CR-RS210 Fixed-Mount Barcode Reader
User Manual

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Preface

Overview

This document applies to the CR-RS210 fixed-mount barcode reader. It primarily covers the installation and usage details for this model. Please read the operating manual carefully before using this product to avoid any misuse.

Applicable Personnel

This document is intended for the following individuals:

- Sales Engineer
- Development Engineer

Symbol Conventions

symbol	illustrate
 illustrate	Description mark, indicating supplementary description and detailed explanation of the content.
 Warning	Warning sign, indicating that the operation is risky and failure to comply may result in equipment failure or damage.
 Danger	Danger means that the operation is dangerous and may cause personal safety accidents if not followed. Please be sure to follow it.

Document Version

Document version number	Release Time
V1.1	2025/07/8

Safety Instructions

Please read and follow these safety precautions before installing, operating, and maintaining the equipment.

Security Statement

1. To ensure personal and equipment safety, please follow all safety precautions marked on the equipment and in the manual when installing, operating, and maintaining the equipment.

2. This equipment should be used in an environment that meets the design specifications. Otherwise, it may cause malfunction. Functional abnormalities or component damage caused by failure to comply with relevant regulations are not covered by the equipment quality assurance scope.

3. Our company will not bear any legal responsibility for personal safety accidents, property losses, etc. caused by illegal operation of equipment.

Precautions for safe use

Warning

1. During the installation and use of the product, all electrical safety regulations of the country and the area of use must be strictly observed.

2. Please strictly follow the installation method in this guide to install the equipment and ensure that the equipment is firmly fixed.

3. Do not install the product indoors in an environment where it may be exposed to water or other liquids. If the product gets wet, it may cause fire and electric shock hazards!

4. If the product starts to smoke, produce an odor, or make noise, please turn off the power immediately and unplug the power cord, and contact the dealer or service center in time.

5. Please be sure to use the power adapter provided by a regular manufacturer. The power adapter must

comply with the power limit requirements (LPS) of safety regulations. For specific requirements, please refer to the product technical specifications.

6. The plug or socket of the equipment is the device for disconnecting the power supply. Please do not block it to ensure easy plugging and unplugging.

7. Make sure to disconnect the power supply when performing wiring, disassembly, etc. Do not operate with power on, otherwise there is a risk of electric shock!

8. During the installation, maintenance and debugging process, looking directly at this product may cause damage to the eyes. Protective measures such as wearing protective glasses should be taken during operation.

9. Do not point the lens at strong light (such as lighting, sunlight or laser beam, etc.), otherwise the image sensor will be damaged.

10. If the product does not work properly, please contact the nearest service center. Do not disassemble or modify the product in any way. (The company does not assume any responsibility for problems caused by unauthorized modifications or repairs).

11. Please strictly follow the relevant national regulations and standards to dispose of the product to avoid environmental pollution and property loss.

Notice

1. Before unpacking, please check whether the product packaging is intact and whether there is any damage, moisture, dampness, deformation, etc.

2. Please store and transport the product in accordance with the storage and transportation conditions. The storage temperature and humidity should meet the requirements.

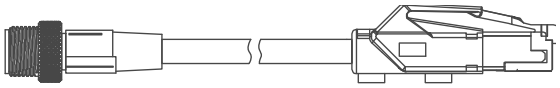
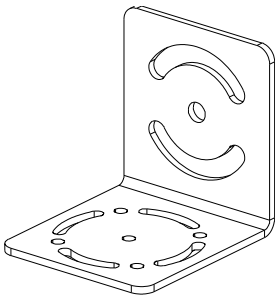
3. Do not use the product in extremely hot, cold, dusty, corrosive or high humidity environments. For specific temperature and humidity requirements, please refer to the product parameter table.

4. Do not place any exposed flame source, such as a lit candle, on the device.

1. Product introduction

1.1 Packaging and accessories

1. CR-RS210 fixed-mount barcode reader
2. Adapter cable 1 (network cable)
3. Adapter cable 2 (IO & power cable)
4. L-shaped fixing bracket

	
Figure 1-3-1 CR-RS210 body diagram	Adapter cable 1
	
Adapter cable 2	Shaped fixing bracket

Illustrate：

- Note 1: The adapter cable 1 required for CR-RS210 device connection is a standard 4-pin aviation plug to IO & power adapter cable, which can use a standard aviation head industrial cable
- Note 2: The adapter cable 2 required for CR-RS210 device connection is a standard 12-pin aviation plug to RJ45 (network cable) adapter cable, and a standard aviation head industrial cable can be used.

2. Preparation

2-1 Installation and Fixing

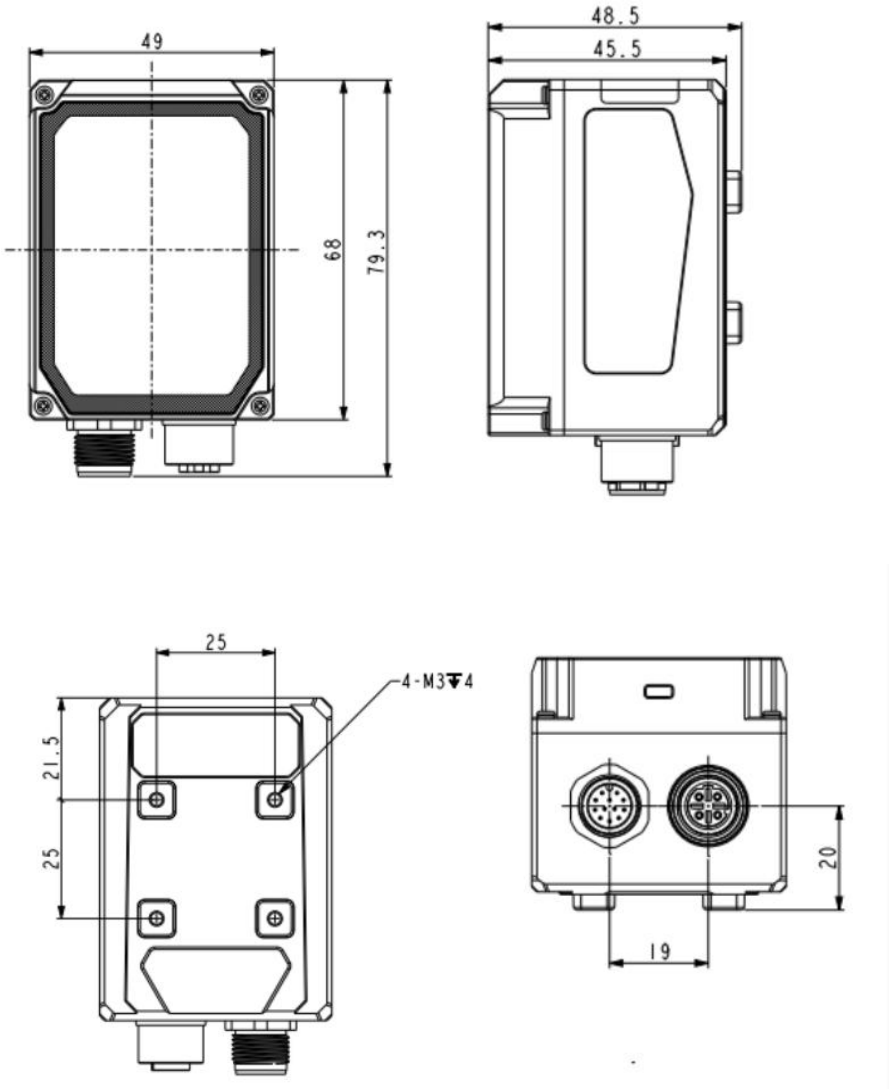


Figure 2-1-1 CR-RS210 series product structure and dimensions

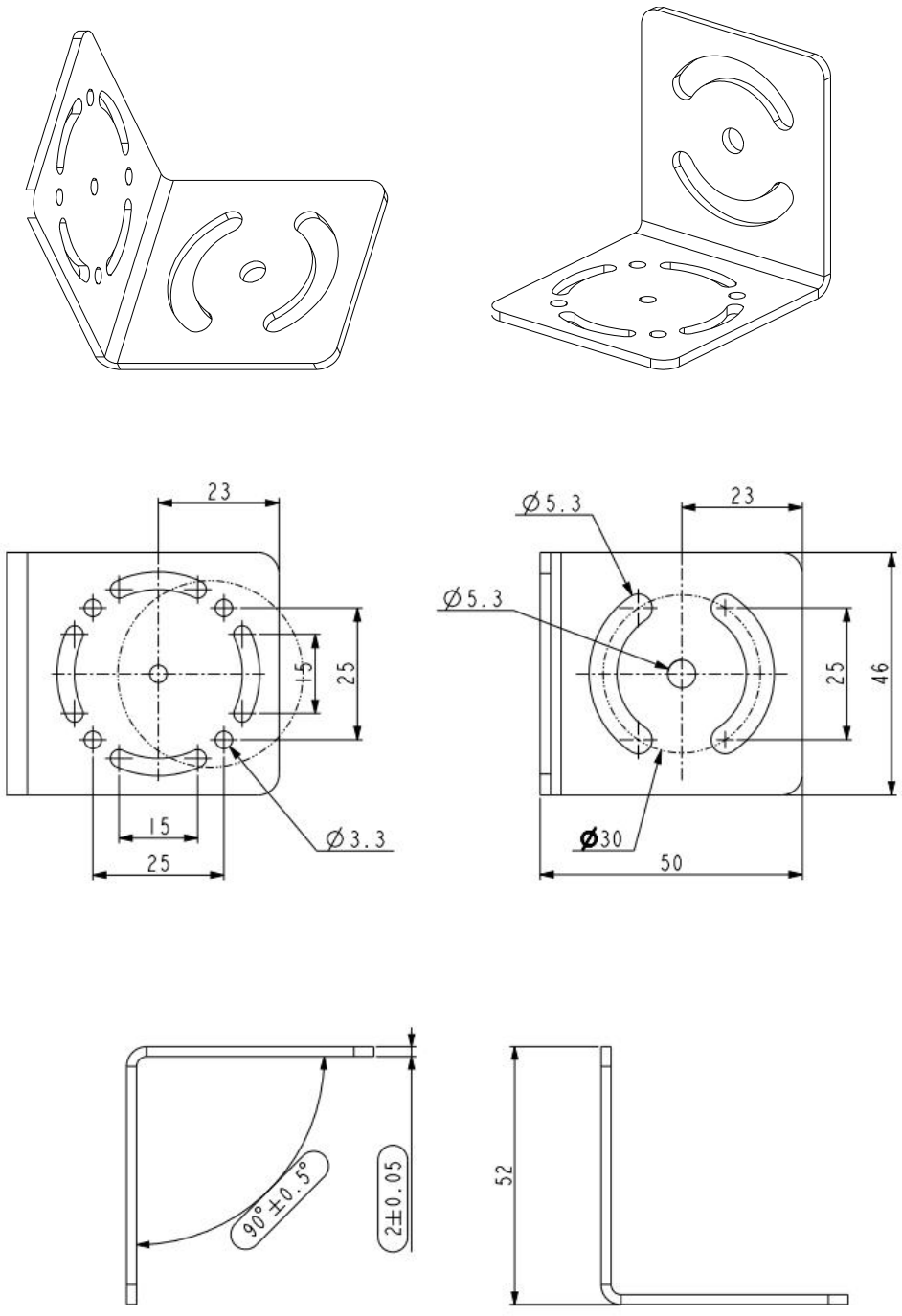
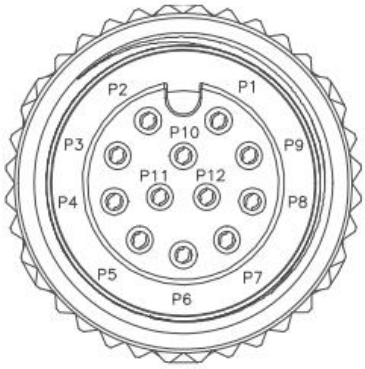


Figure 2-1-2 2D dimension drawing of L-shaped fixing bracket

2-2 Electrical Wiring

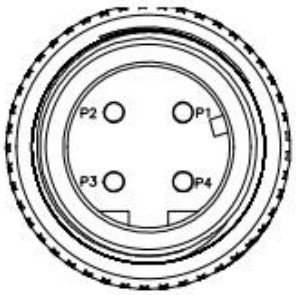
1. Connect the power cord and communication cable to the code reader device respectively;
2. Connect the loose wires of the power cable to the power supply;
3. Turn on the power supply;

2-2-1 Definition of Aerial Plug Interface 1 (Cable End)



Sr. No.	Definition
P1	VCC
P2	GND
P3	TXD
P4	SGND
P5	RXD
P6	IN2
P7	IN_COM
P8	IN1
P9	OUT1
P10	OUT2
P11	OUT3
P12	CUT COM

2-2-2 Definition of Aerial Plug Interface 2 (Cable End)



Sr. No.	Definition
P1	TXP
P2	RXP
P3	TXN
P4	RXN

2-2-3 Cable and Wire PINMAP Instructions

Table 2-2-3-1 CR -RS290 adapter cable 1 (IO & power adapter cable) PINMAP description

Serial number	Wire color	Function
1	brown	VCC
2	blue	GND
3	yellow	RS232_TXD
4	Purple	RS232_GND
5	orange color	RS232_RXD
6	grey	IN 2
7	blue and white	IN _COM
8	green	IN 1
9	pink	OUT1
1 0	light blue	OUT2
11	White	OUT3
12	Black (thin)	OUT_COM
13	Black (thick)	PGND

2-2-4 IO Input

If the IO output type of the external sensor or device is NPN (pull-down), you need to connect the "Common In" of the optically isolated input of the code reader to "24VDC" and the "Input" to the output port of the external sensor.

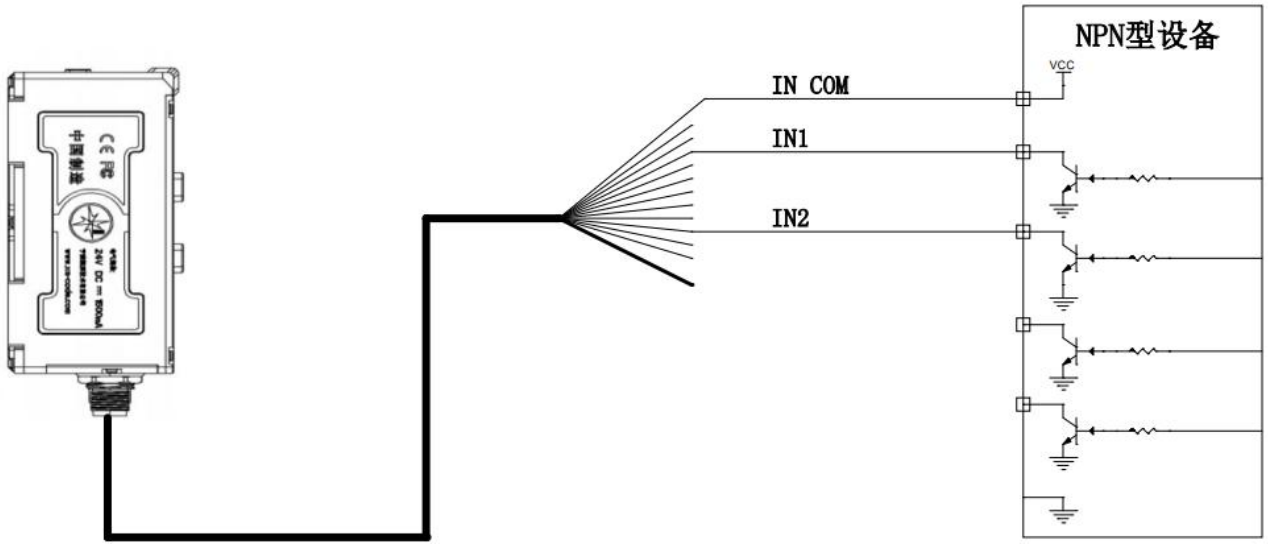
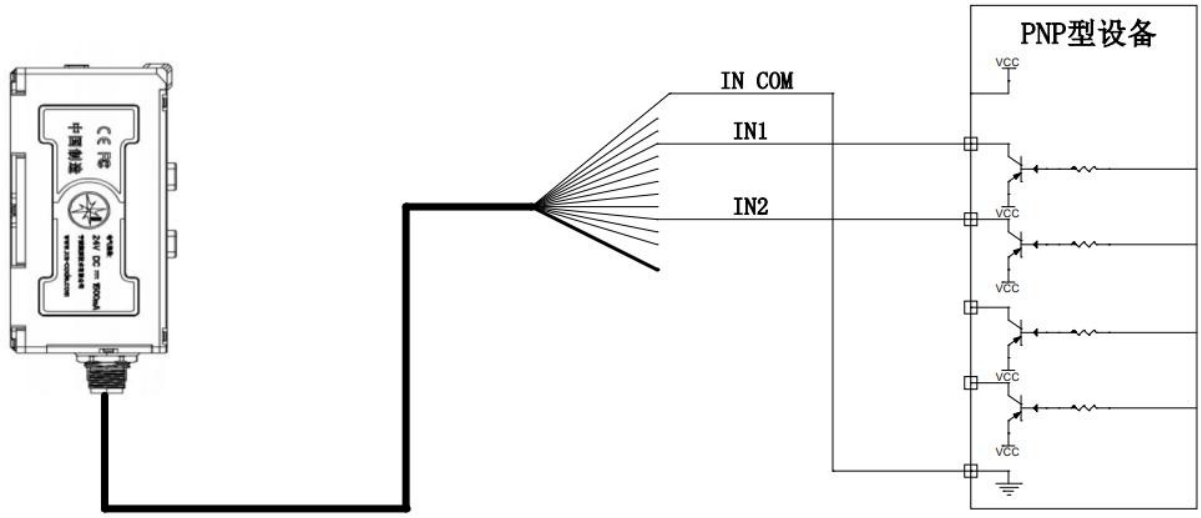


Figure 2-2-4-1 Schematic diagram of the connection between NPN (low level active) sensor and CR-RS210 input IO

If the IO output type of the external sensor or device is PNP (pull-up), the "Common In" of the optically isolated input of the code reader needs to be connected to "GND" and the "Input" to the output port of the external sensor.



Schematic diagram of the connection between PNP (high level active) sensor and CR-RS210 input IO

2-2-5 IO Output

For NPN (active low) outputs (OUT1, OUT2, and OUT3), connect "Common Out" to "GND," and connect the external load between the output and a positive supply voltage (<28VDC). When the output is on, it is pulled down to ground , allowing current to flow through the load. When the output is off, no current flows through the load.

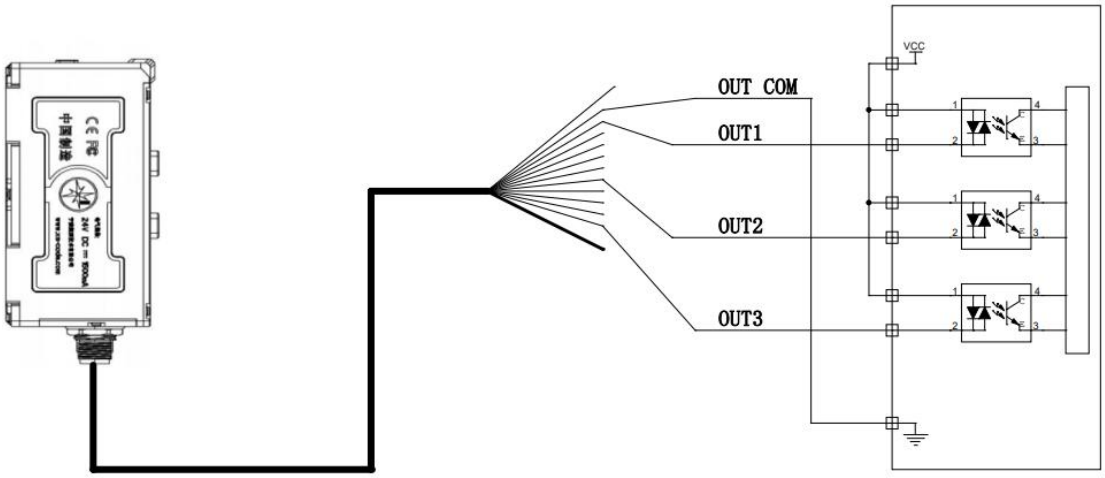


Figure 2-2-5-1 Schematic diagram of CR-RS210 device and NPN (active low) type external device output IO connection

For PNP outputs (OUT1, OUT2, and OUT3), connect "Common Out" to "24VDC" and connect the external load between the output and the negative power supply (0VDC). When the output is on, it is pulled up to the power supply, allowing current to flow through the load. When the output is off, no current flows through the load.

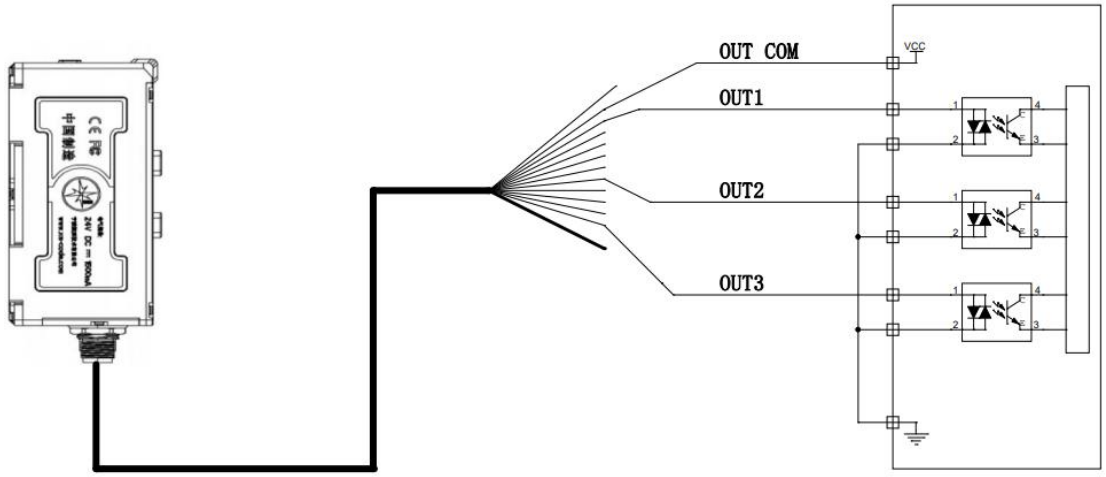


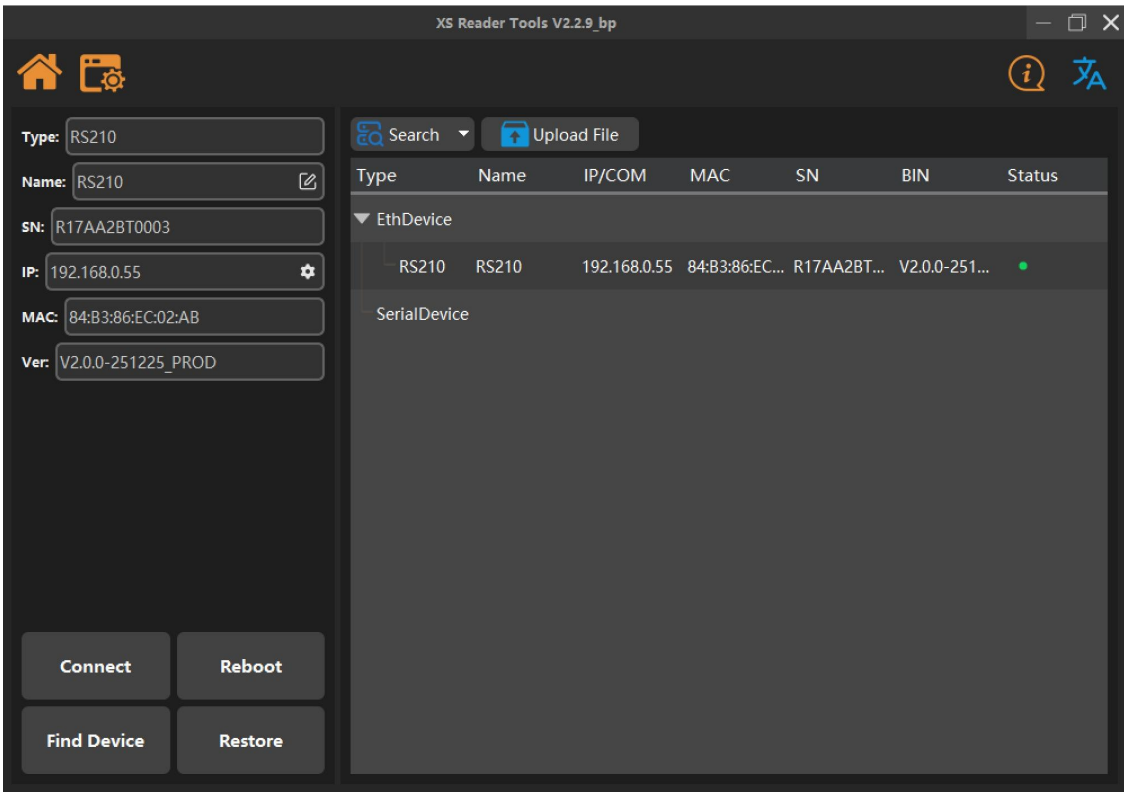
Figure 2-2-5-2 Schematic diagram of CR-RS210 device and PNP (high level active) type external device output IO connection

3 Get Started

3 - 1 Reader Tools Interface Introduction

3-1-1 Reader Tools software main interface

(1)Schematic diagram of the main interface of Reader Tools software



Reader Tools :

icon	Interpretation	describe
	Equipment List	Display equipment list Perform equipment maintenance
	Device Configuration	Device debugging and application settings
	Help Documentation	Operating manuals , troubleshooting , and software information
	Language settings	Reader Tools Language settings

(2) Device Detailed Information Area:

This area will display detailed information of the selected device, including device model, device name (user editable), device serial number, device IP address, device firmware version number, etc.

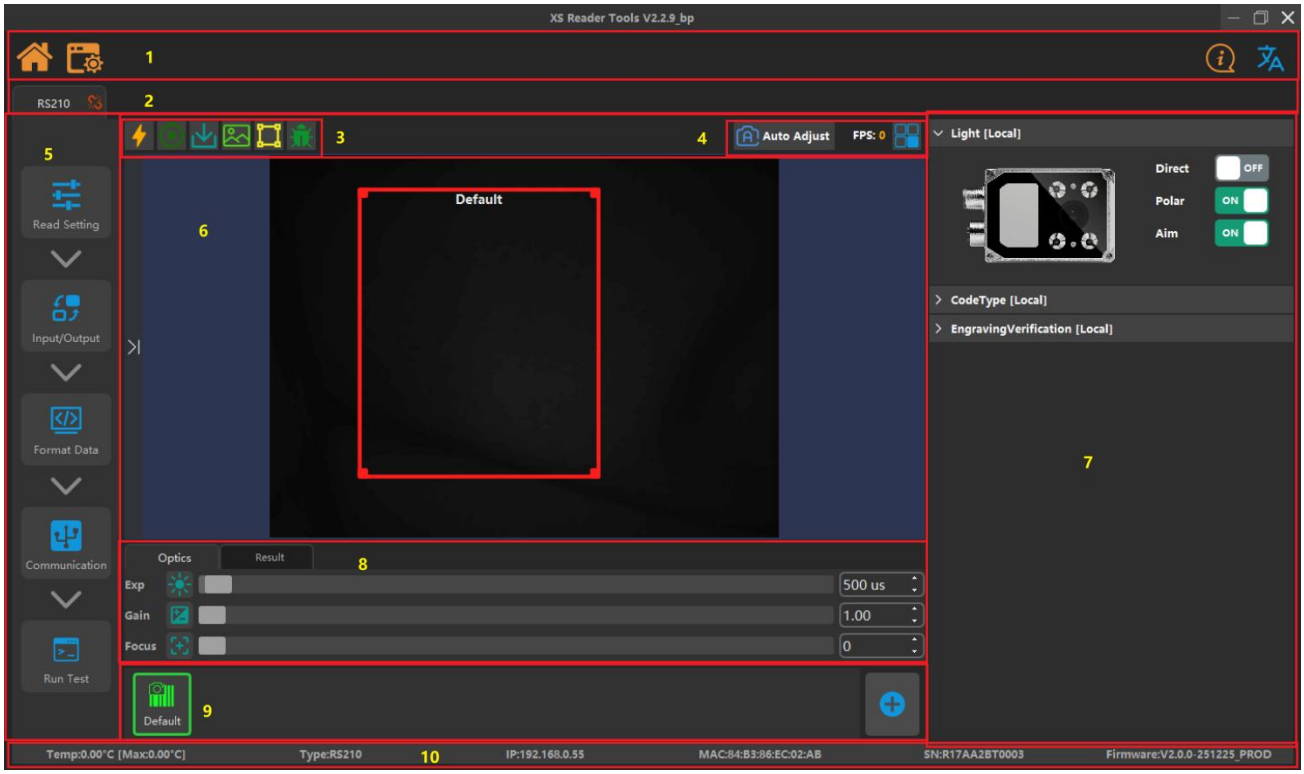
(3) Device list button area, this area has 2 buttons:

Function button name	Button functions
Search device	Refresh the device list to effectively update the device status in the device list
Upload files	configuration files and firmware versions for selected devices (configuration can be imported for multiple devices at the same time)
▿ Symbols	Click the ▼ symbol next to the device search bar to open the network port/serial port search interface.
Refresh serial port	You can manually refresh the list of USB virtual serial port devices currently connected to the PC.
Refresh network port	You can manually refresh the network adapter information currently connected to the PC.

（4）Function key area, this area has 4 function keys:

Function button name	Button functions
Start connecting	For the selected device, enter the device debugging interface and perform parameter debugging
Restart	Perform a soft restart on the selected device
Discovering devices	For the selected device, its LED indicator lights up in a polling manner to facilitate finding the corresponding physical device location
Restore factory settings	Perform a factory reset on the selected device (use with caution)

3-1-2 Reader Tools software device debugging interface



Sr. No.	Functional Area	Functional Description
1	Main function buttons	It can switch between the main interface and the device interface, display and other fun.
2	Device debugging window switching area	Switch between the main interface and device interface, display functions, and more.
3	Debug Toolbar	Debug window switching when multiple devices are connected.
4	One-click debugging and toolbar	Switch between code reader operating modes and edit ROIs.
5	Setting up navigation	One-touch debugging trigger button, parameter saving, exporting, and log exporting.
6	Device Image Window	Navigate through the complete code reader setup process.
7	Set navigation details	View real-time code reader image information and code reading statistics.
8	Optical parameter adjustment area	Detailed parameter configuration window for individual settings and navigation categories.
9	Configuring Group Zones	Adjust exposure, gain, and focus parameters for code reader sampled images.
10	Detailed device status	Code reader configuration group area. Real-time code reader status display.

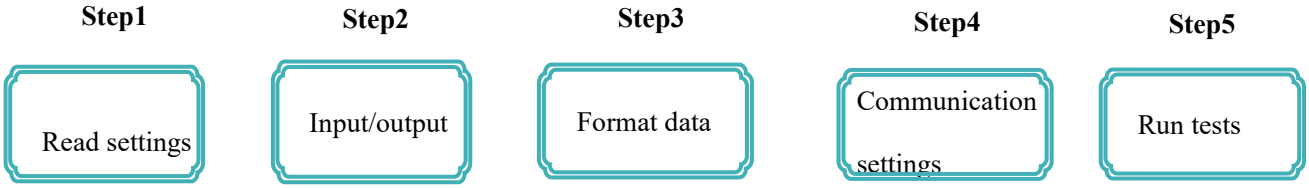
（1）Debug toolbar buttons and function introduction

Button	Function	Description
	Continuous trigger	In [Debug Mode], continuously trigger the barcode reader. In [Debug Mode], single-trigger the barcode reader. Download the current window image to your local computer.
	Single trigger	In debugging mode, the software triggers the barcode reader once to complete the photo capture and decoding process. In running mode, the trigger signal time can be controlled by clicking a button to complete a single trigger process.
	Download image	Download the image from the current window to your local computer; You can choose between "Current Image" (the compressed .jpg image) and "Original Image" (the original .bmp image).
	Enable image transfer	During the debugging process, image uploads to the current window are disabled/allowed by default.
	Edit ROI	It includes two functions: editing and resetting the ROI (Region of Interest). These options allow you to edit and modify the ROI. Editing the ROI can be done by entering numerical values or directly dragging the ROI box to modify the ROI area. This allows you to control and limit the decoding area. Resetting the ROI area restores the default ROI area.
	Mode switch	【Operation Mode】icon  【Debug mode】icon  Debugging mode: Configuration parameters can be modified, but input and output channels are not enabled, so trigger signals cannot be received and data cannot be output. Running mode: Configuration parameters cannot be modified, but input and output channels are enabled, allowing for the reception of trigger signals and output of data.

	One-click debugging	One-key debugging function button
	File import and export	This button is associated with 5 function buttons and 1 hidden function button. **Save Configuration:** Saves the user-modified configuration information to the device. The device will automatically use this configuration after a power cycle and restart. **Get Configuration:** Exports the user-modified configuration information to the PC, facilitating subsequent batch modification of device configurations. **Get Logs:** After enabling the log button in the communication settings, you can export the device operation logs here. **NTP+ Time Synchronization:** After entering the local network card IP address for NTP, click "Synchronize Time." After powering off and restarting the device, the device time will be synchronized with the local computer time, which can be used for automatic FTP image saving with time-based naming. Local Decoding (hidden function button): This can be accessed by pressing the [Ctrl] key and right-clicking the multi-function button 5 times.
	Autofocus	Automatic focus will be activated after clicking.

（2）Setting up the navigation bar

The Superisys barcode reader setup navigation bar is arranged according to the configuration steps of a conventional barcode reader. The setup steps of the barcode reader are as follows:



The step1 is to read the settings:

This navigation section primarily involves selecting the barcode reader's light source, adjusting exposure, gain, and focal length parameters (the goal is to achieve the clearest possible image quality , which can be achieved through autofocus), and setting the algorithm for the sample to be read (selecting enabled algorithms, including DM, QR, and barcode algorithms, and setting the barcode grade verification function). Once these settings are complete, the barcode reader can stably decode the target sample.

Step 2 Input/Output:

In this navigation category, you can mainly complete the code reader input trigger command settings, input and output IO settings, code reader working mode settings, etc.

Step 3：Format the data:

In this navigation category, you can mainly complete the secondary editing settings of the barcode reader output content (code content prefix and suffix settings, barcode content filtering rule settings, etc.), as well as the combination logic settings (this function is used in the case of multiple configuration groups, detailed in Chapter 6-1)

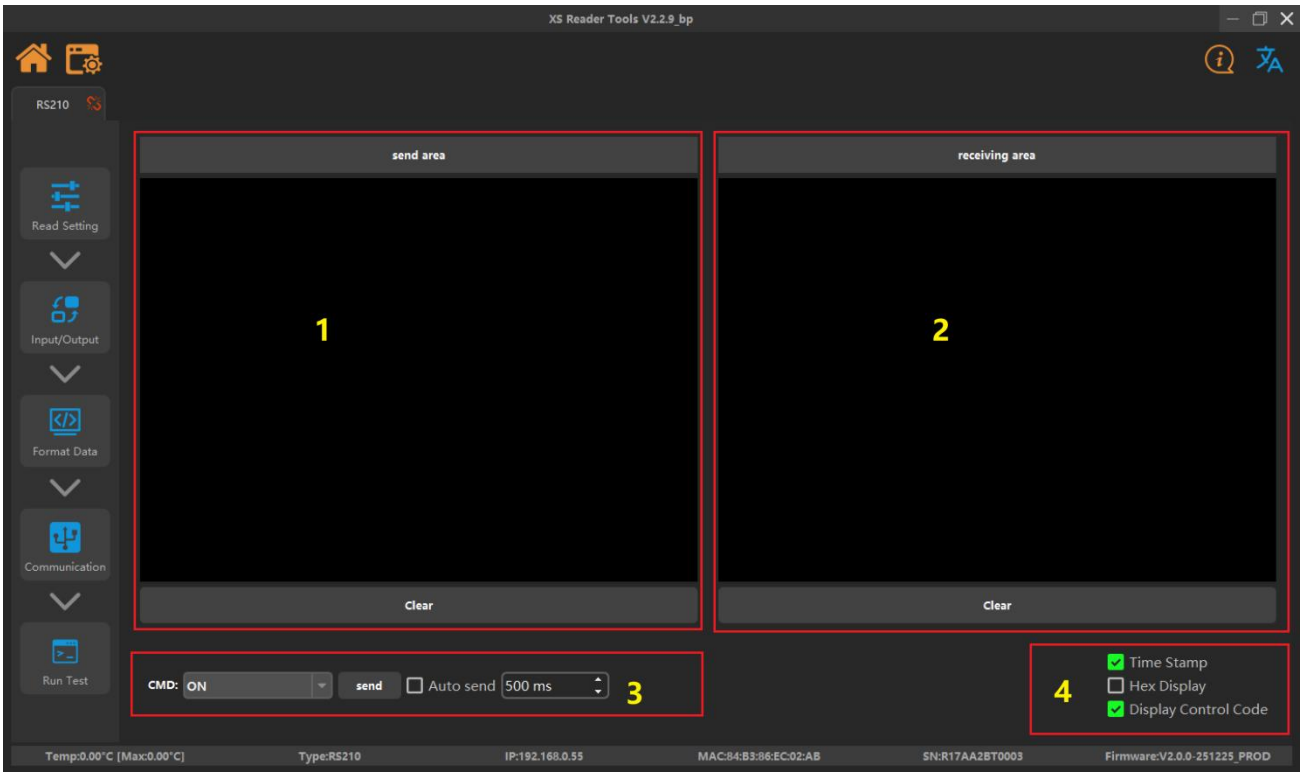
Step 4: Communication settings:

In this navigation category, you will primarily configure the reader's communication mode, such as RS232 port, TCP port, EIP, PN, MODBUS TCP , and FTP communication settings. Once this step is complete, all reader configuration options are complete.

Step 5: Run the test (optional):

In this navigation category, the main focus is to simulate the customer's triggering environment and simulate the triggering of the barcode reader to assist the customer in verifying whether the data content meets expectations.

Run test interface



Serial number	Functional Area
1	Data receiving area
2	Data sending area
3	Command editing area
4	Display Settings

3-2 Getting Started

Step 1: Install the barcode reader and perform electrical wiring as required. (See the barcode reader documentation for details)

Step 2: Double-click Reader Tools to run . The software will automatically search for devices of all interface types, including Ethernet and serial communication devices. If the reader's power and communication cables are not properly connected before opening the software, connect them correctly first, then click the Refresh button on the device search page and wait for the search to complete.

Step 3: Double-click the device name or select the device and click "Start Connecting" to enter the device configuration interface. Follow the navigation bar to complete the barcode reader configuration; see 3-4-3 for details.

Step 4: After completing the configuration, manually switch the device to "Run Mode" or directly close the XS Reader software.

Click the [Debug Mode] icon  to turn it into the [Run Mode] icon 

3-3 device connection

The CR-RS series supports two IP address acquisition methods: DHCP and static IP.

Default configuration:

Mode: Static IP

IP address: 192.168.10.116

(It must be in the same network segment as the PC. For example, if the PC IP is 192.168.2.x, then the barcode reader IP must also be 192.168.2.x)

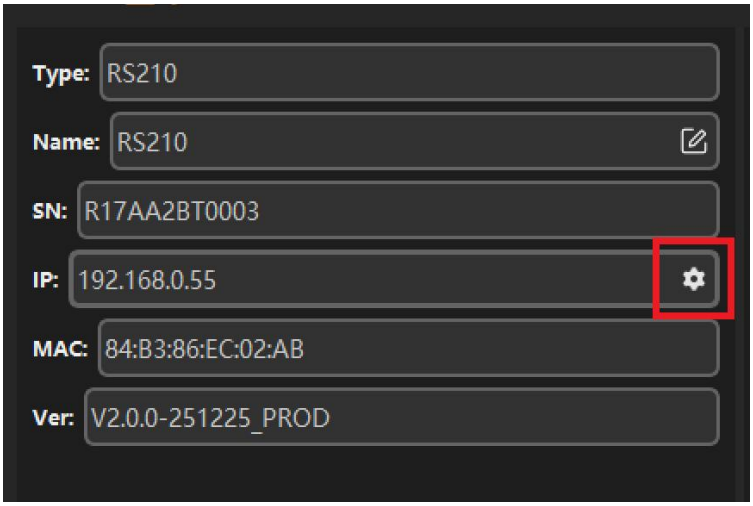
If they are different, the host computer will prompt a pop-up window prompting "The device IP is not in the same network, please modify it and try again."

Subnet mask: 255.255.255.0 (same as IP, needs to be the same)

Gateway: 192.168.10.1

3-3-1 DHCP

Click the device list to select the device, and then click the Set button in the IP address column.



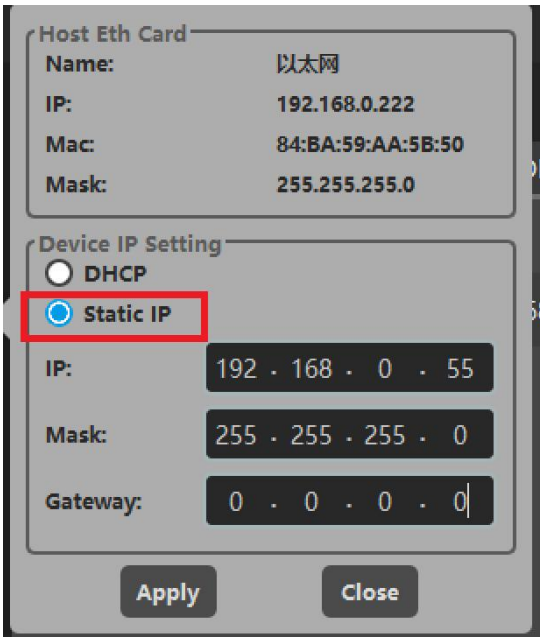
In the pop-up window, select DHCP mode and click Apply Changes.



Note: The DHCP mode requires the host to support DHCP server function, otherwise it will not be able to obtain a correct and available IP address. Common DHCP hosts are network routers.

3-3-2 Static IP Address

Click the Set button in the IP address column.



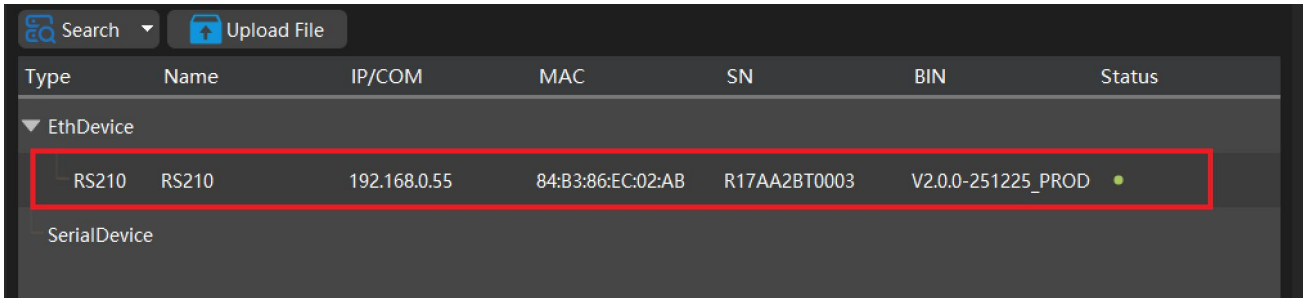
Select the static IP option and modify the static IP settings as needed. Ensure that the barcode reader's IP address and the corresponding computer's network card address are on the same network segment and have the same subnet mask. After setting the parameters, click "Apply Changes," and then click "Rescan Devices" to find the corresponding device.

Note:

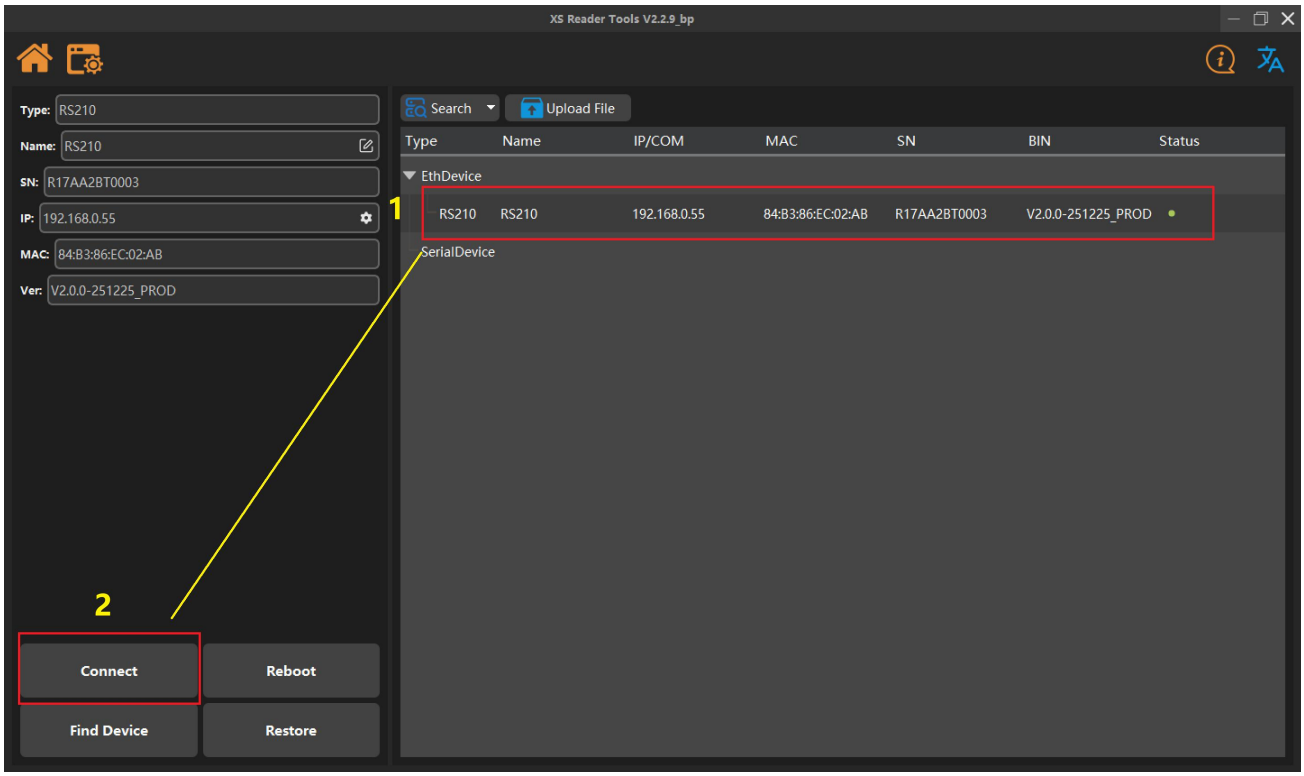
- Please ensure that the static IP address you set is on the same local network segment as the host's network card.
- The static IP address you set cannot be the same as the IP address of any other device on the local network; otherwise, it will cause network problems.

3-3-3Device Debug Connection

Method 1: Double-click the device that has been searched in the device list to enter the settings interface

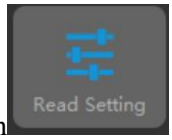


Method 2: Click to select the device to be connected in the device list, and click the [Start Connecting] button in the device information column on the left.



4 Read Settings

4-1 Light source settings

Step 1: Click on Settings Navigation 

button to enter the read settings interface.

Step 2: Set the light source. Figure 4-1-1 shows the light source configuration interface for the CR-RS210 series barcode reader.

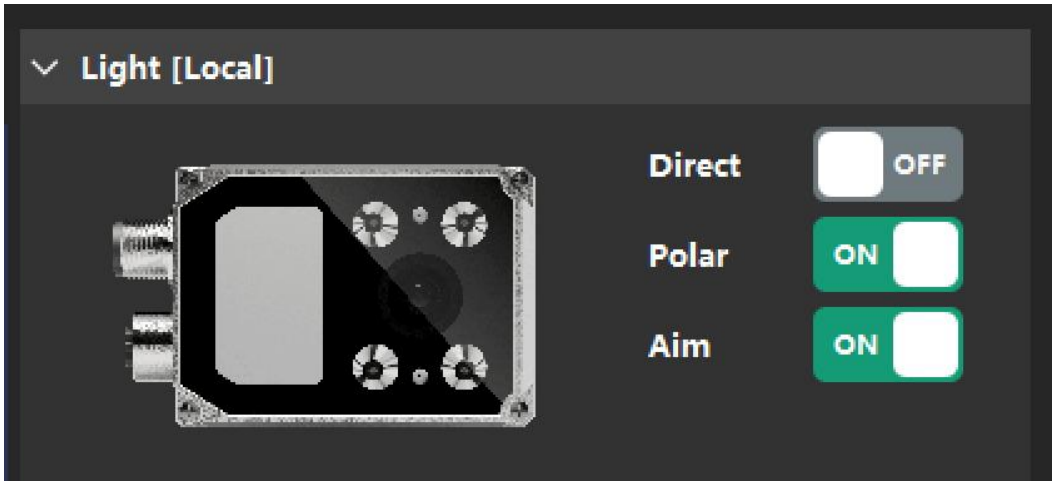


Figure 4-1-1 CR-RS210 series light source setting interface

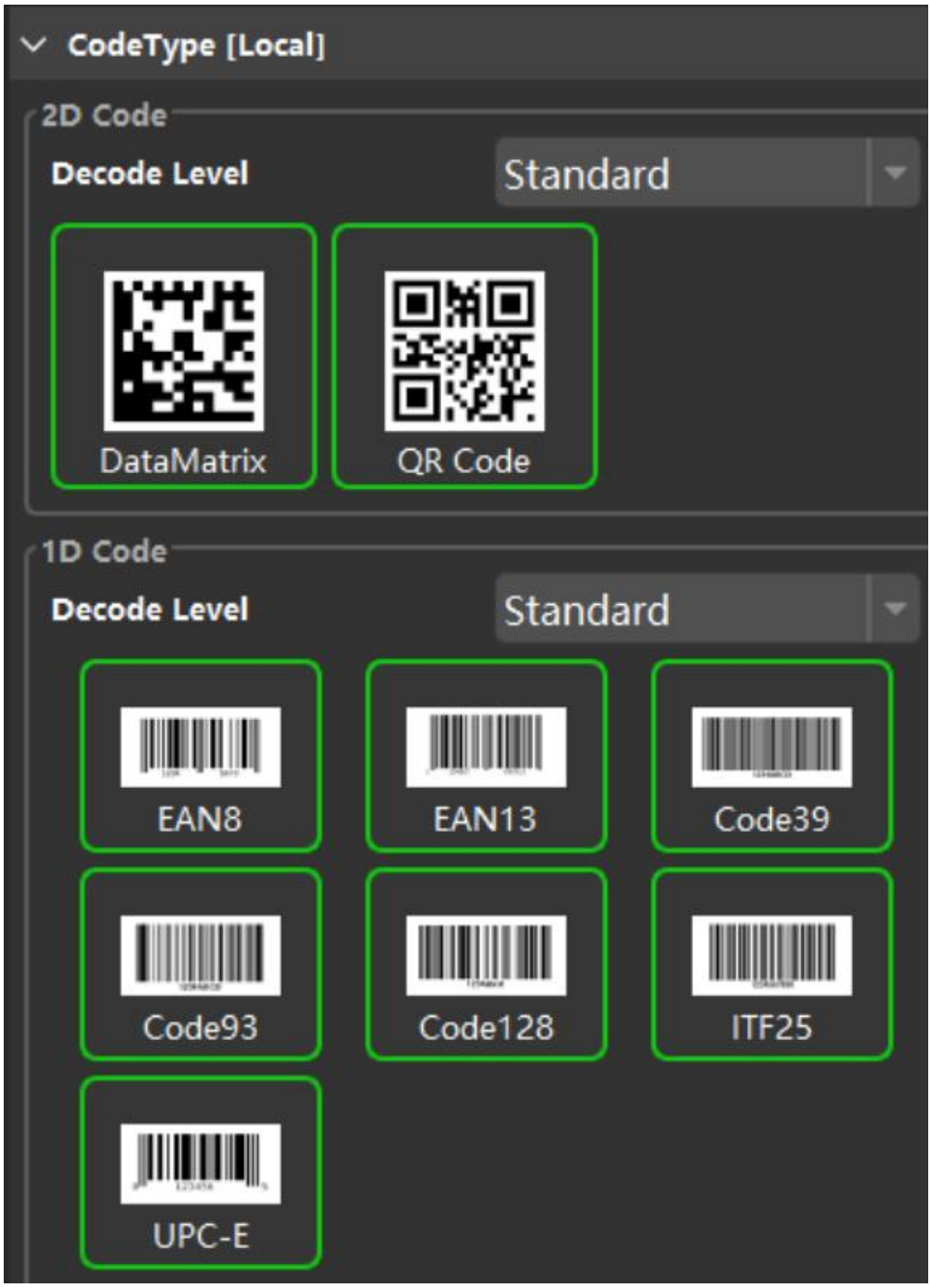
1) **Direct light:** Light shines directly onto the barcode; the light intensity is high, suitable for conventional materials, but prone to reflections.

2) **Polarized light:** Light is filtered by a polarizer to select specific directions of light, which can suppress reflections. Suitable for highly reflective materials, but the light intensity is reduced.

3) **Aiming light:** Used for positioning the barcode area in the field of view; the area between the two green dots is the center of the imaging field of view.

4-2 code system and algorithm

Click the check box of the symbology to select the desired decoding symbology.



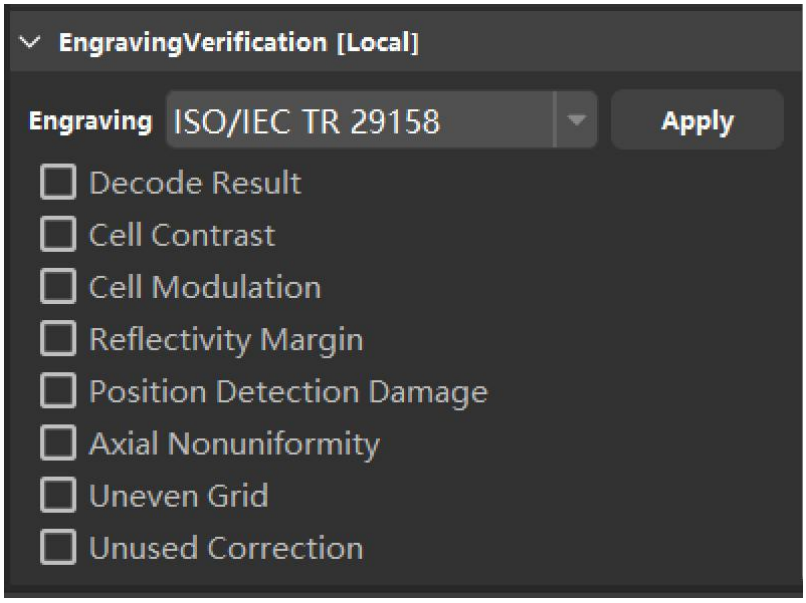
1) **Decoding Capability:** Divided into Standard and Enhanced modes. Standard mode offers faster decoding speed, while Enhanced mode provides stronger decoding performance, but increases decoding time.

2) **Code Type:** Click the code type checkbox to select the desired decoding code type. DataMatrix_N is an enhanced decoding function specifically for DM codes. By inputting the number of bits in the DM code (the number of code points on one side, not the character length), you can lock the code type characteristics and

enable a dedicated model, resulting in more stable and powerful decoding performance. However, enabling the DataMatrix_N function will prevent decoding of codes with different bit lengths or other code types; it will only decode DM codes of that specific bit length, and decoding time will increase. This function is generally only used for problematic DM codes or codes with fluctuating decoding results. If regular codes can be decoded stably, we recommended not to select this function.

4-3 Engraving Verification

（1） The CR-RS210 series barcode readers support mark verification according to the following three standards: ISO/IEC 16022, ISO/IEC 15415, and ISO/IEC TR 29158.

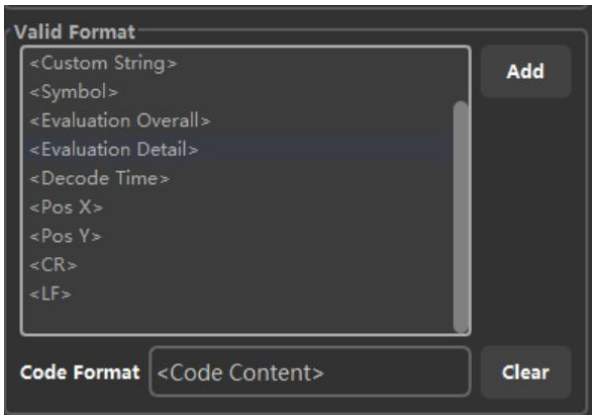


(2)When use this feature, click the "Engraving Verification" dropdown menu, select the appropriate engraving verification standard, and check the sub-items to be included in the evaluation. Then click "Apply." The last column of the results section will then display the corresponding QR code grade.

3) Click "Format Data" in the navigation bar, and then set the output format for the rating results of the current configuration group in "Local Formatting".

<Evaluation Overall> represents the overall rating result under the current engraving verification standard, for example: "A";

<Evaluation Detail> represents the detailed rating results. Unselected rating sub-items are represented by "-", and each rating sub-item result is separated by "/". Example result: "A/A/-/-/A/-/-/B".

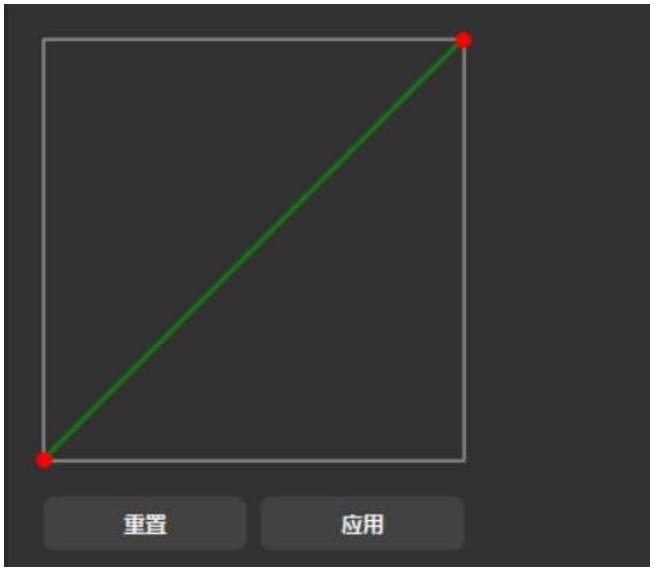


4 - 4 Image curve editing

1) Image curve editing is a core function for fine-tuning images and is commonly used in post-production photography and image retouching. By adjusting the curve in a coordinate graph, it changes the image's brightness, contrast, and color, enabling precise overall or localized optimization.

2) The horizontal axis of the graph represents the original image brightness (input levels, from dark to bright), and the vertical axis represents the adjusted brightness (output levels). Initially, it's a diagonal line indicating no adjustment. Users can add anchor points and drag the curve; for example, an S-shaped curve enhances contrast, while an inverted S-shaped curve reduces contrast.

3) By dragging the curve to adjust the contrast, the image elements become clearer. If the effect is unsatisfactory, you can reset to restore the initial state. Once satisfied with the effect, click "Apply."



5 Input and Output

5-1 Input Setting——Trigger Mode Selection

The input/output setting diagram is as follows:



The CR-RS series barcode readers support multiple trigger modes: single (external), periodic (external), burst (external), self-trigger (internal), continuous (internal), adaptive trigger (internal), and demonstration (internal).

Single (External): In this mode, upon receiving a trigger signal, the barcode reader performs a single capture, decoding, and data upload, effectively completing a single decoding operation. Configurable parameters in this mode include a timeout (limiting the maximum duration of a single decoding cycle) and a trigger delay (the delay after the barcode reader receives a trigger signal before decoding).

Cycle (External): In this mode, after receiving a trigger signal, the barcode reader will continue to decode within the set **timeout** period until the decoding is successful, and then immediately exit the current beat and wait for the next trigger signal; if the decoding fails within the timeout period, the barcode reader will output a decoding failure signal after the set timeout period is reached. The configurable parameters in this mode include timeout (limiting the upper limit of a decoding beat),

Burst (External): In this mode, upon receiving a trigger signal, the reader rapidly and continuously captures images according to the configured **burst length** and **interval** . Decoding begins after the burst is complete, and continues until decoding is successful or the timeout expires, at which point the reader outputs the decoded result. Configurable parameters in this mode include timeout (limiting the maximum duration of a

decoding cycle), trigger delay (the delay after the reader receives a trigger signal before decoding), burst length (the number of consecutive images captured after receiving the trigger signal), and interval (the interval between image captures).

The RS290 barcode reader supports multiple trigger modes: Single (external), Periodic (external), Self-triggering (internal), Continuous (internal), and Adaptive triggering (internal).

Single (external): In this mode, after receiving a trigger signal, the barcode reader will complete one cycle of image capture + decoding + data upload, i.e., one decoding operation. Configurable parameters in this mode include timeout time (limiting the maximum time for one decoding cycle) and trigger delay (the delay between receiving the trigger signal and performing the decoding operation).

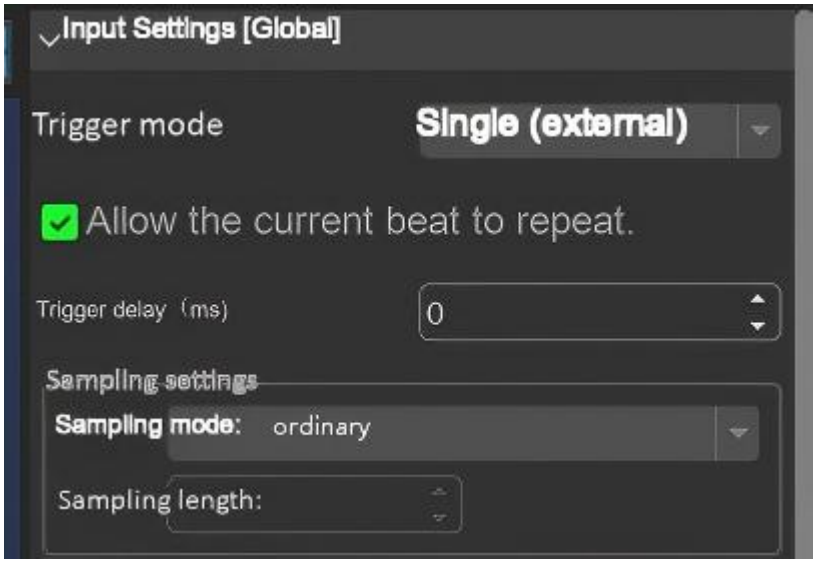
Periodic (external): In this mode, after receiving a trigger signal, the barcode reader will continuously perform decoding within the set timeout period until decoding is successful, then immediately exit the current cycle and wait for the next trigger signal; if decoding fails within the timeout period, the barcode reader will output a decoding failure signal after the set timeout period. Configurable parameters in this mode include timeout time (limiting the maximum time for one decoding cycle).

Self-triggering (internal): In this mode, the barcode reader does not rely on external trigger signals. The barcode reader will perform periodic image capture and decoding at a fixed frequency. The configurable parameter in this mode is the self-triggering interval (the time period between triggers).

Continuous (internal): In this mode, the barcode reader does not rely on external trigger signals. The barcode reader will perform rapid image capture and decoding at its maximum capability (one cycle starts immediately after the previous one ends). Configurable parameters in this mode include timeout time (limiting the maximum time for one decoding cycle) and the option to allow repeated result output (comparing the content of consecutive decoding cycles to determine whether to output the result).

5-1-2 Sampling Settings - Normal and Burst

1) In normal sampling mode: The sampling length is fixed at 1, and the sampling length cannot be modified. This means that in one decoding cycle of a single configuration group,
only one image is captured and decoded. This mode can be used with various trigger modes and multiple configuration groups;

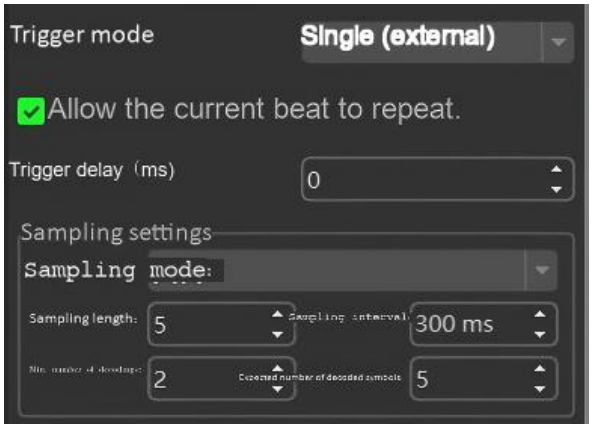


2) **In burst sampling mode: t**he sampling length and sampling interval can be set, and the minimum and expected number of decoded codes are also added; it can be combined with various trigger modes; it can be combined with multiple configuration groups;
Taking the parameters in the following figure as an example, with a single configuration group and single-shot mode, the sampling length is 5, and the sampling interval is 300ms. This means that in one decoding process of a single configuration group, the image capture interval is 300ms, and 5 images are continuously captured and sent to the algorithm for decoding. Assume the algorithm has four possible decoding outcomes: A, B, C, and D.
The following describes the decoding and output for these four cases:
A. All 5 images are decoded, and the cumulative number of decoded codes is less than 2, then the output is NG;

B. All 5 images are decoded, and the cumulative number of decoded codes is greater than or equal to 2 but less than 5, the actual decoded codes are output as GOOD;

C. The reader completes decoding up to the 3rd image, and the cumulative number of decoded codes is 5, reaching the expected number of decoded codes. The 4th and 5th images will not be decoded. In this case, 5 codes will be output according to the expected number of decoded codes;

D. The reader completes decoding up to the 2nd image, and the cumulative number of decoded codes is 4. The algorithm will continue to decode the 3rd image. After decoding the 3rd image, the cumulative number of codes reaches 8, reaching the expected number of decoded codes. The 4th and 5th images will not be decoded. In this case, the first 5 codes will be output as GOOD;



5-1-3 Cycle (External) Global Decoding Quantity Range and Cumulative Decoding Quantity Explanation

1) Global Decoding Quantity

The core point is the decoding quantity range, and the cumulative decoding quantity switch determines whether to accumulate the decoding quantity from multiple rounds within a single beat.

Since multiple rounds within a single beat only occur in periodic mode, the current cumulative decoding quantity switch is only effective in periodic trigger mode. In other trigger modes, enabling or disabling it has no effect.

Note: When the global decoding range function is enabled, the decoding quantity range under sampling settings will become ineffective and will be hidden in the UI. If only the cumulative decoding quantity switch is enabled, but the global decoding quantity range switch is not enabled, accumulation will not be effective.

During the beat, if the accumulated number of codes reaches the expected decoding quantity within the global decoding quantity range, decoding stops, and the system outputs the "expected decoding quantity" results as GOOD.

At the end of the beat, if the accumulated number of codes is greater than or equal to the minimum decoding quantity but less than the expected decoding quantity, the system outputs the actual number of results as GOOD.

At the end of the beat, if the accumulated number of codes is less than the minimum decoding quantity, the system outputs NG.

If there are multiple configuration groups, when the global decoding quantity range is enabled, the configuration groups that were not decoded will append the read failure string from the [local] settings.

2) Cumulative Decoding Count Switch

This setting determines whether to accumulate the number of decoded codes within a single cycle. Since the reader only takes multiple consecutive photos under a single trigger signal in periodic mode, this cumulative decoding count switch is only effective in periodic trigger mode. In other trigger modes, the cumulative decoding count is not applied.

During periodic (external) decoding time: If the accumulated number of codes reaches the expected number of codes within the global decoding count range, decoding stops, and the "expected number of codes" results are output.

At the end of the periodic (external) decoding time: if the accumulated number of decoded codes is greater than or equal to the minimum decoding quantity but less than the expected decoding quantity, the actual number of decoded codes will be output;

At the end of the periodic (external) decoding time: if the accumulated number of decoded codes is less than the minimum decoding quantity, an NG (Not Good) result will be output;

If there are multiple configuration groups and the global decoding quantity range is enabled, the configuration groups that were not decoded will have the "read failure" string from the [local] settings appended.

5-1-4 Beat Deduplication Filtering

Beat definition: One trigger event and the subsequent receipt of a result are considered one beat sample.

1) Allow duplicate entries within the current beat

Single/Periodic: Triggered by ON, stops upon receiving OFF, considered as one beat (under periodic mode, all configurations may be executed multiple times). The focus is on whether there are duplicates within this beat.
Continuous/Self-triggered: This is an internal triggering method; the current beat ends when all containers belonging to the configuration group have been executed. The results of the containers are then compared to check for duplicates.

2) No repetition for N consecutive beats
Single/Cycle: An ON trigger initiates a beat, and it stops upon receiving an OFF signal. This is considered one beat (in a cycle, all configurations may be executed multiple times). The focus is on whether this beat is repeated within the previous n-1 beats.

Continuous/Self-triggered: This is an internal triggering method; all containers belonging to the configured groups are executed, which marks the end of the current cycle.
The results of all containers in this cycle are then compared one by one with the results from the previous n-1 cycles.

5-2 Input Settings-Trigger type

The RS series barcode readers support multiple trigger types: software trigger, hardware trigger, and industrial Ethernet trigger. The software trigger includes TCP port commands and RS232 port commands (editable); the hardware trigger includes two non-polarized optocoupler trigger inputs; and the industrial Ethernet trigger is based on flag bits within the specific protocol packet, independent of trigger commands.

5-2-1 Software Instruction Trigger

There are two types of trigger instructions: the reader ON instruction (triggers the reader to decode) and the

reader OFF instruction (immediately ends the reader's current decoding cycle, generally not used). The editing window is shown below:



The barcode reader instruction editor supports both traditional string input and escape character input.

Example 1: If the barcode reader software inputs the characters "ON", the triggering device can send the characters "ON" or their corresponding ASCII codes 0x4F 0x4E to trigger the barcode reader;

Example 2: If the barcode reader software inputs the characters "\X4F\X4E", the triggering device can send the corresponding characters "ON" or their ASCII codes 0x4F 0x4E to trigger the barcode reader.

5-2-2 Hardware IO Triggering

IO triggering: There are two types: edge triggering and level triggering. Wiring and trigger control should be performed according to the type of high/low level signal of the IO signal, as described in [2-2 Electrical Wiring]. Both types allow setting a debounce time parameter to filter out interference in the IO signal.

Level triggering: The trigger action remains active as long as the signal maintains a high/low level.

Edge triggering: The action is triggered only once at the moment of a signal transition from low to high (rising edge) or high to low (falling edge). The triggering logic is controlled by [5-1 Input Settings - Trigger Mode].

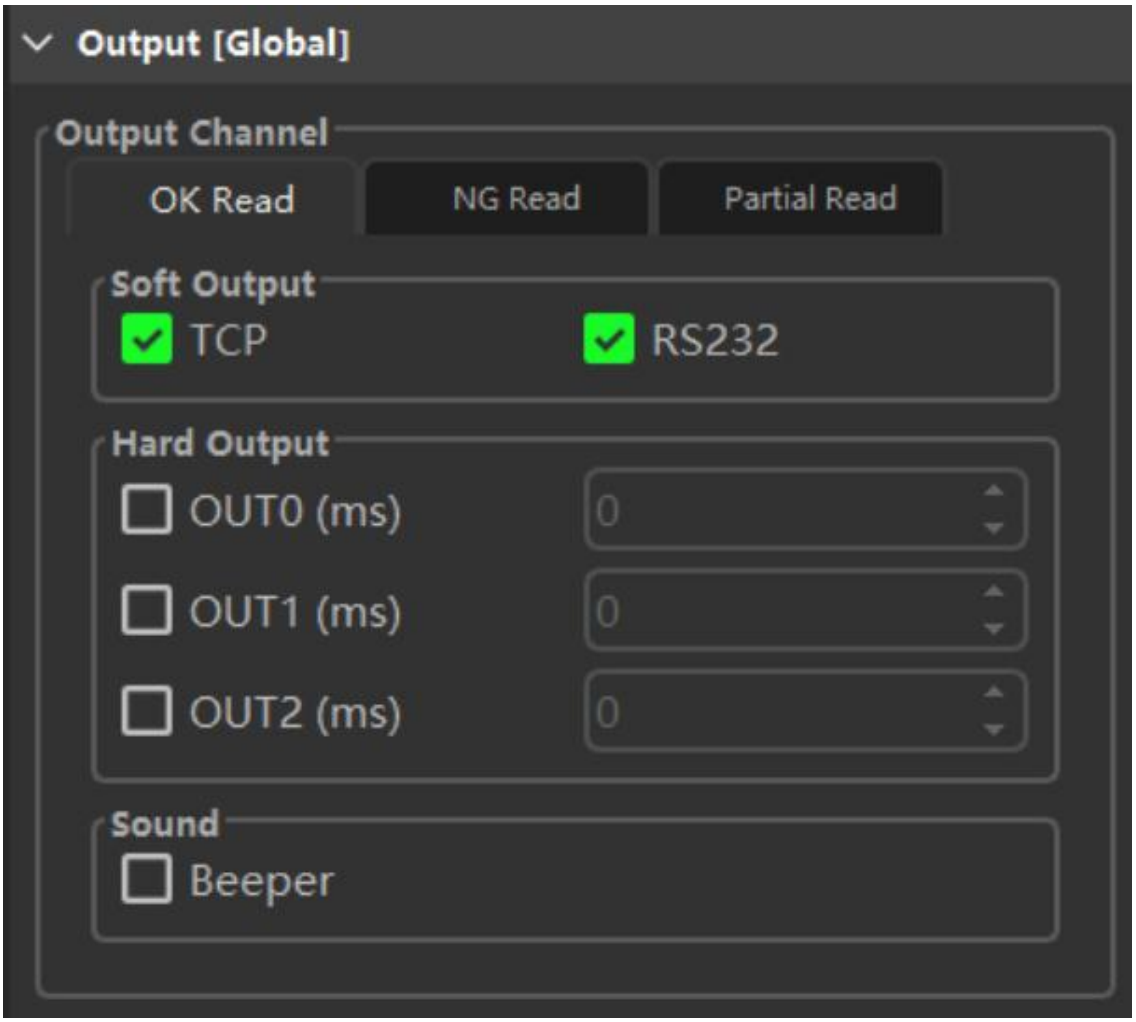
5-3 Output Setting

The CR-RS series barcode readers is [Combination] mode, which performs a combination logic judgment on the results of each configuration group and outputs them in a global format. Based on the combination logic results of the configuration group, three events can be divided into: read success , read failure, and global readout .

read event means the combinational logic expression of the configuration group is true. Conversely, a "

failed read " event means the expression is false. A global read partial event is special in that it is considered a global read partial event only when the combinational logic of the configuration groups is "AND" and a read failure occurs in one of the configuration groups .

In the output settings, users can manually enable three events according to actual needs, whether to trigger TCP, RS232 data port output, buzzer and three-way IO signal output. The diagram is as follows:



6 Formatting data

The diagram for formatting data settings is as follows:



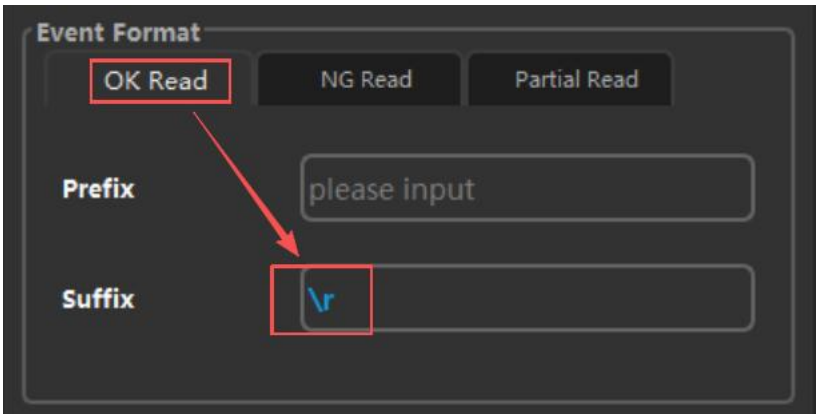
Under this navigation category, users can complete secondary processing and editing of code reading data content and editing of multi-configuration group combination logic (multi-configuration group is a special feature of Superisys products, which is detailed in Chapter 6-1).

6-1 Global Format

All configuration parameters under this subcategory are effective for all configuration groups in the device.

In this subcategory, you can edit the prefix and suffix data of three types of code reading events: read success, read failure, and global readout . It also supports string input and escape character input.

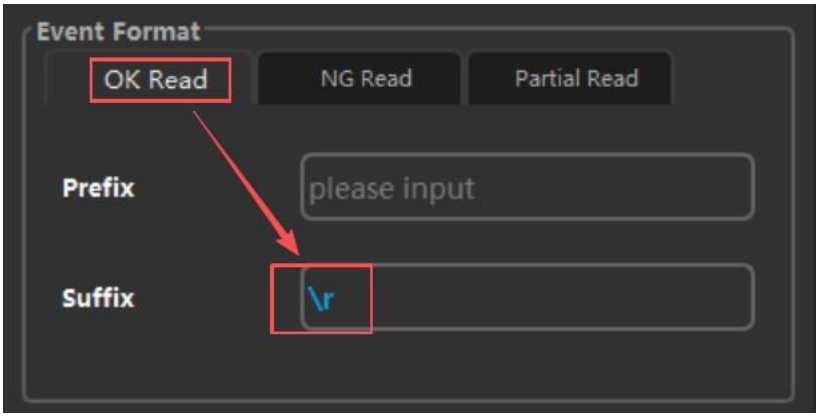
Example: To add a line break after the valid code content in a read success event, edit it as shown below:



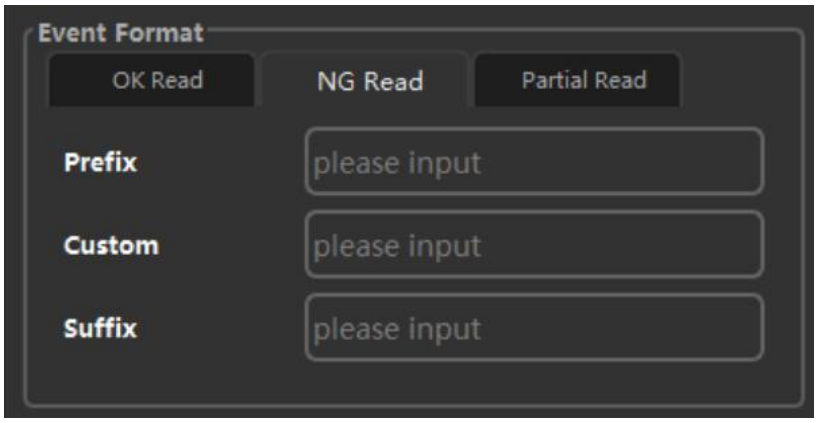
Special note: Read failure events do not output anything by default. If output is required, users

need to edit it themselves.

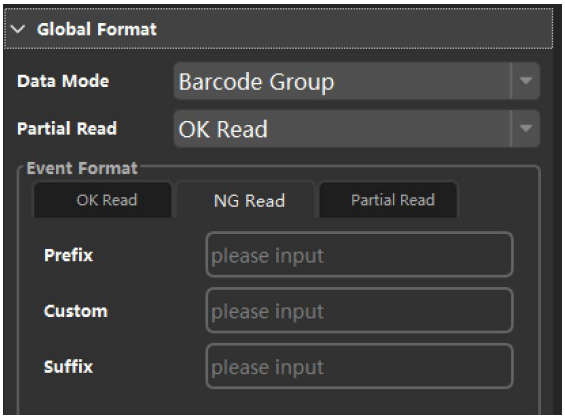
Read successfully: After successfully reading the code, you can add a prefix or suffix to the code content as needed. The input content can be any characters and escape characters except Chinese.



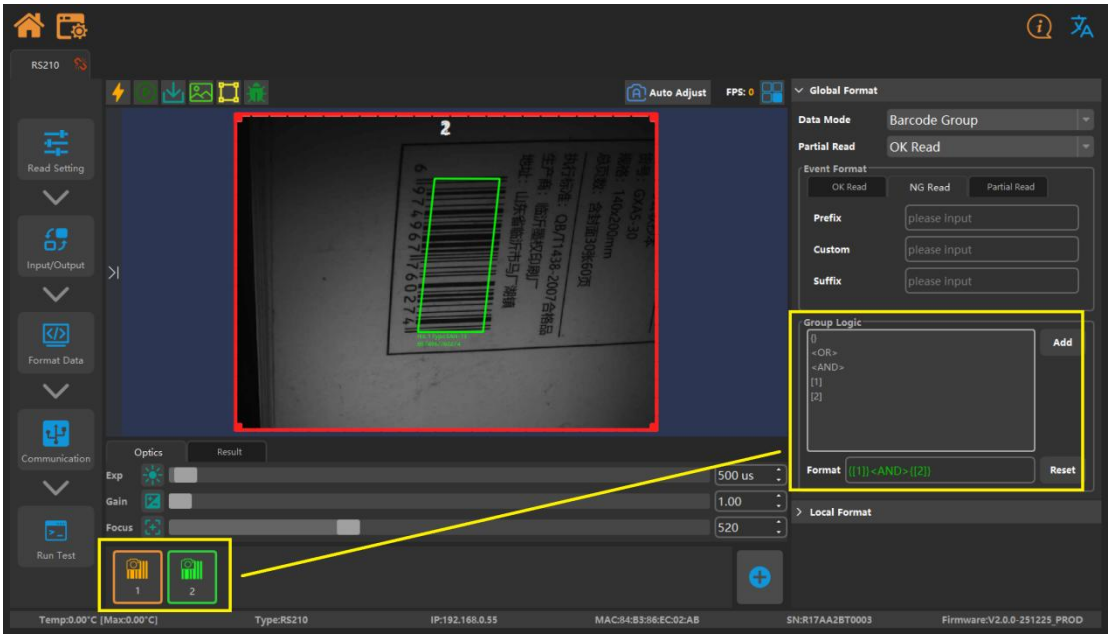
Reading failure: Normally, there is no output after the code reading fails. If you need to output content, you can enter simple characters other than Chinese in the custom string. You can also add prefixes and suffixes as needed.



Partial read: It only takes effect when the configuration group combination logic is "AND" logic and one of the configuration groups fails to read the code. It can be considered a partial read event and needs to be changed from global partial read to partial read. You can also add prefixes and suffixes as needed.



As mentioned above, the default acquisition mode of the Superisys series barcode readers is [Barcode Combination] mode, which performs combination logic judgment on the results of each configuration group and outputs them as a global format. The combination logic setting method is as follows:



The "{ }" result container represents an expected decoding result.

"<OR>" represents "OR" logic.

"<AND>" represents "AND" logic.

"[ ]" is used to accommodate a configuration group object, and the configuration group name is filled in the middle of the symbol.

A single container, the logical relationship between the configuration groups must be " <OR>" logic. " <AND>" logic is used for the logical " AND" relationship between multiple containers .

The result of the configuration group object in the format expression depends on the decoding event of the configuration group object, that is, whether the read is successful or Read failed . Read successful. If the barcode is decoded, it will be " True" , and if the reading fails , it will be " False" . Note that the judgment standard here is the decoding event of the configuration group object. In addition to the barcode being decoded, the configuration group object may also have code filtering set. Therefore, the specific decoding event needs to be comprehensively judged in combination with the above conditions.

Based on the configuration group [1] and configuration group [2] in the above figure , the following lists several typical combination formats and analyzes the corresponding results:

Format	meaning	Illegal reasons
{[1]<OR>[2]}	Output is generated if either [1] or [2] is decoded successfully	Correct format
{[1]}<AND>{[2]}	[1] and [2] must both be decoded successfully to be output	Correct format
[1]<OR>[2]	Illegal format	Missing container format character "{ }"
{[1]<AND>[2]}	Illegal format	Illegal format Cannot use <AND> logic within a container
{[1]}<AND>[2]	Illegal format	Configuration group object [2] is missing container format character "{ }"

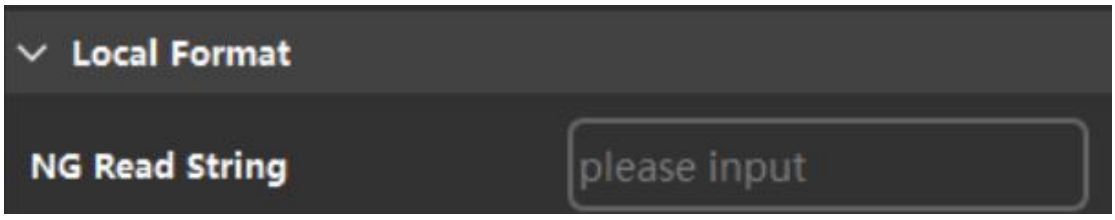
6-2 Local Format

All configuration parameters under this subcategory are only valid for the currently selected configuration group.

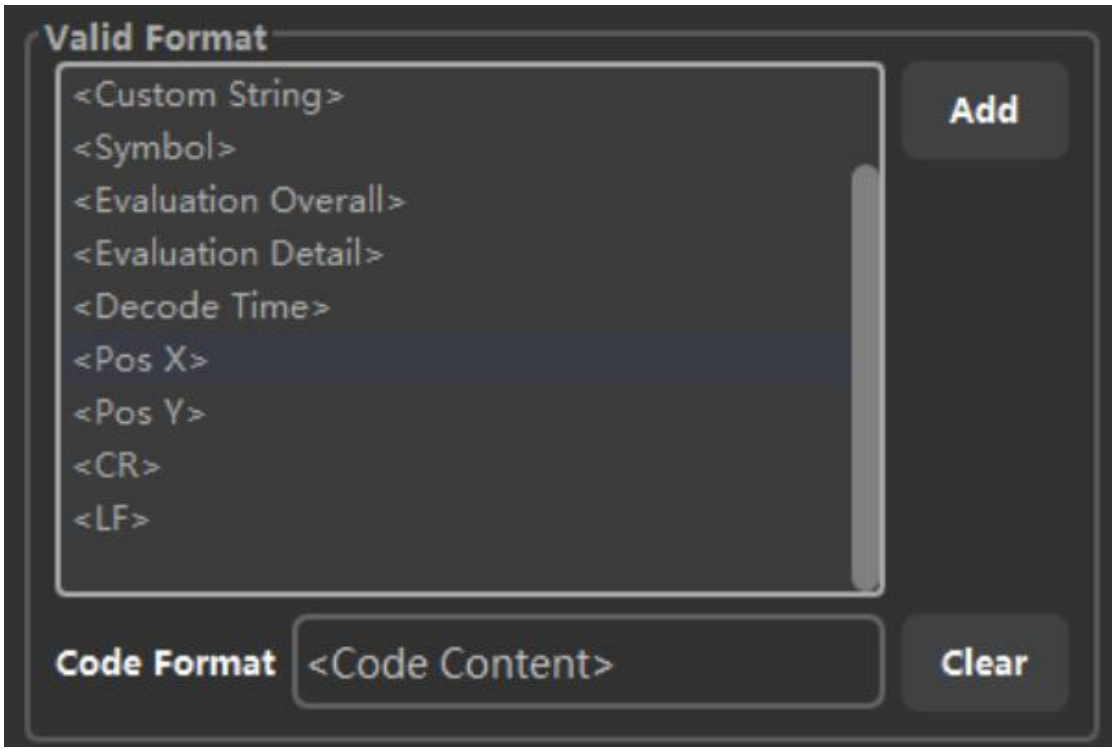
Under this navigation category, you can complete the secondary editing of the data of the current configuration group and configure the filtering of the recognized code content.

Data editing:

Read failed configuration (valid only for the current configuration group):



Valid code formats:



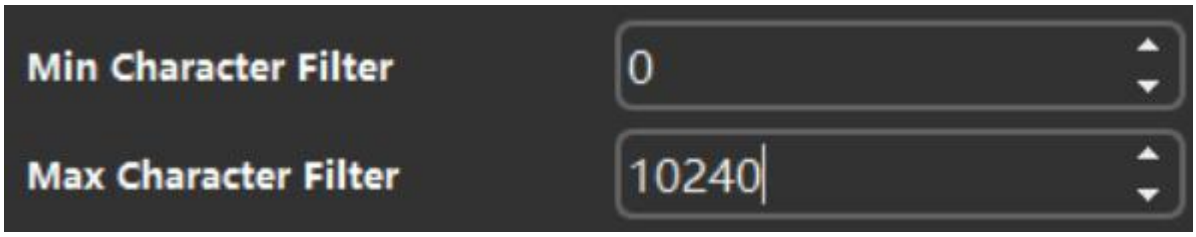
[Double-click] the format character in the format list to insert the corresponding format character into the [Code Format] cursor, or [click] to select the format character and click the [Add] button on the right.

There are 11 valid code formats available for use, as follows:

Format Characters	Interpretation
< Code Content >	Decoding result original string
< Sub String >	Decoding result substring
< Custom String>	Custom strings
<Symbol>	Code System
Evaluation Overall	Overall results of barcode grade verification
Evaluation Detail	Detailed results of barcode level verification
<Decode Time >	Decoding time Unit: milliseconds
< Pos X>	Barcode center X coordinate Accuracy: 0.1 Pixel
<Pos Y >	Y coordinate of the barcode center Precision: 0.1 Pixel
<CR>	carriage return
<LF>	Line Break

Data filtering editor:

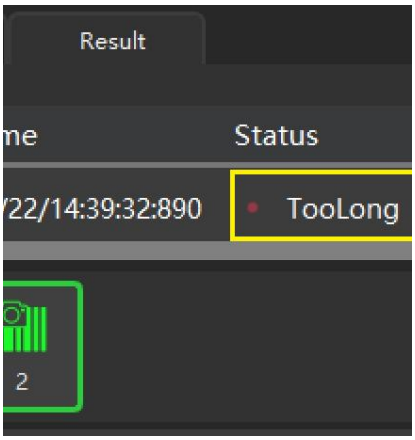
1. Length filter editing, as shown below

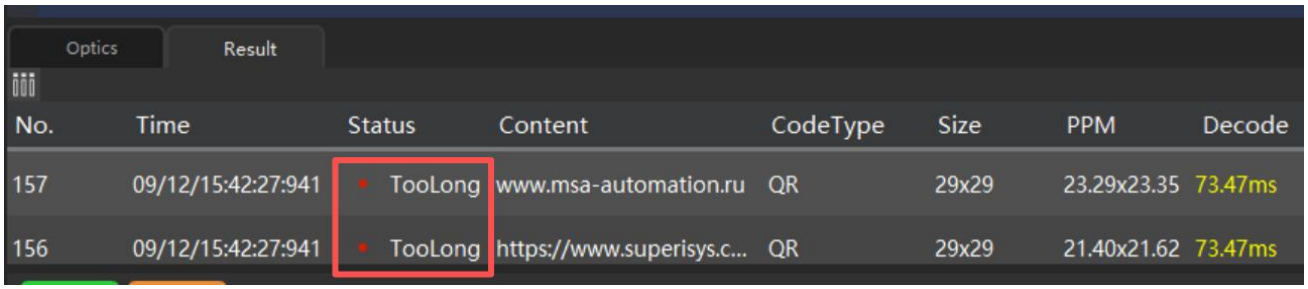


When the read result length is less than the minimum number of characters or greater than the maximum number of characters, the barcode will be filtered. The filtered barcode will be displayed in a red result box in the setting software, and the read result display area will give a corresponding prompt.

Example:

Enter "1" for the minimum number of characters and "10" for the maximum number of characters. This means that all character strings with a length of 1 to 10 characters meet the rule, and otherwise are filtered. For the target code "1648112330185117," the result indicates that it does not meet the length filtering rule. The code is filtered and marked in the reading result.





2. Anticipatory filtering:

In this subcategory, you can enter a regular expression formula. The barcode reader will output the content that meets the formula result, and those that do not meet the formula will be marked and filtered.

Illustrate

- Supports multiple regular expression combination inputs;
- The relationship between multiple regular expressions is "OR" logic, that is, as long as one regular expression is true, the filtering rule is true.
- Common regular expressions are as follows.

Example:

Enter four regular expressions in the expected filter list, namely

Regular expression symbols	Symbol meaning
*	Placeholder, representing 0~n arbitrary characters
?	Placeholder, representing 1 arbitrary character
\x	Escape character, indicating that the following content is a hexadecimal ASCII code value
[a-z]	Character range. Matches any character in the specified range. For example, "[az]" matches any lowercase alphabetic character in the range "a" to "z".
[^a-z]	Negative character range. Matches any character not in the specified range. For example, "[^az]" matches any character not in the range "a" to "z".
[a-z]+	Character range . Indicates that at least one character between [a-z] appears after it, and can appear 1 to n times (n means infinity).

Example:

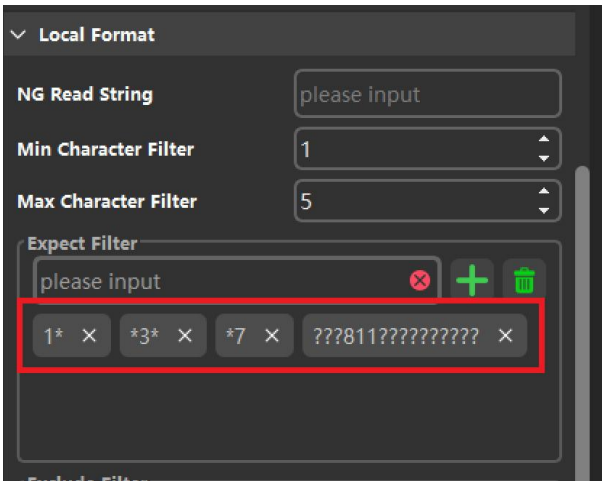
Enter four regular expressions in the expected filtering list, as follows:

1. 1*; (Represents all strings whose first character is "1")

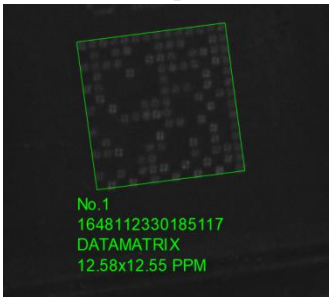
2. *3* (Represents all strings that contain the character "3")

3. *7 (Represents all strings whose last character is "7")

4. ???811?????????? (Represents all strings with a total length of 16 characters, where the fourth to sixth characters are "811")



For the target code "1648112330185117", all four regular expressions mentioned above are satisfied (as long as one is satisfied), the reading result is in line with the expected filtering result, and the content is output normally.



3. Exclusion filtering;

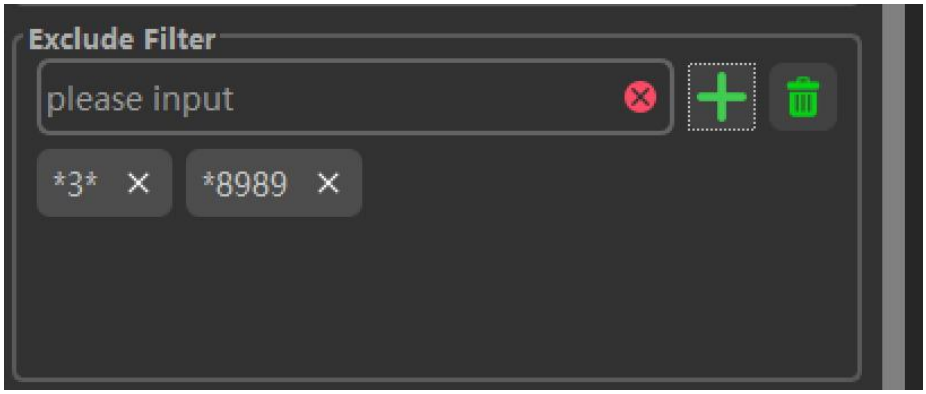
In contrast to the expected filtering, any barcode result field that meets one of the exclusion filtering formats will be filtered.

Example:

Enter two regular expressions in the exclusion filter list,

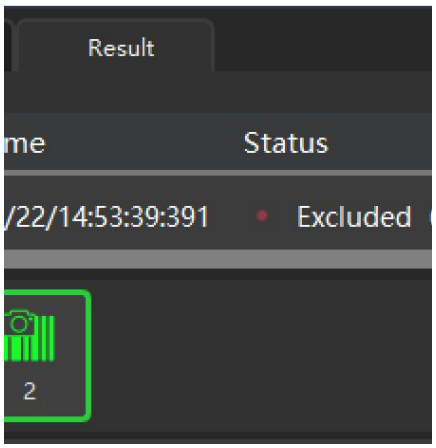
1. *3*; (represents all strings containing the character "3")

2. *8989; (represents all strings ending with "8989")



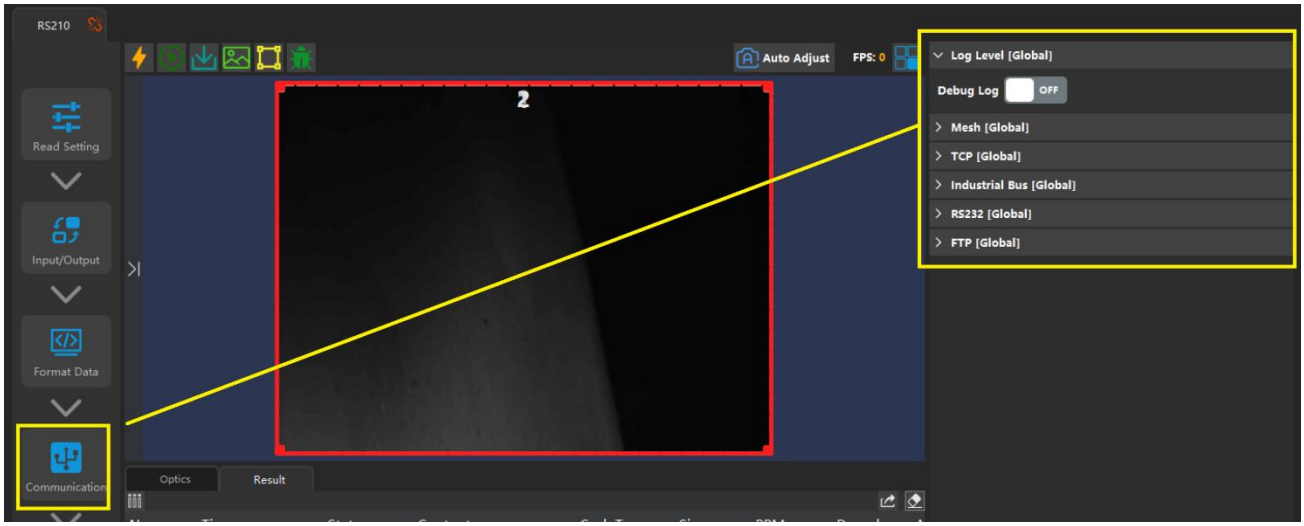
For the target code "1648112330185117", if the first of the above regular expressions is met (the second is not met), and the reading result meets the exclusion filtering result, it is considered an invalid read and the content is not output normally.





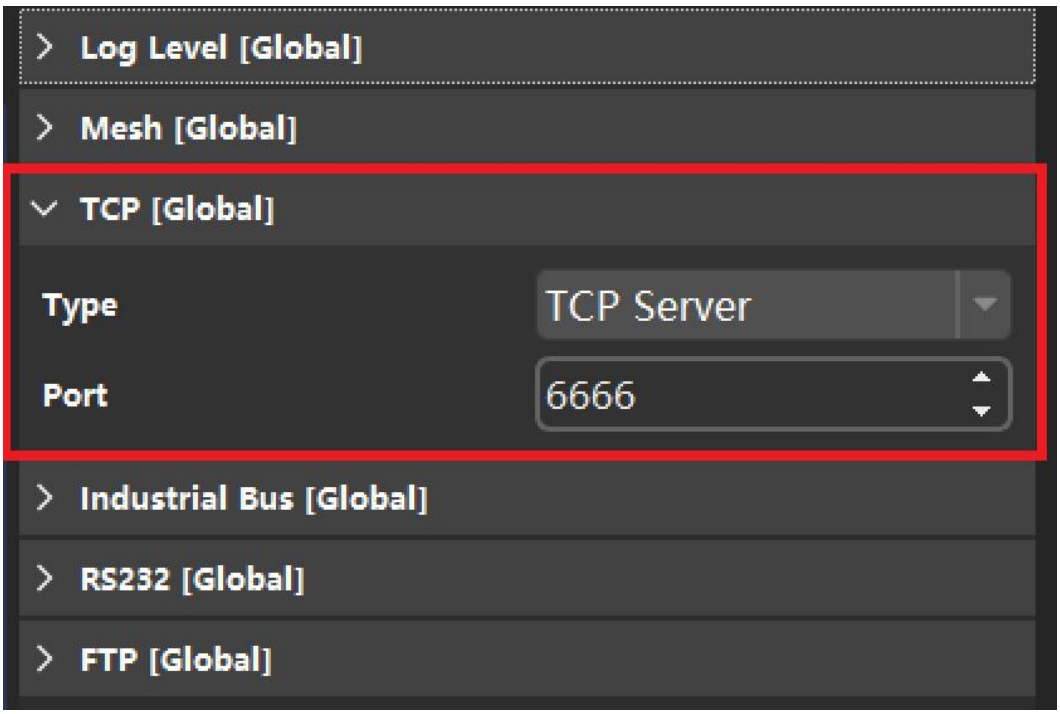
7 Communication Settings

The communication setting diagram is as follows：

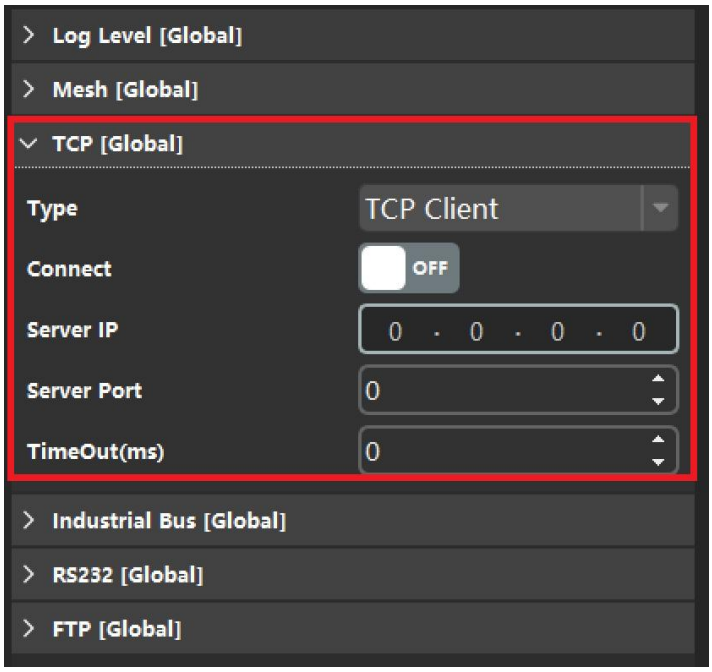


Superisys code readers include TCP (SERVER/CLIENT), fieldbus (MODBUS TCP, EIP, PN , MC), RS232, and FTP (only for image transmission).

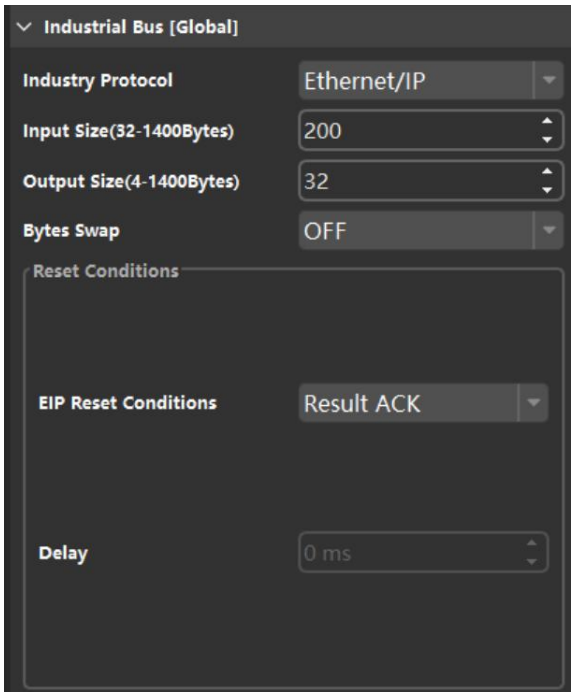
(1) **TCP Communication - TCP Server:** The configurable item is the TCP port number. The corresponding TCP client can connect to the code reader through the code reader IP address (TCP server IP address) and port number, trigger and control the code reader through the trigger command in the input/output settings, and receive data from the code reader.



(2)TCP Communication - TCP Client: Configurable items include connection on/off, server IP address, server port number, and connection timeout. The barcode reader can connect to the TCP server through these settings, trigger the reader using trigger commands in the input/output settings, and receive data from the reader.



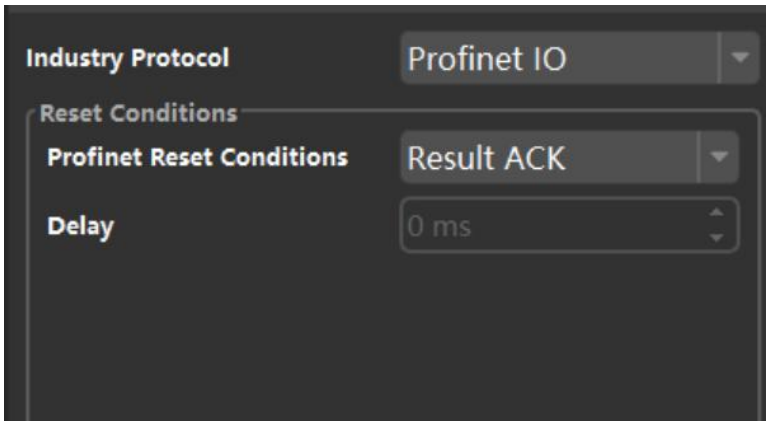
(3)Fieldbus Protocol - EIP: Configurable items include Input Size (code reader input data block size), Output Size (code reader output data block size), data byte order swap switch (code reader data can be swapped between high and low bytes in units of bytes), and reset condition selection.



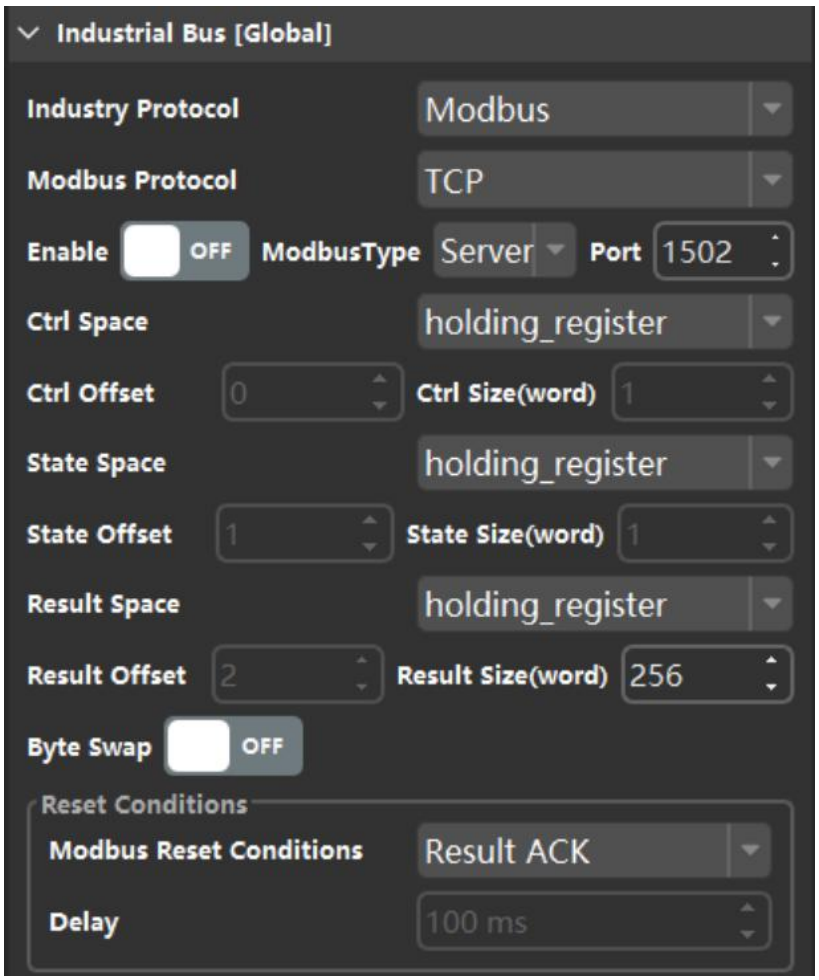
The reset condition selection has two options: Result ACK and Delay. When Result ACK is selected, the PLC program on the other end must actively send a Result ACK signal after the barcode reader completes decoding for the current beat (that is, the barcode reader pulls the Result Ready signal high). Otherwise, the barcode reader will not respond to the triggering behavior of the next beat (the barcode reader clears its state machine based on the Result ACK signal from the PLC, thus reaching the IDLE state). This ensures that the PLC can accurately and effectively capture the current decoded barcode reader's reading results and reading status information, preventing information loss due to subsequent false triggering.

When delay is selected, the barcode reader will automatically clear the status bit of the current beat according to the set delay time (unit: ms), thereby reaching the IDLE state and continuing to respond to the trigger behavior of the next beat.

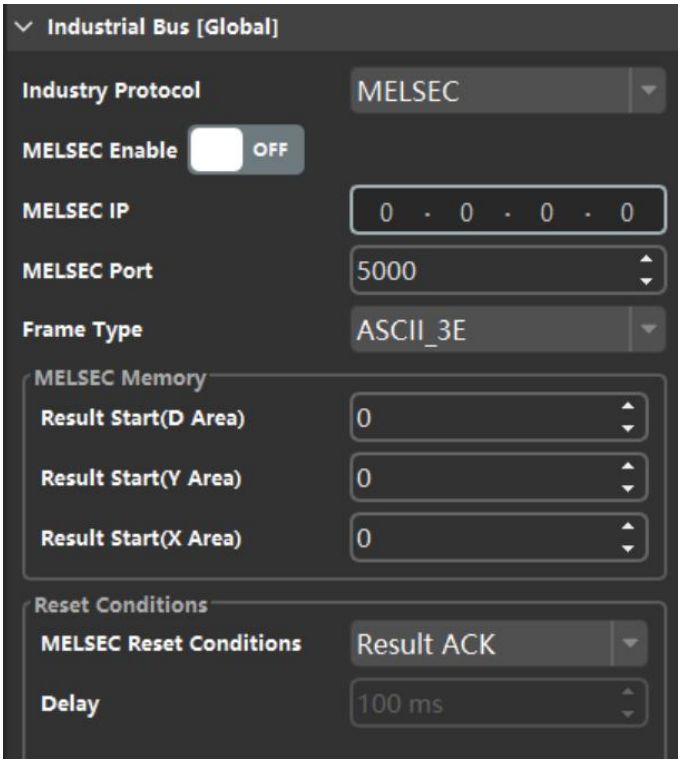
(4)Fieldbus Protocol - PN: The configurable items are Result ACK bit or delay selection. The functional logic is the same as the EIP bus.



(5)Fieldbus Protocol - MODBUS TCP: Configurable items include ModBUS enable switch, ModBUS type (server/client), port number, and byte swap button

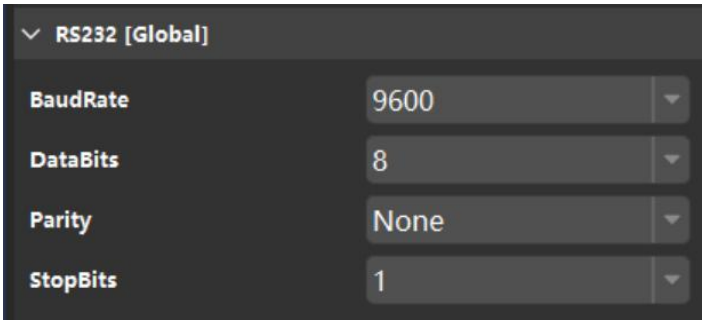

Industrial Bus [Global]
Industry Protocol
Modbus
Modbus Protocol
TCP
Enable
OFF
ModbusType
Server
Port
1502
Ctrl Space
holding_register
Ctrl Offset
0
Ctrl Size(word)
1
State Space
holding_register
State Offset
1
State Size(word)
1
Result Space
holding_register
Result Offset
2
Result Size(word)
256
Byte Swap
OFF
Reset Conditions
Modbus Reset Conditions
Result ACK
Delay
100 ms

(6)Fieldbus protocol - MELSEC: Configurable items include MELSEC protocol enable switch, MELSEC server IP, MELSEC port, MELSEC frame type , memory allocation column and reset condition .



Special note: For the detailed fieldbus configuration process on the barcode reader side, please refer to the " Superisys Barcode Reader Industrial Protocol User Manual V 2.0 .pdf", the relevant PLC model files and DEMO projects .

RS232 serial communication: Configurable items include baud rate, data bits, parity bit, and stop bit.



Baud rate support: 4800, 9600, 19200, 38400, 57600, 115200.

Data bits: 5, 6, 7, 8.

Parity: None, Odd, Even.

Stop bits: 1 , 2 .

The setting takes effect immediately after completion.

8. Run the Test

8-1 Run the test

Click 

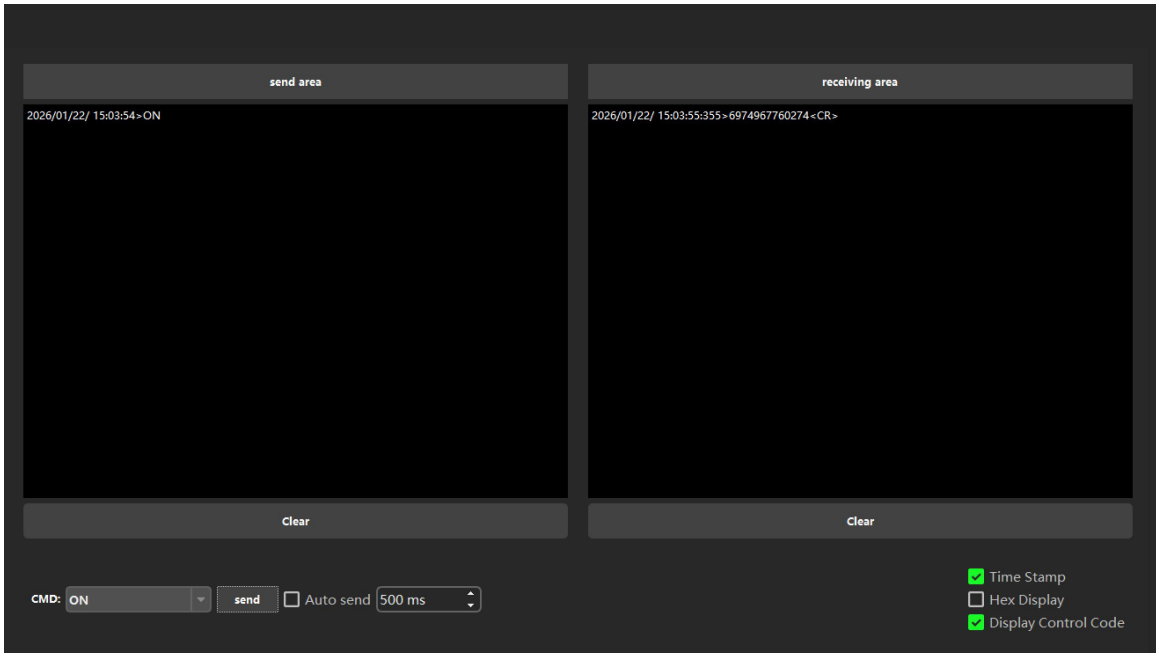
the button to enter the Run Test interface. This interface is used to preview the results under actual running status, helping to analyze whether the global format, local format, decoding logic, and output logic meet user expectations.

As described in Section 3-2, after connecting to the setup software, you can control the barcode reader's operating mode: debug mode or run mode. Only in run mode will the barcode reader decode according to preset rules, user port communication be enabled, and output be configured correctly.

The above actions will be blocked in debug mode.

When switching to the [Run Test] interface, the barcode reader will automatically switch to [Run Mode].

When leaving the [Run Test] interface, the working mode of the barcode reader depends on the button status in Section 3-2.



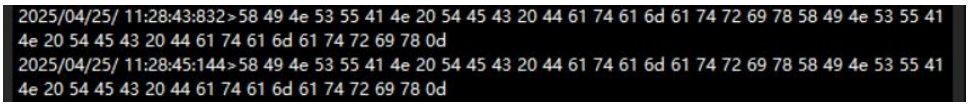
The [Command] drop-down box will automatically fill in the [Trigger Command] and [Release Command] under the current settings. Other commands can also be sent by manual input.

Click the [Send] button to simulate a user terminal, send commands to the barcode reader, and simulate operation. You can also set a scheduled sending time to perform scheduled sending.

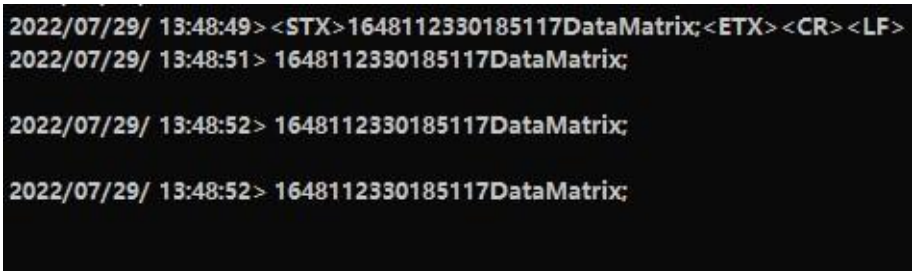
Click the [Show Timestamp] checkbox to control whether a timestamp is inserted in the result header in the terminal. The timestamp refers to the local computer time.



Click the [Hexadecimal Display] checkbox to control whether the terminal results are displayed in hexadecimal. A space will be inserted between bytes for easier observation.



The [Show Control Characters] checkbox is used to control whether to display non-printable characters in the ASCII code table, such as <STX>, <ETX>, etc.



9 Special function description

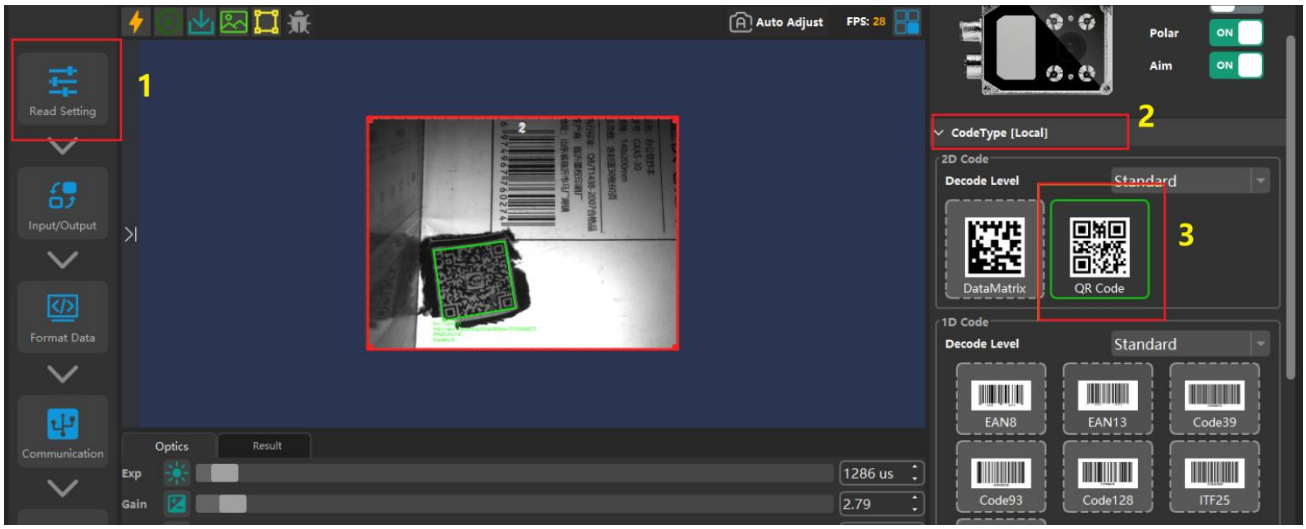
9-1 One-click debugging

One-click debugging is designed to help customers quickly complete the configuration of the optical parameters of the barcode reader and the optimization training of the barcode algorithm. However, one-click debugging does not include the following: **1. Code type and algorithm selection; 2. Focus parameter selection;**

One-key debugging usage steps:

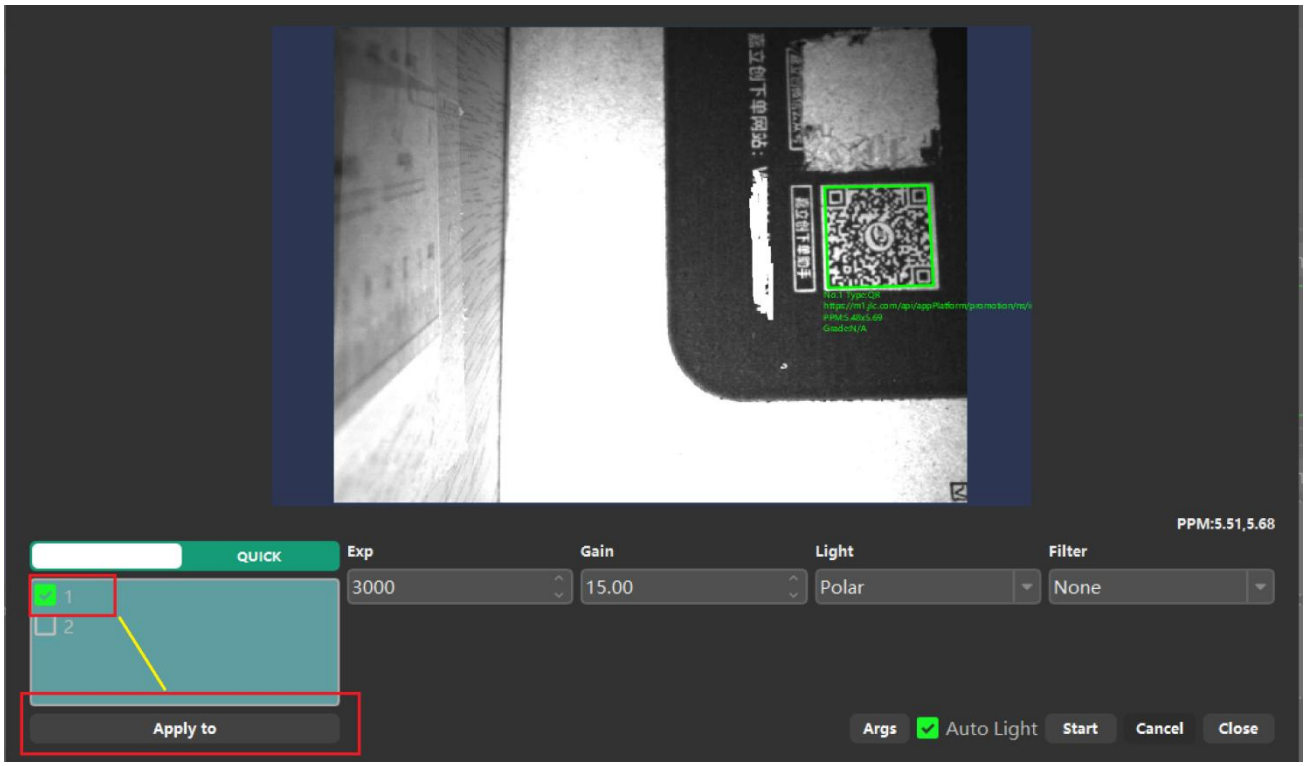
1. Complete the focus parameter debugging of the code reader;

2. Complete the code algorithm selection for the code to be read, as shown below:

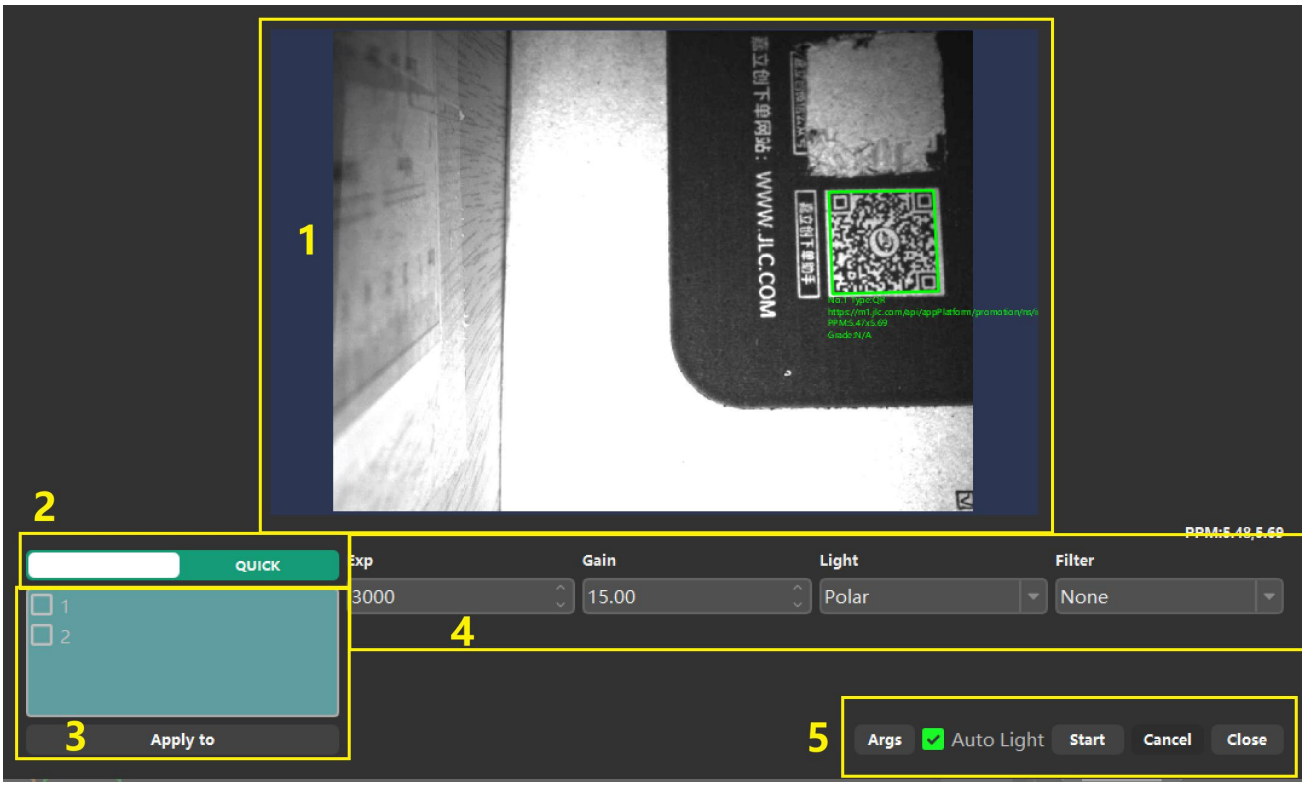


3. Choose a suitable light source (optional); there are three types of light sources: direct light, polarized light, and uniform light (not available on all models) .

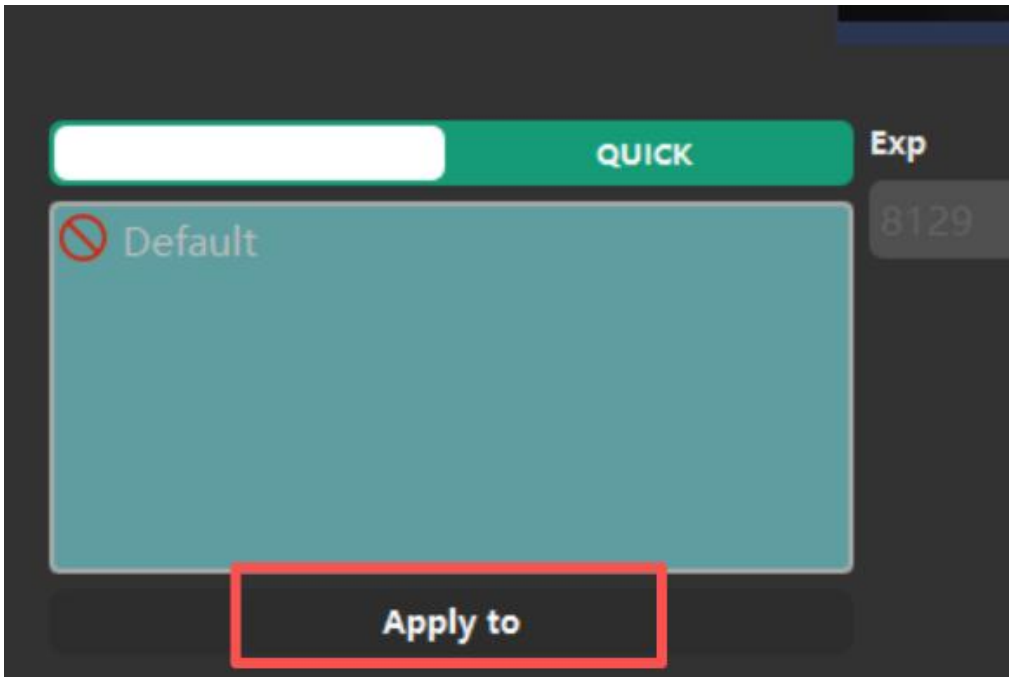
4. Zoom out the ROI and select the target code area that needs one-key debugging (recommended, not necessary). You can zoom in and out the ROI frame by clicking the edge of the red ROI frame with the left mouse button. You can also use the function keys to input the X and Y axis coordinate values of the ROI frame. Right-click the ROI frame to drag the entire ROI frame, as shown below:



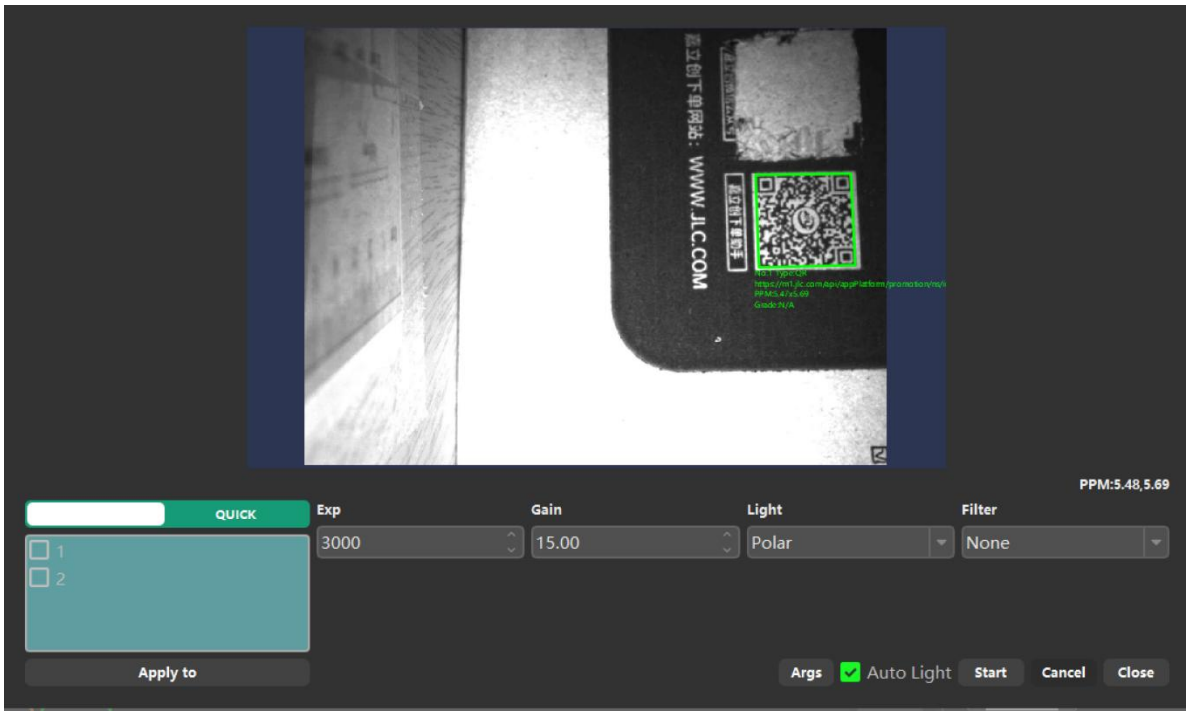
5. Click the one-key debugging function button  to enter the one-key debugging configuration window, and click the " Start " button to perform one-key debugging;



"Apply to Configuration Group".



9-1-1 Introduction to the One-key Debugging Function Window



Function	Functional Description
1	Real-time display of the one-click debugging process.
2	One-click debugging mode selection area: Use the drop-down list to select QUICK or MAX mode. QUICK mode: Optimizes efficiency and completes one-click debugging at the fastest speed. MAX mode: Optimizes performance and performs one-click debugging on the image with full algorithm performance.
3	One-key debugging result application selection, you can apply the one-key debugging result to the corresponding configuration group according to the actual situation
4	One-key debugging result display area (if you are not satisfied with the current debugging result, you can adjust the parameters)
5	Keyboard The "Adaptive Light Source" button allows one-touch debugging, including light source selection for the barcode reader, automatically cycling through suitable light source types. "Start" initiates one-touch debugging. "Cancel" terminates one-touch debugging.

9-2 Configuration Group Function

9-2-1 Configuration Group Concept

CR -RS series barcode readers support multi-functional configuration groups. Each configuration group allows for differentiated settings for camera parameters, lighting, symbology, ROI , filters, and data formatting, enabling flexible response to more complex and diverse application scenarios.

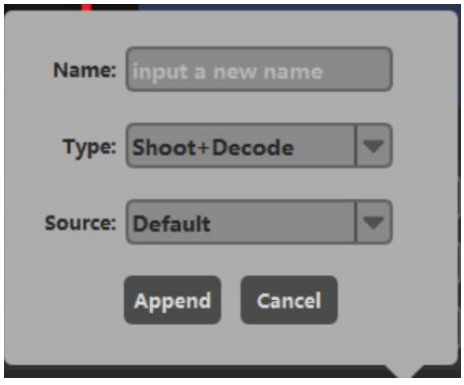
Configure group icon  Represents a [Photo + Decode] configuration group. This type of configuration group acquires and decodes images using the corresponding camera parameters and light source settings. Therefore, multiple configuration groups of this type can fully utilize different camera parameters, such as exposure and focal length, to adapt to various environmental changes.

Configure group icon  This group represents a "Decode Only" configuration group. This group allows you to configure only camera and light source parameters. The decoded image is the image in the previous "Photo + Decode" group. Therefore, this group is primarily used for differentiated settings within the same image environment, such as multi- ROI, multi-region reading, and various barcode filtering methods.

9-2-2 Add configuration group

Click on the Configuration Group function area  button.

Set the configuration group name, select the configuration group type, and select the configuration group object to be copied.



As shown in the figure below: Configuration group [1] captures the first image and has decoding capabilities; configuration group [2] captures the second image and has decoding capabilities. Configuration group [1-1] is the follower configuration group of configuration group [1], that is, it obtains the image of configuration group [1] and loads the configuration parameters of [1-1] for decoding. The same applies to configuration groups [1-2], [2-1], and [2-2].



Drag and drop the configuration group icon to adjust the image dependency between configuration groups

The following contents are supported for different configuration groups:

Functional Area	Supported configuration groups	Support differentiated parameters
camera		Exposure, gain, focus
Debug Toolbar		ROI
Light source settings [non-global]		flash
Code system and algorithm [non-global]		Code system, decoding capability, number of decodes
Filter【Non-global】		Filters, contrast enhancement
Local format		NG characters, code filtering, and valid code formats
Barcode training		Training result parameters

Special Note:

1. The order of configuration groups has nothing to do with the order of output results. The output results are based on the [Global Format] output settings.

2. Configuration groups cannot have duplicate names.

3. The first configuration group type must be a [Photo+Decoding] type configuration group.

4. The camera parameters cannot be modified directly in the [Decoding Only] configuration group. To

modify them, modify the camera and light source parameters of the most recent [Photography + Decoding] configuration group to modify the configuration indirectly.

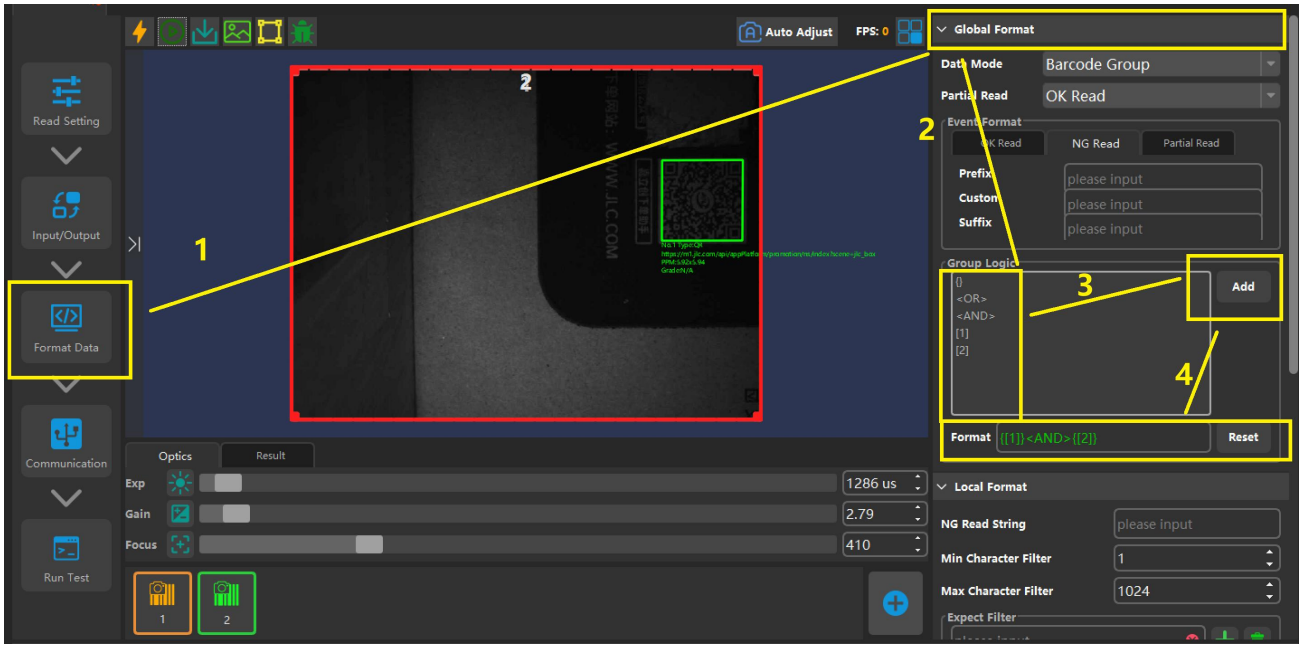
9-2-3 Logical relationship settings of configuration groups

See Section 6-1, Detailed Explanation of Combination Logic Settings in Global Formatting of Formatted Data.

9-2-4 Example

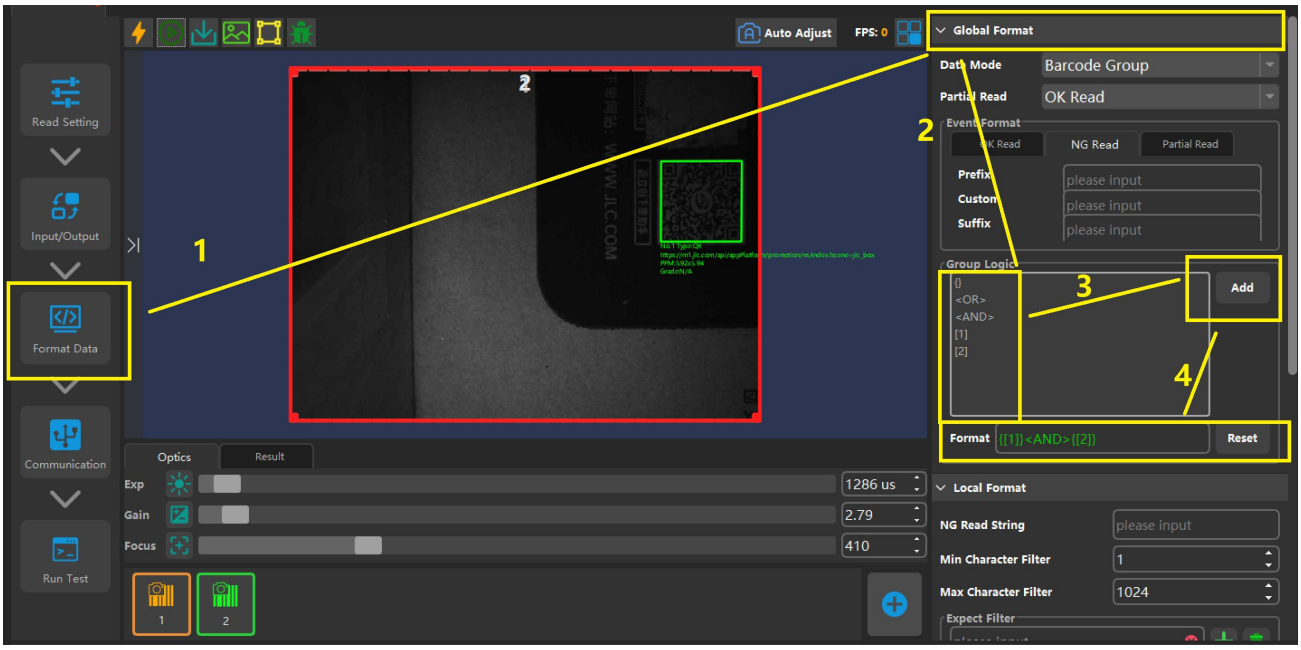
Example 1: Multiple target codes need to be decoded simultaneously.

You can use the multi-configuration group + ROI method to frame the target area to be decoded, and configure the combination logic as <AND> logic. The schematic diagram is as follows:



Example 2: Multiple target codes need to be decoded in a time-sharing manner (multiple target codes may be mixed in the same work section).

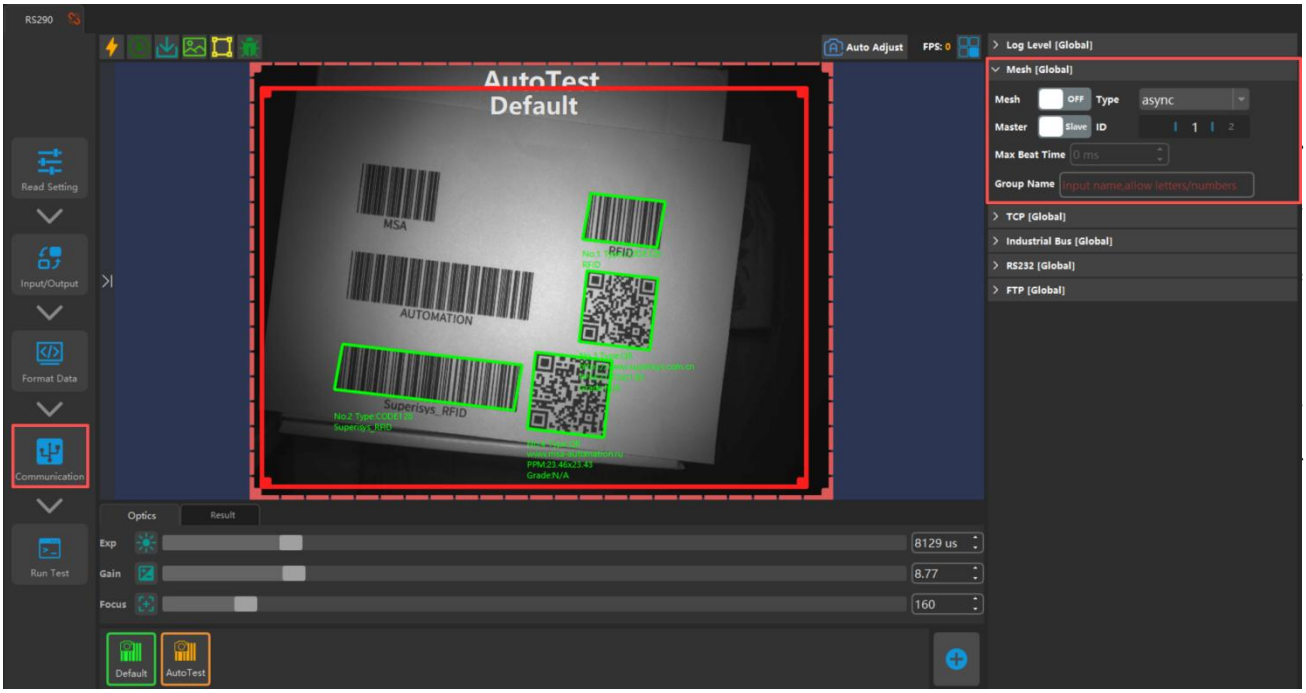
You can use multiple configuration groups to add configuration combination logic as <OR> logic. The schematic diagram is as follows:



9-3 Networking Mode

The networking mode allows multiple barcode readers to be cascaded and used, which can greatly simplify the customer program.

The network mode is set in the Settings Navigation - Communication Settings category, as shown in the figure below:



1) The networking mode supports two operating modes: **synchronous mode and asynchronous mode**.
In synchronous mode, the triggering of the master and slave devices is synchronized. For example, when the master device receives an IO trigger signal or a TCP trigger command, it will simultaneously trigger all devices in the network to perform image capture and decoding (including the master device itself), and transmit the information from all devices in the network to the client through the master port;

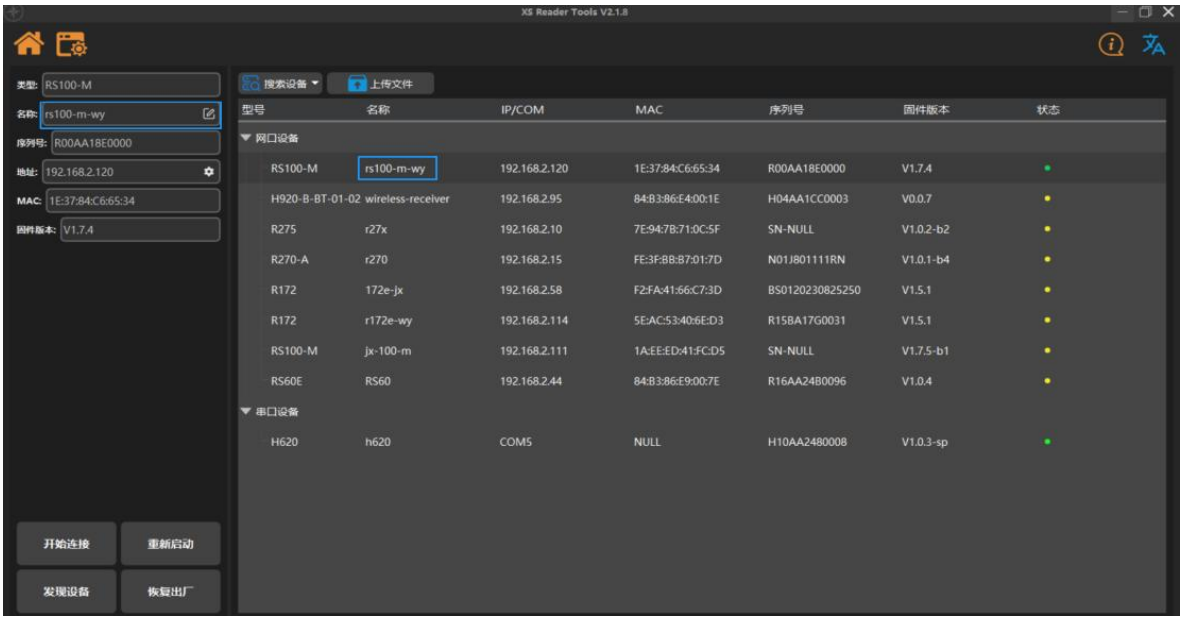
In asynchronous mode, the triggering of the master and slave devices is asynchronous. The triggering of all devices in the network is independent of each other. For example, when the master device receives an IO trigger signal or a TCP trigger command, it will only trigger its own code reading and image capture behavior; at the same time, the master device can use specific commands to specify a certain slave device to perform image capture and decoding; all data in the network is uploaded to the client through the master device.

2) **Network deduplication:** When multiple barcode scanning devices work together, the same barcode may be scanned repeatedly by multiple devices. The network deduplication function can automatically filter out these duplicate results, ensuring that each code is output only once.

9-3-1 Networking Mode Setting Steps

Step 1: Environmental Preparation

Find the target device for networking in the list here;



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illustrate

- You can refer to the design in the figure to customize the name of the target device for easy subsequent identification;

Step 2: Slave configuration

It is assumed here that the barcode reader has completed basic dimming configuration and can read codes stably.

1) Select the "Networking Settings" column in "Communication Settings" to open the configuration drop-down list;

2) Working mode setting: select the networking working mode, the example is "synchronous mode";

3) Working status setting: select the working status of the current device as "slave";

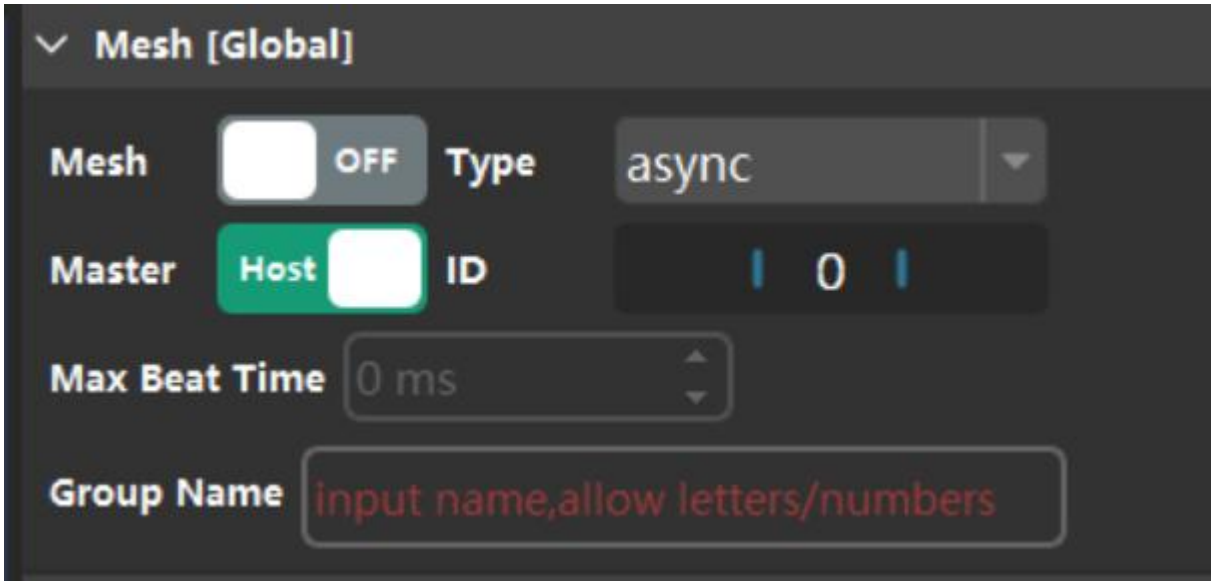
4) Device ID setting: Select the current device ID, which can be 1 to 9; (a total of 10 slaves are supported in one network) (Note that the slave ID number must be manually selected, otherwise it will default to 0. The device with ID 0 can only be the master device);

5) Network group name setting: Set the network group name to which the current device belongs; (Note that the group name must be set, and the master station and the slave station must be set to the same name)

6) Turn on the networking function of the device;

Step 3: Master Station Configuration

It is assumed here that the barcode reader has completed basic dimming configuration and can read codes stably.



1) Select the "Networking Settings" column in "Communication Settings" to open the configuration drop-down list;

2) **Working mode setting:** select the networking working mode, the example is "synchronous mode";

3) **Working status setting:** select the working status of the current device as "Master";

4) The device ID of the master station cannot be set and must be ID0;

5) Network group name setting: Set the network group name to which the current device belongs; (Note that the group name must be set, and the master station and the slave station must be set to the same name)

6) Turn on the networking function of the device;

10 Firmware Upgrade

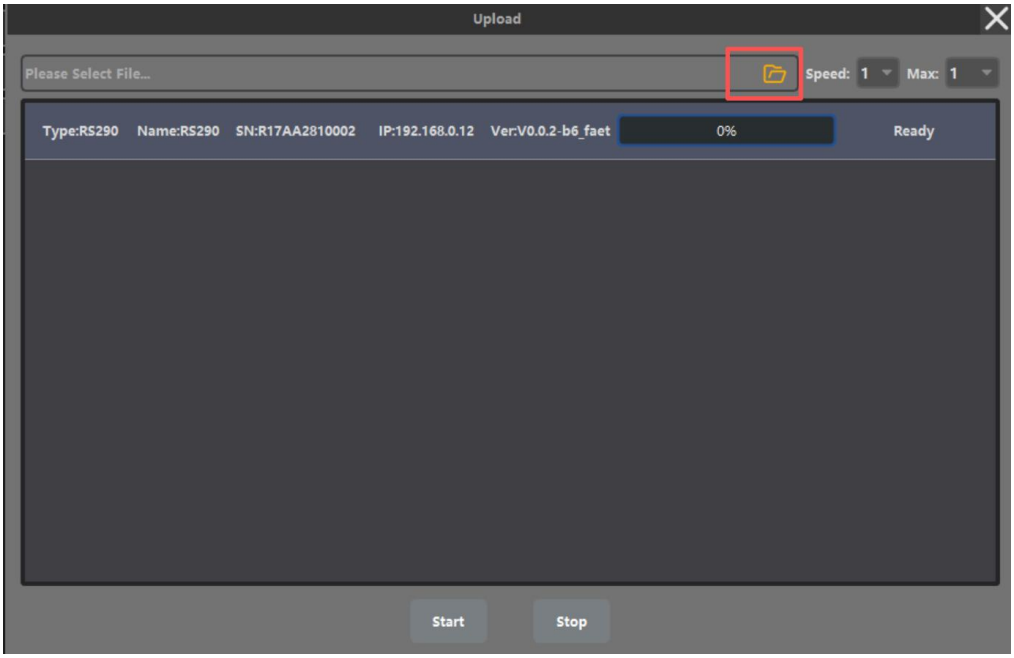
(1)【Click】 button to jump to the device list interface.

(2) [Click] to select the device you want to upgrade or hold down the [Ctrl] key to select multiple devices.



(3) [Click the] [Firmware Upgrade] button to enter the firmware upgrade interface.

Open the file manager and load the firmware of the corresponding device model.



[Click] [Start Upgrade] button to upgrade the firmware. When the upgrade progress reaches 100%, [click] [Close] button.

The software will automatically search for the device again.

Illustrate

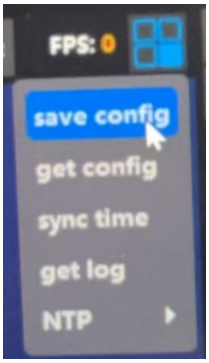
- If the code reader to be upgraded is currently connected, please disconnect it before performing the firmware upgrade.
- If you want to upgrade a file with the suffix IMG, you need to restart and select recover in the main interface.

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11 Configuration Export and Import

11-1 Configuration save

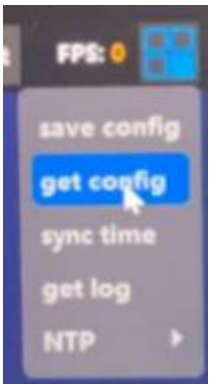
When the reader is set up, [click] the [Toolbar] button, find [Save Configuration], and [click] to write the configuration parameters into the internal memory of the reader. After disconnecting the debugger, the reader will run according to the configuration parameters. If the configuration parameters are not saved and disconnected, the reader will return to the most recently saved state.



11-2 Configuration Export

When multiple barcode readers need to use the same configuration, the configuration file of the completed barcode reader can be exported and downloaded to other barcode readers.

[Click] [Get Configuration] button, the software will pop up the file manager dialog box, select the system path to save the configuration file, the configuration file will be saved in the format with the suffix ".xscfg", click [OK] to complete the export.



Note: The export of the configuration file needs to be completed in the debugging interface.

11-3 Configuration Import

In the device list on the Reader Tools main interface, select the target device to which you want to import the configuration, click the Upload Configuration File function button at the top, select the configuration file to be imported, and confirm. This completes the configuration file import process. The diagram is as follows:

