB unavailable, and a pop-up window will display that **Camera is currently occupied by IDMVS**.

Interface Overview

This section introduces the main interface of IDMVS WEB, as well as the interfaces and functions of the different modules.

IDMVS WEB features multiple function modules, each with its own interface layout. You can quickly switch to any function module via the top navigation bar.

Taking the **Test & Tuning** as an example, the layout of the IDMVS WEB main interface is shown below.

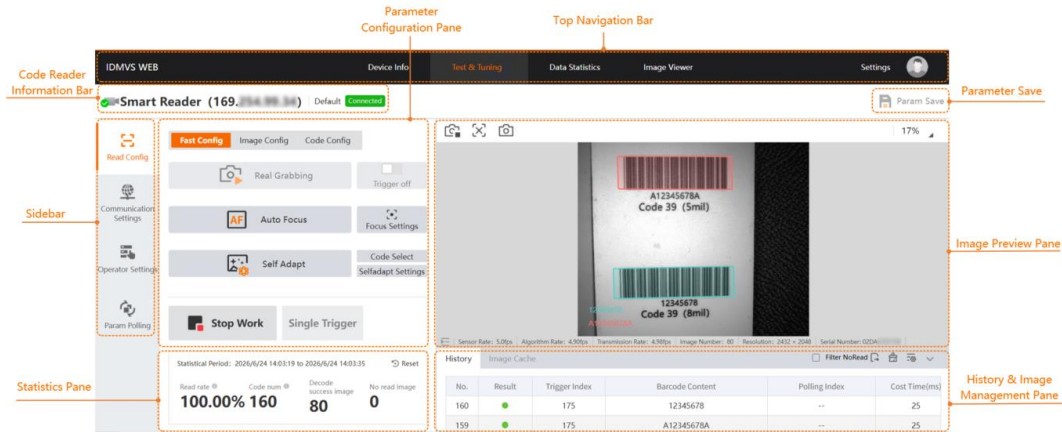


Figure 6-24 Test & Tuning Interface in IDMVS WEB

Device Info

The **Device Info** interface displays basic information about the code reader, including image, device model, IP address, firmware version, etc.

You can perform the following operations here.

- Restart the code reader: Click **Restart** to restart the code reader.
- Modify user ID: Click  on the right side of **Device User ID**, enter the new user ID in the pop-up window, and click **Confirm** to complete the modification.
- Interface navigation: Click **Test & Tuning**, **Data Statistics**, or **Image Viewer** to switch to the corresponding function interface.

Note

The functions displayed here depend on the permissions configured in the **Web Setting**.

Test & Tuning

The **Test & Tuning** interface integrates comprehensive code reader configurations and mainly consists of the following parts.

Note

The functions of the **Test & Tuning** interface in the IDMVS WEB are basically the same as those in the IDMVS client software, with a few parameters differing. You can refer to the IDMVS client software for guidance, but please follow the actual interface of IDMVS WEB.

Table 6-3 Function Description in the Test & Tuning Interface

Name	Description
Code Reader Information Bar	Displays the basic information of the code reader, including device name, IP address, current parameter group, and connection status.
Sidebar	Provides configuration operations for various parameters of the code reader, including Read Config , Communication Settings , Operator Settings , and Param Polling .

Name	Description
Parameter Configuration Pane	The content of this area changes based on the selected function in the Navigation Bar, displaying the corresponding settings.
Statistics Pane	On the Read Config interface, you can preview decoding statistics in this pane.
Parameter Save	It allows you to save the current configuration to a specific parameter group or set a default parameter group to load.
Image Preview Pane	On the Read Config interface, you can preview real-time images and reading results from the code reader in this pane.
History & Image Management Pane	On the Read Config interface, you can view history records and configure the image cache quantity in this pane.

Data Statistics

After completing code reading, you can view the reading results of the specified device within the selected time period on the **Data Statistics** interface, supporting both table and chart modes.

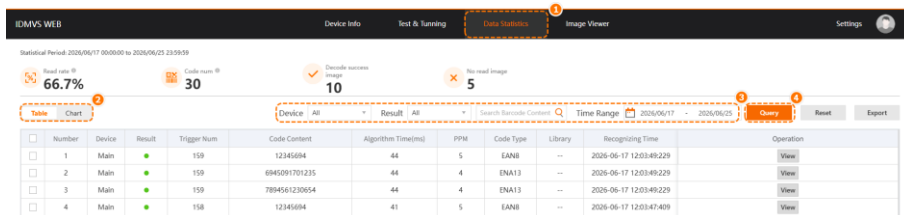


Figure 6-25 Data Statistics Operation Example

Before You Start

The code reading has been completed.

Steps

1. In the top navigation bar of the IDMVS WEB, click **Data Statistics**.
2. In the **Data Statistics** interface, click the **Table** or **Chart** to select a statistics mode.
3. Set the filter methods.

You can combine the following methods:

Table 6-4 Filter Methods

Filter Methods	Description
Device	Filter by the target device.
Result	Filter by status, including All , Success , or Failure (available only in table mode).

Filter Methods	Description
Search Barcode Content	Filter by specific code content (available only in table mode).
Time Range	Filter by start and end time.

4. Click **Query**.

Result

The top of the **Data Statistics** interface displays the core statistics for the selected time range, including:

- **Read rate**: The percentage of successfully decoded images out of the total images captured.
- **Code num**: The total number of codes successfully read.
- **Decode success image**: The number of images successfully decoded.
- **No read image**: The number of images with no code detected.

The lower part of the **Data Statistics** interface displays the matching read records in table or chart mode:

- **Table Mode**: Displays the details of each decoding record (including **Number**, **Device**, **Result**, **Trigger Num**, **Code Content**, **Algorithm Time(ms)**, **PPM**, **Code Type**, **Library**, and **Recognizing Time**). You can click **View** in the operation column for more details.
- **Chart Mode**: Shows the **Recognition Rate** in a line chart, and **Image Count** and **Trigger Count** in bar charts. You can click the legend below to hide the corresponding data.

What to do next

- **Reset Filters**: Click **Reset** to reset the filter methods and clear the current filtered data.
- **Export data**: Click **Export** to export the current displayed data. Data in table mode will be exported in .csv format, while in chart mode you can choose to export in PNG or PDF format.

Image Viewer

You can view real-time and historical code reading images, and set the image cache quantity for the code reader.

Chapter 7 Client Software Settings

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**.



Figure 7-1 IDMVS Client Software User Manual

7.1 Feature Tree Introduction

After the device is connected to the client software, you can click **All Features** in the upper-right corner.

 Note

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

Table 7-1 Feature Tree Description

Name	Description
Device Control	It allows you to view the device's information, edit its name, and restart 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.
Algorithm Control	It allows you to set algorithm parameters.
Focus Control	It allows you to adjust focus for improving image quality.
SelfAdapt Adjust	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 filtering rule of codes.

Name	Description
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.
Statistics Info	It allows you to count data related to code reading.  Note It is available only when the running mode is Normal.
User Set Control	It allows you to save and load configured user set.
Diagnose Event Report	It allows you to monitor memory and CPU usage rate, and let you know when there is a crash, higher CPU usage rate, insufficient memory, etc.

7.2 Running Mode Settings

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

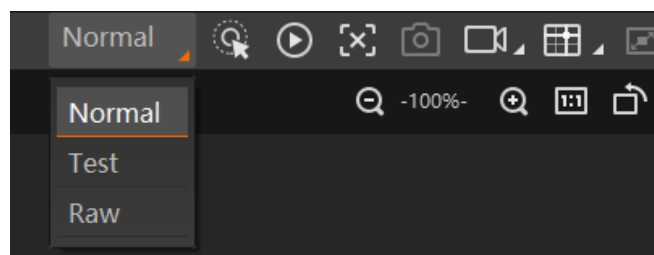


Figure 7-2 Select Running Mode

Table 7-2 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.

Device Mode	Description
Normal Mode	It is used during device normal operation. After reading code in image, the device outputs image and code information.
Raw Mode	It is used during image data testing. The device outputs raw data and displays code information.

 Note

- Stopping the real-time acquisition is required before selecting the running mode.
- The running mode may differ by device model.
- For some devices, Raw Mode cannot be set here, and you can go to **Device Control** to set it.

7.3 Image Quality Settings

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

7.3.1 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 7-3 Set Image Parameters

Name	Description
Exposure Time(μ s)	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.

Name	Description
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 • The device will dynamically adjust the maximum acquisition frame rate based on the current exposure time. If the exposure time is changed, the maximum acquisition frame rate will be automatically updated. When the configured acquisition frame rate exceeds the maximum value, the device will change the frame rate to the maximum value. When it is below the limit, the frame rate remains unchanged. You can set the frame rate within the maximum value according to your actual needs. • Acquisition frame rate and dynamic adjustment of maximum acquisition frame rate 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.

 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.

7.3.2 Set Exposure

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

Table 7-4 Exposure Mode

Exposure Mode	Description
Off	The device exposures according to the value configured by the user in Exposure Time(μs) .
Once	The device adjusts the exposure time automatically according to the image brightness. After adjusting once, the device will switch to off mode.
Continuous	The device adjusts the exposure time continuously according to the image brightness.

Exposure Mode	Description
Exposure Alternate	The device executes exposure alternatively according to the configured multiple exposure values.

Once/Continuous Mode

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.

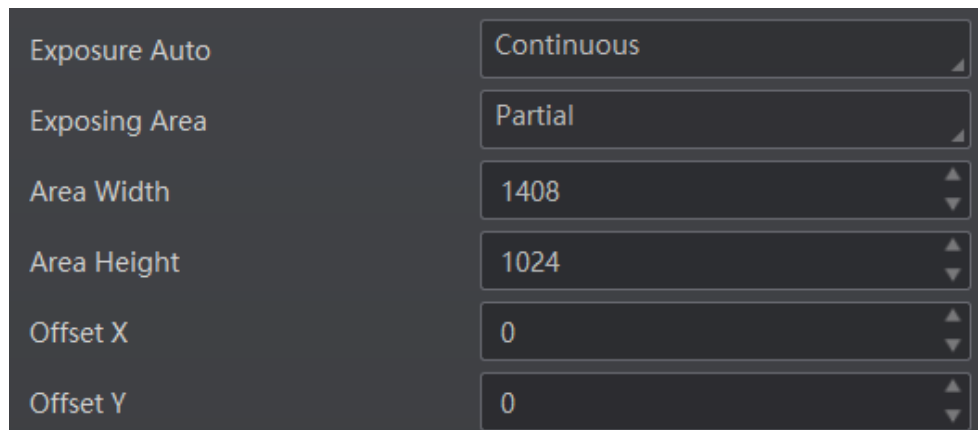


Figure 7-3 Once or Continuous Exposure

Exposure Alternate Mode

Steps

1. Right click the device in **Device Connection**, and click **Feature Tree**.
2. Go to **Image Setting**, and enable **Exposure Alternate**.
3. Select **Exposure1/2/3/4/5/6/7/8** in **Exposure Index**.
4. Enable **Exposure Enable**.
5. Set exposure value in **Exposure Time**.
6. Repeat Step 3 to Step 5 and configure exposure values for each parameter set.

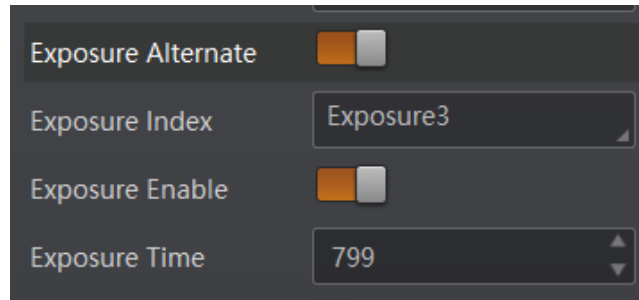


Figure 7-4 Exposure Alternate

Note

The exposure alternate may differ by device model.

7.3.3 Set Gain

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

Table 7-5 Gain Mode

Gain Mode	Description
Off	The device adjust gain according to the value configured by the user in Gain(dB) .
Once	The device adjusts gain automatically according to the image brightness. After adjusting once, the device will switch to off mode.
Continuous	The device adjusts gain continuously according to the image brightness.
Gain Alternate	The device executes gain alternatively according to the configured multiple gain values.

Once/Continuous Mode

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.

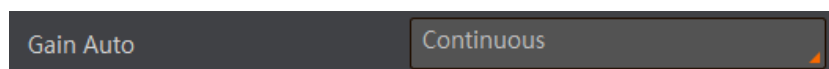


Figure 7-5 Once or Continuous Gain

Gain Alternate Mode

Steps

1. Right click the device in **Device Connection**, and click **Feature Tree**.
2. Go to **Image Setting**, and enable **Gain Alternate**.
3. Select **Gain1/2/3/4/5/6/7/8** in **Gain Index**.
4. Enable **Gain Enable**.
5. Set gain value in **Alternate Gain**.
6. Repeat Step 3 to Step 5 and configure gain values for each parameter set.

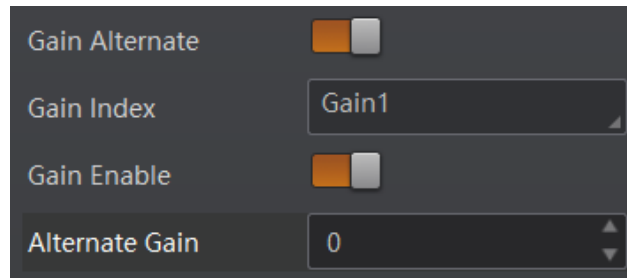


Figure 7-6 Gain Alternate

 Note

The gain alternate may differ by device model.

7.3.4 Set Parameter Polling

For dynamic and complex code-reading scenarios (e.g., varying code positions or fluctuating lighting), the parameter polling function allows you to preconfigure multiple sets of imaging parameters. As the code reader executes grabbing, it automatically switches among these parameter sets to adapt to environmental changes, ensuring stable and accurate code recognition in dynamic scanning scenarios. This section takes multiple parameter polling as an example to introduce this function.

Before You Start

- You should disable **Real Grabbing** of the code reader.

 Note

If **Real Grabbing** is enabled, parameter polling cannot be configured.

- The **Trigger Mode** has been enabled, and the **Trigger In Source** is not **Brightness**.

Steps

1. In the main interface navigation bar of IDMVS, select **Param Polling**.
2. From the dropdown menu at the top of the **Param Polling** page, choose **Multiple Polling**.



Figure 7-7 Parameter Rolling

You should enable any two or more polling parameters. The code reader can alternately apply the enabled polling parameters for code reading until a code is successfully captured, and then the polling stops. The polling sequence between the 8 sets of parameters is shown in the following figure. The polling rule begins with the optimal parameter group and proceeds through the enabled parameter groups in ascending order. For example, if the enabled polling parameters are 1, 2, 3, 4, 5, and the current parameter is 3 (i.e., group 3 is set as the optimal group), the polling sequence will be 3, 4, 5, 1, 2, which constitutes one polling cycle.

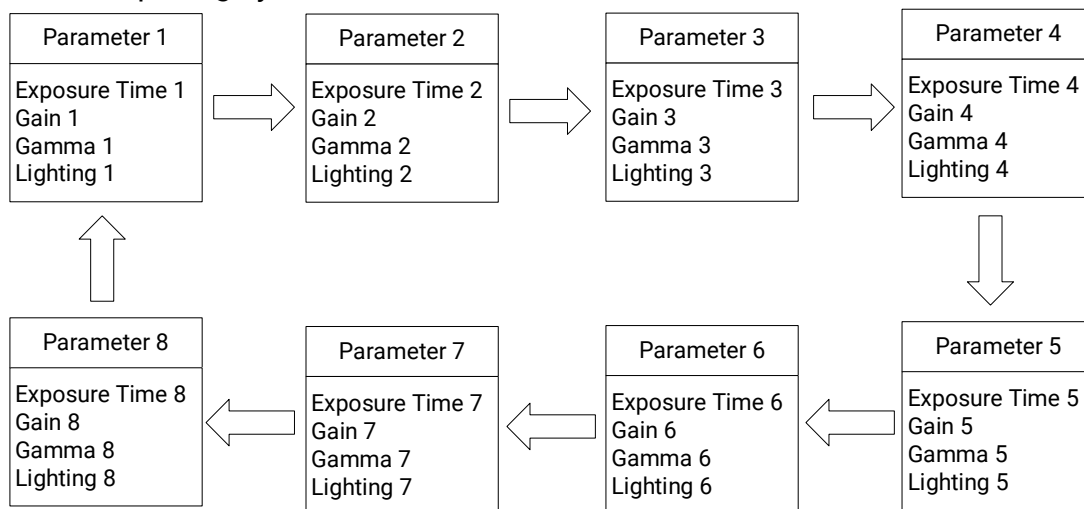


Figure 7-8 Polling Diagram

Note

If you need to execute single polling, select **Param *** (* is the polling group number) to apply a specific parameter group. The current parameter polling interface only supports configuring parameters of the selected group, and parameters of other polling groups are

unavailable. The code reader will apply the currently selected polling parameters during operation.

3. Configure the target polling parameters. The descriptions of polling parameters are as follows:

Note

- The polling parameters may differ by device firmware version.
 - The modified parameter cells are highlighted in purple.
 - The parameters for single-group parameter polling are similar to those for multi-group parameter polling, so this content will take the multiple-group parameter polling parameters as an example.
-
- **Polling Param Name:** Customize the name of the polling parameter.
 - **Polling Param ChgTime:** Display the last editing time of polling parameters. If there is no editing, 1970-01-01 is displayed by default.
 - **Polling Param Enable:** Enable/disable the current polling param in the polling sequence of the code reader.
-

Note

It is only available for **Multiple Polling**. At least 2 polling parameters are required.

- **Polling SingleParam Timeout(ms):** Set the maximum waiting time for code reading in the current polling parameter. If no codes are read during this period, the code reader will stop reading codes and apply the next polling parameter.
 - **Polling SingleParam Period:** Configure frame output quantity during code reading with the current polling parameter.
 - **Polling ROI Region Index:** Set the ROI index for the code reader to read codes by applying the current polling parameter. If 0 or an invalid index is set, the code reader will read all codes in the field of view.
 - **Code Info Settings:** Click **Part Code** to select code types on the **Bar Code Info Setting** page, and configure their valid bit ranges.
-

Note

At the top of the **Bar Code Info Setting** page, you can select all code types at once by checking the **All** button.

- **Internal Light Source:** Enable light channels on the light source diagram of the code reader. Click **All** to turn on all lights. After turned on, the lights are in green color.
-

Note

The light source diagram corresponds to the built-in light source on the code reader.

- **External Light Source:** If the code reader is connected to external light sources through I/O pins, you can select pin No. and enable light sources.
 - **Image Setting:** Refer to section [Image Quality Settings](#) for details of image-related
-

parameters.

- **Polling Focus Pos Enable:** Enable/disable focal length configuration during parameter polling. When it is enabled, set the lens focal length of the code reader through **Polling Focus Pos**.
 - **Polling Time (ms):** Set the polling duration. The polling mode requires at least 2 output frames to determine the polling stopping status.
-

Note

You can configure the parameter at the bottom of the **Param Polling** page only when multiple polling is selected.

- **Polling Period:** Set the number of periods for parameter polling operation. All enabled polling parameters constitute a polling cycle.
-

Note

You can configure the parameter at the bottom of the **Param Polling** page only when multiple polling is selected.

- **Polling Stop Trigger Enable:** Whether to configure a stop condition for triggered parameter polling. When it is enabled, stop conditions can be set through the **Polling Stop Condition**. Available options are as follows.
 - **Single Polling Frame:** Stop current parameter polling based on the number of codes read within a single frame image. After selection, the number of codes can be specified through **Polling Code Num** to trigger the stop.
 - **Whole Polling Period:** Specify the number of codes read within the whole polling period. After selection, the number of codes can be specified through **Polling Code Num** to trigger the stop.
-

Note

You can configure the parameter at the bottom of the **Param Polling** page only when multiple polling is selected.

4. Repeat Step 3 to configure the parameters of the target polling group. You can use the following functions when configuring the parameters of other groups.

- **Search:** Support parameter searching based on input content. If a parameter contains the input content, the corresponding parameter is highlighted in orange.
-

Note

Searching function is case-sensitive.

- **Add Param:** Support adding a new group of polling parameters.
-

Note

Only some code reader models with firmware version V4.0.0 and above support adding polling parameter groups. Up to 8 groups can be added (16 groups in total). Refer to the

actual interface for details.

- **Restore Default:** Restore all parameters of the current polling group to default values.
 - : Click this icon to set the current polling group as follows.
 - **Col Restored Default:** Restore all parameters of the current polling group to default values.
 - **Apply To All:** Apply the parameters of the current polling group to other polling groups.
 - **Apply To Other:** Apply the parameters of the current polling group to the specified polling group.
5. Click **Save** at the top of the **Param Polling** page. Once saved, the polling parameters will be triggered when the code reader starts operation.

7.3.5 Set Light Source

Light source control allows you to enable the device's aiming system and light source. You can go to **Image Settings** → **Light Source** to set related parameters according to actual demands.

- **Lighting Mode:** Based on actual needs, you can select the light source mode, which supports the following modes.
 - **Strobe:** The light source periodically turns on and off at specific frequencies or set times. You can set the following parameters according to the needs.
 - Lighting Duration:** It sets the lighting duration, and the unit is μs .
 - Lighting Delay Time:** It determines the delay time for lighting after exposure, and the unit is μs .
 - Precharge Time:** It determines how earlier the light source starts lighting before exposure, and the unit is μs .
 - **Long:** During image acquisition, the light source remains constantly on. This mode facilitates real-time observation of imaging quality during system debugging, allowing for quick parameter adjustment and focusing.
 - **Strobe Long:** The device starts image acquisition upon receiving an external trigger signal and simultaneously turns on the light source, keeping it lit until acquisition is finished. This mode is applicable for automatic triggering scenarios, such as conveyor line inspection and positioning recognition, effectively reducing energy consumption and extending the light source's lifespan.

Note

Some device models do not support **Strobe** mode.

- **Lighting Channel Selector:** You can activate the necessary lighting channels based on actual requirements. Different light sources can be turned on or off by clicking the upper, lower, left, or right control buttons of lamp beads. All light sources can be turned on or off by clicking **All On** and **All Off**.
- **Aiming Light Mode:** It includes **Off**, **Strobe**, and **StrobeLong**.

7.3.6 Set Smart Tune

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

Note

The smart tune function is supported by some device models and firmware versions.

Before You Start

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

Steps

1. Go to **Image Setting**, click **All Features** on the right corner, and find **SmartTuneControl**.

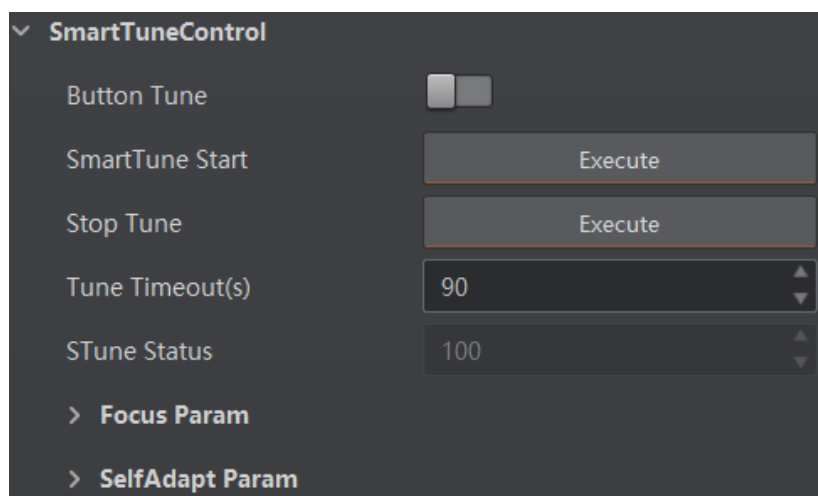


Figure 7-9 Smart Tune Control

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

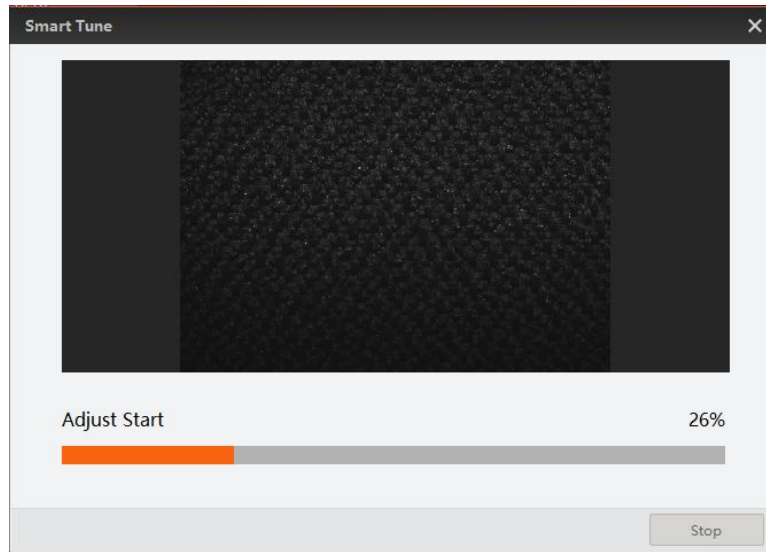


Figure 7-10 Smart Tune Start

Note

- The parameters of the smart tune may differ by device models and firmware versions.
- During the process of smart tune, the focus parameters and self-adaptive parameters will be adjusted in turn.

4. (Optional) View smart tune process via **Smart Tune Status**.
5. (Optional) Click **Execute** in **Stop Tune** to stop smart tune process.
6. (Optional) You can set focus-related parameters and self-adaption parameters via **Focus Param** and **SelfAdapt Param**.

Note

Refer to section [Set Focus](#) and section [Set Self-Adaptive Adjustment](#) for details.

7.3.7 Set Focus

The device supports the auto focus function according to the code position in the field of view. Currently, three types of auto focus are supported, including global auto focus, global manual 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 Auto Focus

The global auto 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**.

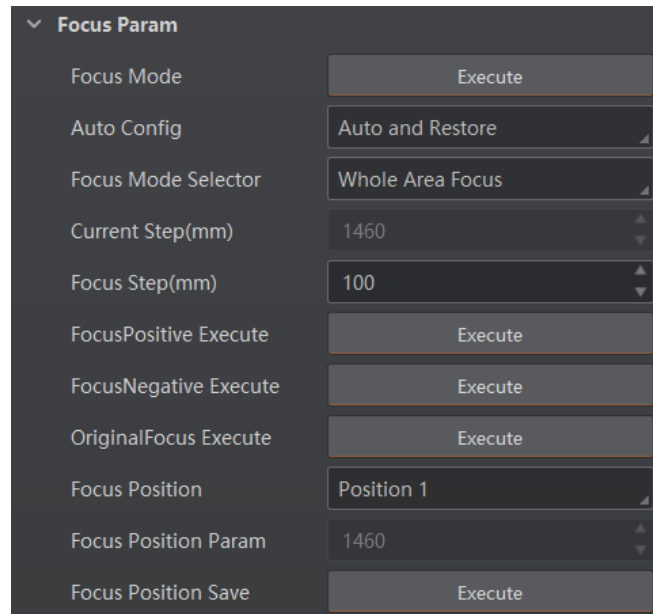


Figure 7-11 Global Focus

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 **Focus Score** after the auto focus is finished.

Global Manual Focus

The global manual focus requires manual focus according to the images displayed in the

live view window.

Steps

1. Go to **Image Settings** → **Focus Param** → **Focus Mode Selector**, and select **Whole Area 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. (Optional) Select **Focus Position** according to actual demands and **Focus Position Param**.
4. Set **Focus Step** according to actual demands.
5. Click **Execute** in **Focus Positive Execute** and **Focus Negative Execute** to adjust focus position.
6. (Optional) View **Focus Score** to know the score of the focus adjustment.
7. (Optional) Select the position parameter from **Focus Position**, and click **Execute** in **Focus Position Save** to save the focus position after adjusting focus.
8. (Optional) Click **Execute** in **Original Focus Execute** to let the focus back to its original position.

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 exist.

Steps

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

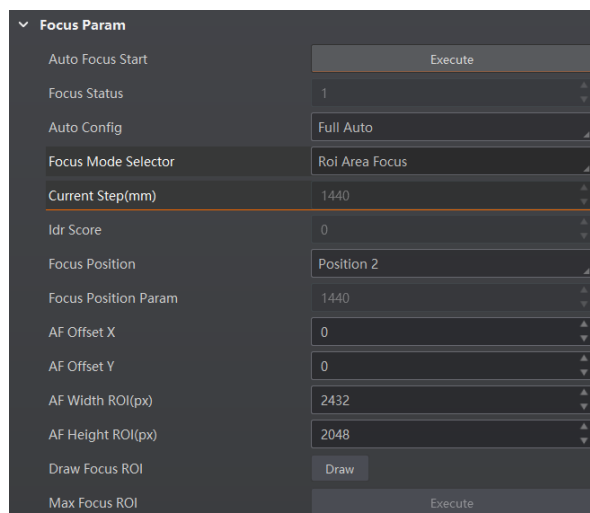


Figure 7-12 ROI Focus

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

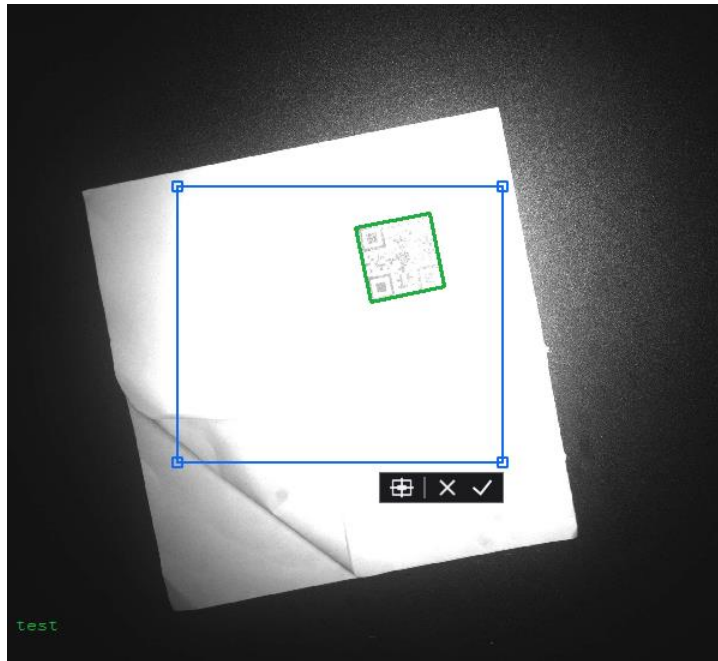


Figure 7-13 Draw Focus ROI Area

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

7.3.8 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.

Note

The function and parameters of self-adaptive adjustment may differ by device models.

Before You Start

Make sure you have connected the device to the client software and have stopped

acquisition.

Steps

1. Go to **Image Settings** → **SelfAdapt Param**.
2. Select **Adjust Source** according to actual demands.
 - **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**.

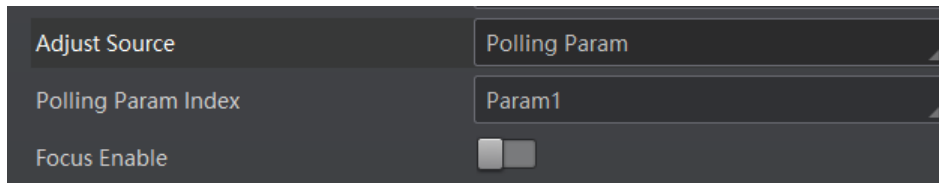


Figure 7-14 Polling Parameter

3. (Optional) Set **Exposure Max** or **Gain Max** according to actual demands.
 - **Exposure Max**: It sets the max. exposure during the self-adaptive adjustment.
 - **Gain Max**: It sets the max. gain during the self-adaptive adjustment.
4. (Optional) Set self-adaptive code type in **Code Type Mode**.
 - **Code SelfAdapt**: All code types added in field of view will be self-adaptive.
 - **1D Code**: 1D code types added in field of view will be self-adaptive.
 - **2D Code**: 2D code types added in field of view will be self-adaptive.
 - **Stack Code**: Stacked code types added in field of view will be self-adaptive.
5. (Optional) Set light source parameters in **Lighting Mode**.
 - **Light Adapt**: The client software will select the best one from all lighting options during the self-adaptive adjustment.
 - **All Light Enable**: All light sources will be turned on during self-adaptive adjustment process.
 - **All Light Disable**: All light sources will be turned off during self-adaptive adjustment process.
6. Click **Execute** in **Adjust Start**. The device will automatically acquire images and perform self-adaptive adjustment, and stop acquisition after adjustment is completed.

Note

If the adjustment is completed, the client software displays the spent time and prompts adjustment succeeded, and the exposure and gain are the values configured in the self-adaptive adjustment. If the adjustment failed or is timeout, the client software prompts adjustment failure or timeout.

7.3.9 Set X/Y-Axis Mirror

The device supports the X/Y-axis mirror function.

Go to **Image Config** → **Other Settings** to set **X/Y-axis Mirror** according to actual demands.

- **X-axis Mirror**: If the parameter is enabled, the image will be reversed in a horizontal way.
- **Y-axis Mirror**: If the parameter is enabled, the image will be reversed in a vertical way.

Note

- The **X/Y-axis Mirror** is disabled by default.
 - After these two parameters are enabled, you can go to **Settings** → **Results Show** to enable **X/Y Reverse Enable Tip**. The X/Y reverse tips will be shown on the image display area during image acquisition.
-



Figure 7-15 Set X/Y-Axis Mirror

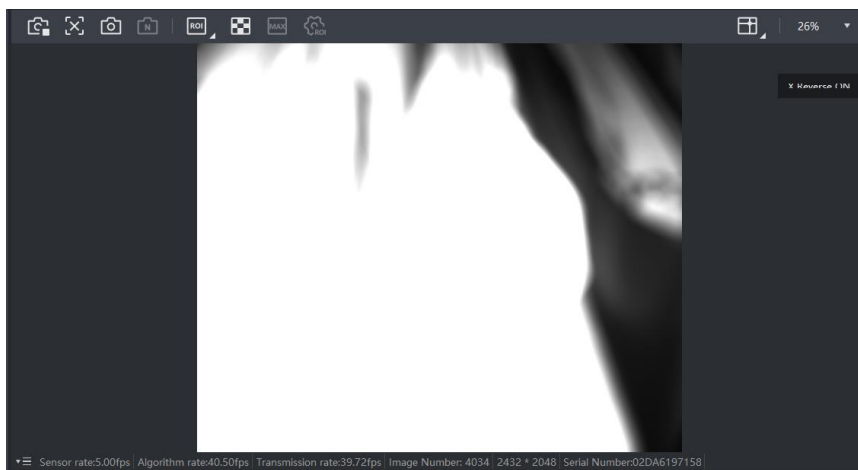


Figure 7-16 X/Y Reverse Tip

7.3.10 Set Test Image Mode

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

Go to **Image Config** → **Other Settings**, and set **Test Image Mode** according to actual demands.

- **Off**: When the test image mode is disabled, the image is captured by the device in real-time.

- **Mono Bar**: The test image pattern is black and white vertical stripes.
- **Run Raw Test**: The test images used by the device are sourced from its test image folder, where all images are preloaded via FTP instead of being captured in real-time. When you use this function, enable **Enable FTP Test Image Server** first.

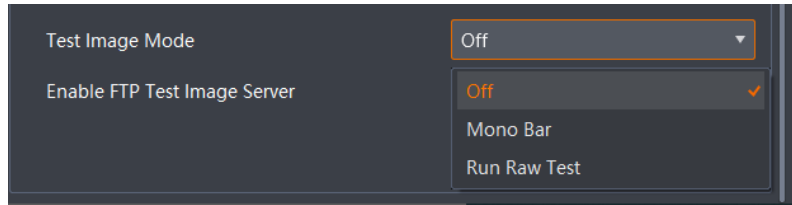


Figure 7-17 Set Test Image Mode

- **Enable FTP Test Image Server**: Select whether to enable the FTP test image server to import the test image. Once enabled, the **Image Import** tab occurs in the **History&Image Management Pane**. The test image can be imported or cleared at the top right corner of this tab.

Note

- Click **Show Advanced Parameters** to display this parameter.
 - After you enable **Enable FTP Test Image Server**, view storage usage and lifespan.
-

7.4 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.

7.4.1 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.
-

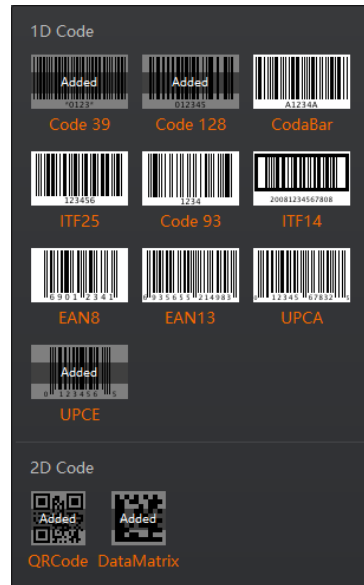


Figure 7-18 Add Codes

7.4.2 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, drawing ROIs in Batch, 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, 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.

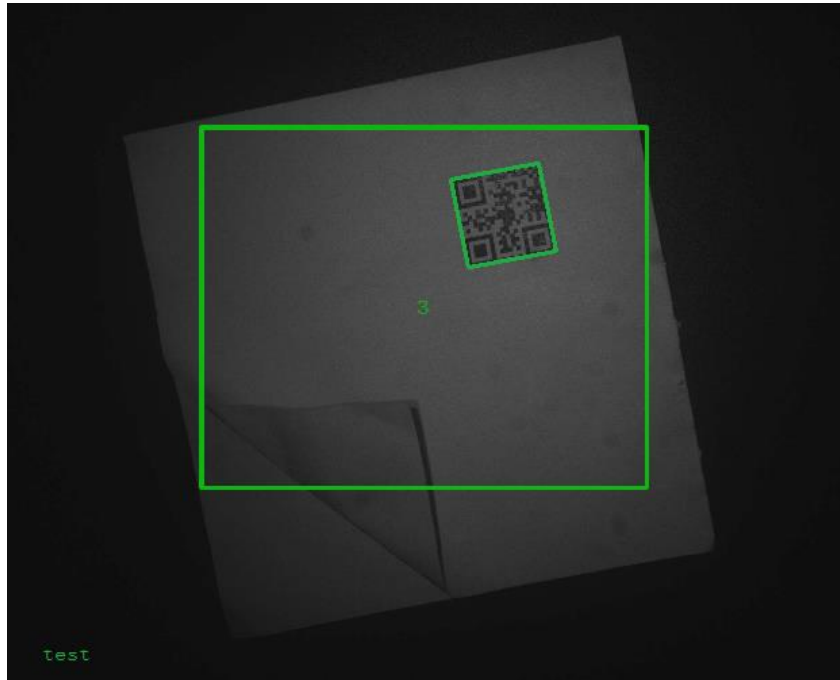


Figure 7-19 Draw ROI

3. (Optional) Repeat Step 2 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.

ROI Index	3
AlgoRegionWidth	979
AlgoRegionHeight	792
AlgoRegionLeftX	469
AlgoRegionLeftY	709

Figure 7-20 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) Enable **ROI Link IO Enable** in **Algorithm Control**, and there will be prompts by the output device when codes are not read in any ROI.

Note

Make sure that the output device is connected when using this function.

Draw ROI in Batch

Steps

1. Go to **Algorithm Settings**, and find **Algorithm ROI**.
2. Click **Batch** to set parameters according to actual demands.
 - **Area Offset**: It sets the pixel quantity from the starting point when the ROI is in horizontal and vertical direction from the full resolution.
 - **Area Size**: It sets the pixel quantity in the horizontal and vertical direction of the ROI.
 - **ROI Number**: It sets the row and column quantity.
 - **Row Spacing**: It sets the interval between rows.
 - **Column Spacing**: It sets the interval between columns.
3. Click **OK** after settings.
4. Repeat other optional steps mentioned in drawing single group of ROI according to actual demands.

Figure 7-21 Draw ROI in Batch

5. (Optional) Enable **ROI Link IO Enable** in **Algorithm Control**, and there will be prompts by the output device when codes are not read in any ROI.

Note

Make sure that the output device is connected when using this function.

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.

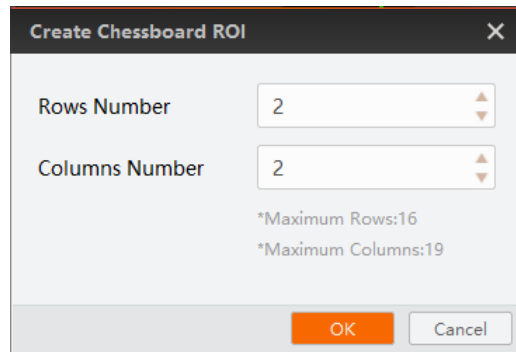


Figure 7-22 Create Chessboard ROI

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.

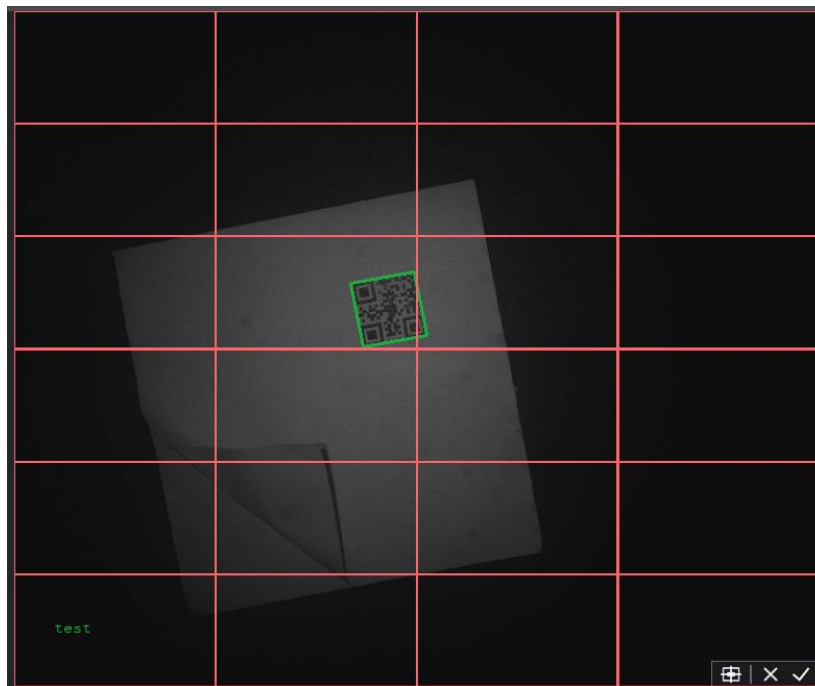


Figure 7-23 Draw ROI via Chessboard

Note

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

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

6. (Optional) Enable **ROI Link IO Enable** in **Algorithm Control**, and there will be prompts by the output device when codes are not read in any ROI.

 Note

- The figures above are for reference only. Refer to the actual conditions.
 - When no ROIs are enabled, the current ROI defaults to full screen.
 - When some ROIs are enabled, the disabled ROI is located at the top-left corner (0, 0) with a size of 128 × 128 pixels.
-

7.4.3 Set Algorithm Parameter

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

 Note

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

Set 1D Code

Waiting Time

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

Code Color

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

Code 39 Check

Enable this parameter if Code 39 uses the parity bit.

 Note

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

ITF 25 Check

Enable this parameter if ITF 25 uses the parity bit.

Note

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

Code Quality Enable

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

Code Score Enable

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

Accurate Timeout Enable

If it is enabled, the accuracy of algorithm timeout will improve.

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.

Algorithm Running Mode

It is used to be set the algorithm operating mode. It includes **HighSpeed**, **HighPerformance**, and **Balance**. **HighSpeed** focuses on recognition speed, and the algorithm can recognize the code rapidly, while **HighPerformance** refers to the algorithm can recognize the code that has distortion, spot or white gap, but its recognition speed is slow. **Balance** refers to the algorithm makes a balance between speed and performance.

2D Code Max. Size

It refers to the max. recognizable code width. The 2D code will not be recognized if its width exceeds the configured value.

Mirror Mode

It is useful when the recognized image is a mirror one, mirroring in X coordinate. Three modes are available: **Adaptive**, **Mirror**, and **NonMirror**.

Downsampling Level

It refers to the pixel sample size that the code reader takes. Increasing this parameter will improve the code reading efficiency at the expense of code recognition rate.

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.

Discrete Flag

Continuous stands for the minimum units in the "L" shaped sides of the DM code are continuous, or the minimum units in the concentric square like  or  in the QR code are continuous. Usually the continuous code uses squares as the minimum units.

Discrete stands for the minimum units in the "L" shaped sides of the DM code are discrete, or the minimum units in the concentric square like  or  in the QR code are discrete. Usually the discrete code uses dots as the minimum units.

Adaptive stands for the device can recognize both continuous code and the discrete code.

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.



Note

If you enable this parameter, the more time will be consumed to recognize the codes in the image.

DM Code Shape

It defines the recognizable code shape. **Square** stands for square mode: If the 2D code is square shaped, it can be recognized by the device. **Rectangle** stands for rectangle mode: If the 2D code is rectangle shaped, it can be recognized by the device. **Adaptive** stands for compatible mode: The device can recognize 2D codes of both the above-mentioned two shapes.

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.

Accurate Timeout Enable

If it is enabled, the accuracy of algorithm timeout will improve.

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.

Accurate Timeout Enable

If it is enabled, the accuracy of algorithm timeout will improve.

7.4.4 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 and Code 128.

 Note

Make sure that the device's running mode is Normal.

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 7-6 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.

Parameter	Description
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.
Quiet Zone	It evaluates that the quiet zone width of the code meets the specification.

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. Enable **Aperture Enable** and enter **Aperture** according to the smallest size of codes.

6. (Optional) Set **Quality1DMaxNum** 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.

7. (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.

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

History		Image Cache							
No.	Read Time	Output Total Cos	Cost Time(ms)	PPM	Barcode Type	Waybill	Barcode Content	Overall Gr	Code Score
71	2023/6/25 17:12:54:417	4981742	121	14.6	QRCode		313200953002023...		61
70	2023/6/25 17:12:54:417	4981742	121	5.8	Code 128		1.000	E	65
69	2023/6/25 17:12:54:417	4981742	121	6	Code 128			E	66

Figure 7-24 Overall Code Quality

Set 2D Code Quality Evaluation

The 2D quality evaluation function uses the ISO29158 and ISO15415 standards 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**.
2. Set **Iso Edition**, including Iso15415 and Iso29158
 - Iso15415 is applicable to the quality evaluation for label 2-dimensional codes.
 - Iso29158 is applicable to the quality evaluation for DPM format 2-dimensional codes.
3. Set **Verify Edition**, including standard mode and HIK mode.
 - Standard mode is a standard quality evaluation mode.
 - HIK mode is a professional quality evaluation mode.
4. When HIK mode is selected, you can set the evaluation criteria based on your actual demands. If enabled, the rating standard is used to evaluate the code quality.

Table 7-7 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.

Parameter	Description
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

5. 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.
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.

7.4.5 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**.

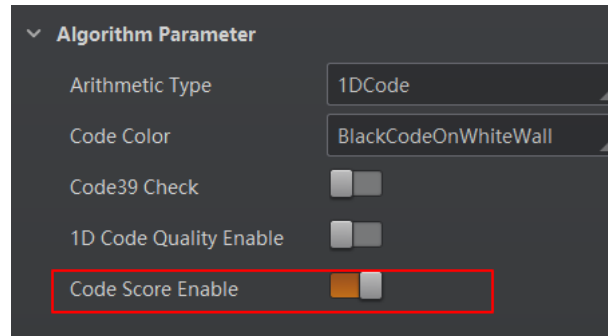


Figure 7-25 Enable Code Score Enable

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

No.	Read Time	Output Total Cos	Cost Time(ms)	PPM	Barcode Type	Waybill	Barcode Content	Overall Gr	Code Score
134	2023/6/25 17:13:38:344	5025673	107	15	QRCode		313200953002023...	■	62
133	2023/6/25 17:13:38:344	5025673	107	5.8	Code 128		1.000	■	64
132	2023/6/25 17:13:38:344	5025673	107	5.9	Code 128			■	66

Figure 7-26 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.

7.5 Signal Input Settings

The input settings allow you to configure the trigger-related parameters. When the code reader interacts with other external devices, you can set and manage the input signals of the code reader, including trigger and stop trigger settings.

Note

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

7.5.1 Set Trigger Mode

Go to **I/O Control** → **Input** to enter the **Input** configuration tab, and select **On** from the dropdown list of the **Trigger Mode** in the **Trigger Settings**.

7.5.2 Set Trigger Source

You can select the corresponding trigger source based on your needs, and set the related parameters.

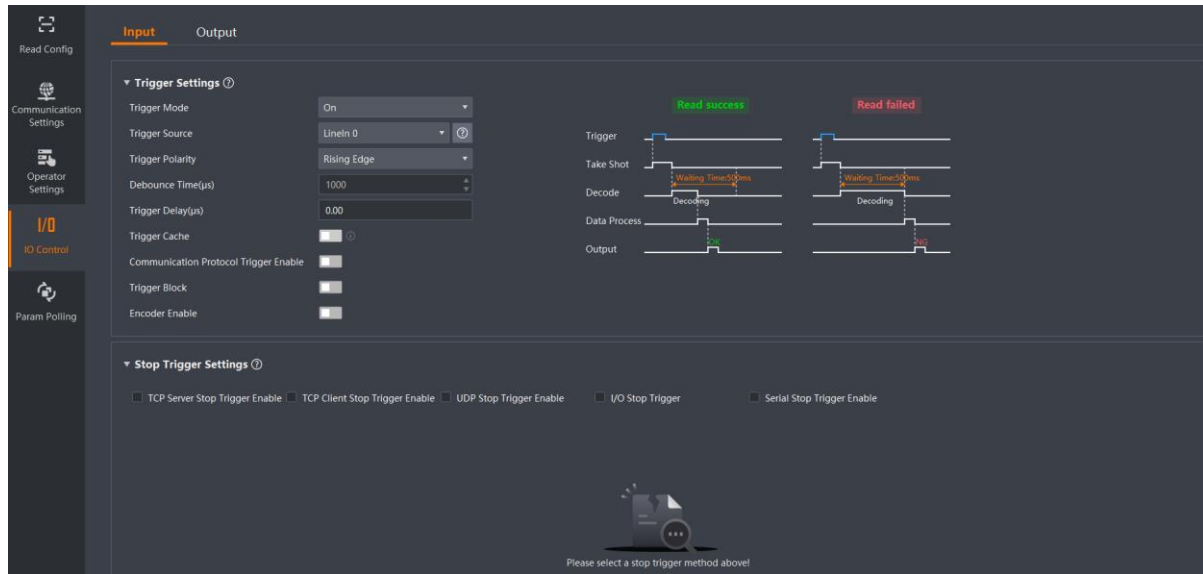


Figure 7-27 Set Trigger Source

Set and Execute Software Trigger Mode

In this mode, the trigger signal is issued by the software and transmitted to the code reader via a Gigabit or 10-Gigabit Ethernet network for image capturing.

Steps

1. Select **Software** as **Trigger Source**.
2. Click **Execute** in **Trigger Software** to send trigger commands.
3. You can also set the following parameters.
 - **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. The sequence diagram of trigger delay is shown below.

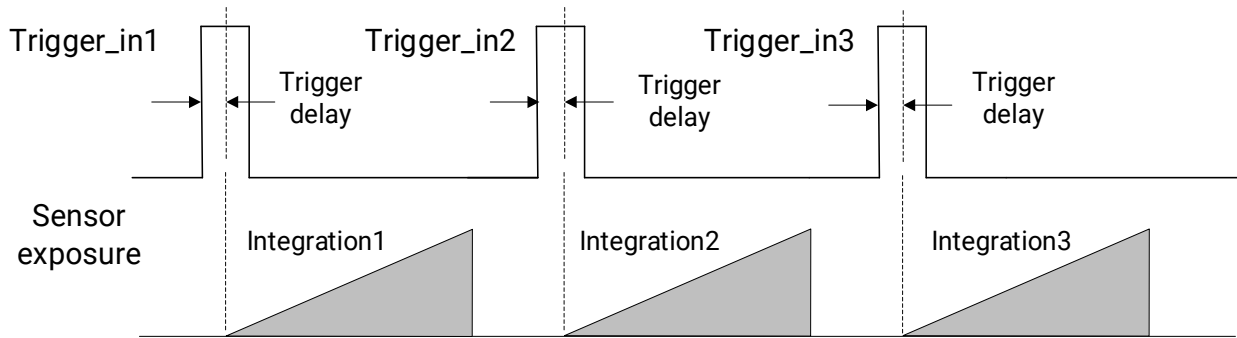


Figure 7-28 Sequence Diagram of Trigger Delay

- **Trigger Cache:** The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.
- **Continuous Command Triggering:** It configures whether the code reader keeps triggering until receiving the corresponding stop trigger command.

Note

Trigger Delay and **Continuous Command Triggering** cannot be set simultaneously.

Set and Execute Hardware Trigger Mode

In this mode, the external devices connect the code reader through I/O interfaces. The trigger signal is issued by external devices and transmitted to the code reader for image capturing.

Steps

1. Select the specific line (LineIn *) as **Trigger Source** according to the actual demands.
2. You can also set the following parameters.
 - **Trigger Polarity:** It is used to set the effective level type of the trigger signal. Available types are as follows.
 - **Rising Edge:** Triggered when the signal shifts from low to high level.
 - **Falling Edge:** Triggered when the signal shifts from high to low level.
 - **Level High:** Continuously triggered when the signal keeps high level.
 - **Level Low:** Continuously triggered when the signal keeps low level.
 - **Debounce Time:** It 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.

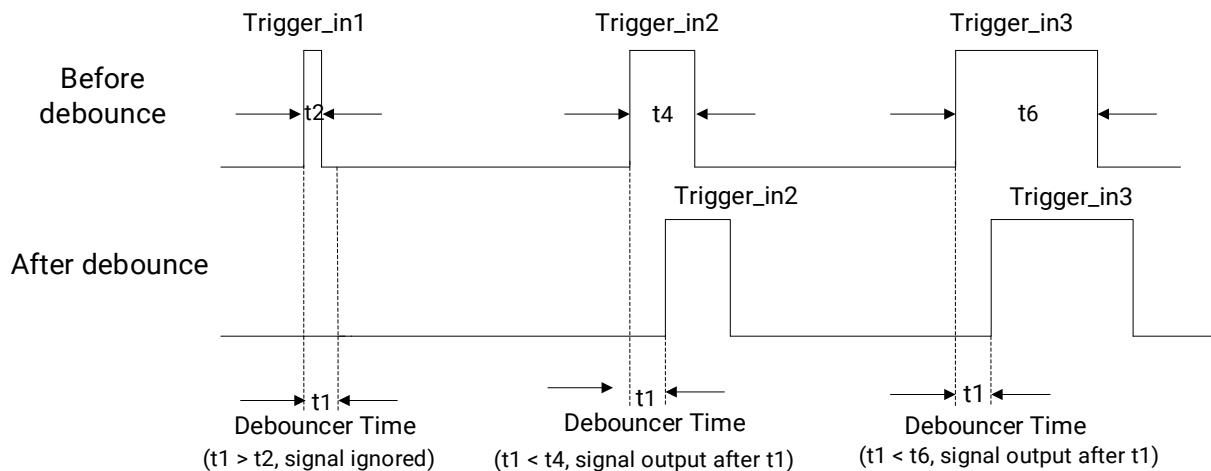


Figure 7-29 Sequence Diagram of Trigger Debounce

- **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.
- **Trigger Cache:** The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.
- **Communication Protocol Trigger Enable:** It configure whether to allow TCP/UDP/Serial protocols to trigger code readers while using Lineln * trigger sources for code readers triggering.
- **Trigger Block:** It selects whether to block new triggers within a certain period of time. Once enabled, the time period for block can be set through **Trigger Block Time (ms)**. After the code reader is triggered once, it will not respond to trigger signals within this time period.

Note

When this parameter is enabled, **Trigger Cache** is unavailable.

- **Trigger Start/End Delay Time:** It sets the waiting time from when the code reader receives the trigger signal to the start or end of trigger-based image acquisition according to requirements. After setting parameters, the corresponding sequence diagram is in the right area as shown in the figure below.

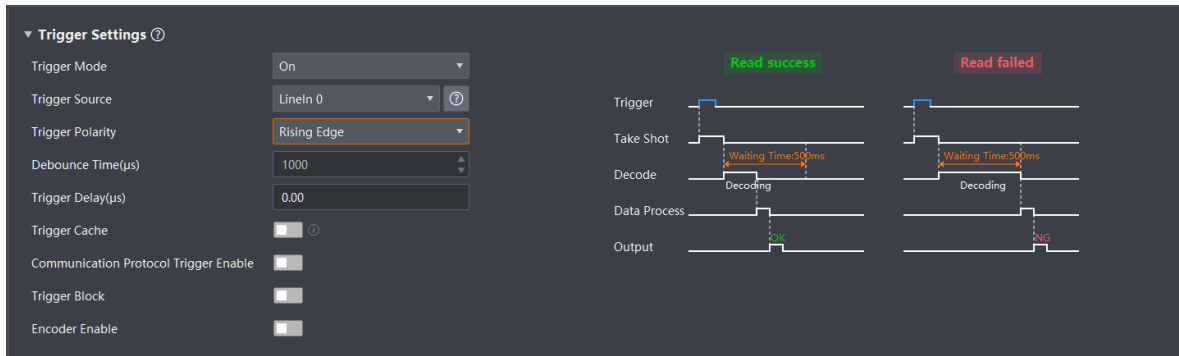


Figure 7-30 Sequence Diagram

Note

- When the **Trigger Polarity** is **Level High** or **Level Low**, these parameters can be set.
- The value of the **Trigger Start Delay Time** cannot exceed that of **Trigger End Delay Time**.
- Double click **Waiting Time** in the sequence diagram, and you can jump to **Algorithm Waiting Time(ms)** to configure the value.
- Encoder Enable:** After it is enabled, the code reader will automatically trigger image acquisition based on encoder input signal.
 - Encoder Source:** You can select LineIn *, and it cannot be the same as the trigger source.
 - Encoder Active:** It sets the level type of the encoder input signal. Available types are **Rising Edge** and **Falling Edge**.
 - Encoder Line DebouncerTime:** It allows the device to filter out unwanted short external trigger signal that is input to the device.
 - Capture Delay Unit:** It sets the delay time from when the material arrives at the designated position to when the code reader captures an image.
 - Reject Delay Unit:** It sets the delay time from when the code reader captures an image to when the rejection action is executed.

Note

After **Encoder Enable** is enabled, you can go to **Operator Settings** → **Data Processing** → **Format Output** to select **Encoder Cnt** and **Start Encoder Cnt**.

Set and Execute Counter Trigger Mode

In this mode, the counter specifies that the trigger source will be generated after the set number of valid signals appears.

Steps

- Select **Counter 0** as **Trigger Source**.
- You can also set the following parameters.
 - Trigger Polarity:** It is used to set the effective level type of the trigger signal. Available

types are as follows.

- **Rising Edge:** Triggered when the signal shifts from low to high level.
- **Falling Edge:** Triggered when the signal shifts from high to low level.
- **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.
- **Trigger Cache:** The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.
- **Count Number:** It sets the number of pulse signals that trigger image capturing and code reading.
- **Count Source:** It sets the source of the external pulse signals monitored by the counter. You can select **LineIn *** or **Off**. When **LineIn *** is selected, **Debounce Time** can be set.

Set and Execute TCP Server Trigger Mode

In this mode, the external devices act as TCP servers, sending TCP commands to the code reader for image capturing.

Steps

1. Select **TCP Server Start** as **Trigger Source**.
2. You can also set the following parameters.
 - **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.
 - **Trigger Cache:** The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.
 - **Fuzzy Trigger:** It selects whether to enable fuzzy matching for the start trigger text and stop trigger command string. When enabled, as long as the sent text contains the start trigger text, triggering will begin; as long as the sent text contains the stop trigger command string, triggering will stop. If the start trigger text and stop trigger command string contain each other, only exact matching is supported, and fuzzy matching will no longer be applied.
 - **Continuous Command Triggering:** It configures whether the code reader keeps triggering until receiving the corresponding stop trigger command.
 - **TCP Server Trigger Port:** It sets the port No. of the server.
 - **TCP Server Trigger Text Format:** When receiving the specified trigger text, the server will output a trigger signal. You can select the text format from **Str** or **Hex**.
 - If **Str** is selected, enter the text in string format in the box next to **TCP Server Trigger Text**.
 - If **Hex** is selected, enter the text in hexadecimal format in the box below **TCP Server Trigger Hex Command**. If needed, you can click  to open the ASCII Cross Reference Table and click a table cell to add the corresponding content to the text box.
 - **TCP Server Handshake Request Text:** It customizes the handshake request command under the TCP.
 - **TCP Server Handshake Response Text:** It customizes the handshake response

command under the TCP.

- **TCP Server Return Data to Trigger Port:** It selects whether to return the output result to the triggering port.
- **TCP Server Auto Reconnect:** It selects whether to reconnect the client software after the network disruption.

Set and Execute UDP Trigger Mode

In this mode, the external devices send the signal to the code reader through UDP commands.

Steps

1. Select **UDP Start** as **Trigger Source**.
2. You can also set the following parameters.
 - **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.
 - **Trigger Cache:** The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.
 - **Fuzzy Trigger:** It selects whether to enable fuzzy matching for the start trigger text and stop trigger command string. When enabled, as long as the sent text contains the start trigger text, triggering will begin; as long as the sent text contains the stop trigger command string, triggering will stop. If the start trigger text and stop trigger command string contain each other, only exact matching is supported, and fuzzy matching will no longer be applied.
 - **Continuous Command Triggering:** It configures whether the code reader keeps triggering until receiving the corresponding stop trigger command.
 - **UDP Trigger Port:** It sets the port No. of the UDP.
 - **UDP Trigger Text Format:** When receiving the specified trigger text, the UDP will output a trigger signal. You can select the text format from **Str** or **Hex**.
 - If **Str** is selected, enter the text in string format in the box next to **UDP Trigger Text**.
 - If **Hex** is selected, enter the text in hexadecimal format in the box below **UDP Trigger Hex Command**. If needed, you can click  to open the ASCII Cross Reference Table and click a table cell to add the corresponding content to the text box.
 - **UDP Handshake Request Text:** It customizes the handshake request command under the UDP.
 - **UDP Handshake Response Text:** It customizes the handshake response command under the UDP.

Set and Execute Serial Port Trigger Mode

In this mode, the external devices send the signal to the code reader through serial commands.

Steps

1. Select **Serial Start** as **Trigger Source**.

2. You can also set the following parameters.

- **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.
 - **Trigger Cache:** The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.
 - **Fuzzy Trigger:** It selects whether to enable fuzzy matching for the start trigger text and stop trigger command string. When enabled, as long as the sent text contains the start trigger text, triggering will begin; as long as the sent text contains the stop trigger command string, triggering will stop. If the start trigger text and stop trigger command string contain each other, only exact matching is supported, and fuzzy matching will no longer be applied.
 - **Continuous Command Triggering:** It configures whether the code reader keeps triggering until receiving the corresponding stop trigger command.
 - **Serial Baud Rate:** It refers to the serial port baud rate of the code reader, which represents the number of bits (bit/s) transmitted per second by the serial port.
-

Note

Please ensure that the serial port baud rate of the code reader and the target device are the same to avoid data loss or errors.

- **Serial Data Bit:** It refers to the bit for each character during data transmission, including 7 and 8. It is usually set to 8 bits.
-

Note

The Hex trigger is only available for 8 serial data bits.

- **Serial Stop Bit:** It refers to the bit used to identify the end of strings after data transmission, including 1 or 2.
 - **Serial Parity Check:** It refers to the bit used to detect transmission errors, with the following three methods:
 - **NoParity:** Do not use the parity bit.
 - **Odd Parity:** Add a parity bit at the end of the data to ensure that there is an odd number of 1s. Upon receiving the data, the receiver checks whether the count of 1s is odd. If it is not, a data transmission error is assumed.
 - **Even Parity:** Add a parity bit at the end of the data to ensure that there is an even number of 1s. Upon receiving the data, the receiver checks whether the count of 1s is even. If it is not, a data transmission error is assumed.
 - **Serial Trigger Text Format:** When receiving the specified trigger text, the server will output a trigger signal. You can select the text format from **Str** or **Hex**.
 - If **Str** is selected, enter the text in string format in the box next to **Serial Trigger Text**.
 - If **Hex** is selected, enter the text in hexadecimal format in the box below **Serial Trigger String**. If needed, you can click  to open the ASCII Cross Reference Table and click a table cell to add the corresponding content to the text box.
 - **Serial Trigger Text:** It sets the trigger text of Serial Start, and it is **Start** by default.
-

- **Serial Handshake Request Text:** It customizes the handshake request command under the serial port.
- **Serial Handshake Response Text:** It customizes the handshake response command under the serial port.

Set and Execute Self Trigger Mode

In this mode, the device will automatically capture images based on the set trigger time interval and count.

Steps

1. Select **Self Trigger** as **Trigger Source**.
2. You can also set the following parameters.
 - **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.
 - **Trigger Cache:** The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.
 - **Self Trigger Period:** You can set the time interval between two consecutive triggers for the code reader in self-trigger mode.
 - **Self Trigger Count:** You can set the number of self-trigger times, which refers to the total number of times the device performs the triggering action in self trigger mode.

Set and Execute Main Sub Mode

In this mode, when the main code reader is triggered, the trigger signals will be sent to the sub code readers.

When the trigger source is **Main Sub**, you should enable the main-sub working mode, set the trigger source of the sub code reader as the main device, and activate the command trigger mode on the main code reader.

Steps

1. Select **Main Sub** as **Trigger Source**.
2. You can also set the following parameters.
 - **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.
 - **Trigger Cache:** The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.

Set and Execute TCP Client Trigger Mode

In this mode, the external devices act as TCP clients, sending TCP commands to the code

reader for image capturing.

Steps

1. Select **TCP Client Start** as **Trigger Source**.
2. You can also set the following parameters.
 - **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.
 - **Trigger Cache**: The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.
 - **Fuzzy Trigger**: It selects whether to enable fuzzy matching for the start trigger text and stop trigger command string. When enabled, as long as the sent text contains the start trigger text, triggering will begin; as long as the sent text contains the stop trigger command string, triggering will stop. If the start trigger text and stop trigger command string contain each other, only exact matching is supported, and fuzzy matching will no longer be applied.
 - **Continuous Command Triggering**: It configures whether the code reader keeps triggering until receiving the corresponding stop trigger command.
 - **TCP Client Trigger IP**: It sets the IP address of the host triggered by TCP.
 - **TCP Client Trigger Port**: It sets the port No. of the host triggered by TCP.
 - **TCP Client Trigger Text Format**: When receiving the specified trigger text, the client will output a trigger signal. You can select the text format from **Str** or **Hex**.
 - If **Str** is selected, enter the text in string format in the box next to **TCP Client Trigger Text**.
 - If **Hex** is selected, enter the text in hexadecimal format in the box below **TCP Client Trigger Hex Command**. If needed, you can click  to open the ASCII Cross Reference Table and click a table cell to add the corresponding content to the text box.
 - **TCP Client Handshake Request Text**: It customizes the handshake request command under the TCP.
 - **TCP Client Handshake Response Text**: It customizes the handshake response command under the TCP.
 - **TCP Client Return Data to Trigger Port**: It selects whether to return the output result to the triggering port.

Set and Execute Brightness Mode

In this 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. Select **Brightness** as **Trigger Source**.
2. You can also set the following parameters.
 - **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.

- **Trigger Cache:** The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process four trigger signals at most.
- **Brightness Sensitivity:** It sets the brightness sensitivity of the code reader. The larger the parameter, the more sensitive the code reader.
- **Brightness Unrespond Time:** It sets the duration during which the code reader will stop responding to triggers after detecting a brightness change and reading codes. During this period, the code reader will not react to new brightness changes, preventing repeated triggering caused by transient light fluctuations.
- **Brightness Timeout:** It sets the maximum waiting time for the code reader to complete the reading after detecting a brightness change; if the code reading is not completed, it will automatically stop waiting.
- **Brightness Auto Mode:** After it is enabled, the gain and exposure parameters will be automatically adjusted when the brightness is triggered.

7.5.3 Set Stop Trigger

The device supports stopping trigger via TCP server, TCP client, UDP, I/O, 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** → **Stop Trigger Settings**.
2. Enable **TCP Server Stop Trigger Enable**.
3. Set following parameters according to actual demands.
 - **TCP Server Stop Trigger Port:** It is 2001 by default.
 - **TCP Server Stop Trigger Format:** You can select the text format from the drop-down list, including **Str** and **Hex**.
 - If **Str** is selected, enter the text in string format in the box next to **TCP Server Stop Trigger String**. It is **stop** by default.
 - If **Hex** is selected, enter the text in hexadecimal format in the box below **TCP Server Stop Trigger Hex Command**. If needed, you can click  to open the ASCII Cross Reference Table and click a table cell to add the corresponding content to the text box.

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** → **Stop Trigger Settings**.
2. Enable **TCP Client Stop Trigger Enable**.
3. Set following parameters according to actual demands.
 - **TCP Client Stop Trigger IP**: Set the IP address of the TCP client target server.
 - **TCP Client Stop Trigger Port**: Set the port No. of the TCP client trigger.
 - **TCP Client Stop Trigger Format**: You can select the text format from the drop-down list, including **Str** and **Hex**.
 - If **Str** is selected, enter the text in string format in the box next to **TCP Client Stop Trigger String**. It is **stop** by default.
 - If **Hex** is selected, enter the text in hexadecimal format in the box below **TCP Client Stop Trigger Hex Command**. If needed, you can click  to open the ASCII Cross Reference Table and click a table cell to add the corresponding content to the text box.

Stop Trigger via UDP

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

Steps

1. Go to **I/O Control** → **Stop Trigger Settings**.
2. Enable **UDP Stop Trigger Enable**.
3. Set following parameters according to actual demands.
 - **UDP Stop Trigger Port**: It is 2002 by default.
 - **UDP Stop Trigger Format**: You can select the text format from the drop-down list, including **Str** and **Hex**.
 - If **Str** is selected, enter the text in string format in the box next to **UDP Stop Trigger String**. It is **stop** by default.
 - If **Hex** is selected, enter the text in hexadecimal format in the box below **UDP Stop Trigger Hex Command**. If needed, you can click  to open the ASCII Cross Reference Table and click a table cell to add the corresponding content to the text box.

Stop Trigger via I/O

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** → **Stop Trigger Settings**.
2. Enable **I/O Stop Trigger Enable**.
3. Select sources from **LineIn 0/1/2** and **SoftwareTriggerEnd** as **I/O Stop Trigger Source**.
4. (Optional) Set trigger polarity (rising edge and falling edge) if **LineIn 0/1/2** is selected as

I/O Stop Trigger Source. If the trigger source of the input signal is the same as that of the trigger stopping via I/O, there is no need to select.

5. (Optional) Click **Execute** in **Software Stop Trigger** to stop trigger if **SoftwareTriggerEnd** is selected as **I/O Stop Trigger Source**.

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** → **Stop Trigger Settings**.
2. Enable **Serial Stop Trigger Enable**.
3. Set following parameters according to actual demands.
 - **Serial Stop Trigger Format:** When receiving the specified trigger text, the server will output a trigger signal. You can select the text format from **Str** or **Hex**.
 - If **Str** is selected, enter the text in string format in the box next to **Serial Stop Trigger String**. It is **stop** by default.
 - If **Hex** is selected, enter the text in hexadecimal format in the box below **Serial Stop Trigger Hex Command**. If needed, you can click  to open the ASCII Cross Reference Table and click a table cell to add the corresponding content to the text box.

Note

Hex is supported only when the data bits of the serial port is 8.

- **Serial Baud Rate:** It sets the baud rate of the serial port, and it is 9600 by default.
- **Serial Data Bit:** 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, including **No Parity**, **Odd Parity**, and **Even Parity**, and it is **No Parity** by default.
- **Serial Stop Bit:** It sets the stop bits of the serial port, and it is 1 by default.

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 **Max. Output Duration** according to actual demands.

Note

The range of **Max. Output Duration** is between 0 ms and 10000 ms.

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 **Min Code Number** and **Max Code Number** according to actual demands.

Note

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

7.6 Signal Output Settings

7.6.1 Select Output Signal

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

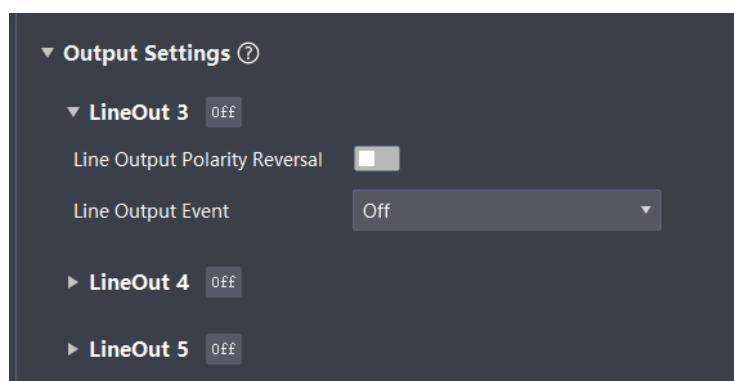


Figure 7-31 Select Output Signal

7.6.2 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** → **Output** → **Output Settings** → **Line Output Event** to select event source.

The device supports following event sources.

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 Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.

Select Acquisition Stop Active

If you select **AcquisitionStopActive** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.

Select Frame Burst Start Active

If you select **FrameBurstStartActive** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.

Select Frame Burst Stop Active

If you select **FrameBurstStopActive** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is

triggered and actual signal starts.

Select Exposure Start Active

If you select **ExposureStartActive** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.
- **LineOut Lead Time:** It sets the advance time of outputting the output signal.

Select Soft Trigger Active

If you select **SoftTriggerActive** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.
- **Software Trigger:** Click **Execute** in **Software Trigger** to output the signal manually.

Select Hard Trigger Active

If you select **HardTriggerActive** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.
- **Hardware Trigger Source:** It sets the hardware trigger source.
- **Hardware Trigger Event:** It sets the trigger activation of trigger event, including **Rising Edge** and **Falling Edge**.

Select Counter Active

If you select **CounterActive** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.

Select Timer Active

If you select **TimerActive** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.

Select No Code Read

If you select **NoCodeRead** as **Line Output Event**, you can set the following parameters.

- **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.

Select Read Success

If you select **ReadSuccess** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.

Select Light Strobe Long

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

Select Command Control I/O

If you select **CommandControlIO** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.
- **TCP Server Port:** It sets the port No. of the TCP server for sending data.
- **TCP Server Return Data to Trigger Port:** It select whether to send the output result back to the triggering device via the same path.
- **TCP Dest. Address:** It sets the IP address of the PC for receiving the data.
- **TCP Dest. Port:** It sets the port No. of the PC for receiving the data.
- **TCP Client Return Data to Trigger Port:** It select whether to send the output result back to the triggering device via the same path.
- **Start Output Text:** It sets the text that initiates data output when the communication tool sends the specified content.
- **Stop Output Text:** It sets the text that terminates data output when the communication tool sends the specified content.
- **Continuous Output Command:** When it is enabled, the client starts output when receiving the start string and ends output only when receiving the stop string.

Select Script Control

If you select **ScriptControl** as **Line Output Event**, you can set the following parameters.

- **Line Output Duration:** It sets the time duration of the output signal.
- **Line Output Delay Time:** It sets the delay time between when the output event is triggered and actual signal starts.

7.6.3 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** → **Output** → **Output Settings**, and enable **Line Output Polarity Reversal**.

Note

The **Line Output Polarity Reversal** function is disabled by default.

7.6.4 Set LED Indicator

The device has 2 user-defined indicators, U1 and U2. They are used to indicate whether some functions of the device are normal or not after you selecting specific events.

Go to **I/O Control Settings** → **LED**, and set corresponding events according to actual demands. When the event you select occurs, indicators will flash once.

Table 7-8 Indicator Description

No.	Parameters	Description
1	Off	No events.
2	Read Success	The indicators flash once when the device reads codes.
3	Who Am I	When multiple code readers are connected, you can select this option and click Execute next to the parameter to make the indicator flash once, helping you identify the currently connected code reader.
4	System Running	The indicators flash once when the device system operates.
5	Be Triggered	The indicators flash once when the device receives trigger signals.
6	LineOut 3	The indicators flash once when LineOut 3 outputs signals.
7	LineOut 4	The indicators flash once when LineOut 4 outputs signals.
8	LineOut 5	The indicators flash once when LineOut 5 outputs signals.

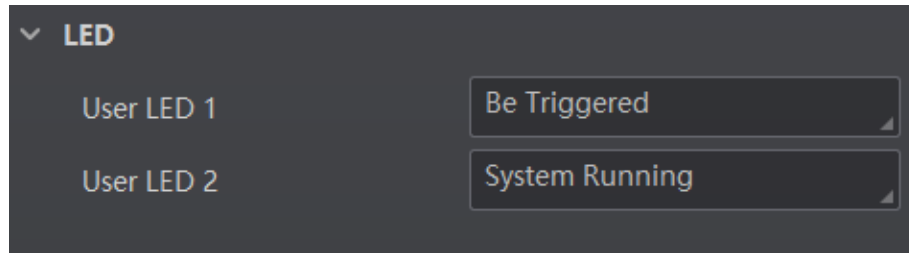


Figure 7-32 Set LED Indicator

7.7 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**, **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.
- If you need communication command for reference, you can open the Communication Commands document by clicking **Help** → **Communication Matrix** on the top menu bar.

7.7.1 Set SmartSDK

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

Table 7-9 SmartSDK Communication Protocol

Parameter	Description
SDK Output Image	It sets whether to enable the output of image data through SDK.
SDK Output Image Quality	After SDK Output Image is enabled, this parameter can be configured to set the compression quality of the output image. The range is 20~99. A higher value indicates better image clarity, but it also increases the storage space required for the image.
Send Trigger ID	It sets whether to enable the output of trigger ID data through SDK.
Image Output Strategy	It sets the source of the image corresponding to the reading result. You can select Recent Frame and Specific Frame .

Parameter	Description
	 Note You can configure this parameter when you enable Trigger On under Read Config → Fast Config .
With Code But NoRead Save Enable	When it is enabled, the client software will store the images detected but not successfully decoded by the code reader.  Note You can configure this parameter when you enable Trigger On under Read Config → Fast Config .

7.7.2 Set TCP Client

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

Table 7-10 TCP Client Communication Protocol

Parameter	Description
TCP Client Chn	It sets the channel connected to the TCP client. Four channels are supported.
TCP Client Chn Enable	If it is enabled, you can set the related parameters for the selected channel.
TCP Dest. Addr	It sets the IP address of the server to be accessed from the code reader.
TCP Dest. Port	It sets the port No. of the server to be accessed from the code reader.
TCP Client Port Lock	If it is enabled, you can set TCP Client Port .
TCP Client Port	It sets the port No. of the code reader for data communication.
Heartbeat Protection	If it is enabled, it will detect the connection status between the client and server, ensuring the reliability and stability of communication.
Barcode as Heartbeat	After Heartbeat Protection is enabled, you can set whether to send the read code data as a heartbeat packet.  Note When both the Barcode as Heartbeat and the configured Heartbeat Text are enabled simultaneously, the software will prioritize sending code data as the heartbeat string. When the code reader is not scanning codes, the content configured in the heartbeat string parameter will be transmitted.

Parameter	Description
Heartbeat Text	It customizes the content of the heartbeat packet to be sent.
Heartbeat Packet Sending Interval	It specifies the time interval for sending heartbeat packets (unit: s).

7.7.3 Set Serial

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

Table 7-11 Serial Communication Protocol

Parameter	Description
Serial Baud Rate	It sets the baud rate of the serial port of the PC that receives data.
Serial Data Bit	It sets the 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 Check	It sets the parity bits of the serial port of the PC that receives data.
Serial Stop Bit	It sets the stop bits of the serial port of the PC that receives data.

7.7.4 Set FTP

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

Table 7-12 FTP Communication Protocol

Parameter	Description
Host IP	It sets the IP address of the FTP server receiving the data.
Host Port	It sets the port No. of the FTP server receiving the data.
User Name	It sets the username used to log in to the FTP server.
User Password	It sets the password used to log in to the FTP server.
Noread Image Format	It sets the image format stored on the FTP server. You can select JPG and BMP .  Note You can configure this parameter when you choose ALL or NoReadBarcode in the FTP Transfer Condition parameter, and Transfer Content contains code pictures.
Image Output Strategy	It sets the source of the image corresponding to the reading result. You can select Recent Frame and Specific Frame .

Parameter	Description
	 Note You can configure this parameter when you enable Trigger On under Read Config → Fast Config .
File Name Encoding Format	It sets the name encoding format of the file stored on the FTP server.
FTP Retransmission	If the transmission fails, you can select whether to automatically retransmit.
FTP Transfer Condition	It sets the trigger conditions for file transmission through, and the following conditions can be selected. • All: Transfer regardless of the decoding result. • ReadBarcode: Transfer through FTP when a code is successfully read. • NoReadBarcode: Transfer through FTP when no code is read.
Transfer Content	It sets the specific content included in the file transfer through FTP. You can set the following content. • JustResult: Only transmit the code reading result in file form. • JustPicture: Only transmit the code image. • ResultAndPicture: Simultaneously transmit the code reading result and image file.
NoRead Image Transfer Strategy	When no barcode is read for FTP transmission (NoReadBarcode), you need to set certain images to transmit. You can select the following strategies.  Note You can configure this parameter when the FTP Transfer Condition is All or NoRead Barcode , and the Transfer Content is JustPicture or ResultAndPicture . • Recent Frame: Transmit the latest image frame. • All Frames: Transmit all collected image frames. • Range Frames: Transmit image frames within a specified range. This strategy requires specifying the image frame range. • Specific Frame: Transmit specified image frames. This strategy requires specifying the image frame sequence number through the Frame Index parameter.
Frame Index	You can precisely select the specific frame to be processed or output.  Note You can configure this parameter when the FTP Transfer Condition is All or NoRead Barcode .
OK/NG Image Directory	It sets whether to store files separately into different directories according to the decoding result (OK or NG).
Transfer Time	It sets the format of the timestamp attached to the file during FTP

Parameter	Description
Format	transmission.
With Code But NoRead Save Enable	When it is enabled, the client software will store the images detected but not successfully decoded by the code reader.  Note You can configure this parameter when you enable Trigger On under Read Config → Fast Config.

7.7.5 Set TCP Server

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

Table 7-13 TCP Server Communication Protocol

Parameter	Description
TCP Server Chn	It sets the channel connected to the TCP server. Four channels are supported.
TCP Server Chn Enable	If it is enabled, you can set the related parameters for the selected channel.
TCP Server Port	It sets the port No. of the code reader for data communication.
TCP Server Auto Reconnect	If the connection with the client is disrupted, you can set whether to automatically reconnect.
Heartbeat Protection	If it is enabled, it will detect the connection status between the client and server, ensuring the reliability and stability of communication.
Barcode as Heartbeat	After Heartbeat Protection is enabled, you can set whether to send the read code data as a heartbeat packet.  Note When both the Barcode as Heartbeat and the configured Heartbeat Text are enabled simultaneously, the software will prioritize sending code data as the heartbeat string. When the code reader is not scanning codes, the content configured in the heartbeat string parameter will be transmitted.
Heartbeat Text	It customizes the content of the heartbeat packet to be sent.
Heartbeat Packet Sending Interval	It specifies the time interval for sending heartbeat packets (unit: s).

7.7.6 Set Profinet

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

Table 7-14 Profinet Communication Protocol

Parameter	Description
Profinet Device Name	You can enter the name of the code reader, which is used for code reader recognition in Profinet protocol communication.
Result Region Size	It selects the buffer size used by the code reader for data exchange in Profinet communication. Please select the result region size reasonably according to the actual situation. • A too-small result region may cause the buffer to be insufficient to store all the data that needs to be transmitted, resulting in data loss or incomplete data transmission. • A too-large result area will occupy more memory resources, which may cause insufficient device memory and affect the operation of other functions.
Response Wait Time	It sets the response time for the code reader after sending a request. If no response is received within this time, the code reader will consider the communication as timed out.

7.7.7 Set MELSEC/SLMP

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

Table 7-15 MELSEC/SLMP Communication Protocol

Parameter	Description
PLC IP	It sets the IP address for the code reader to connect to the PLC.
Server Port	It sets the port for the code reader to connect to the PLC.
Message Frame Type	It sets the communication frame format used by the code reader in the MELSEC/SLMP protocol.
Network Number	It sets the network identity for the code reader in the MELSEC/SLMP network.
PLC Number	It sets the unique identity for the target PLC to ensure that the code reader can address and communicate correctly.
Target PLC IO Number	It sets the starting number of the input/output registers used by the code reader for data exchange in the

Parameter	Description
	MELSEC/SLMP protocol.
Refresh Rate	It sets the frequency of data synchronization between the code reader and PLCs or other external devices.
Control Region Address Offset	It sets the control data register address offset of the code reader in the corresponding communication protocol network, i.e., set the start of control data in the network to ensure correct communication with external devices.
Status Region Address Offset	It sets the status data register address offset of the code reader in the corresponding communication protocol network, i.e., set the start of status data in the network to ensure correct reading and writing of status data.
Result Region Address Offset	It sets the result data register address offset of the code reader in the corresponding communication protocol network, i.e., set the start of result data in the network to ensure correct reading of decoding results or other output data.
Result Region Size	It sets the number of registers used for result data in the corresponding communication protocol network for the code reader, in word units. This parameter determines the capacity of output result data.
Byte Swap Endianness	It sets whether to swap byte transmission order during data transfer. When enabled, bytes are transmitted in Big Endian mode. A high-order byte is the first; a low-order byte is the last. Little Endian mode is the opposite.
Response Wait Time	It sets the response time for the code reader after sending a request. If no response is received within this time, the code reader will consider the communication as timed out.

7.7.8 Set EtherNet/IP

If you select **EtherNet/IP** as the communication protocol, you can configure the following parameters.

Table 7-16 EtherNet/IP Communication Protocol

Parameter	Description
Input Assembly Size	It sets the buffer size of the code reader for receiving data from PLCs or other devices, in bytes. This parameter determines the maximum number of received data.

Parameter	Description
Output Assembly Size	It sets the buffer size of the code reader for sending data to PLCs or other devices, in bytes. This parameter determines the maximum number of transmitted data.
Byte Swap Endianness	It sets whether to swap byte transmission order during data transfer. When enabled, bytes are transmitted in Big Endian mode. A high-order byte is the first; a low-order byte is the last. Little Endian mode is the opposite.
Response Wait Time	It sets the response time for the code reader after sending a request. If no response is received within this time, the code reader will consider the communication as timed out.

7.7.9 Set ModBus

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

Table 7-17 ModBus Communication Protocol

Parameter	Description
ModBus Communication Mode	It includes two modes: Tcp Mode and RS232 Mode . • Tcp Mode refers to ModBus TCP protocol, and is applicable to high-speed and long-distance network communication. • RS232 Mode refers to ModBus RTU protocol, and is applicable to anti-interference communication in industrial environment.
Output Mode	You can select an output mode from Server and Client .
Server IP	When Tcp Mode and Client are selected, it sets the IP address of the Modbus server (i.e., PLC or other device).
Server Port	When Tcp Mode and Client are selected, it sets the port No. of the Modbus server.
Sub Station Address	When Tcp Mode and Client are selected, it sets the identity number of the code reader in the Modbus network. In Modbus communication, each client has a unique identity number to distinguish different devices.
Refresh Rate	It sets the frequency of data synchronization between the code reader and PLCs or other external devices.
Control Region Address Offset	It sets the control data register address offset of the code reader in the corresponding communication protocol

Parameter	Description
	network, i.e., set the start of control data in the network to ensure correct communication with external devices.
Status Region Address Offset	It sets the status data register address offset of the code reader in the corresponding communication protocol network, i.e., set the start of status data in the network to ensure correct reading and writing of status data.
Result Region Address Offset	It sets the result data register address offset of the code reader in the corresponding communication protocol network, i.e., set the start of result data in the network to ensure correct reading of decoding results or other output data.
ModBus Serial Baudrate	When RS232 Mode and Client are selected, it sets the baud rate for data communication.
ModBus Serial Data Bits	When RS232 Mode and Client are selected, it sets the data bits and is 8 by default.
ModBus Serial Parity	When RS232 Mode and Client are selected, it sets the parity bits, including No Parity , Odd Parity , and Even Parity .
ModBus Serial Stop Bit	When RS232 Mode and Client are selected, it sets the stop bits and is 1 by default.
Result Region Size	It sets the number of registers used for result data in the corresponding communication protocol network for the code reader, in word units. This parameter determines the capacity of output result data.
Byte Swap Endianness	It sets whether to swap byte transmission order during data transfer. When enabled, bytes are transmitted in Big Endian mode. A high-order byte is the first; a low-order byte is the last. Little Endian mode is the opposite.
Response Wait Time	It sets the response time for the code reader after sending a request. If no response is received within this time, the code reader will consider the communication as timed out.

7.7.10 Set UDP

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

Table 7-18 UDP Communication Protocol

Parameter	Description
UDP Dest. Address	It sets the IP address of the external device receiving the

Parameter	Description
	output data.
UDP Dest. Port	It sets the port No. of the external device receiving the output data.

7.7.11 Set Fins

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

Table 7-19 Fins Communication Protocol

Parameter	Description
FINS Communication Method	You can select the communication method when using the FINS communication protocol. The options are as follows. • UDP: The UDP communication method has a faster transmission speed but lower data communication reliability compared to the TCP protocol. It is suitable for scenarios that require high real-time performance and can tolerate some data loss. • TCP: The TCP communication method is more reliable than UDP and suitable for scenarios that require data integrity and transmission order.
Server IP	It sets the IP address of the target server (i.e., PLC or other device).
Server Port	It sets the port No. of the target server.
Refresh Rate	It sets the frequency of data synchronization between the code reader and PLCs or other external devices.
Control Region Address Offset	It sets the control data register address offset of the code reader in the corresponding communication protocol network, i.e., set the start of control data in the network to ensure correct communication with external devices.
Status Region Address Offset	It sets the status data register address offset of the code reader in the corresponding communication protocol network, i.e., set the start of status data in the network to ensure correct reading and writing of status data.
Result Region Address Offset	It sets the result data register address offset of the code reader in the corresponding communication protocol network, i.e., set the start of result data in the network to ensure correct reading of decoding results or other output data.
Result Region Size	It sets the number of registers used for result data in the corresponding communication protocol network for the code reader, in word units. This parameter determines the capacity of

Parameter	Description
	output result data.
Byte Swap Endianness	It sets whether to swap byte transmission order during data transfer. When enabled, bytes are transmitted in Big Endian mode. A high-order byte is the first; a low-order byte is the last. Little Endian mode is the opposite.
Response Wait Time	It sets the response time for the code reader after sending a request. If no response is received within this time, the code reader will consider the communication as timed out.

7.8 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.

7.8.1 Format Output

The **Format Output** supports organizing data output through communication protocols according to specific structures, formats, or rules, including adding or removing output content or characters, and configuring the start and end portions of the output content. The client software supports format configuration based on communication protocols. The operation steps are as follows.

Note

- Before using **Format Output**, you should enable communication protocols on the **Communication Settings** page, except for the **SmartSDK Protocol**.
 - When you enable **Script Enable** under the **Lua Script** tab, the format of the output content is controlled by the Lua script. And then, the function of **Format Output** cannot be configured.
-

Steps

1. Go to **Operator Settings** → **Data Processing** → **Format Output**, and enter the **Format Output** tab.

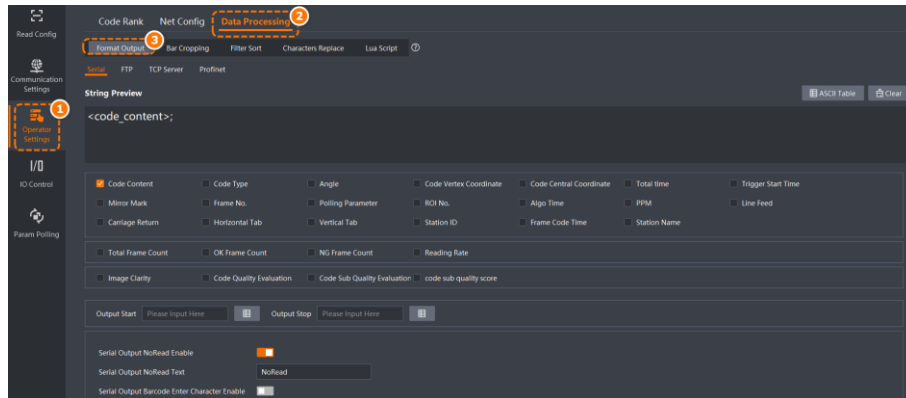


Figure 7-33 Format Output

2. Above the **String Preview** content box, select the communication protocol.
3. In the **String Preview** content box, left-click to specify the cursor position, which determines where the content will be inserted.
4. In the **String Preview** content box below, configure the content to be added, and set the start and end of output content.

The configurable parameters of each communication protocol are described below.

Note

In the upper right corner of the **String Preview** content box, characters can be added by clicking **ASCII Table**. All the added content boxes can be deleted by clicking **Clear**.

FTP

When transferring files generated by the code reader through the FTP protocol, it supports formatting the upload path and transmission image name of the file.

- **FTP Upload Directory String:** You can customize the FTP upload file path, and the content and order included in the file path can be selected according to actual needs, such as **Device ip**, **image**, **Year**, **Month**, **Day**, and characters in the ASCII table.
- **FTP Result File Settings:** You can define the content of the result file for FTP upload. You can choose the content and sequence included in the result name according to your actual needs. You can select **Code Content**, **Code Type**, **Angel**, **Total time**, **Trigger Start Time**, **Mirror Mark** and so on, as well as characters in the ASCII table.

Note

- You can configure this parameter when you select **JustResult** or **ResultAndPicture** on the **Communication Settings** → **Communication Protocols Config** → **FTP Protocol** → **Transfer Content** page.
 - The parameters that can be selected are as shown on the interface, and will not be listed one by one here.
- **FTP Picture Name:** You can customize the FTP upload image name, and you can choose the content and order included in the image name according to actual needs, such as

Read Bar Result, Code Content, Code Type, Frame Time, Trigger No., Frame No., Polling Parameter, ROI No., Incremental Value, and characters in the ASCII table.

Other Protocols

For communication protocols such as TCP client, TCP server, Serial, Profinet, MELSEC/SLMP, EtherNet/IP, ModBus, UDP, and FINS, output content can be formatted.

- **Output Content:** You can customize the output content through the communication protocol. According to actual needs, select the parameter content and order on the configuration interface, such as **Code Content, Code Type, Total Frame Count, OK Frame Count, Code Score, Code Quality Evaluation,** and so on.

Note

The parameters that can be selected are as shown on the interface, and will not be listed one by one here.

- **Output Start/Stop:** It extracts data that starts and ends with specific characters for transmission through the **Output Start** and **Output Stop**. The client software supports formatted editing of output start/stop content. Click the icon  on the right side of **Output Start** or **Output Stop** to open the **Format Editing** window. You can select **Code Count** and **Trigger No.**

Note

During multi-code reading, **Code Count** and **Trigger No.** are output only once.

- ****Output NoRead Enable:** It sets whether to output a preset text when there is no decoding result. When enabled, the preset text can be specified by configuring the ****Output NoRead Text**. The default text is "NoRead".
- ****Output With Code NoRead Text:** The preset text that is automatically output when code image is detected but with decoding failure, which is customizable. The default text is "NoRead". You need enable the function **With Code But NoRead Check Enable** via **Read Config → Code Config → Reading Algorithm Settings** on the main window.

Note

This feature does not support the Smart SDK Protocol and FTP Protocol.

- ****Output NoCode Text:** The preset text that is automatically output when no valid code is detected, which is customizable. The default text is "NoCode". You need enable the function **With Code But NoRead Check Enable** via **Read Config → Code Config → Reading Algorithm Settings** on the main window.

Note

This feature does not support the SmartSDK Protocol and FTP Protocol.

- ****Output Add NoRead Enable:** When you select **CodeNum Stop Trigger** on the **Stop Trigger Settings** interface, you can set no-read quantity padding method. The available options are as follows:

- **Off**: disable this function.
- **Add Noread**: If the minimum number of codes set is 3, when the actual number of codes read is 2, the code reader will output 2 valid codes and 1 code with the content "Noread" (a total of 3 codes).
- **Just Noread**: If the minimum number of codes set is 3, when the actual number of codes read is 2, the code reader will output "Noread".

Note

The default output "Noread" text can be customized in the ****Output NoRead Text** parameter. For example, if it is changed to "No", the output text will also be "No".

- ****Output Barcode Enter Character Enable**: It sets whether to automatically add an enter character after each output content.
- ****Output Barcode Newline Character Enable**: It sets whether to automatically add a newline character after each output content.

7.8.2 Code Cropping

The **Bar Cropping** supports cropping and processing the read code data to meet special handling requirements, such as extracting specific data or specifying code content.

Go to **Operator Settings** → **Data Processing** → **Bar Cropping** and configure the **Barcode Cut Mode** for different code processing needs. Available modes and their parameters are as follows.

Simple Cut

It can crop code data by setting start and end offsets, suitable for extracting specific segments from long codes.

- **Max Code Output Length**: It sets the maximum length of cropped code data to ensure output does not exceed the specified length.
- **Code Start Offset**: It sets the start sequence number for cropping codes from the left, beginning with 1. "0" means no left-side cropping. For example, 2 means cropping the first 2 leftmost data.
- **Code End Offset**: It sets the start sequence number for cropping codes from the right, beginning with 1. "0" means no right-side cropping. For example, 2 means cropping the first 2 rightmost data.

Range Cut

You can set character expression to crop codes. Compared to the Simple Cut, this mode is more flexible, supporting segmented extraction. Rules for character expression are as follows.

- Single character: "(n)" extracts the n character in the code. For example, if the code content is 123456789 and the cropping expression is (5), it will output 5.
- Range: "(m-n)" extracts the continuous segment from characters m to n. For example, if

the code content is 123456789 and the cropping expression is (1-4), it will output 1234.

- **Multiple ranges:** "(m-n,p-q)" extracts multiple different continuous segments. For example, if the code content is 123456789 and the cropping expression is (1-4,6-9), it will output 12346789.
- **Open-ended:** "(n-)" extracts from character n to the end of the code; "(-m)" extracts from the end to the m-last character. For example, if the code content is 123456789 and the cropping expression is (1-), it will output 123456789. If the code content is 123456789 and the cropping expression is (-1), it will output 9.

Pattern Cut

You can use predefined **Pattern Cut Text** to crop or replace code content. Rules are as follows.

- **([]):** No change of the code content. For example, if the code content is CodeA and the cut pattern is ([]), the output code content is CodeA.
- **([String]):** Character Expression mode: Full replacement of the code with String. For example, if the code content is CodeA and the cut pattern is ([OK]), the output code content is OK.
- **([Left],[Right]):** Extract the code content between Left and Right. For example, if the code content is CodeA and the cut pattern is ([Co],[A]), the output code content is de. If the string responding to Left is not found, the code will be cut from the start. If the string responding to Right is not found, the code will be cut from the end.

Note

If the code content is A|Hello, world|A and the cut pattern is ([|],[|]), the output code content is Hello, world. If the code content is A|Hello, world and the cut pattern is ([|],[|]), the output code content is Hello, world. If the code content is Hello, world|A and the cut pattern is ([|],[|]), the output code content is Hello, world.

-
- **([Left],[Right],[Replace]):** Extract the code between Left and Right and use Replace the string between Left and Right with Replace. For example, if the code content is CodeA and the cut pattern is ([Co],[A],[OK]), the output code content is CoOKA.

Universal Cut

You can crop code data based on self-defined logic and rules.

- **Expected Code Length:** It sets the maximum output length of the cropped code data, ensuring that the output code information is shorter than the specified length.
- **Barcode Length Cut Mode:** There are three options:
 - **Left Justifying Cut:** Cut the code from the left based on the set expected code length.
 - **Right Justifying Cut:** Cut the code from the right based on the set expected code length.
 - **User Defined Rule Cut:** When the code length is not equal to the expected length, the self-defined string will be output; when the code length is equal to the expected length, the original code content will be output. This mode specifies the content to be

replaced through the **Specific String Text**.

 Note

If the **Specific String Text** is not configured, it will output the original code content.

7.8.3 Filter Sorting

The client software supports filtering code-reading results through three modes: normal filtering, regular expression filtering, and script-based filtering, and allows setting sorting rules to optimize data output.

Normal Filter

The Filter Rules module supports setting normal rules to filter codes simply, suitable for basic screening requirements such as filtering based solely on code length or fixed-position strings.

The descriptions of parameters are as follows.

Parameters Specific to Normal Filter Mode

- **Only Output Numerics:** When it is enabled, the output code information will be pure numeric data. Non-numeric information will be filtered out.
- **Begins with Specific Strings:** When it is enabled, only codes starting with specific strings will be output. Mismatched codes will be filtered. Enable this feature and enter the specific characters in the **Begins with**.
- **Include Specific Strings:** When it is enabled, only codes containing specific strings will be output. Non-matching codes will be filtered. Enable this feature and enter the specific characters in the **Specific Strings**. Set the start and end of searching the **Specific Strings** in codes by setting the parameters of the **String Search Area Start** and **String Search Area End**.
- **Exclude Specific String Enable:** When enabled, only codes excluding specific strings will be output. Codes containing these strings will be filtered. Enable this feature and enter the characters to exclude in the **Exclude Specific String**. Set the start and end index of searching the **Exclude Specific Strings** in codes by setting the parameters of the **Exclude String Search Area Start** and **Exclude String Search Area End**.

Parameters Common to All Filter Modes

- **Data Output Mode:** This parameter is used to control whether the code reading results are output in real time during the triggering process. You can select the following modes.
 - **Instant output:** The reading results will be output immediately when a code is recognized.
 - **Whole Package Output:** No code results are output during the trigger period. Instead, all merged results are output in a single batch after the trigger ends.
 - **Fixed Time Output:** The timing starts at the rising or falling edge of the trigger signal. After a preset delay time, the code reading result is output via the specified

communication interface.

Note

Only enable **Trigger Mode** can you configure this parameter.

- **Filter Duplicate Code by Trigger:** This parameter is used to control whether duplicate read codes are filtered during continuous triggering. When it is enabled, the system will automatically remove duplicate decoding results within a specified number of triggers, retaining only unique code data to prevent duplicate data output. After enabling this parameter, the **Tigger Count for Filter** can be configured to specify the number of continuous triggers during which duplicate code filtering is applied.
-

Note

Only enable **Trigger Mode** can you configure this parameter.

- **UPCA Auto Zero-Fill:** When it is enabled, auto zero-fill will ensure that a fixed length of the UPC-A code is always 13 digits.
 - **Code Data Output Interval:** If no new code is detected after the set timeout period, the entire batch of data is forcibly output. However, if a new barcode is received, the timer restarts. This parameter can output the complete batch only after the set time has expired.
-

Note

Only disable **Trigger Mode** can you configure this parameter.

- **Filter Duplicate Code by ROI:** When it is enabled, duplicate codes within the ROI will be removed during code recognition and processing, ensuring each code is identified only once.
-

Note

Only enable **ROI Enable** via **Read Config** → **Code Config** → **ROI Settings** can you configure this parameter.

- **Min. Output Duration (ms):** This parameter is used to define the shortest time from the trigger start to the output of the code-reading fusion result by the code reader. If the set time is exceeded before the trigger ends, the code-reading fusion result will be output after the trigger ends.
-

Note

This parameter is available only when the **Trigger Mode** is "On" and the **Whole Package Output** mode is selected.

- **Max. Decoding Length:** It sets the maximum code length. Codes exceeding this length will not be analyzed.
-

Note

- When an image contains N codes, the maximum output length is calculated as: $N * \text{Max. Decoding Length}$.
 - This parameter does not limit formatting characters. If each of the N barcodes contains formatting characters, the maximum output length is: $N * (\text{Barcode Length} + \text{Formatting Character Length})$.
-
- **Min. Decoding Length:** It sets the minimum code length. Codes shorter than this length will not be analyzed.
 - **History Filter Mode:** It filters codes based on the code reader history. Available modes are as follows.
 - **Time-based:** Set a time interval in which only new codes will be read and repeated codes will be filtered. In this mode, the starting point of the time interval can be set by **Filter Time Mode**, with two options of **First Read Code Mode** and **Last Read Code Mode**; the time interval can be set by configuring the **Filter Time (ms)**.
 - **Quantity-based:** Set a history code-reading range in which only new codes will be read and repeated codes will be filtered. In this mode, the code-reading range can be set by configuring the **Max history code num value**.
 - **Read Times Threshold:** It sets the times threshold for code reading. A code is considered valid and output only if its decoding times exceed this threshold; otherwise, it is regarded invalid and the results will not be output.
 - **JPEG Transmission Conditions:** It sets the conditions for transmitting JPEG image data. The available conditions are as follows.
 - **All:** The code reader transmits JPEG image data regardless of decoding results.
 - **ReadBarcode:** The code reader transmits JPEG image data only when a code is successfully read.
 - **NoReadBarcode:** The code reader transmits JPEG data only when no code is read.

Regular Expression Filter

The Filter Rules module supports setting regular expressions for complex matching and filtering of codes, such as handling dynamically changing components or matching multiple formats.

You can follow these steps to configure regular expression filtering.

Steps

1. Select **Regular Expression** as the **Filter Mode**, and click **Config** in **Regular Expression Quick Config** 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.

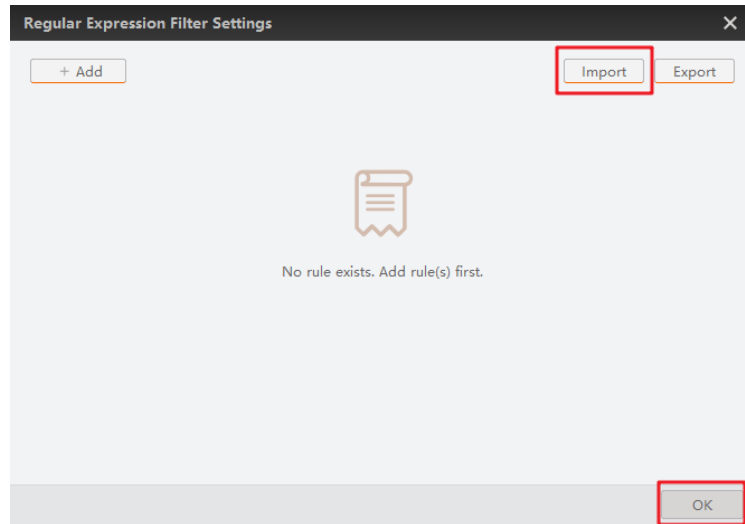


Figure 7-34 Regular Expression Filter Settings

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

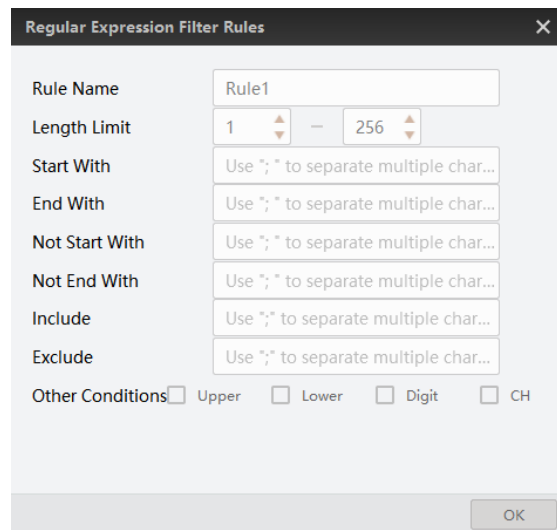


Figure 7-35 Enter Customized Regular Expression Filter Rules

Table 7-20 Filter Rule Parameters

Parameter	Description
Rule Name	The default rule name is Rule 1, and you can edit it according to actual demands.
Length Limit	It sets the length range of the code, and its upper limit is 256.
Start With	It sets the specific start with code. You can use semicolon to separate if there are multiple characters.  Note

Parameter	Description
	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.
Include	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.
Exclude	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. (Optional) After setting filter rule, enter the code in **Code Check** to check if the filter rule is successful.

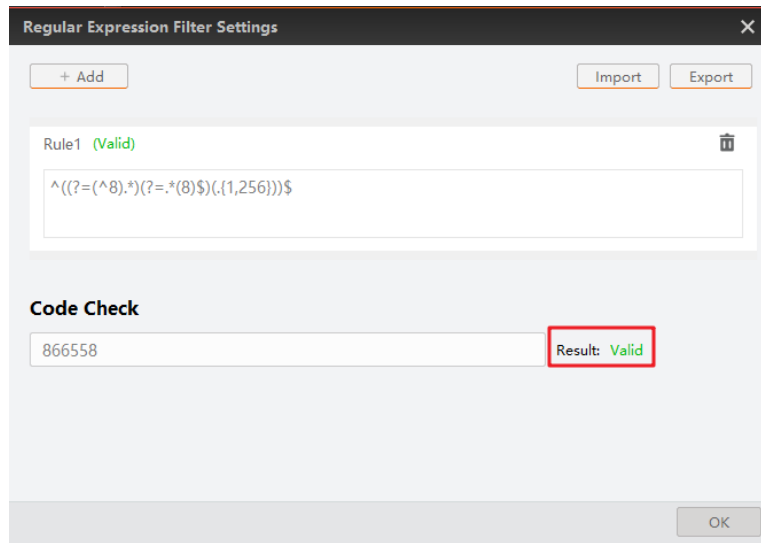


Figure 7-36 Code Check

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.
 6. Click **Ok** at the bottom of the **Regular Expression Filter Settings** page to save the configured regular expressions.
 7. Select the valid regular expression rules through the **Regex Group Num** in the **Filter Rules**.
-

Note

- The filter rule parameters of the regular expression may differ by device models and firmware versions.
 - For descriptions of other configurable filter parameters, please refer to section [Parameters Common to All Filter Modes](#).
-

Script

When a Lua script is imported, the code reader prioritizes the script filtering for data processing, rendering both normal and regular expression filtering ineffective. For more details, please refer to section [Lua Script](#).

Sorting Method

The Sorting Method module supports setting rules to sort code data, applicable for

scenarios requiring ordered processing of decoded data.

Go to **Operator Settings** → **Data Processing** → **Filter Sort** to configure sorting rules in the **Sorting Method**. Parameter descriptions are as follows:

- **Sorting Rules**

Select sorting rules for the output results based on requirements. Available options include:

- **ROI ASC/DESC**: Output results based on ascending or descending ROI of codes.
- **Center Coordinate X ASC/DESC**: Output results based on ascending or descending X-coordinate of code center points.
- **Center Coordinate Y ASC/DESC**: Output results based on ascending or descending Y-coordinate of code center points.
- **Scan ASC/DESC**: Output results based on ascending or descending scanning sequence of codes.
- **Code Type ASC/DESC**: Output results based on ascending or descending code types.
- **Code Length ASC/DESC**: Output results based on ascending or descending content length of codes.
- **CodePositionLeft/Right/High/Low High/Low/Left/Right**: Sort based on the vertex positions of codes in the image. Determine the primary and secondary basis for the sorted output by selecting the primary priority and secondary priority.
- **CodeCenterPositionLeft/Right/High/Low High/Low/Left/Right**: Sort based on the central point positions of codes in the image. Determine the primary and secondary basis for the sorted output by setting the primary priority and secondary priority.
- **Sort Tolerance (px)**: It sets the allowable position deviation when sorting by primary priority (unit: px).
- **One by One Enable**: It sets whether to output code information sequentially at specified intervals, with only one code output at a time followed by a default carriage return and line feed after each code. After enabling this parameter, you can specify the time interval between each output of code information by setting the **One By One Interval(ms)**.
- **Fill in Code Pos Width**: It sets whether to fill the values in the code position coordinates to specified digits. When enabled, the filling digits can be configured via the **Code Pos Width**.

If the digits of the x or y in the code position coordinates (x, y) is less than the **Code Pos Width**, you can add "0" to x and y until their digits reach the **Code Pos Width**. If the digits already meet or exceed **Code Pos Width**, no processing is applied.

 Note

This parameter is available when communication protocols other than the smartSDK protocol are enabled.

- **Fill in ROI Output Noread**: When it is enabled, the code reader verifies decoding results based on the number of configured ROIs. If a ROI fails to read a code, a customizable NoRead filling text (default: "NoRead") is output to ensure the total number of decoding results is consistent with the set ROI count.

Note

This parameter is available when communication protocols other than the smartSDK protocol are enabled.

7.8.4 Characters Replace

The **Characters Replace** function allows you to standardize code output by replacing specified characters or performing case conversion on the decoded content.

Steps

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

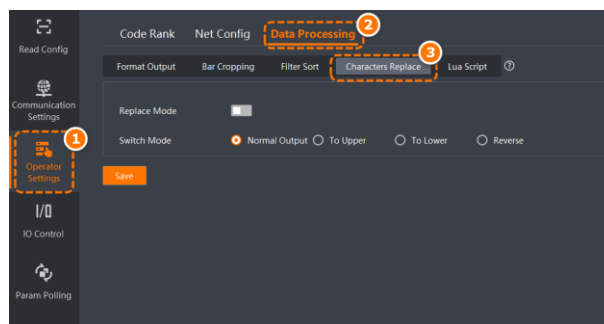


Figure 7-37 Characters Replace

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

You can click  next to the input field and select characters from the **ASCII Table**.

- 4) Repeat the above steps to add multiple character replacement rules.

To delete a rule, select the box next to the rule and click **Delete** to remove it.

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

Result

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

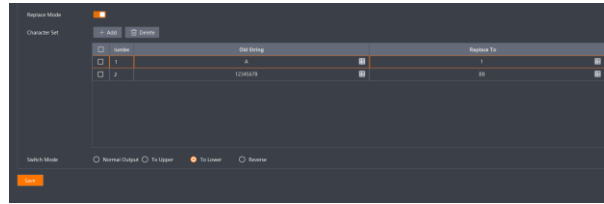


Figure 7-38 Example of Characters Replace

7.8.5 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 starting 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.

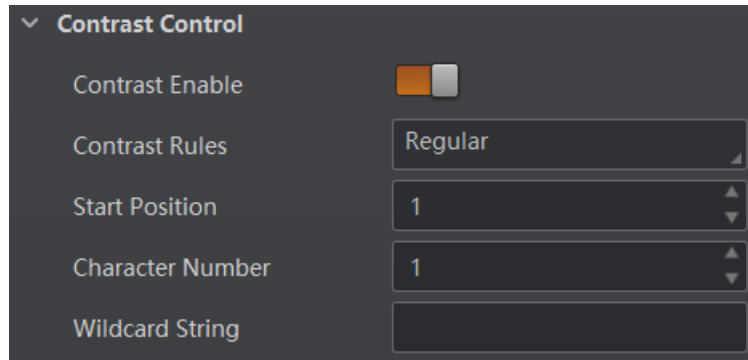


Figure 7-39 Regular Contrast

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 starting 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 to 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).

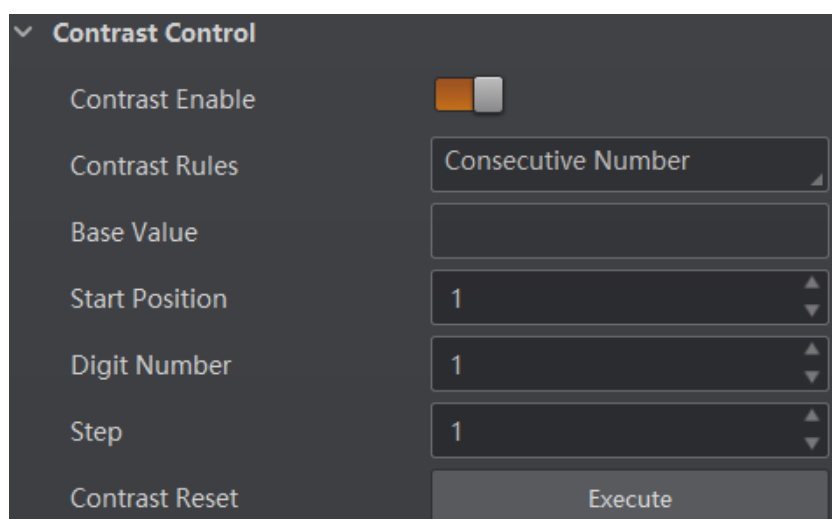


Figure 7-40 Consecutive Number Contrast

7.9 Multi-Reader Synchronization

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

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

Table 7-21 Comparison of Networking Modes

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

Networking Mode	Primary Purpose	Working Principle	Application Scenario
	of multiple code readers	reading results to the main and the main integrates and transmits the reading results to the corresponding host or client system.	multi-station setups, or large-area scanning requiring coordinated output.

7.9.1 Main-Sub Configuration

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

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

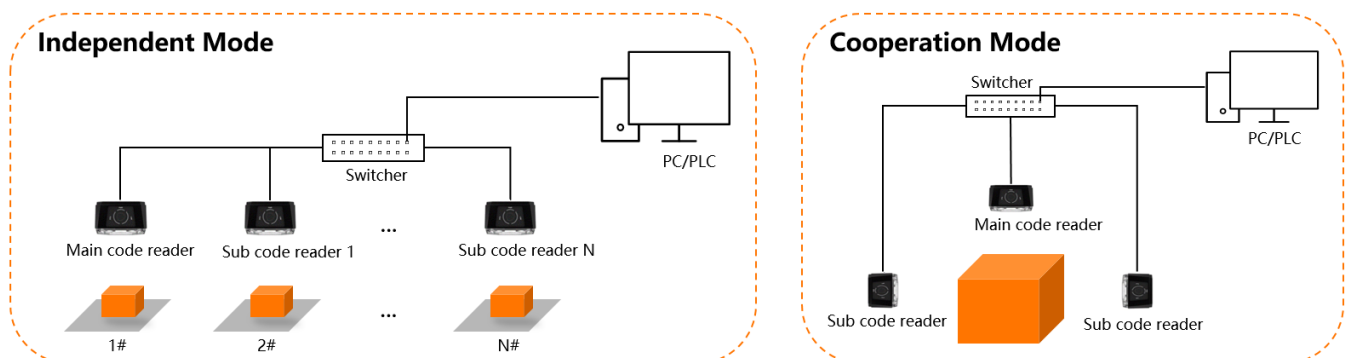


Figure 7-41 Diagram of Working Mode

Table 7-22 Mode Overview

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

Mode	Description	Use Case	Benefits
	before sending to the host.	with multiple sides which require multi-angle reading.	simplifies host-side integration and processing.

Steps

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

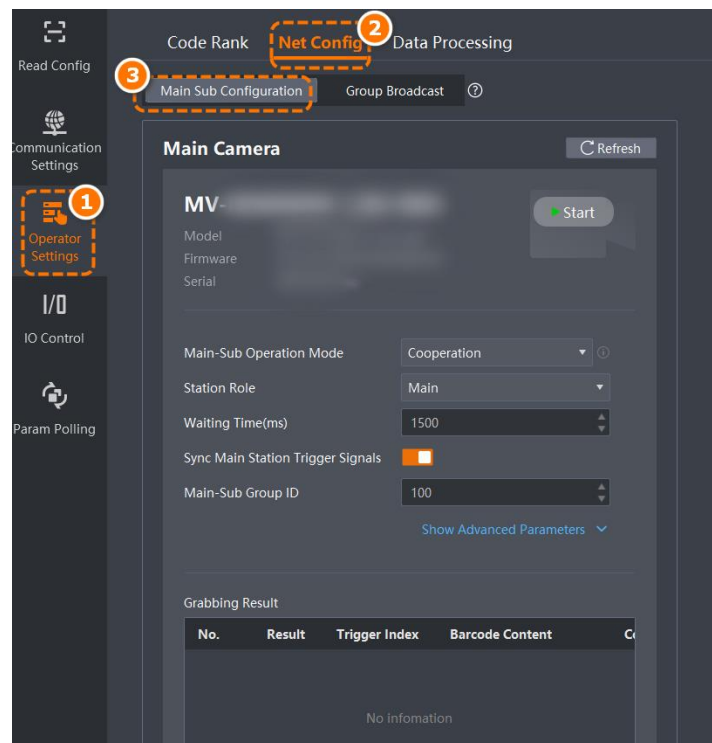


Figure 7-42 Main Sub Configuration

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

Common Parameters

Main-Sub Operation Mode

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

Note

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

- **Off:** Main-sub configuration feature is disabled.

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

Note

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

Station Role

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

Waiting Time (ms)

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

Note

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

Sync Main Station Trigger Signals

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

Note

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

Main-Sub Group ID

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

Advanced Parameters

Station Port

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

Sync Main Station ROI

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

Note

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

Display Sub Station Reading Data

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

Query Sub Station ID

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

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

Note

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

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

Note

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

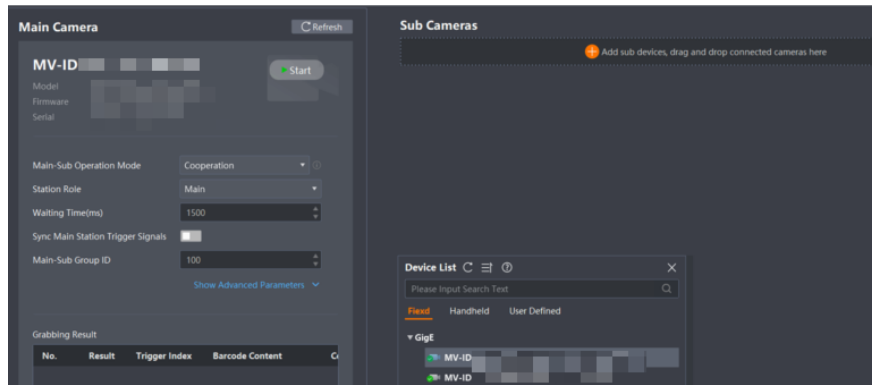


Figure 7-43 Example of Adding Sub Cameras

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

Common Parameters

Main-Sub Operation Mode

Select the same mode as the main code reader.

Station Role

Select **Sub**.

Main-Sub Group ID

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

Station ID

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



Note

This parameter is read-only and cannot be edited.

Main Station IP

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



Note

This parameter is read-only and cannot be edited.

Main Station Connection Status

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

Note

This parameter is read-only and cannot be edited.

Advanced Parameters

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

Main Station Name

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

Main Station Model

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

Main Station Serial Number

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

6. Configure the main-sub station trigger source according to the actual scenario. For the operation details, refer to section [Signal Input Settings](#).

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

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

Note

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

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

Note

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

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

What to do next

After the main-sub configuration is finished, you can proceed to configure data processing rules and data output settings. Refer to section [Data Processing Settings](#) and section

[Communication Settings](#) for details.

7.9.2 Multicast

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

You can go to **Operator Settings** → **Net Config** → **Group Broadcast** on the Navigation Bar of the main window to configure the following parameters.

Note

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

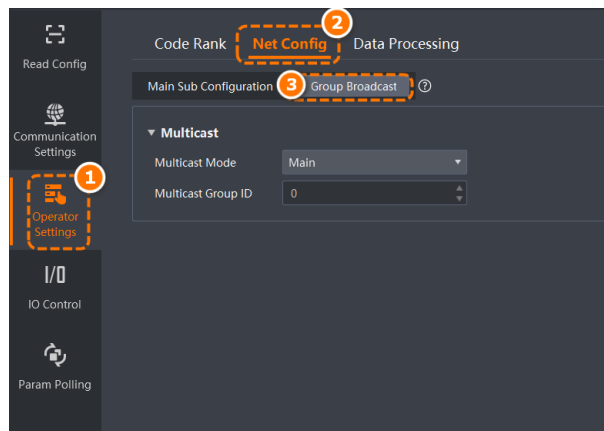


Figure 7-44 Group Broadcast

Multicast Mode

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

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

Multicast Group ID

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

7.9.3 Multi Frame

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

Before You Start

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

Steps

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

Note

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

2. (Optional) Customize window division.

- 1) In the **Custom Division** window, click **Add** in the upper-left corner.

Note

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

- 2) Enter a division name and click **OK**.

- 3) Select the optimal grid under **Window Division**, with options including **2x2**, **3x3**, and **4x4**.

- 4) Adjust the division by clicking **Merge** to merge the adjacent windows or clicking **Split** to split the merged windows.

Note

Up to 16 windows are supported.

- 5) Click **Save**.

3. Select code reader for preview.

- In 1-window mode, the selected code reader is displayed by default. To switch windows, drag other connected code readers from the device list to the preview window. The 1-window preview is shown below.

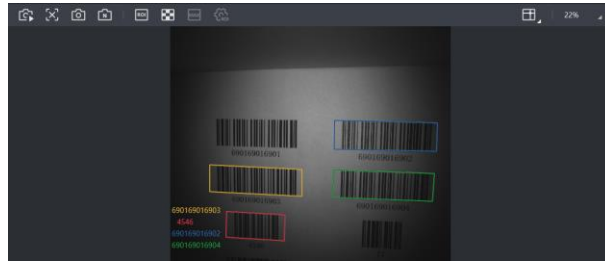


Figure 7-45 1-Window Preview

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

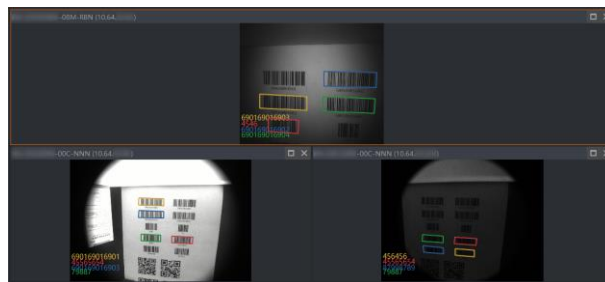


Figure 7-46 Multi-Window Preview

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

What to do next

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

7.10 Lua Script

Note

Lua Script is available for some device models.

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

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

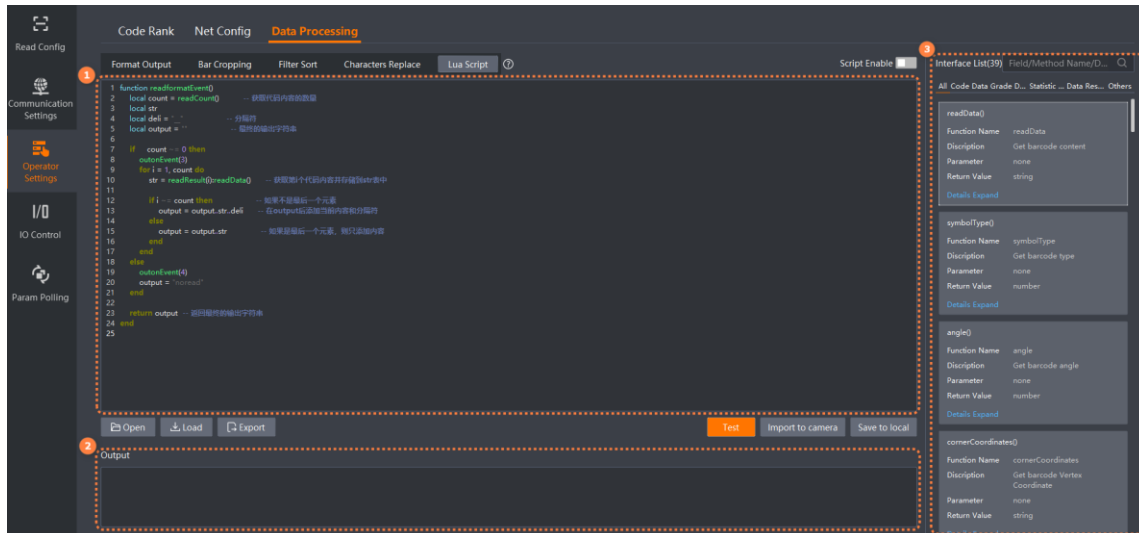


Figure 7-47 Lua Script

The descriptions of each module are in the table below.

Table 7-23 Lua Script Module Description

No.	Module Name	Function Description
1	Script Editing Area	It is used for editing Lua script code. Note The script editing area supports real-time syntax notification. Button functions in the script editing area are introduced below: • Script Enable: Select whether to enable the format output function of the Lua Script. Once it is enabled, format output cannot be configured. Note When the script contains formatting-related API, it will be enabled automatically. • Open: Open the local script files. • Load: Load script files from the code reader. • Export: Export Lua scripts from the code reader to the selected directory. • Test: Execute the scripts in the script editing area and view the results in the output area. • Import to Camera: Save the scripts in the script editing area to the connected code reader. • Save to Local: Save the scripts in the script editing area as Lua files to the local.

No.	Module Name	Function Description
2	Script Output Area	You can view script execution results here. • If compilation is successful, this area will show Verify Success with test results. • If compilation is failed, it will display error details and line numbers.
3	API List	Display supported Lua APIs and related descriptions.  Note Some APIs provide sample codes. You can check and copy sample codes.

Using the Lua Script requires some cautions and procedures. Refer to the latest version of **IDMVS Client Software User Manual** for details.

7.11 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 7-24 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.

Parameter Name	Description
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.

The screenshot shows a software interface titled "Statistics Info". It contains a list of statistics with corresponding numerical values, all currently set to 0. At the bottom, there is a button labeled "Execute".

Statistics Mode	Value
Statistics Mode	All Frames
Total Frame Number	0
Read Frame Number	0
Noread Frame Number	0
Read Rate(%)	0
Algo Time Ave(ms)	0
Algo Time Max(ms)	0
Algo Time Min(ms)	0
Read Time Ave(ms)	0
Read Time Max(ms)	0
Read Time Min(ms)	0
Reset Statistics	Execute

Figure 7-48 Statistics Information

7.12 External Command Control

The External Command Control function is designed to handle non-standard communication protocols. Upon receiving data, the device performs a validity check based on user-defined length of header data, trailer data, and private data. Validated data will be delivered via the DSP's (digital signal processor) private data interface.

You can configure the command parameters through the **External Command Control** module in the client software.

Steps

1. In the upper-right corner of the client software main interface, click **All Features**.
2. On the **All Feature** page, click **External Command Control**.
3. Select **TCP/UDP/Serial** as **External Command Protocols** and configure the following parameters.
 - **TCP/UDP/Serial Command Enable**: When it is enabled, the code reader transmits data via TCP/UDP/Serial communication protocol.

- **TCP/UDP Command Port:** You can set the port No. for TCP/UDP communication.
-

 Note

When TCP/UDP protocol is enabled, ensure this port No. differs from the port No. in **Communication Configuration**.

When **Serial** is selected, the following parameters need to be configured.

- **Serial Baudrate:** It refers to the serial port baud rate of the code reader, which represents the number of bits (bit/s) transmitted per second by the serial port.
-

 Note

Please ensure that the serial port baud rate of the code reader and the target device are the same to avoid data loss or errors.

- **Serial Data Bits:** It refers to the bit for each character during data transmission, including **7** and **8**. It is usually set to 8 bits.
-

 Note

The Hex trigger is only available for 8 serial data bits.

- **Serial Parity:** It refers to the bit used to detect transmission errors, with the following three methods:
 - **NoParity:** Do not use the parity bit.
 - **Odd Parity:** Add a parity bit at the end of the data to ensure that there is an odd number of 1s. Upon receiving the data, the receiver checks whether the count of 1s is odd. If it is not, a data transmission error is assumed.
 - **Even Parity:** Add a parity bit at the end of the data to ensure that there is an even number of 1s. Upon receiving the data, the receiver checks whether the count of 1s is even. If it is not, a data transmission error is assumed.
 - **Serial Stop Bits:** It refers to the bit used to identify the end of strings after data transmission, including **1** or **2**.
-

7.13 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.

Chapter 8 I/O Electrical Feature and Wiring

This section introduces the I/O electrical features and wiring methods of the device. The device has three opto-isolated input signals and three opto-isolated output signals.

8.1 Input Signal

The device's LineIn 0/1/2 are input signals, and their internal circuit is as follows.

Note

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

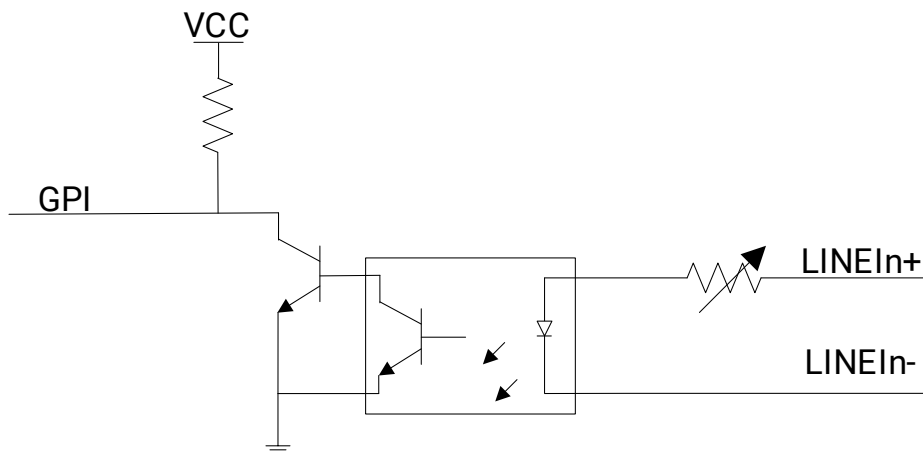


Figure 8-1 Internal Circuit of Input Signal

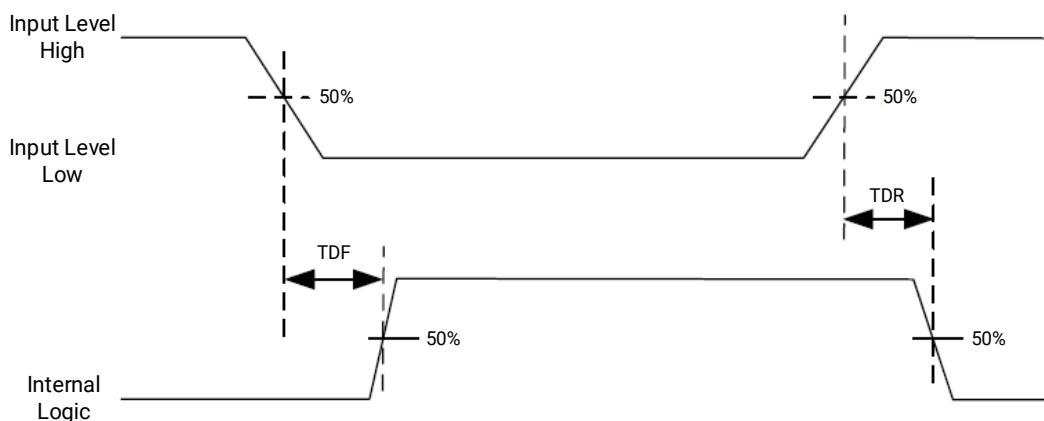


Figure 8-2 Input Logic Level

Table 8-1 Input Electrical Feature

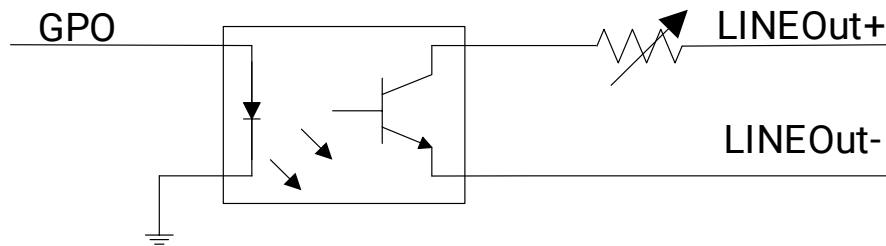
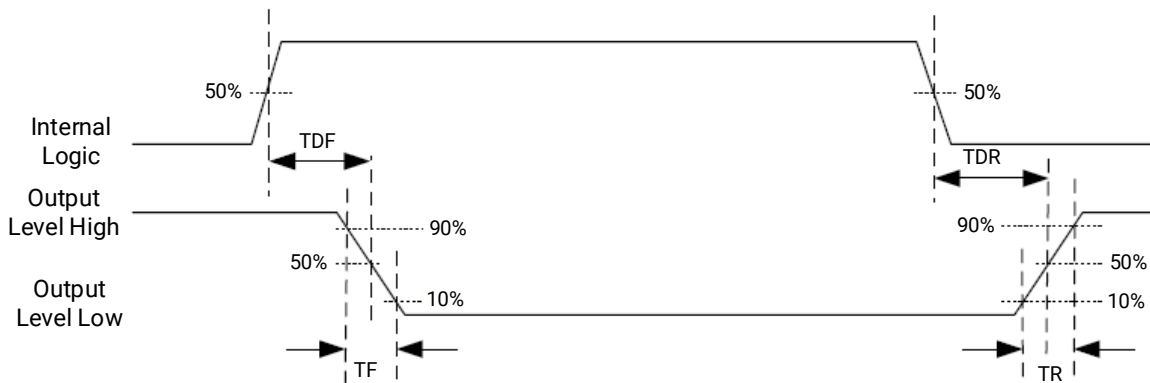
Parameter Name	Parameter Symbol	Value
Input Logic Level Low	VL	1.5 VDC
Input Logic Level High	VH	2 VDC
Input Falling Delay	TDF	81.6 μ s
Input Rising Delay	TDR	7 μ s

8.2 Output Signal

The device's LineOut 0/1/2 are output signals, and their internal circuit is as follows.

Note

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


Figure 8-3 Internal Circuit of Output Signal

Figure 8-4 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 8-2 Output Electrical Feature

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

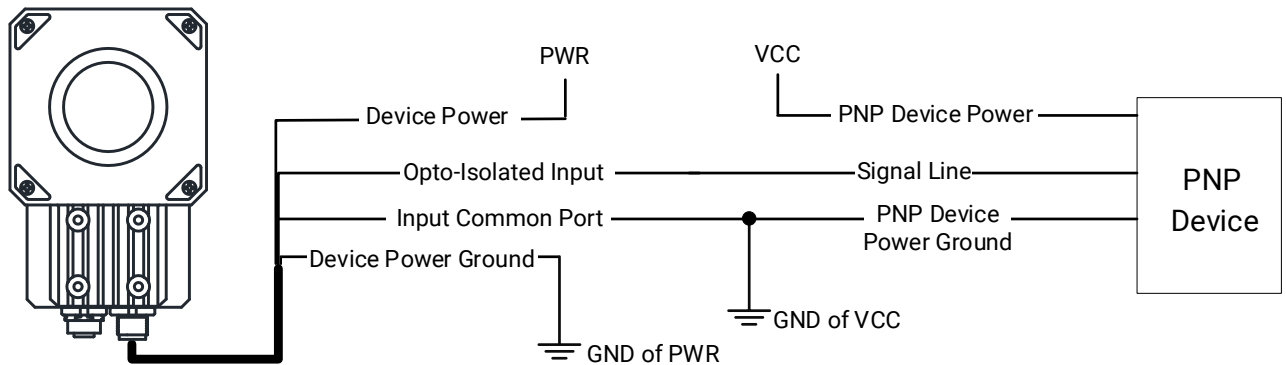
8.3 Input Signal Wiring

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

Note

Input signal wiring may differ by external device types.

PNP Device

**Figure 8-5 Input Signal Connecting to PNP Device**

NPN Device

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

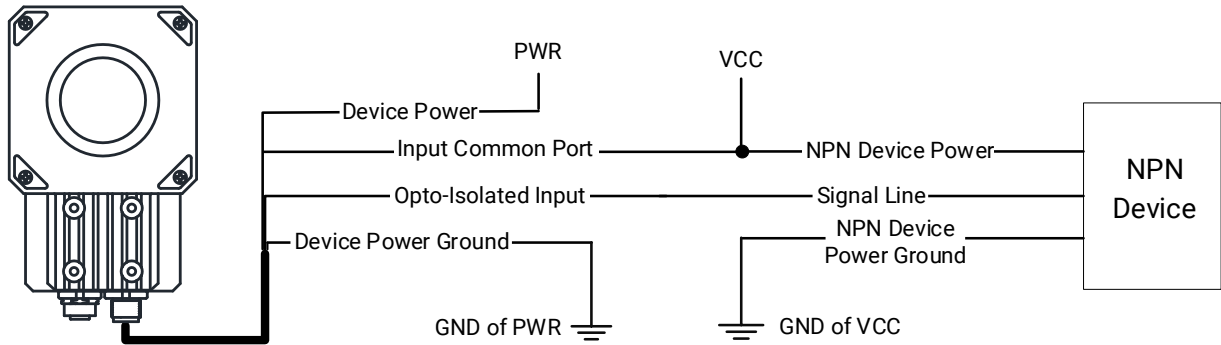


Figure 8-6 Input Signal Connecting to NPN Device Without Pull-Up Resistor

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

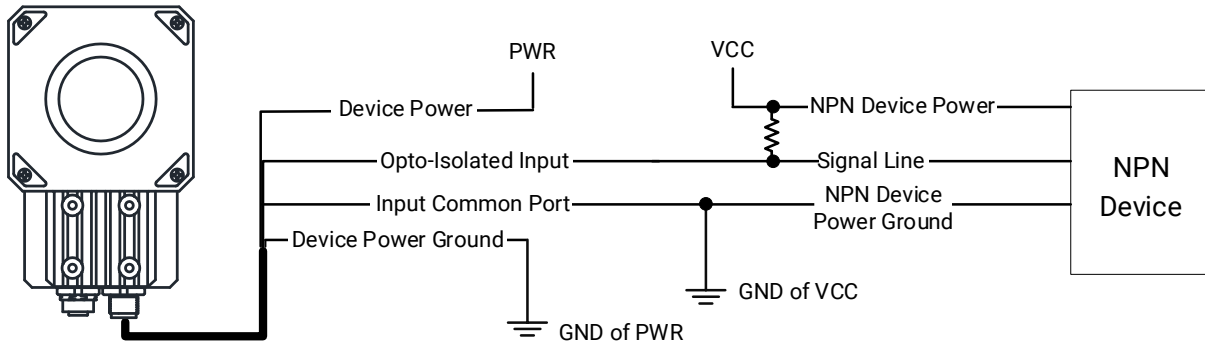


Figure 8-7 Input Signal Connecting to NPN Device with Pull-Up Resistor

8.4 Output Signal Wiring

The device can output signal to external devices via I/O interface, and here we take LineOut 0 as an example to introduce output signal wiring.

Note

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

PNP Device

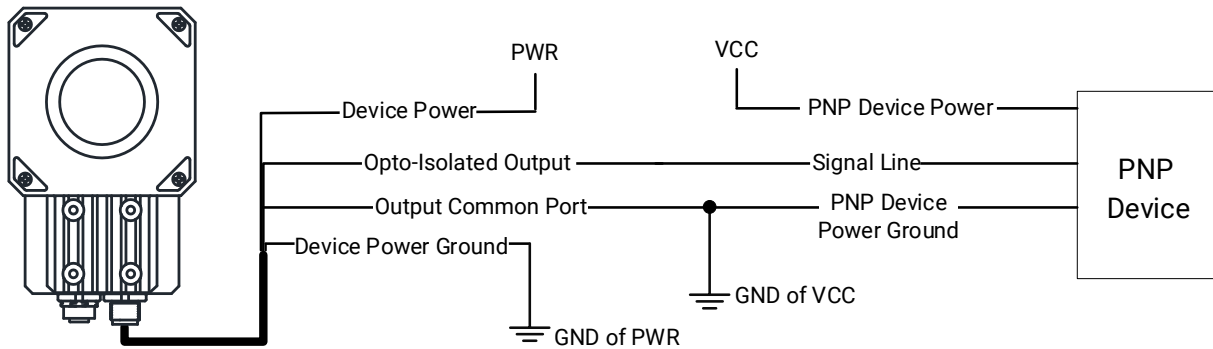


Figure 8-8 Output Signal Connecting to PNP Device

NPN Device

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

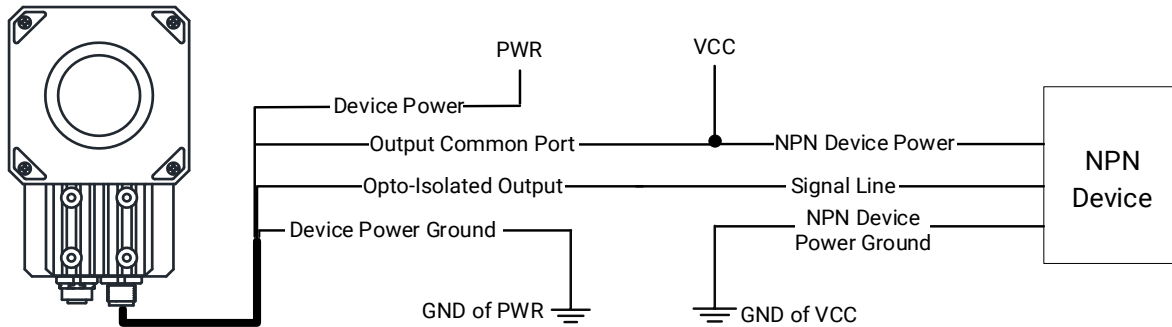


Figure 8-9 Output Signal Connecting to NPN Device Without Pull-Up Resistor

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

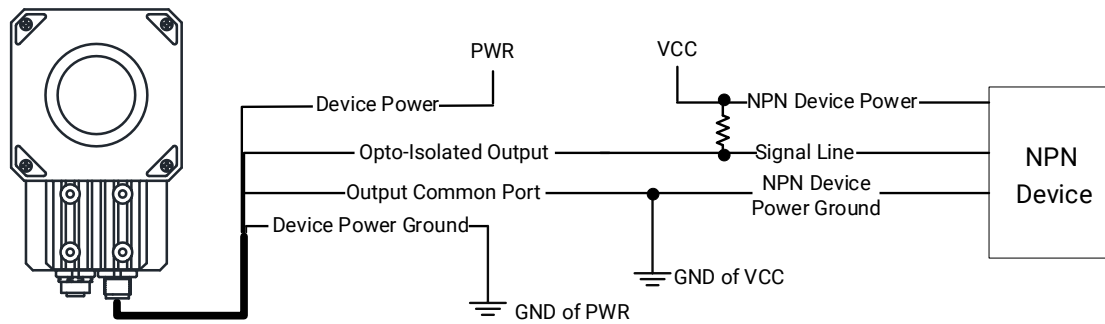


Figure 8-10 Output Signal Connecting to NPN Device with Pull-Up Resistor

8.5 RS-232 Serial Port

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

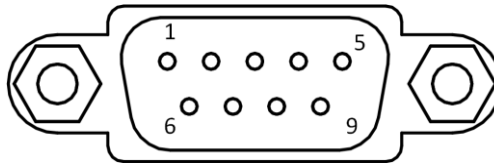


Figure 8-11 9-Pin Male Connector

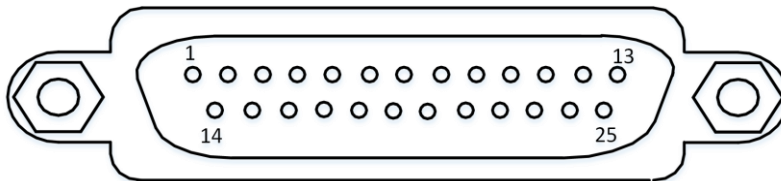


Figure 8-12 25-Pin Male Connector

Table 8-3 Pin Definitions

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

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

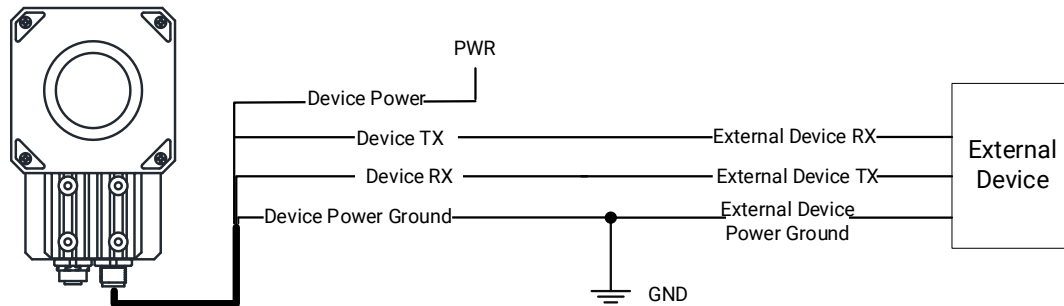


Figure 8-13 RS-232 Serial Port Wiring

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 blue) to make sure the device is powered up normally.
Network exception occurs.	Check the network connection (the LNK indicator is solid green or the ACT indicator is flashing yellow) to make sure the device can be connected to the network normally.

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 quality is very poor during the live view?

Table 9-3 Question 3

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

9.4 Why there is no image in the live view?

Table 9-4 Question 4

Possible Cause	Solution
Trigger mode is enabled, but there is no trigger signal.	Send the trigger signal to the device, or disable the trigger mode.
Incorrect running mode settings, and no codes are recognized within the field of view.	Set the running mode as the test mode.

9.5 Why codes within the field of view cannot be recognized?

Table 9-5 Question 5

Possible Cause	Solution
Correct code types are not selected in the Algorithm Settings .	Go to Algorithm Settings , and select different types of codes according to actual demands.

9.6 Why the recognized codes are incomplete?

Table 9-6 Question 6

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

Chapter 10 Revision History

Table 10-1 Revision History

Version No.	Date	Revision Details
V3.1.0	Aug. 18, 2026	• Add Section Configure via IDMVS WEB. • Edit Section Set Light Source. • Edit Section Set X/Y-Axis Mirror. • Edit Section Set Test Image Mode. • Edit Section Signal Input Settings. • Edit Section Signal Output Settings. • Edit Section Communication Settings. • Edit Section Format Output. • Edit Section Code Cropping. • Edit Section Filter Sorting. • Add Section External Command Control.
V3.0.0	Mar. 18, 2026	Edit the whole structure and content.
V2.5.0	Feb. 9, 2022	• Edit Section Set Code Reading ROI. • Edit Section Set 1D Algorithm Parameter. • Edit Section Set 2D Algorithm Parameter. • Edit Section Set Filter Rule • Edit Section Set Result Format.
V2.2.0	Apr. 29, 2021	• Edit Section Appearance. • Edit Section Installation Preparation. • Edit Section Set Exposure. • Edit Section Set Gain. • Edit Section Set Light Source. • Edit Section Set 1D Algorithm Parameter. • Edit Section Set 2D Algorithm Parameter. • Add Section Set Code Quantity Evaluation. • Add Section Set Stack Code Algorithm Parameter. • Edit Section Set Code Reading ROI. • Edit Section Set Self-Adaptive Adjustment. • Add Section Set Time.
V2.0.0	Nov. 25, 2020	• Add Section Set Exposure. • Add Section Set Gain. • Edit Section Set Polling. • Edit Section Set Lens Focus. • Edit Section Add Barcode. • Edit Section Set 1D Algorithm Parameter. • Edit Section Set 2D Algorithm Parameter.

Version No.	Date	Revision Details
		• Edit Section Set Code Reading ROI. • Add Section Set Self-Adaptive Adjustment. • Add Section Set and Execute Self Trigger Mode. • Edit Section Set Event Source. • Edit Section Set Filter Rule. • Edit Section Set Result Format. • Add Section Compare Control Settings. • Edit Section Communication Settings. • Add Section Statistics Information. • Add Section Event Report.
V1.0.0	Dec. 20, 2019	• 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



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